PS 111 GENERAL PSYCHOLOGY SMWC



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Introduction to Psychology Textbook SMWC

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Licensing

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CHAPTER OVERVIEW

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SECTION OVERVIEW

1.1: Introducing and Defining Psychology

Welcome to your psychology class! **Psychology** is defined as *the science of behavior and mental processes*. Further breaking that definition down, **behavior** is *anything a person or animal does that can be observed and recorded*. Examples of behavior include talking to a roommate, smiling at a friend, walking across a street, clicking on a multiple choice option during a quiz, and barking at another dog. **Mental processes** are *the internal and subjective experiences of a person or animal*. Examples of mental processes include thinking about what you will have for dinner tonight, feeling angry, and having a dream about missing a final exam.

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1.2: Why Psychology Relies on Empirical Methods Rather Than Intuition

Learning Objectives

1. Explain why using our intuition about everyday behavior is insufficient for a complete understanding of the causes of behavior.

Despite the differences in their interests, areas of study, and approaches, all psychologists have one thing in common: They rely on scientific methods. *Research psychologists* use scientific methods to create new knowledge about the causes of behavior, whereas *psychologist-practitioners*, such as clinical, counseling, industrial-organizational, and school psychologists, use existing research to enhance the everyday life of others. The science of psychology is important for both researchers and practitioners.

In a sense all humans are scientists. We all have an interest in asking and answering questions about our world. We want to know why things happen, when and if they are likely to happen again, and how to reproduce or change them. Such knowledge enables us to predict our own behavior and that of others. We may even collect *data* (i.e., *any information collected through formal observation or measurement*) to aid us in this undertaking. It has been argued that people are "everyday scientists" who conduct research projects to answer questions about behavior (Nisbett & Ross, 1980). When we perform poorly on an important test, we try to understand what caused our failure to remember or understand the material and what might help us do better the next time. When our good friends Monisha and Charlie break up, despite the fact that they appeared to have a relationship made in heaven, we try to determine what happened. When we contemplate the rise of terrorist acts around the world, we try to investigate the causes of this problem by looking at the terrorists themselves, the situation around them, and others' responses to them.

The Problem of Intuition

The results of these "everyday" research projects can teach us many principles of human behavior. We learn through experience that if we give someone bad news, he or she may blame us even though the news was not our fault. We learn that people may become depressed after they fail at an important task. We see that aggressive behavior occurs frequently in our society, and we develop theories to explain why this is so. These insights are part of everyday social life. In fact, much research in psychology involves the scientific study of everyday behavior (Heider, 1958; Kelley, 1967).

The problem, however, with the way people collect and interpret data in their everyday lives is that they are not always particularly thorough. Often, when one explanation for an event seems "right," we adopt that explanation as the truth even when other explanations are possible and potentially more accurate. For example, eyewitnesses to violent crimes are often extremely confident in their identifications of the perpetrators of these crimes. But research finds that eyewitnesses are no less confident in their identifications when they are incorrect than when they are correct (Cutler & Wells, 2009; Wells & Hasel, 2008). People may also become convinced of the existence of extrasensory perception (ESP), or the predictive value of astrology, when there is no evidence for either (Gilovich, 1993). Furthermore, psychologists have also found that there are a variety of cognitive and motivational biases that frequently influence our perceptions and lead us to draw erroneous conclusions (Fiske & Taylor, 2007; Hsee & Hastie, 2006). In summary, accepting explanations for events without testing them thoroughly may lead us to think that we know the causes of things when we really do not.

Research Focus: Unconscious Preferences for the Letters of Our Own Name

A study reported in the *Journal of Consumer Research* (Brendl, Chattopadhyay, Pelham, & Carvallo, 2005) demonstrates the extent to which people can be unaware of the causes of their own behavior. The research demonstrated that, at least under certain conditions (and although they do not know it), people frequently prefer brand names that contain the letters of their own name to brand names that do not contain the letters of their own name.

The research participants were recruited in pairs and were told that the research was a taste test of different types of tea. For each pair of participants, the experimenter created two teas and named them by adding the word stem "oki" to the first three letters of each participant's first name. For example, for Jonathan and Elisabeth, the names of the teas would have been Jonoki and Elioki.

The participants were then shown 20 packets of tea that were supposedly being tested. Eighteen packets were labeled with made-up Japanese names (e.g., “Mataku” or “Somuta”), and two were labeled with the brand names constructed from the participants’ names. The experimenter explained that each participant would taste only two teas and would be allowed to choose one packet of these two to take home.

One of the two participants was asked to draw slips of paper to select the two brands that would be tasted at this session. However, the drawing was rigged so that the two brands containing the participants’ name stems were always chosen for tasting. Then, while the teas were being brewed, the participants completed a task designed to heighten their needs for self-esteem, and that was expected to increase their desire to choose a brand that had the letters of their own name. Specifically, the participants all wrote about an aspect of themselves that they would like to change.

After the teas were ready, the participants tasted them and then chose to take a packet of one of the teas home with them. After they made their choice, the participants were asked why they chose the tea they had chosen, and then the true purpose of the study was explained to them.

The results of this study found that participants chose the tea that included the first three letters of their own name significantly more frequently (64% of the time) than they chose the tea that included the first three letters of their partner’s name (only 36% of the time). Furthermore, the decisions were made unconsciously; the participants did not know why they chose the tea they chose. When they were asked, more than 90% of the participants thought that they had chosen on the basis of taste, whereas only 5% of them mentioned the real cause—that the brand name contained the letters of their name.

Once we learn about the outcome of a given event (e.g., when we read about the results of a research project), we frequently believe that we would have been able to predict the outcome ahead of time. The problem is that just reading a description of research findings leads us to think of the many cases we know that support the findings, and thus makes them seem believable. For example, if your psychology professor told you that researchers have found that asking a person for a favor tends to make the person like the favor-asker less, you may be likely to say “of course it does – I could have predicted that!” However, in fact, researchers have found that asking a person for a favor tends to make the person like the favor-asker *more* (Schopler & Compere, 1971). The tendency to think that we could have predicted something that has already occurred that we probably would not have been able to predict is called **the hindsight bias**, and it one of the reasons that psychologist prefer to rely on empirical methods rather than on intuition or "common sense".

Why Psychologists Rely on Empirical Methods

All scientists, whether they are physicists, chemists, biologists, sociologists, or psychologists, use *empirical methods* to study the topics that interest them. Empirical methods include the processes of collecting and organizing data and drawing conclusions about those data. The empirical methods used by scientists have developed over many years and provide a basis for collecting, analyzing, and interpreting data within a common framework in which information can be shared. We can label the *scientific method* as *the set of assumptions, rules, and procedures that scientists use to conduct empirical research*.



Figure 1.2.2: Psychologists use a variety of techniques to measure and understand human behavior. Tim Sheerman-Chase – “Volunteer Duty” Psychology Testing – CC BY 2.0. CAFNR – CC BY-NC 2.0

Key Takeaways

- Psychology is the scientific study of mind and behavior.
- Though it is easy to think that everyday situations have commonsense answers, scientific studies have found that people are not always as good at predicting outcomes as they think they are.
- The hindsight bias leads us to think that we could have predicted events that we actually could not have predicted.
- People are frequently unaware of the causes of their own behaviors.

- Psychologists use the scientific method to collect, analyze, and interpret evidence.
- Employing the scientific method allows the scientist to collect empirical data objectively, which adds to the accumulation of scientific knowledge.

Exercises and Critical Thinking

1. Can you think of a time when you used your intuition to analyze an outcome, only to be surprised later to find that your explanation was completely incorrect? Did this surprise help you understand how intuition may sometimes lead us astray?
2. Describe the scientific method in a way that someone who knows nothing about science could understand it.

References

Brendl, C. M., Chattopadhyay, A., Pelham, B. W., & Carvallo, M. (2005). Name letter branding: Valence transfers when product specific needs are active. *Journal of Consumer Research*, *32*(3), 405–415.

Cacioppo, J. T., Berntson, G. G., Sheridan, J. F., & McClintock, M. K. (2000). Multilevel integrative analyses of human behavior: Social neuroscience and the complementing nature of social and biological approaches. *Psychological Bulletin*, *126*(6), 829–843.

Chen, P.-Y., Wang, S.-C., Poland, R. E., & Lin, K.-M. (2009). Biological variations in depression and anxiety between East and West. *CNS Neuroscience & Therapeutics*, *15*(3), 283–294.

Cutler, B. L., & Wells, G. L. (2009). Expert testimony regarding eyewitness identification. In J. L. Skeem, S. O. Lilienfeld, & K. S. Douglas (Eds.), *Psychological science in the courtroom: Consensus and controversy* (pp. 100–123). New York, NY: Guilford Press.

Fiske, S. T., & Taylor, S. E. (2007). *Social cognition: From brains to culture*. New York, NY: McGraw-Hill.

Gilovich, T. (1993). *How we know what isn't so: The fallibility of human reason in everyday life*. New York, NY: Free Press.

Heider, F. (1958). *The psychology of interpersonal relations*. Hillsdale, NJ: Erlbaum.

Hsee, C. K., & Hastie, R. (2006). Decision and experience: Why don't we choose what makes us happy? *Trends in Cognitive Sciences*, *10*(1), 31–37.

Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), *Nebraska symposium on motivation* (Vol. 15, pp. 192–240). Lincoln: University of Nebraska Press.

Nisbett, R. E., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice Hall.

Seedat, S., Scott, K. M., Angermeyer, M. C., Berglund, P., Bromet, E. J., Brugha, T. S.,…Kessler, R. C. (2009). Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. *Archives of General Psychiatry*, *66*(7), 785–795.

Schopler, J., & Compere, J. S. (1971). Effects of being kind or harsh to another on liking. *Journal of Personality and Social Psychology*, *20*(2), 155–159.

Wells, G. L., & Hasel, L. E. (2008). Eyewitness identification: Issues in common knowledge and generalization. In E. Borgida & S. T. Fiske (Eds.), *Beyond common sense: Psychological science in the courtroom* (pp. 159–176). Malden, NJ: Blackwell.

Williams, N., Simpson, A. N., Simpson, K., & Nahas, Z. (2009). Relapse rates with long-term antidepressant drug therapy: A meta-analysis. *Human Psychopharmacology: Clinical and Experimental*, *24*(5), 401–408.

Wilson, E. O. (1998). *Consilience: The unity of knowledge*. New York, NY: Vintage Books

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1.3: The Scientific Method in Psychology

Learning Objectives

- Explain how the process of scientific research addresses questions about behavior

Scientific research is a critical tool for successfully navigating our complex world. Without it, we would be forced to rely solely on intuition, other people's authority, and blind luck. While many of us feel confident in our abilities to decipher and interact with the world around us, history is filled with examples of how very wrong we can be when we fail to recognize the need for evidence in supporting claims. At various times in history, we would have been certain that the sun revolved around a flat earth, that the earth's continents did not move, and that mental illness was caused by possession. It is through systematic scientific research that we divest ourselves of our preconceived notions and superstitions and gain an objective understanding of ourselves and our world.



Figure **1.3.1**: Some of our ancestors, across the world and over the centuries, believed that trephination—the practice of making a hole in the skull, as shown here—allowed evil spirits to leave the body, thus curing mental illness and other disorders. (credit: "taiproject"/Flickr)

The goal of all scientists is to better understand the world around them. Psychologists focus their attention on understanding behavior, as well as the cognitive (mental) and physiological (body) processes that underlie behavior. In contrast to other methods that people use to understand the behavior of others, such as intuition and personal experience, the hallmark of scientific research is that there is evidence to support a claim. Scientific knowledge is **empirical**: It is grounded in objective, tangible evidence that can be observed time and time again, regardless of who is observing.

While behavior is observable, the mind is not. If someone is crying, we can see behavior. However, the reason for the behavior is more difficult to determine. Is the person crying due to being sad, in pain, or happy? Sometimes we can learn the reason for someone's behavior by simply asking a question, like "Why are you crying?" However, there are situations in which an individual is either uncomfortable or unwilling to answer the question honestly, or is incapable of answering. For example, infants would not be able to explain why they are crying. In such circumstances, the psychologist must be creative in finding ways to better understand behavior. This chapter explores how scientific knowledge is generated, and how important that knowledge is in forming decisions in our personal lives and in the public domain.

The Process of Scientific Research

Scientific knowledge is advanced through a process known as the **scientific method**. Basically, ideas (in the form of theories and hypotheses) are tested against the real world (in the form of empirical observations), and those empirical observations lead to more ideas that are tested against the real world, and so on. In this sense, the scientific process is circular.

We've stated that theories and hypotheses are ideas, but what sort of ideas are they, exactly? A **theory** is a well-developed set of ideas that propose an explanation for observed phenomena. Theories are repeatedly checked against the world, but they tend to be too complex to be tested all at once; instead, researchers create hypotheses to test specific aspects of a theory.

A **hypothesis** is a testable prediction about how the world will behave if our idea is correct, and it is often worded as an if-then statement (e.g., if I study all night, I will get a passing grade on the test). The hypothesis is extremely important because it bridges the gap between the realm of ideas and the real world. As specific hypotheses are tested, theories are modified and refined to reflect and incorporate the result of these tests.

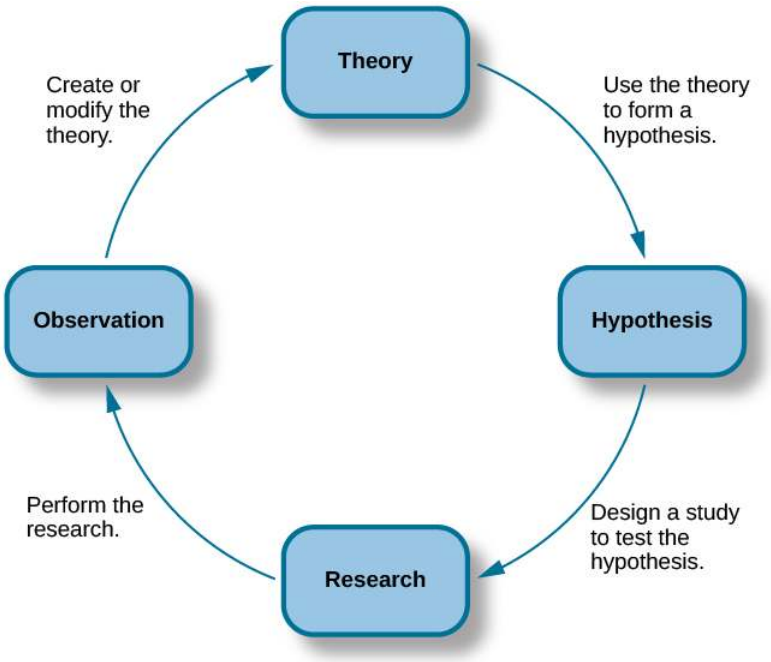
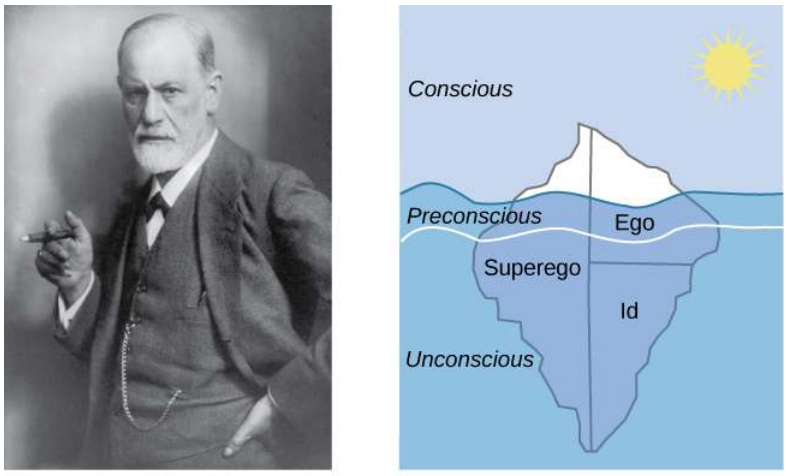


Figure **1.3.4**: The scientific method of research includes proposing hypotheses, conducting research, and creating or modifying theories based on results.

To see how this process works, let's consider a specific theory and a hypothesis that might be generated from that theory. As you'll learn in a later chapter, the James-Lange theory of emotion asserts that emotional experience relies on the physiological arousal associated with the emotional state. If you walked out of your home and discovered a very aggressive snake waiting on your doorstep, your heart would begin to race and your stomach churn. According to the James-Lange theory, these physiological changes would result in your feeling of fear. A hypothesis that could be derived from this theory might be that a person who is unaware of the physiological arousal that the sight of the snake elicits will not feel fear.

A scientific hypothesis is also **falsifiable**, or capable of being shown to be incorrect. You will learn later in this class that Sigmund **Freud** had lots of interesting ideas to explain various human behaviors. However, a major criticism of Freud's theories is that many of his ideas are not falsifiable; for example, it is impossible to imagine empirical observations that would disprove the existence of the id, the ego, and the superego—the three elements of personality described in Freud's theories. Despite this, Freud's theories are widely taught in introductory psychology texts because of their historical significance for personality psychology and psychotherapy, and these remain the root of all modern forms of therapy.



(a) (b)

Figure **1.3.5**: Many of the specifics of (a) Freud's theories, such as (b) his division of the mind into id, ego, and superego, have fallen out of favor in recent decades because they are not falsifiable. In broader strokes, his views set the stage for much of psychological thinking today, such as the unconscious nature of the majority of psychological processes.

In contrast, the James-Lange theory does generate falsifiable hypotheses, such as the one described above. Some individuals who suffer significant injuries to their spinal columns are unable to feel the bodily changes that often accompany emotional experiences. Therefore, we could test the hypothesis by determining how emotional experiences differ between individuals who have the ability to detect these changes in their physiological arousal and those who do not. In fact, this research has been conducted and while the emotional experiences of people deprived of an awareness of their physiological arousal may be less intense, they still experience emotion (Chwalisz, Diener, & Gallagher, 1988).

Two other terms are an important part of the scientific method because they are related to how psychology researcher make it possible for other researchers to validate their work: operational definition and replication.

An **operational definition** is a definition of a concept that is stated in terms of precisely how it is to be measured. Many concepts that researchers are interested in studying cannot be directly observed or measured, and this poses a problem because empiricism (observation) is at the heart of the scientific method. Operationally defining a variable involves taking an abstract concept like depression that cannot be directly observed and transforming it into something that can be directly observed and measured. Most variables can be operationally defined in many different ways. For example, depression can be operationally defined as people's scores on a paper-and-pencil depression scale such as the Beck Depression Inventory, the number of depressive symptoms they are experiencing, or whether they have been diagnosed with major depressive disorder. Researchers are wise to choose an operational definition that has been used extensively in the research literature.

Replication happens when researchers repeat, add to, or modify—previous research findings. The scientific method therefore results in an accumulation of scientific knowledge through the reporting of research and the addition to and modifications of these reported findings by other scientists.

Scientific research's dependence on falsifiability and replication allows for great confidence in the information that it produces. Typically, by the time information is accepted by the scientific community, it has been tested repeatedly.

Within the framework of the scientific method, research psychologists use many different research methods. We will be discussing 3 categories of research methods in more detail in the next two sections of this book. Specifically, we will cover descriptive methods, the correlational method, and the experimental method.

Summary

Scientists are engaged in explaining and understanding how the world around them works, and they are able to do so by coming up with theories that generate hypotheses that are testable and falsifiable. Theories that stand up to their tests are retained and refined, while those that do not are discarded or modified.

Glossary

empirical

grounded in objective, tangible evidence that can be observed time and time again, regardless of who is observing

falsifiable

able to be disproven by experimental results

hypothesis

(plural: hypotheses) tentative and testable statement about the relationship between two or more variables

theory

well-developed set of ideas that propose an explanation for observed phenomena

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1.4: Descriptive Methods

Learning Objectives

- Describe the different descriptive research methods used by psychologists
- Discuss the strengths and weaknesses of case studies, naturalistic observation, surveys, and archival research

There are many research methods available to psychologists in their efforts to understand, describe, and explain behavior. The methods discussed in this section are descriptive research methods. As the name implies, these methods attempt only to describe behavior. Not matter how interesting or powerful its findings are, descriptive research cannot explain the cause of the behavior it is describing. Only one method can do that, and we'll discuss it later.

Each of these descriptive research methods has unique strengths and weaknesses, and each method may only be appropriate for certain types of research questions. For example, studies that rely primarily on observation produce incredible amounts of information, but the ability to apply this information to the larger population is somewhat limited because of small sample sizes. Survey research, on the other hand, allows researchers to easily collect data from relatively large samples. While this allows for results to be generalized to the larger population more easily, the information that can be collected on any given survey is somewhat limited and subject to problems associated with any type of self-reported data. Some researchers conduct archival research by using existing records. While this can be a fairly inexpensive way to collect data that can provide insight into a number of research questions, researchers using this approach have no control on how or what kind of data was collected.

Clinical or Case Studies

In 2011, the *New York Times* published a feature story on Krista and Tatiana Hogan, Canadian twin girls. These particular twins are unique because Krista and Tatiana are conjoined twins, connected at the head. There is evidence that the two girls are connected in a part of the brain called the thalamus, which is a major sensory relay center. Most incoming sensory information is sent through the thalamus before reaching higher regions of the cerebral cortex for processing.

The implications of this potential connection mean that it might be possible for one twin to experience the sensations of the other twin. For instance, if Krista is watching a particularly funny television program, Tatiana might smile or laugh even if she is not watching the program. This particular possibility has piqued the interest of many neuroscientists who seek to understand how the brain uses sensory information.

These twins represent an enormous resource in the study of the brain, and since their condition is very rare, it is likely that as long as their family agrees, scientists will follow these girls very closely throughout their lives to gain as much information as possible (Dominus, 2011).

In observational research, scientists are conducting a **clinical** or **case study** when they focus on one person or just a few individuals. Indeed, some scientists spend their entire careers studying just $10-20$ individuals. Why would they do this? Obviously, when they focus their attention on a very small number of people, they can gain a tremendous amount of insight into those cases. The richness of information that is collected in clinical or case studies is unmatched by any other single research method. This allows the researcher to have a very deep understanding of the individuals and the particular phenomenon being studied.

If clinical or case studies provide so much information, why are they not more frequent among researchers? As it turns out, the major benefit of this particular approach is also a weakness. As mentioned earlier, this approach is often used when studying individuals who are interesting to researchers because they have a rare characteristic. Therefore, the individuals who serve as the focus of case studies are not like most other people. If scientists ultimately want to explain all behavior, focusing attention on such a special group of people can make it difficult to generalize any observations to the larger population as a whole. **Generalizing** refers to the ability to apply the findings of a particular research project to larger segments of society. Again, case studies provide enormous amounts of information, but since the cases are so specific, the potential to apply what's learned to the average person may be very limited.

Naturalistic Observation

If you want to understand how behavior occurs, one of the best ways to gain information is to simply observe the behavior in its natural context. However, people might change their behavior in unexpected ways if they know they are being observed. How do researchers obtain accurate information when people tend to hide their natural behavior? As an example, imagine that your professor asks everyone in your class to raise their hand if they always wash their hands after using the restroom. Chances are that almost everyone in the classroom will raise their hand, but do you think hand washing after every trip to the restroom is really that universal?

This is very similar to the phenomenon mentioned earlier in this chapter: many individuals do not feel comfortable answering a question honestly. But if we are committed to finding out the facts about hand washing, we have other options available to us.

Suppose we send a classmate into the restroom to actually watch whether everyone washes their hands after using the restroom. Will our observer blend into the restroom environment by wearing a white lab coat, sitting with a clipboard, and staring at the sinks? We want our researcher to be inconspicuous—perhaps standing at one of the sinks pretending to put in contact lenses while secretly recording the relevant information. This type of observational study is called **naturalistic observation**: observing behavior in its natural setting. To better understand peer exclusion, Suzanne Fanger collaborated with colleagues at the University of Texas to observe the behavior of preschool children on a playground. How did the observers remain inconspicuous over the duration of the study? They equipped a few of the children with wireless microphones (which the children quickly forgot about) and observed while taking notes from a distance. Also, the children in that particular preschool (a “laboratory preschool”) were accustomed to having observers on the playground (Fanger, Frankel, & Hazen, 2012).

It is critical that the observer be as unobtrusive and as inconspicuous as possible: when people know they are being watched, they are less likely to behave naturally. If you have any doubt about this, ask yourself how your driving behavior might differ in two situations: In the first situation, you are driving down a deserted highway during the middle of the day; in the second situation, you are being followed by a police car down the same deserted highway.



Figure **1.4.1**: Seeing a police car behind you would probably affect your driving behavior. (credit: Michael Gil)

It should be pointed out that naturalistic observation is not limited to research involving humans. Indeed, some of the best-known examples of naturalistic observation involve researchers going into the field to observe various kinds of animals in their own environments. As with human studies, the researchers maintain their distance and avoid interfering with the animal subjects so as not to influence their natural behaviors. Scientists have used this technique to study social hierarchies and interactions among animals ranging from ground squirrels to gorillas. The information provided by these studies is invaluable in understanding how those animals organize socially and communicate with one another. The anthropologist Jane **Goodall**, for example, spent nearly five decades observing the behavior of chimpanzees in Africa. As an illustration of the types of concerns that a researcher might encounter in naturalistic observation, some scientists criticized Goodall for giving the chimps names instead of referring to them by numbers—using names was thought to undermine the emotional detachment required for the objectivity of the study (McKie, 2010).



(a) (b)

Figure 1.4.2: (a) Jane Goodall made a career of conducting naturalistic observations of (b) chimpanzee behavior. (credit "Jane Goodall": modification of work by Erik Hersman; "chimpanzee": modification of work by "Afrika Force"/Flickr.com)

The greatest benefit of naturalistic observation is the **validity**, or accuracy, of information collected unobtrusively in a natural setting. Having individuals behave as they normally would in a given situation means that we have a higher degree of ecological validity, or realism, than we might achieve with other research approaches. Therefore, our ability to generalize the findings of the research to real-world situations is enhanced. If done correctly, we need not worry about people or animals modifying their behavior simply because they are being observed. Sometimes, people may assume that reality programs give us a glimpse into authentic human behavior. However, the principle of inconspicuous observation is violated as reality stars are followed by camera crews and are interviewed on camera for personal confessionals. Given that environment, we must doubt how natural and realistic their behaviors are.

The major downside of naturalistic observation is that they are often difficult to set up and control. In our restroom study, what if you stood in the restroom all day prepared to record people's hand washing behavior and no one came in? Or, what if you have been closely observing a troop of gorillas for weeks only to find that they migrated to a new place while you were sleeping in your tent? The benefit of realistic data comes at a cost. As a researcher you have no control of when (or if) you have behavior to observe. In addition, this type of observational research often requires significant investments of time, money, and a good dose of luck.

Sometimes studies involve structured observation. In these cases, people are observed while engaging in set, specific tasks. An excellent example of structured observation comes from Strange Situation by Mary Ainsworth (you will read more about this in the chapter on lifespan development). The Strange Situation is a procedure used to evaluate attachment styles that exist between an infant and caregiver. In this scenario, caregivers bring their infants into a room filled with toys. The Strange Situation involves a number of phases, including a stranger coming into the room, the caregiver leaving the room, and the caregiver's return to the room. The infant's behavior is closely monitored at each phase, but it is the behavior of the infant upon being reunited with the caregiver that is most telling in terms of characterizing the infant's attachment style with the caregiver.

Another potential problem in observational research is **observer bias**. Generally, people who act as observers are closely involved in the research project and may unconsciously skew their observations to fit their research goals or expectations. To protect against this type of bias, researchers should have clear criteria established for the types of behaviors recorded and how those behaviors should be classified. In addition, researchers often compare observations of the same event by multiple observers, in order to test **inter-rater reliability**: a measure of reliability that assesses the consistency of observations by different observers.

Surveys

Often, psychologists develop surveys as a means of gathering data. **Surveys** are lists of questions to be answered by research participants, and can be delivered as paper-and-pencil questionnaires, administered electronically, or conducted verbally. Generally, the survey itself can be completed in a short time, and the ease of administering a survey makes it easy to collect data from a large number of people.

Surveys allow researchers to gather data from larger samples than may be afforded by other research methods**.** A **sample** is a subset of individuals selected from a **population**, which is the overall group of individuals that the researchers are interested in. Researchers study the sample and seek to generalize their findings to the population.

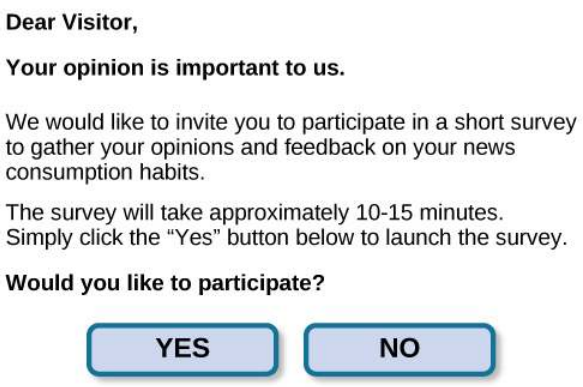


Figure 1.4.3: Surveys can be administered in a number of ways, including electronically administered research, like the survey shown here. (credit: Robert Nyman)

There is both strength and weakness of the survey in comparison to case studies. By using surveys, we can collect information from a larger sample of people. A larger sample is better able to reflect the actual diversity of the population, thus allowing better generalizability. Therefore, if our sample is sufficiently large and diverse, we can assume that the data we collect from the survey can be generalized to the larger population with more certainty than the information collected through a case study. However, given the greater number of people involved, we are not able to collect the same depth of information on each person that would be collected in a case study.

Another potential weakness of surveys is something we touched on earlier in this chapter: People don't always give accurate responses. They may lie, misremember, or answer questions in a way that they think makes them look good. For example, people may report drinking less alcohol than is actually the case.

Any number of research questions can be answered through the use of surveys. One real-world example is the research conducted by Jenkins, Ruppel, Kizer, Yehl, and Griffin (2012) about the backlash against the US Arab-American community following the terrorist attacks of September 11, 2001. Jenkins and colleagues wanted to determine to what extent these negative attitudes toward Arab-Americans still existed nearly a decade after the attacks occurred. In one study, 140 research participants filled out a survey with 10 questions, including questions asking directly about the participant's overt prejudicial attitudes toward people of various ethnicities. The survey also asked indirect questions about how likely the participant would be to interact with a person of a given ethnicity in a variety of settings (such as, "How likely do you think it is that you would introduce yourself to a person of Arab-American descent?"). The results of the research suggested that participants were unwilling to report prejudicial attitudes toward any ethnic group. However, there were significant differences between their pattern of responses to questions about social interaction with Arab-Americans compared to other ethnic groups: they indicated less willingness for social interaction with Arab-Americans compared to the other ethnic groups. This suggested that the participants harbored subtle forms of prejudice against Arab-Americans, despite their assertions that this was not the case (Jenkins et al., 2012).

Archival Research

Some researchers gain access to large amounts of data without interacting with a single research participant. Instead, they use existing records to answer various research questions. This type of research approach is known as **archival research**. Archival research relies on looking at past records or data sets to look for interesting patterns or relationships.

For example, a researcher might access the academic records of all individuals who enrolled in college within the past ten years and calculate how long it took them to complete their degrees, as well as course loads, grades, and extracurricular involvement. Archival research could provide important information about who is most likely to complete their education, and it could help identify important risk factors for struggling students.



(a) (b)

Figure 1.4.4: A researcher doing archival research examines records, whether archived as a (a) hardcopy or (b) electronically. (credit "paper files": modification of work by "Newtown graffiti"/Flickr; "computer": modification of work by INPIVIC Family/Flickr)

In comparing archival research to other research methods, there are several important distinctions. For one, the researcher employing archival research never directly interacts with research participants. Therefore, the investment of time and money to collect data is considerably less with archival research. Additionally, researchers have no control over what information was originally collected. Therefore, research questions have to be tailored so they can be answered within the structure of the existing data sets. There is also no guarantee of consistency between the records from one source to another, which might make comparing and contrasting different data sets problematic.

Summary

The clinical or case study involves studying just a few individuals for an extended period of time. While this approach provides an incredible depth of information, the ability to generalize these observations to the larger population is problematic. Naturalistic observation involves observing behavior in a natural setting and allows for the collection of valid, true-to-life information from realistic situations. However, naturalistic observation does not allow for much control and often requires quite a bit of time and money to perform. Researchers strive to ensure that their tools for collecting data are both reliable (consistent and replicable) and valid (accurate).

Surveys can be administered in a number of ways and make it possible to collect large amounts of data quickly. However, the depth of information that can be collected through surveys is somewhat limited compared to a clinical or case study.

Archival research involves studying existing data sets to answer research questions.

Glossary

archival research

method of research using past records or data sets to answer various research questions, or to search for interesting patterns or relationships

attrition

reduction in number of research participants as some drop out of the study over time

clinical or case study

observational research study focusing on one or a few people

generalize

inferring that the results for a sample apply to the larger population

inter-rater reliability

measure of agreement among observers on how they record and classify a particular event

naturalistic observation

observation of behavior in its natural setting

observer bias

when observations may be skewed to align with observer expectations

population

overall group of individuals that the researchers are interested in

sample

subset of individuals selected from the larger population

survey

list of questions to be answered by research participants—given as paper-and-pencil questionnaires, administered electronically, or conducted verbally—allowing researchers to collect data from a large number of people

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1.5: Correlational and Experimental Methods

Learning Objectives

- Explain what a correlation coefficient tells us about the relationship between variables
- Recognize that correlation does not indicate a cause-and-effect relationship between variables
- Discuss our tendency to look for relationships between variables that do not really exist
- Explain random sampling and assignment of participants into experimental and control groups
- Discuss how experimenter or participant bias could affect the results of an experiment
- Identify independent and dependent variables

Did you know that as sales in ice cream increase, so does the overall rate of crime? Is it possible that indulging in your favorite flavor of ice cream could send you on a crime spree? Or, after committing crime do you think you might decide to treat yourself to a cone? There is no question that a relationship exists between ice cream and crime (e.g., Harper, 2013), but it would be pretty foolish to decide that one thing actually caused the other to occur.

It is much more likely that both ice cream sales and crime rates are related to the temperature outside. When the temperature is warm, there are lots of people out of their houses, interacting with each other, getting annoyed with one another, and sometimes committing crimes. Also, when it is warm outside, we are more likely to seek a cool treat like ice cream. How do we determine if there is indeed a relationship between two things? And when there is a relationship, how can we discern whether it is attributable to coincidence or causation?

Correlational Research

Correlation means that there is a relationship between two or more variables (such as ice cream consumption and crime), but this relationship does not necessarily imply cause and effect. When two variables are correlated, it simply means that as one variable changes, so does the other. We can measure correlation by calculating a statistic known as a correlation coefficient. A correlation coefficient is a number from -1 to $+1$ that indicates the strength and direction of the relationship between variables. The correlation coefficient is usually represented by the letter *r*.

The number portion of the correlation coefficient indicates the strength of the relationship. The closer the number is to 1 (be it negative or positive), the more strongly related the variables are, and the more predictable changes in one variable will be as the other variable changes. The closer the number is to zero, the weaker the relationship, and the less predictable the relationships between the variables becomes. For instance, a correlation coefficient of 0.9 indicates a far stronger relationship than a correlation coefficient of 0.3. If the variables are not related to one another at all, the correlation coefficient is 0. The example above about ice cream and crime is an example of two variables that we might expect to have no relationship to each other.

The sign—positive or negative—of the correlation coefficient indicates the direction of the relationship. A **positive correlation** means that the variables move in the same direction. Put another way, it means that as one variable increases so does the other, and conversely, when one variable decreases so does the other. A **negative correlation** means that the variables move in opposite directions. If two variables are negatively correlated, a decrease in one variable is associated with an increase in the other and vice versa.

The example of ice cream and crime rates is a positive correlation because both variables increase when temperatures are warmer. Other examples of positive correlations are the relationship between an individual's height and weight or the relationship between a person's age and number of wrinkles. One might expect a negative correlation to exist between someone's tiredness during the day and the number of hours they slept the previous night: the amount of sleep decreases as the feelings of tiredness increase. In a real-world example of negative correlation, student researchers at the University of Minnesota found a weak negative correlation ($r = -0.29$) between the average number of days per week that students got fewer than 5 hours of sleep and their GPA (Lowry, Dean, & Manders, 2010). Keep in mind that a negative correlation is not the same as no correlation. For example, we would probably find no correlation between hours of sleep and shoe size.

As mentioned earlier, correlations have predictive value. Imagine that you are on the admissions committee of a major university. You are faced with a huge number of applications, but you are able to accommodate only a small percentage of the applicant pool.

How might you decide who should be admitted? You might try to correlate your current students' college GPA with their scores on standardized tests like the SAT or ACT. By observing which correlations were strongest for your current students, you could use this information to predict relative success of those students who have applied for admission into the university.

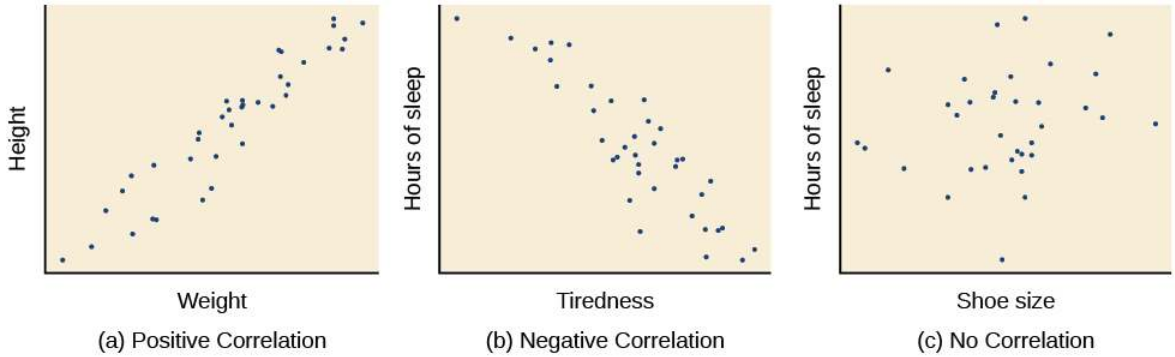


Figure **1.5.1**: Scatterplots are a graphical view of the strength and direction of correlations. The stronger the correlation, the closer the data points are to a straight line. In these examples, we see that there is (a) a positive correlation between weight and height, (b) a negative correlation between tiredness and hours of sleep, and (c) no correlation between shoe size and hours of sleep.

Correlation Does Not Indicate Causation

Correlational research is useful because it allows us to discover the strength and direction of relationships that exist between two variables. However, correlation is limited because establishing the existence of a relationship tells us little about **cause and effect**. While variables are sometimes correlated because one does cause the other, it could also be that some other factor, a confounding variable, is actually causing the systematic movement in our variables of interest. In the ice cream/crime rate example mentioned earlier, temperature is a confounding variable that could account for the relationship between the two variables.

Even when we cannot point to clear confounding variables, we should not assume that a correlation between two variables implies that one variable causes changes in another. This can be frustrating when a cause-and-effect relationship seems clear and intuitive. Think back to our discussion of the research done by the American Cancer Society and how their research projects were some of the first demonstrations of the link between smoking and cancer. It seems reasonable to assume that smoking causes cancer, but if we were limited to **correlational research**, we would be overstepping our bounds by making this assumption.

Unfortunately, people mistakenly make claims of causation as a function of correlations all the time. Such claims are especially common in advertisements and news stories. For example, recent research found that people who eat cereal on a regular basis achieve healthier weights than those who rarely eat cereal (Frantzen, Treviño, Echon, Garcia-Dominic, & DiMarco, 2013; Barton et al., 2005). Guess how the cereal companies report this finding. Does eating cereal really cause an individual to maintain a healthy weight, or are there other possible explanations, such as, someone at a healthy weight is more likely to regularly eat a healthy breakfast than someone who is obese or someone who avoids meals in an attempt to diet? While correlational research is invaluable in identifying relationships among variables, a major limitation is the inability to establish causality. Psychologists want to make statements about cause and effect, but the only way to do that is to conduct an experiment to answer a research question. The next section describes how scientific experiments incorporate methods that eliminate, or control for, alternative explanations, which allow researchers to explore how changes in one variable cause changes in another variable.



Figure **1.5.2**: Does eating cereal really cause someone to be a healthy weight? (credit: Tim Skillern)

Illusory Correlations

The temptation to make erroneous cause-and-effect statements based on correlational research is not the only way we tend to misinterpret data. We also tend to make the mistake of illusory correlations, especially with unsystematic observations. **Illusory correlations**, or false correlations, occur when people believe that relationships exist between two things when no such relationship exists. One well-known illusory correlation is the supposed effect that the moon's phases have on human behavior. Many people passionately assert that human behavior is affected by the phase of the moon, and specifically, that people act strangely when the moon is full.



Figure **1.5.3**: Many people believe that a full moon makes people behave oddly. (credit: Cory Zanker)

There is no denying that the moon exerts a powerful influence on our planet. The ebb and flow of the ocean's tides are tightly tied to the gravitational forces of the moon. Many people believe, therefore, that it is logical that we are affected by the moon as well. After all, our bodies are largely made up of water. A meta-analysis of nearly 40 studies consistently demonstrated, however, that the relationship between the moon and our behavior does not exist (Rotton & Kelly, 1985). While we may pay more attention to odd behavior during the full phase of the moon, the rates of odd behavior remain constant throughout the lunar cycle.

Why are we so apt to believe in illusory correlations like this? Often we read or hear about them and simply accept the information as valid. Or, we have a hunch about how something works and then look for evidence to support that hunch, ignoring evidence that would tell us our hunch is false; this is known as **confirmation bias**. Other times, we find illusory correlations based on the information that comes most easily to mind, even if that information is severely limited. And while we may feel confident that we can use these relationships to better understand and predict the world around us, illusory correlations can have significant drawbacks. For example, research suggests that illusory correlations—in which certain behaviors are inaccurately attributed to certain groups—are involved in the formation of prejudicial attitudes that can ultimately lead to discriminatory behavior (Fiedler, 2004).

Causality: Conducting Experiments and using the Data

As you've learned, the only way to establish that there is a cause-and-effect relationship between two variables is to conduct a scientific **experiment**. Experiment has a different meaning in the scientific context than in everyday life. In everyday conversation, we often use it to describe trying something for the first time, such as experimenting with a new hair style or a new food. However, in the scientific context, an experiment has precise requirements for design and implementation.

The Experimental Hypothesis

In order to conduct an experiment, a researcher must have a specific hypothesis to be tested. As you've learned, hypotheses can be formulated either through direct observation of the real world or after careful review of previous research. For example, if you think that children should not be allowed to watch violent programming on television because doing so would cause them to behave more violently, then you have basically formulated a hypothesis—namely, that watching violent television programs causes children to behave more violently. How might you have arrived at this particular hypothesis? You may have younger relatives who watch cartoons featuring characters using martial arts to save the world from evildoers, with an impressive array of punching, kicking, and defensive postures. You notice that after watching these programs for a while, your young relatives mimic the fighting behavior of the characters portrayed in the cartoon.



Figure **1.5.4**: Seeing behavior like this right after a child watches violent television programming might lead you to hypothesize that viewing violent television programming leads to an increase in the display of violent behaviors. (credit: Emran Kassim)

These sorts of personal observations are what often lead us to formulate a specific hypothesis, but we cannot use limited personal observations and anecdotal evidence to rigorously test our hypothesis. Instead, to find out if real-world data supports our hypothesis, we have to conduct an experiment.

Designing an Experiment

The most basic experimental design involves two groups: the experimental group and the control group. The two groups are designed to be the same except for one difference— experimental manipulation. The **experimental group** gets the experimental manipulation—that is, the treatment or variable being tested (in this case, violent TV images)—and the **control group** does not. Since experimental manipulation is the only difference between the experimental and control groups, we can be sure that any differences between the two are due to experimental manipulation rather than chance.

In our example of how violent television programming might affect violent behavior in children, we have the experimental group view violent television programming for a specified time and then measure their violent behavior. We measure the violent behavior in our control group after they watch nonviolent television programming for the same amount of time. It is important for the control group to be treated similarly to the experimental group, with the exception that the control group does not receive the experimental manipulation. Therefore, we have the control group watch non-violent television programming for the same amount of time as the experimental group.

We also need to precisely define, or operationalize, what is considered violent and nonviolent. An **operational definition** is a description of how we will measure our variables, and it is important in allowing others understand exactly how and what a researcher measures in a particular experiment. In operationalizing violent behavior, we might choose to count only physical acts like kicking or punching as instances of this behavior, or we also may choose to include angry verbal exchanges. Whatever we determine, it is important that we operationalize violent behavior in such a way that anyone who hears about our study for the first time knows exactly what we mean by violence. This aids peoples' ability to interpret our data as well as their capacity to repeat our experiment should they choose to do so.

Once we have operationalized what is considered violent television programming and what is considered violent behavior from our experiment participants, we need to establish how we will run our experiment. In this case, we might have participants watch a 30-minute television program (either violent or nonviolent, depending on their group membership) before sending them out to a playground for an hour where their behavior is observed and the number and type of violent acts is recorded.

Ideally, the people who observe and record the children's behavior are unaware of who was assigned to the experimental or control group, in order to control for experimenter bias. **Experimenter bias** refers to the possibility that a researcher's expectations might skew the results of the study. Remember, conducting an experiment requires a lot of planning, and the people involved in the research project have a vested interest in supporting their hypotheses. If the observers knew which child was in which group, it might influence how much attention they paid to each child's behavior as well as how they interpreted that behavior. By being blind

to which child is in which group, we protect against those biases. This situation is a **single-blind study**, meaning that one of the groups (participants) are unaware as to which group they are in (experiment or control group) while the researcher who developed the experiment knows which participants are in each group.

In a **double-blind study**, both the researchers and the participants are blind to group assignments. Why would a researcher want to run a study where no one knows who is in which group? Because by doing so, we can control for both experimenter and participant expectations. If you are familiar with the phrase **placebo effect**, you already have some idea as to why this is an important consideration. The placebo effect occurs when people's expectations or beliefs influence or determine their experience in a given situation. In other words, simply expecting something to happen can actually make it happen.

The placebo effect is commonly described in terms of testing the effectiveness of a new medication. Imagine that you work in a pharmaceutical company, and you think you have a new drug that is effective in treating depression. To demonstrate that your medication is effective, you run an experiment with two groups: The experimental group receives the medication, and the control group does not. But you don't want participants to know whether they received the drug or not.

Why is that? Imagine that you are a participant in this study, and you have just taken a pill that you think will improve your mood. Because you expect the pill to have an effect, you might feel better simply because you took the pill and not because of any drug actually contained in the pill—this is the placebo effect.

To make sure that any effects on mood are due to the drug and not due to expectations, the control group receives a placebo (in this case a sugar pill). Now everyone gets a pill, and once again neither the researcher nor the experimental participants know who got the drug and who got the sugar pill. Any differences in mood between the experimental and control groups can now be attributed to the drug itself rather than to experimenter bias or participant expectations.



Figure 1.5.5: Providing the control group with a placebo treatment protects against bias caused by expectancy. (credit: Elaine and Arthur Shapiro)

Independent and Dependent Variables

In a research experiment, we strive to study whether changes in one thing cause changes in another. To achieve this, we must pay attention to two important variables, or things that can be changed, in any experimental study: the independent variable and the dependent variable. An **independent variable** is manipulated or controlled by the experimenter. In a well-designed experimental study, the independent variable is the only important difference between the experimental and control groups. In our example of how violent television programs affect children's display of violent behavior, the independent variable is the type of program—violent or nonviolent—viewed by participants in the study. A **dependent variable** is what the researcher measures to see how much effect the independent variable had. In our example, the dependent variable is the number of violent acts displayed by the experimental participants.

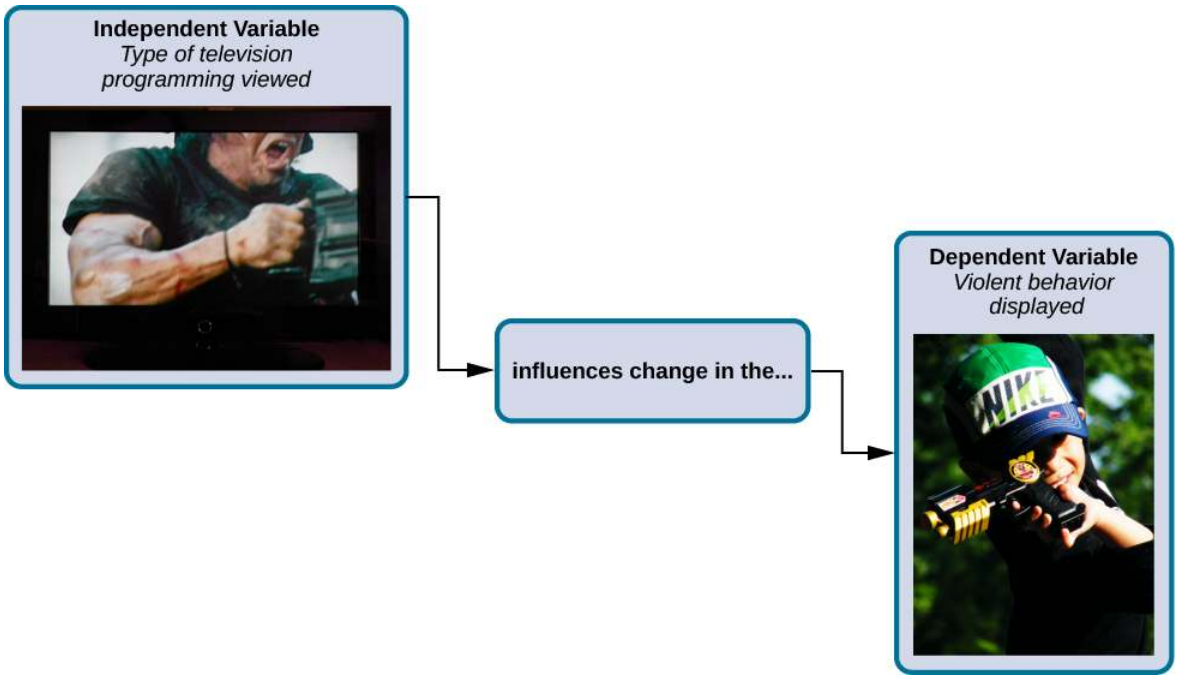


Figure **1.5.6**: In an experiment, manipulations of the independent variable are expected to result in changes in the dependent variable. (credit "automatic weapon": modification of work by Daniel Oines; credit "toy gun": modification of work by Emran Kassim)

We expect that the dependent variable will change as a function of the independent variable. In other words, the dependent variable *depends* on the independent variable. A good way to think about the relationship between the independent and dependent variables is with this question: What effect does the independent variable have on the dependent variable? Returning to our example, what effect does watching a half hour of violent television programming or nonviolent television programming have on the number of incidents of physical aggression displayed on the playground?

Selecting and Assigning Experimental Participants

Now that our study is designed, we need to obtain a sample of individuals to include in our experiment. Our study involves human participants so we need to determine who to include. **Participants** are the subjects of psychological research, and as the name implies, individuals who are involved in psychological research actively participate in the process. Often, psychological research projects rely on college students to serve as participants. In fact, the vast majority of research in psychology subfields has historically involved students as research participants (Sears, 1986; Arnett, 2008). But are college students truly representative of the general population? College students tend to be younger, more educated, more liberal, and less diverse than the general population. Although using students as test subjects is an accepted practice, relying on such a limited pool of research participants can be problematic because it is difficult to generalize findings to the larger population.

Our hypothetical experiment involves children, and we must first generate a sample of child participants. Samples are used because populations are usually too large to reasonably involve every member in our particular experiment. If possible, we should use a random sample (there are other types of samples, but for the purposes of this chapter, we will focus on random samples). A **random sample** is a subset of a larger population in which every member of the population has an equal chance of being selected. Random samples are preferred because if the sample is large enough we can be reasonably sure that the participating individuals are representative of the larger population. This means that the percentages of characteristics in the sample—sex, ethnicity, socioeconomic level, and any other characteristics that might affect the results—are close to those percentages in the larger population.

In our example, let's say we decide our population of interest is fourth graders. But all fourth graders is a very large population, so we need to be more specific; instead we might say our population of interest is all fourth graders in a particular city. We should include students from various income brackets, family situations, races, ethnicities, religions, and geographic areas of town. With

this more manageable population, we can work with the local schools in selecting a random sample of around 200 fourth graders who we want to participate in our experiment.

In summary, because we cannot test all of the fourth graders in a city, we want to find a group of about 200 that reflects the composition of that city. With a representative group, we can generalize our findings to the larger population without fear of our sample being biased in some way.



(a) (b)

Figure 1.5.7: Researchers may work with (a) a large population or (b) a sample group that is a subset of the larger population. (credit "crowd": modification of work by James Cridland; credit "students": modification of work by Laurie Sullivan)

Now that we have a sample, the next step of the experimental process is to split the participants into experimental and control groups through random assignment. With **random assignment**, all participants have an equal chance of being assigned to either group. There is statistical software that will randomly assign each of the fourth graders in the sample to either the experimental or the control group.

Random assignment is critical for sound **experimental design**. With sufficiently large samples, random assignment makes it unlikely that there are systematic differences between the groups. So, for instance, it would be very unlikely that we would get one group composed entirely of males, a given ethnic identity, or a given religious ideology. This is important because if the groups were systematically different before the experiment began, we would not know the origin of any differences we find between the groups: Were the differences preexisting, or were they caused by manipulation of the independent variable? Random assignment allows us to assume that any differences observed between experimental and control groups result from the manipulation of the independent variable.

Issues to Consider

While experiments allow scientists to make cause-and-effect claims, they are not without problems. True experiments require the experimenter to manipulate an independent variable, and that can complicate many questions that psychologists might want to address. For instance, imagine that you want to know what effect sex (the independent variable) has on spatial memory (the dependent variable). Although you can certainly look for differences between males and females on a task that taps into spatial memory, you cannot directly control a person's sex. We categorize this type of research approach as quasi-experimental and recognize that we cannot make cause-and-effect claims in these circumstances.

Experimenters are also limited by ethical constraints. For instance, you would not be able to conduct an experiment designed to determine if experiencing abuse as a child leads to lower levels of self-esteem among adults. To conduct such an experiment, you would need to randomly assign some experimental participants to a group that receives abuse, and that experiment would be unethical.

Interpreting Experimental Findings

Once data is collected from both the experimental and the control groups, a **statistical analysis** is conducted to find out if there are meaningful differences between the two groups. A statistical analysis determines how likely any difference found is due to chance (and thus not meaningful). In psychology, group differences are considered meaningful, or significant, if the odds that these differences occurred by chance alone are 5 percent or less. Stated another way, if we repeated this experiment 100 times, we would expect to find the same results at least 95 times out of 100.

The greatest strength of experiments is the ability to assert that any significant differences in the findings are caused by the independent variable. This occurs because random selection, random assignment, and a design that limits the effects of both

experimenter bias and participant expectancy should create groups that are similar in composition and treatment. Therefore, any difference between the groups is attributable to the independent variable, and now we can finally make a causal statement. If we find that watching a violent television program results in more violent behavior than watching a nonviolent program, we can safely say that watching violent television programs causes an increase in the display of violent behavior.

Reporting Research

When psychologists complete a research project, they generally want to share their findings with other scientists. The American Psychological Association (APA) publishes a manual detailing how to write a paper for submission to scientific journals. Unlike an article that might be published in a magazine like *Psychology Today*, which targets a general audience with an interest in psychology, scientific journals generally publish **peer-reviewed journal articles** aimed at an audience of professionals and scholars who are actively involved in research themselves.

A peer-reviewed journal article is read by several other scientists (generally anonymously) with expertise in the subject matter. These peer reviewers provide feedback—to both the author and the journal editor—regarding the quality of the draft. Peer reviewers look for a strong rationale for the research being described, a clear description of how the research was conducted, and evidence that the research was conducted in an ethical manner. They also look for flaws in the study's design, methods, and statistical analyses. They check that the conclusions drawn by the authors seem reasonable given the observations made during the research. Peer reviewers also comment on how valuable the research is in advancing the discipline's knowledge. This helps prevent unnecessary duplication of research findings in the scientific literature and, to some extent, ensures that each research article provides new information. Ultimately, the journal editor will compile all of the peer reviewer feedback and determine whether the article will be published in its current state (a rare occurrence), published with revisions, or not accepted for publication.

Peer review provides some degree of quality control for psychological research. Poorly conceived or executed studies can be weeded out, and even well-designed research can be improved by the revisions suggested. Peer review also ensures that the research is described clearly enough to allow other scientists to **replicate** it, meaning they can repeat the experiment using different samples to determine reliability. Sometimes replications involve additional measures that expand on the original finding. In any case, each replication serves to provide more evidence to support the original research findings. Successful replications of published research make scientists more apt to adopt those findings, while repeated failures tend to cast doubt on the legitimacy of the original article and lead scientists to look elsewhere. For example, it would be a major advancement in the medical field if a published study indicated that taking a new drug helped individuals achieve a healthy weight without changing their diet. But if other scientists could not replicate the results, the original study's claims would be questioned.

DIG DEEPER: The Vaccine-Autism Myth and Retraction of Published Studies

Some scientists have claimed that routine childhood vaccines cause some children to develop autism, and, in fact, several peer-reviewed publications published research making these claims. Since the initial reports, large-scale epidemiological research has suggested that vaccinations are not responsible for causing autism and that it is much safer to have your child vaccinated than not. Furthermore, several of the original studies making this claim have since been retracted.

A published piece of work can be rescinded when data is called into question because of falsification, fabrication, or serious research design problems. Once rescinded, the scientific community is informed that there are serious problems with the original publication. Retractions can be initiated by the researcher who led the study, by research collaborators, by the institution that employed the researcher, or by the editorial board of the journal in which the article was originally published. In the vaccine-autism case, the retraction was made because of a significant conflict of interest in which the leading researcher had a financial interest in establishing a link between childhood vaccines and autism (Offit, 2008). Unfortunately, the initial studies received so much media attention that many parents around the world became hesitant to have their children vaccinated (Figure). For more information about how the vaccine/autism story unfolded, as well as the repercussions of this story, take a look at Paul Offit's book, *Autism's False Prophets: Bad Science, Risky Medicine, and the Search for a Cure.*



Figure 1.5.8: Some people still think vaccinations cause autism. (credit: modification of work by UNICEF Sverige)

Reliability and Validity

Reliability and validity are two important considerations that must be made with any type of data collection. **Reliability** refers to the ability to consistently produce a given result. In the context of psychological research, this would mean that any instruments or tools used to collect data do so in consistent, reproducible ways.

Unfortunately, being consistent in measurement does not necessarily mean that you have measured something correctly. To illustrate this concept, consider a kitchen scale that would be used to measure the weight of cereal that you eat in the morning. If the scale is not properly calibrated, it may consistently under- or overestimate the amount of cereal that's being measured. While the scale is highly reliable in producing consistent results (e.g., the same amount of cereal poured onto the scale produces the same reading each time), those results are incorrect. This is where validity comes into play. **Validity** refers to the extent to which a given instrument or tool accurately measures what it's supposed to measure. While any valid measure is by necessity reliable, the reverse is not necessarily true. Researchers strive to use instruments that are both highly reliable and valid.

EVERYDAY CONNECTION: How Valid Is the SAT?

Standardized tests like the SAT are supposed to measure an individual's aptitude for a college education, but how reliable and valid are such tests? Research conducted by the College Board suggests that scores on the SAT have high predictive validity for first-year college students' GPA (Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008). In this context, predictive validity refers to the test's ability to effectively predict the GPA of college freshmen. Given that many institutions of higher education require the SAT for admission, this high degree of predictive validity might be comforting.

However, the emphasis placed on SAT scores in college admissions has generated some controversy on a number of fronts. For one, some researchers assert that the SAT is a biased test that places minority students at a disadvantage and unfairly reduces the likelihood of being admitted into a college (Santelices & Wilson, 2010). Additionally, some research has suggested that the predictive validity of the SAT is grossly exaggerated in how well it is able to predict the GPA of first-year college students. In fact, it has been suggested that the SAT's predictive validity may be overestimated by as much as 150% (Rothstein, 2004). Many institutions of higher education are beginning to consider de-emphasizing the significance of SAT scores in making admission decisions (Rimer, 2008).

In 2014, College Board president David Coleman expressed his awareness of these problems, recognizing that college success is more accurately predicted by high school grades than by SAT scores. To address these concerns, he has called for significant changes to the SAT exam (Lewin, 2014).

Summary

A correlation is described with a correlation coefficient, r, which ranges from -1 to $+1$. The correlation coefficient tells us about the nature (positive or negative) and the strength of the relationship between two or more variables. Correlations do not tell us anything about causation—regardless of how strong the relationship is between variables. In fact, the only way to demonstrate causation is by conducting an experiment. People often make the mistake of claiming that correlations exist when they really do not.

Researchers can test cause-and-effect hypotheses by conducting experiments. Ideally, experimental participants are randomly selected from the population of interest. Then, the participants are randomly assigned to their respective groups. Sometimes, the researcher and the participants are blind to group membership to prevent their expectations from influencing the results.

In ideal experimental design, the only difference between the experimental and control groups is whether participants are exposed to the experimental manipulation. Each group goes through all phases of the experiment, but each group will experience a different level of the independent variable: the experimental group is exposed to the experimental manipulation, and the control group is not exposed to the experimental manipulation. The researcher then measures the changes that are produced in the dependent variable in each group. Once data is collected from both groups, it is analyzed statistically to determine if there are meaningful differences between the groups.

Psychologists report their research findings in peer-reviewed journal articles. Research published in this format is checked by several other psychologists who serve as a filter separating ideas that are supported by evidence from ideas that are not. Replication has an important role in ensuring the legitimacy of published research. In the long run, only those findings that are capable of being replicated consistently will achieve consensus in the scientific community.

Glossary

cause-and-effect relationship

changes in one variable cause the changes in the other variable; can be determined only through an experimental research design

confirmation bias

tendency to ignore evidence that disproves ideas or beliefs

confounding variable

unanticipated outside factor that affects both variables of interest, often giving the false impression that changes in one variable causes changes in the other variable, when, in actuality, the outside factor causes changes in both variables

control group

serves as a basis for comparison and controls for chance factors that might influence the results of the study—by holding such factors constant across groups so that the experimental manipulation is the only difference between groups

correlation

relationship between two or more variables; when two variables are correlated, one variable changes as the other does

correlation coefficient

number from -1 to +1, indicating the strength and direction of the relationship between variables, and usually represented by *r*

dependent variable

variable that the researcher measures to see how much effect the independent variable had

double-blind study

experiment in which both the researchers and the participants are blind to group assignments

experimental group

group designed to answer the research question; experimental manipulation is the only difference between the experimental and control groups, so any differences between the two are due to experimental manipulation rather than chance

experimenter bias

researcher expectations skew the results of the study

illusory correlation

seeing relationships between two things when in reality no such relationship exists

independent variable

variable that is influenced or controlled by the experimenter; in a sound experimental study, the independent variable is the only important difference between the experimental and control group

negative correlation

two variables change in different directions, with one becoming larger as the other becomes smaller; a negative correlation is not the same thing as no correlation

operational definition

description of what actions and operations will be used to measure the dependent variables and manipulate the independent variables

participants

subjects of psychological research

peer-reviewed journal article

article read by several other scientists (usually anonymously) with expertise in the subject matter, who provide feedback regarding the quality of the manuscript before it is accepted for publication

placebo effect

people's expectations or beliefs influencing or determining their experience in a given situation

positive correlation

two variables change in the same direction, both becoming either larger or smaller

random assignment

method of experimental group assignment in which all participants have an equal chance of being assigned to either group

random sample

subset of a larger population in which every member of the population has an equal chance of being selected

reliability

consistency and reproducibility of a given result

replicate

repeating an experiment using different samples to determine the research's reliability

single-blind study

experiment in which the researcher knows which participants are in the experimental group and which are in the control group

statistical analysis

determines how likely any difference between experimental groups is due to chance

validity

accuracy of a given result in measuring what it is designed to measure

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1.6: Ethics in Research Psychology

Psychology differs somewhat from the natural sciences such as chemistry in that researchers conduct studies with human research participants. Because of this there is a natural tendency to want to guard research participants against potential psychological harm. For example, it might be interesting to see how people handle ridicule but it might not be advisable to ridicule research participants.

Scientific psychologists follow a specific set of guidelines for research known as a code of **ethics**. There are extensive ethical guidelines for how human participants should be treated in psychological research (Diener & Crandall, 1978; Sales & Folkman, 2000). Following are a few highlights:

1. *Informed consent*. In general, people should know when they are involved in research, and understand what will happen to them during the study. They should then be given a free choice as to whether to participate.
2. *Confidentiality*. Information that researchers learn about individual participants should not be made public without the consent of the individual.
3. *Privacy*. Researchers should not make observations of people in private places such as their bedrooms without their knowledge and consent. Researchers should not seek confidential information from others, such as school authorities, without consent of the participant or his or her guardian.
4. *Benefits*. Researchers should consider the benefits of their proposed research and weigh these against potential risks to the participants. People who participate in psychological studies should be exposed to risk only if they fully understand these risks and only if the likely benefits clearly outweigh the risks.
5. *Deception*. Some researchers need to deceive participants in order to hide the true nature of the study. This is typically done to prevent participants from modifying their behavior in unnatural ways. Researchers are required to “debrief” their participants after they have completed the study. Debriefing is an opportunity to educate participants about the true nature of the study.

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CHAPTER OVERVIEW

2: Brains, Bodies, and Behavior

2.1: The Neuron is the Building Block of the Nervous System

2.2: Our Brains Control Our Thoughts, Feelings, and Behavior

2.3: Psychologists Study the Brain Using Many Different Methods

2.4: Putting It All Together- The Nervous System and the Endocrine System

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2.1: The Neuron is the Building Block of the Nervous System

Learning Objectives

1. Describe the structure and functions of the neuron.
2. Draw a diagram of the pathways of communication within and between neurons.
3. List three of the major neurotransmitters and describe their functions.

The nervous system is composed of more than 100 billion cells known as *neurons*. A neuron is *a cell in the nervous system whose function it is to receive and transmit information*. As you can see in Figure **2.1.2**, neurons are made up of three major parts: a cell body, or soma, which *contains the nucleus of the cell and keeps the cell alive*; a branching treelike fiber known as the dendrite, which *collects information from other cells and sends the information to the soma*; and a long, segmented fiber known as the axon, which *transmits information away from the cell body toward other neurons or to the muscles and glands*.

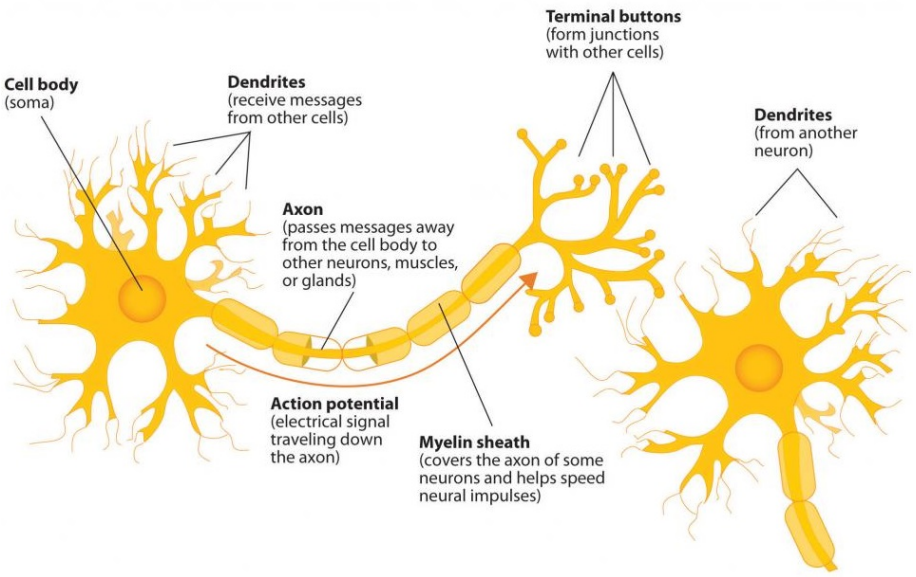


Figure **2.1.2** : Components of the Neuron

Some neurons have hundreds or even thousands of dendrites, and these dendrites may themselves be branched to allow the cell to receive information from thousands of other cells. The axons are also specialized, and some, such as those that send messages from the spinal cord to the muscles in the hands or feet, may be very long—even up to several feet in length. To improve the speed of their communication, and to keep their electrical charges from shorting out with other neurons, axons are often surrounded by a *myelin sheath*. The myelin sheath is *a layer of fatty tissue surrounding the axon of a neuron that both acts as an insulator and allows faster transmission of the electrical signal*. Axons branch out toward their ends, and at the tip of each branch is a *terminal button*.

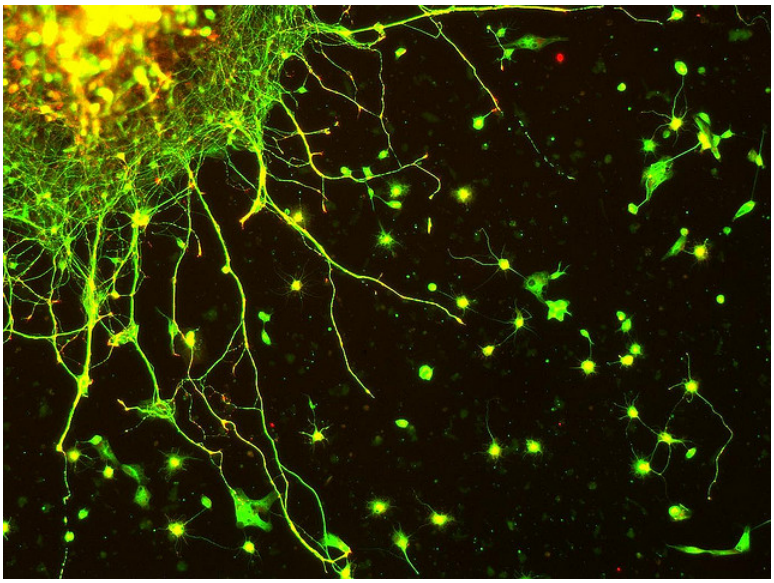


Figure **2.1.3**: The nervous system, including the brain, is made up of billions of interlinked neurons. This vast interconnected web is responsible for all human thinking, feeling, and behavior. MR McGill – Neurons, In Vitro Color! – CC BY-NC 2.0

Neurons Communicate Using Electricity and Chemicals

The nervous system operates using an *electrochemical* process. An electrical charge moves through the neuron itself and chemicals are used to transmit information between neurons. Within the neuron, when a signal is received by the dendrites, is it transmitted to the soma in the form of an electrical signal, and, if the signal is strong enough, it may then be passed on to the axon and then to the terminal buttons. If the signal reaches the terminal buttons, they are signaled to emit chemicals known as *neurotransmitters*, which communicate with other neurons across the spaces between the cells, known as *synapses*.



Video Clip: The Electrochemical Action of the Neuron. This video clip shows a model of the electrochemical action of the neuron and neurotransmitters. https://youtu.be/TKG0MtH5crc

The electrical signal moves through the neuron as a result of changes in the electrical charge of the axon. Normally, the axon remains in the resting potential, *a state in which the interior of the neuron contains a greater number of negatively charged ions than does the area outside the cell*. When the segment of the axon that is closest to the cell body is stimulated by an electrical signal from the dendrites, and if this electrical signal is strong enough that it passes a certain level or *threshold*, the cell membrane in this first segment opens its gates, allowing positively charged sodium ions that were previously kept out to enter. This *change in*

electrical charge that occurs in a neuron when a nerve impulse is transmitted is known as the action potential. Once the action potential occurs, the number of positive ions exceeds the number of negative ions in this segment, and the segment temporarily becomes positively charged.

As you can see in Figure **2.1.4**, the axon is segmented by a series of *breaks between the sausage-like segments of the myelin sheath*. Each of these gaps is a node of Ranvier. The electrical charge moves down the axon from segment to segment, in a set of small jumps, moving from node to node. When the action potential occurs in the first segment of the axon, it quickly creates a similar change in the next segment, which then stimulates the next segment, and so forth as the positive electrical impulse continues all the way down to the end of the axon. As each new segment becomes positive, the membrane in the prior segment closes up again, and the segment returns to its negative resting potential. In this way the action potential is transmitted along the axon, toward the terminal buttons. The entire response along the length of the axon is very fast—it can happen up to 1,000 times each second.

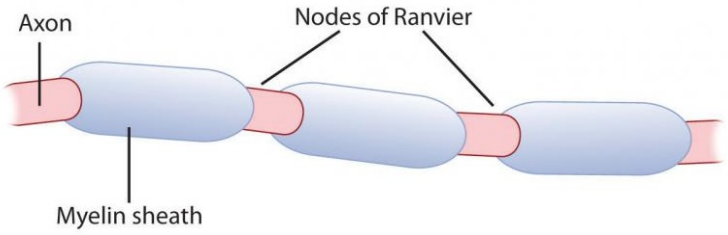


Figure **2.1.4**: The Myelin Sheath and the Nodes of Ranvier. The myelin sheath wraps around the axon but also leaves small gaps called the nodes of Ranvier. The action potential jumps from node to node as it travels down the axon.

An important aspect of the action potential is that it operates in an *all or nothing* manner. What this means is that the neuron either fires completely, such that the action potential moves all the way down the axon, or it does not fire at all. Thus neurons can provide more energy to the neurons down the line by firing faster but not by firing more strongly. Furthermore, the neuron is prevented from repeated firing by the presence of a *refractory period*—a brief time after the firing of the axon in which the axon cannot fire again because the neuron has not yet returned to its resting potential.

Neurotransmitters: The Body's Chemical Messengers

Not only do the neural signals travel via electrical charges *within* the neuron, but they also travel via chemical transmission *between* the neurons. Neurons are separated by junction areas known as synapses, *areas where the terminal buttons at the end of the axon of one neuron nearly, but don't quite, touch the dendrites of another*. The synapses provide a remarkable function because they allow each axon to communicate with many dendrites in neighboring cells. Because a neuron may have synaptic connections with thousands of other neurons, the communication links among the neurons in the nervous system allow for a highly sophisticated communication system.

When the electrical impulse from the action potential reaches the end of the axon, it signals the terminal buttons to release **neurotransmitters** into the synapse. A neurotransmitter is *a chemical that relays signals across the synapses between neurons*. Neurotransmitters travel across the synaptic space between the terminal button of one neuron and the dendrites of other neurons, where they bind to the dendrites in the neighboring neurons. Furthermore, different terminal buttons release different neurotransmitters, and different dendrites are particularly sensitive to different neurotransmitters. The dendrites will admit the neurotransmitters only if they are the right shape to fit in the receptor sites on the receiving neuron. For this reason, the receptor sites and neurotransmitters are often compared to a lock and key (Figure **2.1.5**).

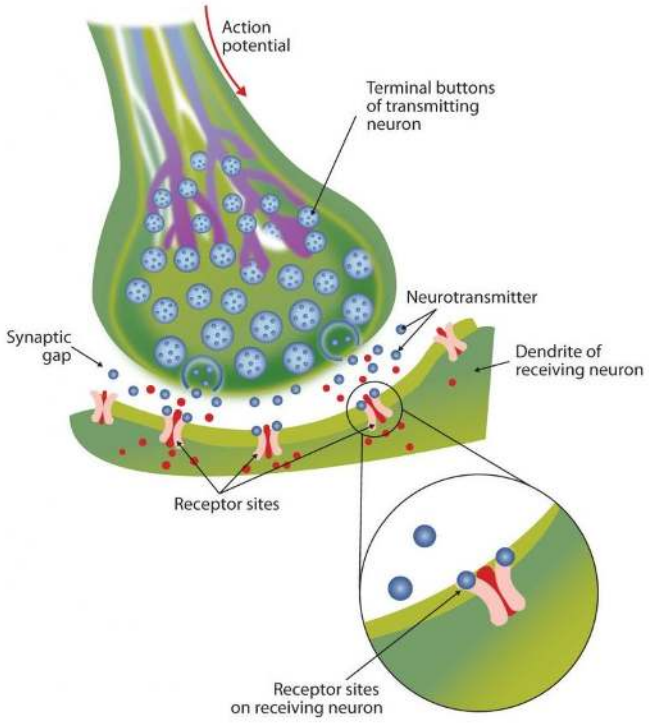


Figure **2.1.5**: The Synapse. When the nerve impulse reaches the terminal button, it triggers the release of neurotransmitters into the synapse. The neurotransmitters fit into receptors on the receiving dendrites in the manner of a lock and key.

When neurotransmitters are accepted by the receptors on the receiving neurons their effect may be either *excitatory* (i.e., they make the cell more likely to fire) or *inhibitory* (i.e., they make the cell less likely to fire). Furthermore, if the receiving neuron is able to accept more than one neurotransmitter, then it will be influenced by the excitatory and inhibitory processes of each. If the excitatory effects of the neurotransmitters are greater than the inhibitory influences of the neurotransmitters, the neuron moves closer to its firing threshold, and if it reaches the threshold, the action potential and the process of transferring information through the neuron begins.

Neurotransmitters that are not accepted by the receptor sites must be removed from the synapse in order for the next potential stimulation of the neuron to happen. This process occurs in part through the breaking down of the neurotransmitters by enzymes, and in part through reuptake, *a process in which neurotransmitters that are in the synapse are reabsorbed into the transmitting terminal buttons, ready to again be released after the neuron fires*.

More than 100 chemical substances produced in the body have been identified as neurotransmitters, and these substances have a wide and profound effect on emotion, cognition, and behavior. Neurotransmitters regulate our appetite, our memory, our emotions, as well as our muscle action and movement. And as you can see in Table **2.1.1**, some neurotransmitters are also associated with psychological and physical diseases.

Drugs that we might ingest—either for medical reasons or recreationally—can act like neurotransmitters to influence our thoughts, feelings, and behavior. An agonist is *a drug that has chemical properties similar to a particular neurotransmitter and thus mimics the effects of the neurotransmitter*. When an agonist is ingested, it binds to the receptor sites in the dendrites to excite the neuron, acting as if more of the neurotransmitter had been present. As an example, cocaine is an agonist for the neurotransmitter dopamine. Because dopamine produces feelings of pleasure when it is released by neurons, cocaine creates similar feelings when it is ingested. An antagonist is *a drug that reduces or stops the normal effects of a neurotransmitter*. When an antagonist is ingested, it binds to the receptor sites in the dendrite, thereby blocking the neurotransmitter. As an example, the poison curare is an antagonist for the neurotransmitter acetylcholine. When the poison enters the brain, it binds to the dendrites, stops communication among the neurons, and usually causes death. Still other drugs work by blocking the reuptake of the neurotransmitter itself—when reuptake is reduced by the drug, more neurotransmitter remains in the synapse, increasing its action.

Table **2.1.1** The Major Neurotransmitters and Their Functions

Neurotransmitter	Description and function	Notes
Acetylcholine (ACh)	A common neurotransmitter used in the spinal cord and motor neurons to stimulate muscle contractions. It's also used in the brain to regulate memory, sleeping, and dreaming.	Alzheimer's disease is associated with an undersupply of acetylcholine. Nicotine is an agonist that acts like acetylcholine.
Dopamine	Involved in movement, motivation, and emotion, Dopamine produces feelings of pleasure when released by the brain's reward system, and it's also involved in learning.	Schizophrenia is linked to increases in dopamine, whereas Parkinson's disease is linked to reductions in dopamine (and dopamine agonists may be used to treat it).
Endorphins	Released in response to behaviors such as vigorous exercise, orgasm, and eating spicy foods.	Endorphins are natural pain relievers. They are related to the compounds found in drugs such as opium, morphine, and heroin. The release of endorphins creates the runner's high that is experienced after intense physical exertion.
GABA (gamma-aminobutyric acid)	The major inhibitory neurotransmitter in the brain.	A lack of GABA can lead to involuntary motor actions, including tremors and seizures. Alcohol stimulates the release of GABA, which inhibits the nervous system and makes us feel drunk. Low levels of GABA can produce anxiety, and GABA agonists (tranquilizers) are used to reduce anxiety.
Glutamate	The most common neurotransmitter, it's released in more than 90% of the brain's synapses. Glutamate is found in the food additive MSG (monosodium glutamate).	Excess glutamate can cause overstimulation, migraines and seizures.
Serotonin	Involved in many functions, including mood, appetite, sleep, and aggression.	Low levels of serotonin are associated with depression, and some drugs designed to treat depression (known as selective serotonin reuptake inhibitors, or SSRIs) serve to prevent their reuptake.

Key Takeaways

- The central nervous system (CNS) is the collection of neurons that make up the brain and the spinal cord.
- The peripheral nervous system (PNS) is the collection of neurons that link the CNS to our skin, muscles, and glands.
- Neurons are specialized cells, found in the nervous system, which transmit information. Neurons contain a dendrite, a soma, and an axon.
- Some axons are covered with a fatty substance known as the myelin sheath, which surrounds the axon, acting as an insulator and allowing faster transmission of the electrical signal
- The dendrite is a treelike extension that receives information from other neurons and transmits electrical stimulation to the soma.
- The axon is an elongated fiber that transfers information from the soma to the terminal buttons.
- Neurotransmitters relay information chemically from the terminal buttons and across the synapses to the receiving dendrites using a type of lock and key system.
- The many different neurotransmitters work together to influence cognition, memory, and behavior.

- Agonists are drugs that mimic the actions of neurotransmitters, whereas antagonists are drugs that block the action of neurotransmitters.

Exercises and Critical Thinking

1. Draw a picture of a neuron and label its main parts.
2. Imagine an action that you engage in every day and explain how neurons and neurotransmitters might work together to help you engage in that action.

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2.2: Our Brains Control Our Thoughts, Feelings, and Behavior

Learning Objectives

1. Describe the structures and function of the "old brain" and its influence on behavior.
2. Explain the structure of the cerebral cortex (its hemispheres and lobes) and the function of each area of the cortex.
3. Define the concepts of brain plasticity, neurogenesis, and brain lateralization.

If you were someone who understood brain anatomy and were to look at the brain of an animal that you had never seen before, you would nevertheless be able to deduce the likely capacities of the animal. This is because the brains of all animals are very similar in overall form. In each animal the brain is layered, and the basic structures of the brain are similar (Figure **2.2.6**).

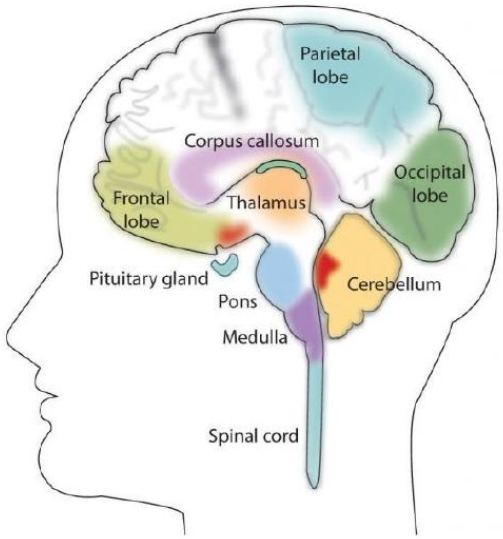


Figure **2.2.6**: The Major Structures in the Human Brain. The major brain parts are colored and labeled. Source: Adapted from Camazine, S. (n.d.). Images of the brain. Medical, science, and nature things: Photography and digital imagery by Scott Camazine.

The innermost structures of the brain—the parts nearest the spinal cord—are the oldest part of the brain, and these areas carry out the same the functions they did for our distant ancestors. The "old brain" regulates basic survival functions, such as breathing, moving, resting, and feeding, and creates our experiences of emotion. Mammals, including humans, have developed further brain layers that provide more advanced functions—for instance, better memory, more sophisticated social interactions, and the ability to experience emotions. Humans have a very large and highly developed outer layer known as the cerebral cortex (Figure **2.2.7**), which makes us particularly adept at these processes.

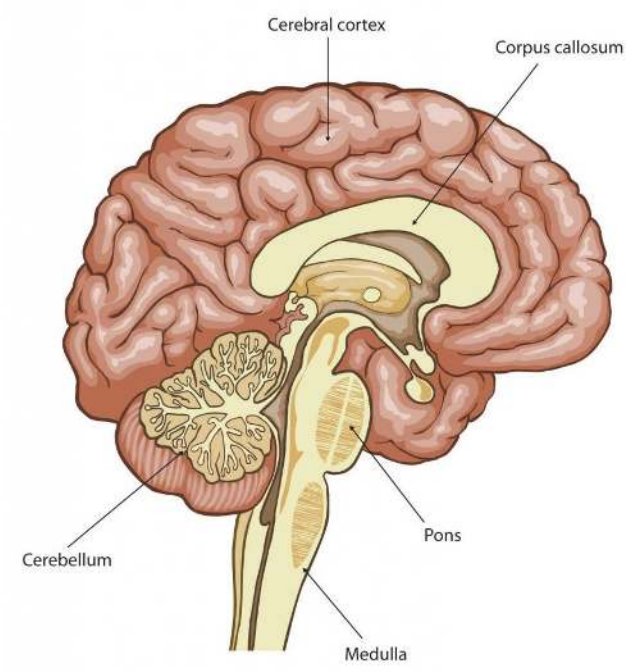


Figure **2.2.7**: Cerebral Cortex. Humans have a very large and highly developed outer brain layer known as the cerebral cortex. The cortex provides humans with excellent memory, outstanding cognitive skills, and the ability to experience complex emotions. Adapted from Wikia Education. (n.d.). Cerebral cortex.

The Old Brain: Wired for Survival

The brain stem is *the oldest and innermost region of the brain*. It's designed to control the most basic functions of life, including breathing, attention, and motor responses (Figure **2.2.8**). The brain stem begins where the spinal cord enters the skull and forms the medulla, *the area of the brain stem that controls heart rate and breathing*. In many cases the medulla alone is sufficient to maintain life—animals that have the remainder of their brains above the medulla severed are still able to eat, breathe, and even move. The spherical shape above the medulla is the pons, *a structure in the brain stem that helps control the movements of the body, playing a particularly important role in balance and walking*.

Running through the medulla and the pons is a long, narrow network of neurons known as the reticular formation. The job of the reticular formation is to filter out some of the stimuli that are coming into the brain from the spinal cord and to relay the remainder of the signals to other areas of the brain. The reticular formation also plays important roles in walking, eating, sexual activity, and sleeping. When electrical stimulation is applied to the reticular formation of an animal, it immediately becomes fully awake, and when the reticular formation is severed from the higher brain regions, the animal falls into a deep coma.

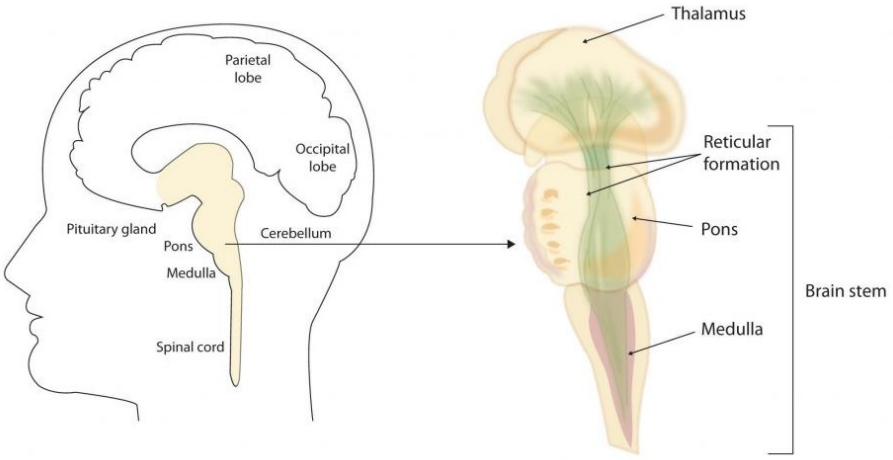


Figure **2.2.8**: The Brain Stem and the Thalamus. The brain stem is an extension of the spinal cord, including the medulla, the pons, the thalamus, and the reticular formation.

Above the brain stem are other parts of the old brain that also are involved in the processing of behavior and emotions (Figure **2.2.9**). The **thalamus** is *the egg-shaped structure above the brain stem that applies still more filtering to the sensory information that is coming up from the spinal cord and through the reticular formation, and it relays some of these remaining signals to the higher brain levels* (Guillery & Sherman, 2002). The thalamus also receives some of the higher brain's replies, forwarding them to the medulla and the cerebellum. The thalamus is also important in sleep because it shuts off incoming signals from the senses, allowing us to rest.

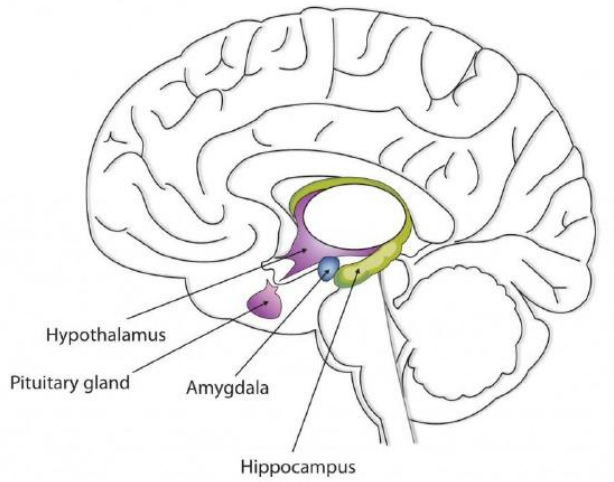


Figure **2.2.9**: The Limbic System. This diagram shows the major parts of the limbic system, as well as the pituitary gland, which is controlled by it.

The cerebellum (literally, "little brain") *consists of two wrinkled ovals behind the brain stem. It functions to coordinate voluntary movement*. People who have damage to the cerebellum have difficulty walking, keeping their balance, and holding their hands steady. Consuming alcohol influences the cerebellum, which is why people who are drunk have more difficulty walking in a straight line. Also, the cerebellum contributes to emotional responses, helps us discriminate between different sounds and textures, and is important in learning (Bower & Parsons, 2003).

Whereas the primary function of the brain stem is to regulate the most basic aspects of life, including motor functions, the *limbic system* is largely responsible for memory and emotions, including our responses to reward and punishment. The limbic system is *a brain area, located between the brain stem and the two cerebral hemispheres, that governs emotion and memory. It includes the amygdala, the hypothalamus, and the hippocampus*.

The amygdala*consists of two "almond-shaped" clusters (amygdala comes from the Latin word for "almond") and is primarily responsible for regulating our perceptions of, and reactions to, aggression and fear*. The amygdala has connections to other bodily systems related to fear, including the sympathetic nervous system (which we will see later is important in fear responses), facial responses (which perceive and express emotions), the processing of smells, and the release of neurotransmitters related to stress and aggression (Best, 2009). In one early study, Klüver and Bucy (1939) damaged the amygdala of an aggressive rhesus monkey. They found that the once angry animal immediately became passive and no longer responded to fearful situations with aggressive behavior. Electrical stimulation of the amygdala in other animals also influences aggression. In addition to helping us experience fear, the amygdala also helps us learn from situations that create fear. When we experience events that are dangerous, the amygdala stimulates the brain to remember the details of the situation so that we learn to avoid it in the future (Sigurdsson, Doyère, Cain, & LeDoux, 2007).

Located just under the thalamus (hence its name) the hypothalamus is *a brain structure that contains a number of small areas that perform a variety of functions, including the important role of linking the nervous system to the endocrine system via the pituitary gland*. Through its many interactions with other parts of the brain, the hypothalamus helps regulate body temperature, hunger, thirst, and sex, and responds to the satisfaction of these needs by creating feelings of pleasure. Olds and Milner (1954) discovered these reward centers accidentally after they had momentarily stimulated the hypothalamus of a rat. The researchers noticed that after being stimulated, the rat continued to move to the exact spot in its cage where the stimulation had occurred, as if it were trying to re-create the circumstances surrounding its original experience. Upon further research into these reward centers, Olds (1958) discovered that animals would do almost anything to re-create enjoyable stimulation, including crossing a painful electrified grid to receive it. In one experiment a rat was given the opportunity to electrically stimulate its own hypothalamus by pressing a pedal. The rat enjoyed the experience so much that it pressed the pedal more than 7,000 times per hour until it collapsed from sheer exhaustion.

The hippocampus*consists of two "horns" that curve back from the amygdala*. The hippocampus is important in storing information in long-term memory. If the hippocampus is damaged, a person cannot build new memories, living instead in a strange world where everything he or she experiences just fades away, even while older memories from the time before the damage are untouched.

The Cerebral Cortex Creates Consciousness and Thinking

All animals have adapted to their environments by developing abilities that help them survive. Some animals have hard shells, others run extremely fast, and some have acute hearing. Human beings do not have any of these particular characteristics, but we do have one big advantage over other animals—we are very, very smart.

You might think that we should be able to determine the intelligence of an animal by looking at the ratio of the animal's brain weight to the weight of its entire body. But this does not really work. The elephant's brain is one thousandth of its weight, but the whale's brain is only one ten-thousandth of its body weight. On the other hand, although the human brain is one 60th of its body weight, the mouse's brain represents one fortieth of its body weight. Despite these comparisons, elephants do not seem 10 times smarter than whales, and humans definitely seem smarter than mice.

The key to the advanced intelligence of humans is not found in the size of our brains. What sets humans apart from other animals is our larger cerebral cortex—*the outer bark-like layer of our brain that allows us to so successfully use language, acquire complex skills, create tools, and live in social groups* (Gibson, 2002). In humans, the cerebral cortex is wrinkled and folded, rather than smooth as it is in most other animals. This creates a much greater surface area and size, and allows increased capacities for learning, remembering, and thinking. The folding of the cerebral cortex is referred to as *corticalization*.

Although the cortex is only about one tenth of an inch thick, it makes up more than 80% of the brain's weight. The cortex contains about 20 billion nerve cells and 300 trillion synaptic connections (de Courten-Myers, 1999). Supporting all these neurons are billions more glial cells (glia), *cells that surround and link to the neurons, protecting them, providing them with nutrients, and absorbing unused neurotransmitters*. The glia come in different forms and have different functions. For instance, the myelin sheath surrounding the axon of many neurons is a type of glial cell. The glia are essential partners of neurons, without which the neurons could not survive or function (Miller, 2005).

The cerebral cortex is divided into two *hemispheres*, and each hemisphere is divided into four *lobes*, each separated by folds known as *fissures*. If we look at the cortex starting at the front of the brain and moving over the top (Figure **2.2.10**), we see first the frontal

lobe (behind the forehead), *which is responsible primarily for thinking, planning, memory, and judgment*. Following the frontal lobe is the parietal lobe, *which extends from the middle to the back of the skull and which is responsible primarily for processing information about touch*. Then comes the occipital lobe, *at the very back of the skull, which processes visual information*. Finally, in front of the occipital lobe (pretty much between the ears) is the temporal lobe, *responsible primarily for hearing and language*.

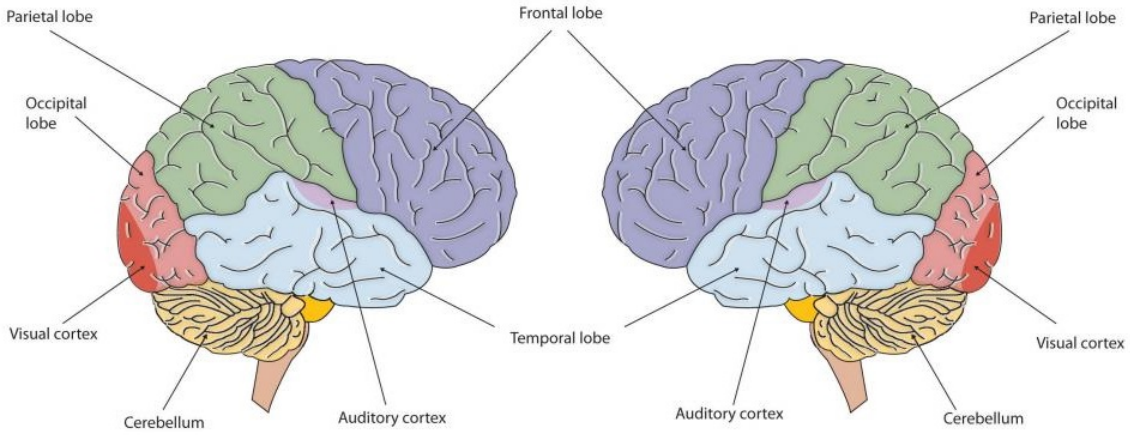


Figure **2.2.10**: The Two Hemispheres. The brain is divided into two hemispheres (left and right), each of which has four lobes (temporal, frontal, occipital, and parietal). Furthermore, there are specific cortical areas that control different processes.

Functions of the Cortex

When the German physicists Gustav Fritsch and Eduard Hitzig (1870/2009) applied mild electric stimulation to different parts of a dog's cortex, they discovered that they could make different parts of the dog's body move. Furthermore, they discovered an important and unexpected principle of brain activity. They found that stimulating the right side of the brain produced movement in the left side of the dog's body, and vice versa. This finding follows from a general principle about how the brain is structured, called *contralateral control*. The brain is wired such that in most cases the left hemisphere receives sensations from and controls the right side of the body, and vice versa.

Fritsch and Hitzig also found that the movement that followed the brain stimulation only occurred when they stimulated a specific arch-shaped region that runs across the top of the brain from ear to ear, just at the front of the parietal lobe (Figure **2.2.11**). Fritsch and Hitzig had discovered the motor cortex, *the part of the cortex that controls and executes movements of the body by sending signals to the cerebellum and the spinal cord*. More recent research has mapped the motor cortex even more fully, by providing mild electronic stimulation to different areas of the motor cortex in fully conscious patients while observing their bodily responses (because the brain has no sensory receptors, these patients feel no pain). As you can see in Figure **2.2.11**, this research has revealed that the motor cortex is specialized for providing control over the body, in the sense that the parts of the body that require more precise and finer movements, such as the face and the hands, also are allotted the greatest amount of cortical space.

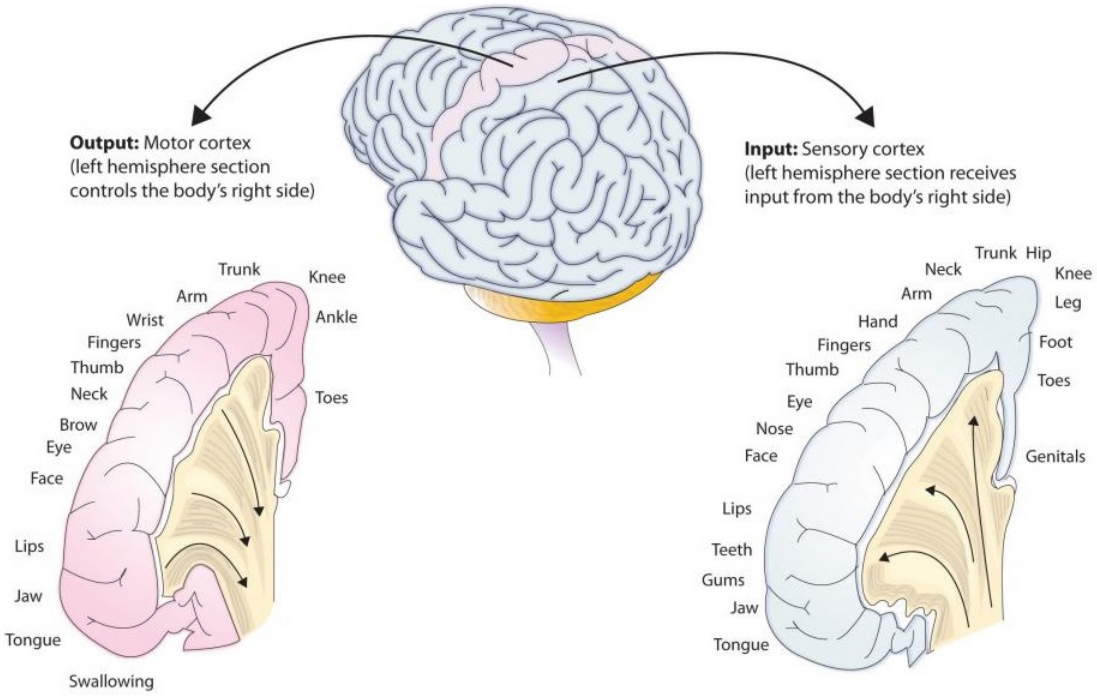


Figure **2.2.11**: The Sensory Cortex and the Motor Cortex. The portion of the sensory and motor cortex devoted to receiving messages that control specific regions of the body is determined by the amount of fine movement that area is capable of performing. Thus the hand and fingers have as much area in the cerebral cortex as does the entire trunk of the body.

Just as the motor cortex sends out messages to the specific parts of the body, the somatosensory cortex, *an area just behind and parallel to the motor cortex at the back of the frontal lobe, receives information from the skin's sensory receptors and the movements of different body parts*. Again, the more sensitive the body region, the more area is dedicated to it in the sensory cortex. Our sensitive lips, for example, occupy a large area in the sensory cortex, as do our fingers and genitals.

Other areas of the cortex process other types of sensory information. The visual cortex is *the area located in the occipital lobe (at the very back of the brain) that processes visual information*. If you were stimulated in the visual cortex, you would see flashes of light or color, and perhaps you remember having had the experience of "seeing stars" when you were hit in, or fell on, the back of your head. The temporal lobe, located on the lower side of each hemisphere, contains the auditory cortex, *which is responsible for hearing and language*. The temporal lobe also processes some visual information, providing us with the ability to name the objects around us (Martin, 2007).

As you can see in Figure **2.2.11**, the motor and sensory areas of the cortex account for a relatively small part of the total cortex. The remainder of the cortex is made up of association areas*in which sensory and motor information is combined and associated with our stored knowledge*. These association areas are the places in the brain that are responsible for most of the things that make human beings seem human. The association areas are involved in higher mental functions, such as learning, thinking, planning, judging, moral reflecting, figuring, and spatial reasoning.

The Brain Is Flexible: Neuroplasticity

The control of some specific bodily functions, such as movement, vision, and hearing, is performed in specified areas of the cortex, and if these areas are damaged, the individual will likely lose the ability to perform the corresponding function. For instance, if an infant suffers damage to facial recognition areas in the temporal lobe, it is likely that he or she will never be able to recognize faces (Farah, Rabinowitz, Quinn, & Liu, 2000). On the other hand, the brain is not divided up in an entirely rigid way. The brain's neurons have a remarkable capacity to reorganize and extend themselves to carry out particular functions in response to the needs of the organism, and to repair damage. As a result, the brain constantly creates new neural communication routes and rewires existing ones. Neuroplasticity refers to *the brain's ability to change its structure and function in response to experience or damage*. Neuroplasticity enables us to learn and remember new things and adjust to new experiences.

Our brains are the most “plastic” when we are young children, as it is during this time that we learn the most about our environment. On the other hand, neuroplasticity continues to be observed even in adults (Kolb & Fantie, 1989). The principles of neuroplasticity help us understand how our brains develop to reflect our experiences. For instance, accomplished musicians have a larger auditory cortex compared with the general population (Bengtsson et al., 2005) and also require less neural activity to move their fingers over the keys than do novices (Münte, Altenmüller, & Jäncke, 2002). These observations reflect the changes in the brain that follow our experiences.

Plasticity is also observed when there is damage to the brain or to parts of the body that are represented in the motor and sensory cortexes. When a tumor in the left hemisphere of the brain impairs language, the right hemisphere will begin to compensate to help the person recover the ability to speak (Thiel et al., 2006). And if a person loses a finger, the area of the sensory cortex that previously received information from the missing finger will begin to receive input from adjacent fingers, causing the remaining digits to become more sensitive to touch (Fox, 1984).

Although neurons cannot repair or regenerate themselves as skin or blood vessels can, new evidence suggests that the brain can engage in neurogenesis, *the forming of new neurons* (Van Praag, Zhao, Gage, & Gazzaniga, 2004). These new neurons originate deep in the brain and may then migrate to other brain areas where they form new connections with other neurons (Gould, 2007). This leaves open the possibility that someday scientists might be able to “rebuild” damaged brains by creating drugs that help grow neurons.

Research Focus: Identifying the Unique Functions of the Left and Right Hemispheres Using Split-Brain Patients

We have seen that the left hemisphere of the brain primarily senses and controls the motor movements on the right side of the body, and vice versa. This fact provides an interesting way to study brain lateralization—*the idea that the left and the right hemispheres of the brain are specialized to perform different functions*. Gazzaniga, Bogen, and Sperry (1965) studied a patient, known as W. J., who had undergone an operation to relieve severe seizures. In this surgery *the region that normally connects the two halves of the brain and supports communication between the hemispheres*, known as the corpus callosum, is severed. As a result, the patient essentially becomes a person with two separate brains. Because the left and right hemispheres are separated, each hemisphere develops a mind of its own, with its own sensations, concepts, and motivations (Gazzaniga, 2005).

In their research, Gazzaniga and his colleagues tested the ability of W. J. to recognize and respond to objects and written passages that were presented to only the left or to only the right brain hemispheres (Figure **2.2.12**). The researchers had W. J. look straight ahead and then flashed, for a fraction of a second, a picture of a geometrical shape to the left of where he was looking. By doing so, they assured that—because the two hemispheres had been separated—the image of the shape was experienced only in the right brain hemisphere (remember that sensory input from the left side of the body is sent to the right side of the brain). Gazzaniga and his colleagues found that W. J. was able to identify what he had been shown when he was asked to pick the object from a series of shapes, using his left hand, but that he could not do this when the object was shown in the right visual field. On the other hand, W. J. could easily read written material presented in the right visual field (and thus experienced in the left hemisphere) but not when it was presented in the left visual field.

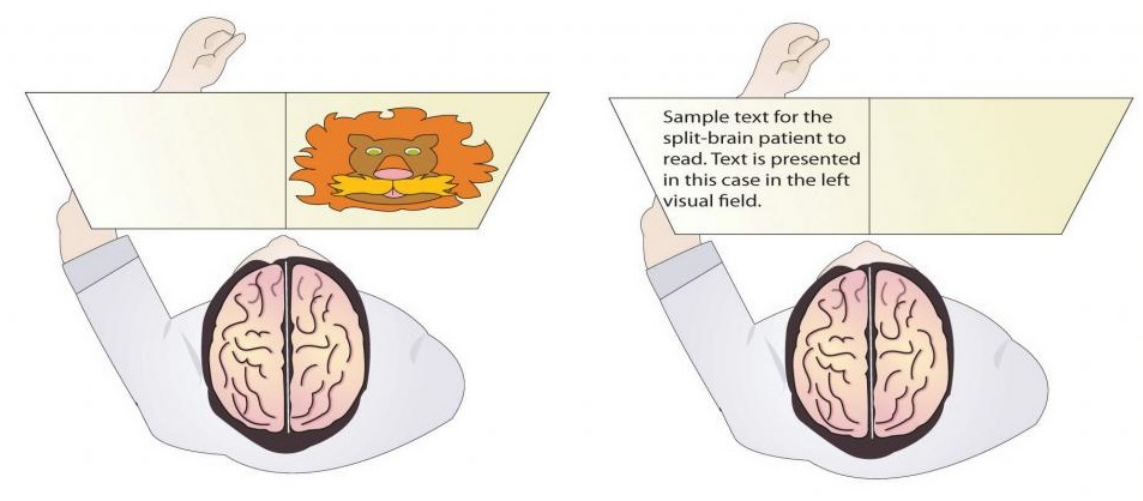


Figure **2.2.12** Visual and Verbal Processing in the Split-Brain Patient

The information that is presented on the left side of our field of vision is transmitted to the right brain hemisphere, and vice versa. In split-brain patients, the severed corpus callosum does not permit information to be transferred between hemispheres, which allows researchers to learn about the functions of each hemisphere. In the sample on the left, the split-brain patient could not choose which image had been presented because the left hemisphere cannot process visual information. In the sample on the right the patient could not read the passage because the right brain hemisphere cannot process language.

This research, and many other studies following it, has demonstrated that the two brain hemispheres specialize in different abilities. In most people the ability to speak, write, and understand language is located in the left hemisphere. This is why W. J. could read passages that were presented on the right side and thus transmitted to the left hemisphere, but could not read passages that were only experienced in the right brain hemisphere. The left hemisphere is also better at math and at judging time and rhythm. It is also superior in coordinating the order of complex movements—for example, lip movements needed for speech. The right hemisphere, on the other hand, has only very limited verbal abilities, and yet it excels in perceptual skills. The right hemisphere is able to recognize objects, including faces, patterns, and melodies, and it can put a puzzle together or draw a picture. This is why W. J. could pick out the image when he saw it on the left, but not the right, visual field.

Although Gazzaniga's research demonstrated that the brain is in fact lateralized, such that the two hemispheres specialize in different activities, this does not mean that when people behave in a certain way or perform a certain activity they are only using one hemisphere of their brains at a time. That would be drastically oversimplifying the concept of brain differences. We normally use both hemispheres at the same time, and the difference between the abilities of the two hemispheres is not absolute (Soroker et al., 2005).

Psychology in Everyday Life: Why Are Some People Left-Handed?

Across cultures and ethnic groups, about 90% of people are mainly right-handed, whereas only 10% are primarily left-handed (Peters, Reimers, & Manning, 2006). This fact is puzzling, in part because the number of left-handers is so low, and in part because other animals, including our closest primate relatives, do not show any type of handedness. The existence of right-handers and left-handers provides an interesting example of the relationship among evolution, biology, and social factors and how the same phenomenon can be understood at different levels of analysis (Harris, 1990; McManus, 2002).

At least some handedness is determined by genetics. Ultrasound scans show that 9 out of 10 fetuses suck the thumb of their right hand, suggesting that the preference is determined before birth (Hepper, Wells, & Lynch, 2005), and the mechanism of transmission has been linked to a gene on the X chromosome (Jones & Martin, 2000). It has also been observed that left-handed people are likely to have fewer children, and this may be in part because the mothers of left-handers are more prone to miscarriages and other prenatal problems (McKeever, Cerone, Suter, & Wu, 2000).

But culture also plays a role. In the past, left-handed children were forced to write with their right hands in many countries, and this practice continues, particularly in collectivistic cultures, such as India and Japan, where left-handedness is viewed

negatively as compared with individualistic societies, such as the United States. For example, India has about half as many left-handers as the United States (Ida & Mandal, 2003).

There are both advantages and disadvantages to being left-handed in a world where most people are right-handed. One problem for lefties is that the world is designed for right-handers. Automatic teller machines (ATMs), classroom desks, scissors, microscopes, drill presses, and table saws are just some examples of everyday machinery that is designed with the most important controls on the right side. This may explain in part why left-handers suffer somewhat more accidents than do right-handers (Dutta & Mandal, 2006).

Despite the potential difficulty living and working in a world designed for right-handers, there seem to be some advantages to being left-handed. Throughout history, a number of prominent artists have been left-handed, including Leonardo da Vinci, Michelangelo, Pablo Picasso, and Max Escher. Because the right hemisphere is superior in imaging and visual abilities, there may be some advantage to using the left hand for drawing or painting (Springer & Deutsch, 1998). Left-handed people are also better at envisioning three-dimensional objects, which may explain why there is such a high number of left-handed architects, artists, and chess players in proportion to their numbers (Coren, 1992). However, there are also more left-handers among those with reading disabilities, allergies, and migraine headaches (Geschwind & Behan, 2007), perhaps due to the fact that a small minority of left-handers owe their handedness to a birth trauma, such as being born prematurely (Betancur, Vélez, Cabanieu, & le Moal, 1990).

In sports in which handedness may matter, such as tennis, boxing, fencing, or judo, left-handers may have an advantage. They play many games against right-handers and learn how to best handle their styles. Right-handers, however, play very few games against left-handers, which may make them more vulnerable. This explains why a disproportionately high number of left-handers are found in sports where direct one-on-one action predominates. In other sports, such as golf, there are fewer left-handed players because the handedness of one player has no effect on the competition.

The fact that left-handers excel in some sports suggests the possibility that they may have also had an evolutionary advantage because their ancestors may have been more successful in important skills such as hand-to-hand combat (Bodmer & McKie, 1994). At this point, however, this idea remains only a hypothesis, and determinants of human handedness are yet to be fully understood.

Key Takeaways

- The old brain—including the brain stem, medulla, pons, reticular formation, thalamus, cerebellum, amygdala, hypothalamus, and hippocampus—regulates basic survival functions, such as breathing, moving, resting, feeding, emotions, and memory.
- The cerebral cortex, made up of billions of neurons and glial cells, is divided into the right and left hemispheres and into four lobes.
- The frontal lobe is primarily responsible for thinking, planning, memory, and judgment. The parietal lobe is primarily responsible for bodily sensations and touch. The temporal lobe is primarily responsible for hearing and language. The occipital lobe is primarily responsible for vision. Other areas of the cortex act as association areas, responsible for integrating information.
- The brain changes as a function of experience and potential damage in a process known as plasticity. The brain can generate new neurons through neurogenesis.
- The motor cortex controls voluntary movements. Body parts requiring the most control and dexterity take up the most space in the motor cortex.
- The sensory cortex receives and processes bodily sensations. Body parts that are the most sensitive occupy the greatest amount of space in the sensory cortex.
- The left cerebral hemisphere is primarily responsible for language and speech in most people, whereas the right hemisphere specializes in spatial and perceptual skills, visualization, and the recognition of patterns, faces, and melodies.
- The severing of the corpus callosum, which connects the two hemispheres, creates a “split-brain patient,” with the effect of creating two separate minds operating in one person.
- Studies with split-brain patients as research participants have been used to study brain lateralization.
- Neuroplasticity allows the brain to adapt and change as a function of experience or damage.

Exercises and Critical Thinking

1. Do you think that animals experience emotion? What aspects of brain structure might lead you to believe that they do or do not?
2. Consider your own experiences and speculate on which parts of your brain might be particularly well developed as a result of these experiences.
3. Which brain hemisphere are you likely to be using when you search for a fork in the silverware drawer? Which brain hemisphere are you most likely to be using when you struggle to remember the name of an old friend?
4. Do you think that encouraging left-handed children to use their right hands is a good idea? Why or why not?

References

Bengtsson, S. L., Nagy, Z., Skare, S., Forsman, L., Forssberg, H., & Ullén, F. (2005). Extensive piano practicing has regionally specific effects on white matter development. *Nature Neuroscience, 8*(9), 1148–1150.

Best, B. (2009). The amygdala and the emotions. In *Anatomy of the mind* (chap. 9). Retrieved from Welcome to the World of Ben Best website: http://www.benbest.com/science/anatmind/anatmd9.html

Betancur, C., Vélez, A., Cabanieu, G., & le Moal, M. (1990). Association between left-handedness and allergy: A reappraisal. *Neuropsychologia, 28*(2), 223–227.

Bodmer, W., & McKie, R. (1994). *The book of man: The quest to discover our genetic heritage*. London, England: Little, Brown and Company.

Bower, J. M., & Parsons, J. M. (2003). Rethinking the lesser brain. *Scientific American, 289*, 50–57.

Coren, S. (1992). *The left-hander syndrome: The causes and consequences of left-handedness*. New York, NY: Free Press.

de Courten-Myers, G. M. (1999). The human cerebral cortex: Gender differences in structure and function. *Journal of Neuropathology and Experimental Neurology, 58*, 217–226.

Dutta, T., & Mandal, M. K. (2006). Hand preference and accidents in India. *Laterality: Asymmetries of Body, Brain, and Cognition, 11*, 368–372.

Farah, M. J., Rabinowitz, C., Quinn, G. E., & Liu, G. T. (2000). Early commitment of neural substrates for face recognition. *Cognitive Neuropsychology, 17*(1–3), 117–123.

Fox, J. L. (1984). The brain's dynamic way of keeping in touch. *Science, 225*(4664), 820–821.

Fritsch, G., & Hitzig, E. (2009). Electric excitability of the cerebrum (Über die Elektrische erregbarkeit des Grosshirns). *Epilepsy & Behavior, 15*(2), 123–130. (Original work published 1870)

Gazzaniga, M. S., Bogen, J. E., & Sperry, R. W. (1965). Observations on visual perception after disconnexion of the cerebral hemispheres in man. *Brain, 88*(2), 221–236.

Geschwind, N., & Behan, P. (2007). *Left-handedness: Association with immune disease, migraine, and developmental learning disorder*. Cambridge, MA: MIT Press.

Gibson, K. R. (2002). Evolution of human intelligence: The roles of brain size and mental construction. *Brain Behavior and Evolution 59*, 10–20.

Gould, E. (2007). How widespread is adult neurogenesis in mammals? *Nature Reviews Neuroscience 8*, 481–488. doi:10.1038/nrn2147

Harris, L. J. (1990). Cultural influences on handedness: Historical and contemporary theory and evidence. In S. Coren (Ed.), *Left-handedness: Behavioral implications and anomalies*. New York, NY: Elsevier.

Hepper, P. G., Wells, D. L., & Lynch, C. (2005). Prenatal thumb sucking is related to postnatal handedness. *Neuropsychologia, 43*, 313–315.

Ida, Y., & Mandal, M. K. (2003). Cultural differences in side bias: Evidence from Japan and India. *Laterality: Asymmetries of Body, Brain, and Cognition, 8*(2), 121–133.

Jones, G. V., & Martin, M. (2000). A note on Corballis (1997) and the genetics and evolution of handedness: Developing a unified distributional model from the sex-chromosomes gene hypothesis. *Psychological Review, 107*(1), 213–218.

Klüver, H., & Bucy, P. C. (1939). Preliminary analysis of functions of the temporal lobes in monkeys. *Archives of Neurology & Psychiatry (Chicago), 42*, 979–1000.

Kolb, B., & Fantie, B. (1989). Development of the child's brain and behavior. In C. R. Reynolds & E. Fletcher-Janzen (Eds.), *Handbook of clinical child neuropsychology* (pp. 17–39). New York, NY: Plenum Press.

Olds, J. (1958). Self-stimulation of the brain: Its use to study local effects of hunger, sex, and drugs. *Science, 127*, 315–324.

Martin, A. (2007). The representation of object concepts in the brain. *Annual Review of Psychology, 58*, 25–45.

McKeever, W. F., Cerone, L. J., Suter, P. J., & Wu, S. M. (2000). Family size, miscarriage-proneness, and handedness: Tests of hypotheses of the developmental instability theory of handedness. *Laterality: Asymmetries of Body, Brain, and Cognition, 5*(2), 111–120.

McManus, I. C. (2002). *Right hand, left hand: The origins of asymmetry in brains, bodies, atoms, and cultures*. Cambridge, MA: Harvard University Press.

Miller, G. (2005). Neuroscience: The dark side of glia. *Science, 308*(5723), 778–781.

Münte, T. F., Altenmüller, E., & Jäncke, L. (2002). The musician's brain as a model of neuroplasticity. *Nature Reviews Neuroscience, 3*(6), 473–478.

Olds, J., & Milner, P. (1954). Positive reinforcement produced by electrical stimulation of septal area and other regions of rat brain. *Journal of Comparative and Physiological Psychology, 47*, 419–427.

Peters, M., Reimers, S., & Manning, J. T. (2006). Hand preference for writing and associations with selected demographic and behavioral variables in 255,100 subjects: The BBC Internet study. *Brain and Cognition, 62*(2), 177–189.

Sherman, S. M., & Guillery, R. W. (2006). *Exploring the thalamus and its role in cortical function* (2nd ed.). Cambridge, MA: MIT Press.

Sigurdsson, T., Doyère, V., Cain, C. K., & LeDoux, J. E. (2007). Long-term potentiation in the amygdala: A cellular mechanism of fear learning and memory. *Neuropharmacology, 52*(1), 215–227.

Soroker, N., Kasher, A., Giora, R., Batori, G., Corn, C., Gil, M., & Zaidel, E. (2005). Processing of basic speech acts following localized brain damage: A new light on the neuroanatomy of language. *Brain and Cognition, 57*(2), 214–217.

Springer, S. P., & Deutsch, G. (1998). *Left brain, right brain: Perspectives from cognitive neuroscience* (5th ed.). A series of books in psychology. New York, NY: W. H. Freeman/Times Books/Henry Holt & Co.

Thiel, A., Habedank, B., Herholz, K., Kessler, J., Winhuisen, L., Haupt, W. F., & Heiss, W. D. (2006). From the left to the right: How the brain compensates progressive loss of language function. *Brain and Language, 98*(1), 57–65.

Van Praag, H., Zhao, X., Gage, F. H., & Gazzaniga, M. S. (2004). Neurogenesis in the adult mammalian brain. In *The cognitive neurosciences* (3rd ed., pp. 127–137). Cambridge, MA: MIT Press.

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2.3: Psychologists Study the Brain Using Many Different Methods

Learning Objectives

1. Compare and contrast the techniques that scientists use to view and understand brain structures and functions.

One problem in understanding the brain is that it is difficult to get a good picture of what is going on inside it. But there are a variety of empirical methods that allow scientists to look at brains in action, and the number of possibilities has increased dramatically in recent years with the introduction of new *neuroimaging* techniques. In this section we will consider the various techniques that psychologists use to learn about the brain. Each of the different techniques has some advantages, and when we put them together, we begin to get a relatively good picture of how the brain functions and which brain structures control which activities.

Perhaps the most immediate approach to visualizing and understanding the structure of the brain is to directly analyze the brains of human cadavers. When Albert Einstein died in 1955, his brain was removed and stored for later analysis. Researcher Marian Diamond (1999) later analyzed a section of the Einstein's cortex to investigate its characteristics. Diamond was interested in the role of glia, and she hypothesized that the ratio of glial cells to neurons was an important determinant of intelligence. To test this hypothesis, she compared the ratio of glia to neurons in Einstein's brain with the ratio in the preserved brains of 11 other more "ordinary" men. However, Diamond was able to find support for only part of her research hypothesis. Although she found that Einstein's brain had relatively more glia in all the areas that she studied than did the control group, the difference was only statistically significant in one of the areas she tested. Diamond admits a limitation in her study is that she had only one Einstein to compare with 11 ordinary men.

Lesions Provide a Picture of What Is Missing

An advantage of the cadaver approach is that the brains can be fully studied, but an obvious disadvantage is that the brains are no longer active. In other cases, however, we can study living brains. The brains of living human beings may be damaged, for instance, as a result of strokes, falls, automobile accidents, gunshots, or tumors. These damages are called *lesions*. In rare occasions, brain lesions may be created intentionally through surgery, such as that designed to remove brain tumors or (as in split-brain patients) to reduce the effects of epilepsy. Psychologists also sometimes intentionally create lesions in animals to study the effects on their behavior. In so doing, they hope to be able to draw inferences about the likely functions of human brains from the effects of the lesions in animals.

Lesions allow the scientist to observe any loss of brain function that may occur. For instance, when an individual suffers a stroke, a blood clot deprives part of the brain of oxygen, killing the neurons in the area and rendering that area unable to process information. In some cases, the result of the stroke is a specific lack of ability. For instance, if the stroke influences the occipital lobe, then vision may suffer, and if the stroke influences the areas associated with language or speech, these functions will suffer. In fact, our earliest understanding of the specific areas involved in speech and language were gained by studying patients who had experienced strokes.

Figure **2.3.13**



John M. Harlow – Phineas Gage – public domain.

Areas in the frontal lobe of Phineas Gage were damaged when a metal rod blasted through it. Although Gage lived through the accident, his personality, emotions, and moral reasoning were influenced. The accident helped scientists understand the role of the

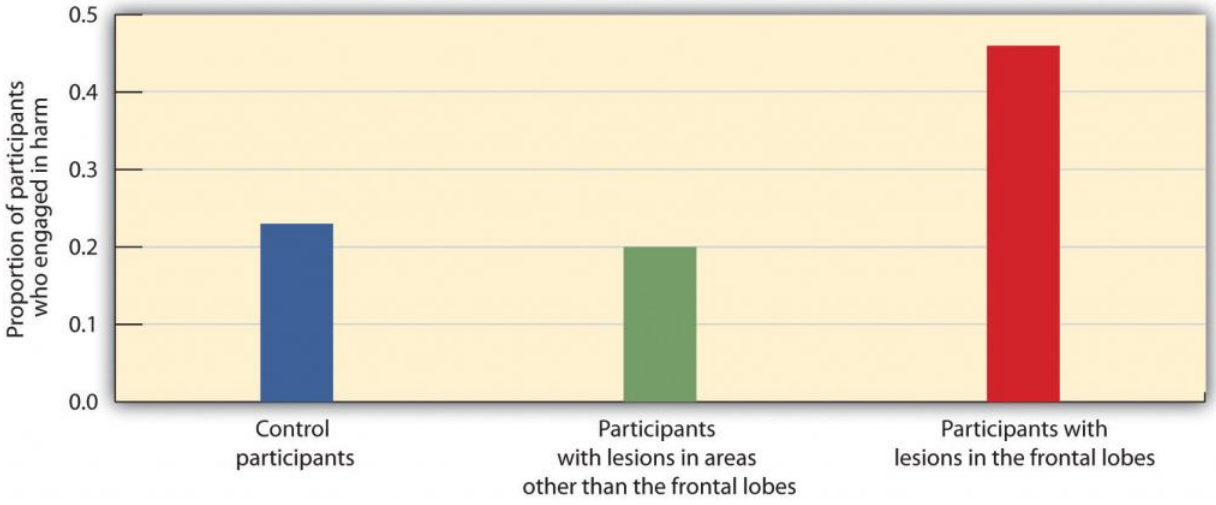
frontal lobe in these processes.

It is now known that a good part of our moral reasoning abilities are located in the frontal lobe, and at least some of this understanding comes from lesion studies. For instance, consider the well-known case of Phineas Gage, a 25-year-old railroad worker who, as a result of an explosion, had an iron rod driven into his cheek and out through the top of his skull, causing major damage to his frontal lobe (Macmillan, 2000). Although remarkably Gage was able to return to work after the wounds healed, he no longer seemed to be the same person to those who knew him. The amiable, soft-spoken Gage had become irritable, rude, irresponsible, and dishonest. Although there are questions about the interpretation of this case study (Kotowicz, 2007), it did provide early evidence that the frontal lobe is involved in emotion and morality (Damasio et al., 2005).

More recent and more controlled research has also used patients with lesions to investigate the source of moral reasoning. Michael Koenigs and his colleagues (Koenigs et al., 2007) asked groups of normal persons, individuals with lesions in the frontal lobes, and individuals with lesions in other places in the brain to respond to scenarios that involved doing harm to a person, even though the harm ultimately saved the lives of other people (Miller, 2008).

In one of the scenarios the participants were asked if they would be willing to kill one person in order to prevent five other people from being killed. As you can see in Figure **2.3.14**, they found that the individuals with lesions in the frontal lobe were significantly more likely to agree to do the harm than were individuals from the two other groups.

Figure **2.3.14** The Frontal Lobe and Moral Judgment

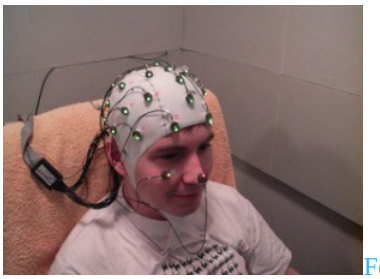


Koenigs and his colleagues (2007) found that the frontal lobe is important in moral judgment. Persons with lesions in the frontal lobe were more likely to be willing to harm one person in order to save the lives of five others than were control participants or those with lesions in other parts of the brain.

Recording Electrical Activity in the Brain

In addition to lesion approaches, it is also possible to learn about the brain by studying the electrical activity created by the firing of its neurons. One approach, primarily used with animals, is to place detectors in the brain to study the responses of specific neurons. Research using these techniques has found, for instance, that there are specific neurons, known as *feature detectors*, in the visual cortex that detect movement, lines and edges, and even faces (Kanwisher, 2000).

Figure **2.3.15**


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A participant in an EEG study has a number of electrodes placed around the head, which allows the researcher to study the activity of the person's brain. The patterns of electrical activity vary depending on the participant's current state (e.g., whether he or she is sleeping or awake) and on the tasks the person is engaging in.

A less invasive approach, and one that can be used on living humans, is electroencephalography (EEG). The EEG is *a technique that records the electrical activity produced by the brain's neurons through the use of electrodes that are placed around the research participant's head.* An EEG can show if a person is asleep, awake, or anesthetized because the brain wave patterns are known to differ during each state. EEGs can also track the waves that are produced when a person is reading, writing, and speaking, and are useful for understanding brain abnormalities, such as epilepsy. A particular advantage of EEG is that the participant can move around while the recordings are being taken, which is useful when measuring brain activity in children who often have difficulty keeping still. Furthermore, by following electrical impulses across the surface of the brain, researchers can observe changes over very fast time periods.

Peeking Inside the Brain: Neuroimaging

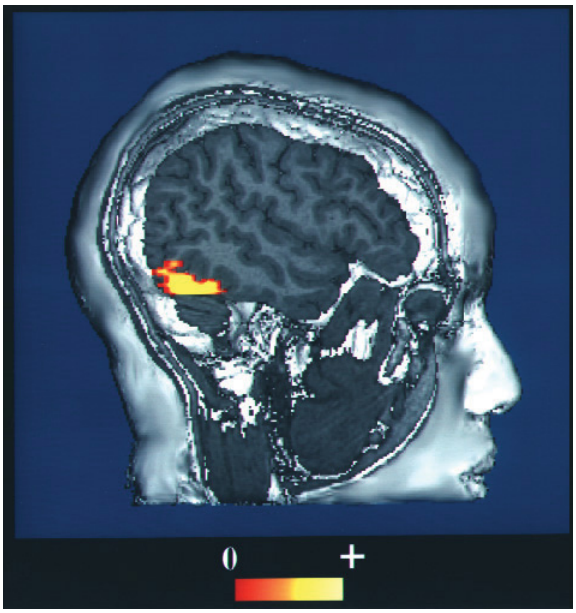
Although the EEG can provide information about the general patterns of electrical activity within the brain, and although the EEG allows the researcher to see these changes quickly as they occur in real time, the electrodes must be placed on the surface of the skull and each electrode measures brain waves from large areas of the brain. As a result, EEGs do not provide a very clear picture of the structure of the brain.

But techniques exist to provide more specific brain images. Functional magnetic resonance imaging (fMRI) is *a type of brain scan that uses a magnetic field to create images of brain activity in each brain area*. The patient lies on a bed within a large cylindrical structure containing a very strong magnet. Neurons that are firing use more oxygen, and the need for oxygen increases blood flow to the area. The fMRI detects the amount of blood flow in each brain region, and thus is an indicator of neural activity.

Very clear and detailed pictures of brain structures (see, e.g., Figure **2.3.16**) can be produced via fMRI. Often, the images take the form of cross-sectional "slices" that are obtained as the magnetic field is passed across the brain. The images of these slices are taken repeatedly and are superimposed on images of the brain structure itself to show how activity changes in different brain structures over time. When the research participant is asked to engage in tasks while in the scanner (e.g., by playing a game with another person), the images can show which parts of the brain are associated with which types of tasks. Another advantage of the fMRI is that is it noninvasive. The research participant simply enters the machine and the scans begin.

Although the scanners themselves are expensive, the advantages of fMRIs are substantial, and they are now available in many university and hospital settings. fMRI is now the most commonly used method of learning about brain structure.

Figure **2.3.16** fMRI Image



The fMRI creates brain images of brain structure and activity. In this image the red and yellow areas represent increased blood flow and thus increased activity. From your knowledge of brain structure, can you guess what this person is doing?

Photo courtesy of the National Institutes of Health, Wikimedia Commons – public domain.

There is still one more approach that is being more frequently implemented to understand brain function, and although it is new, it may turn out to be the most useful of all. Transcranial magnetic stimulation (TMS) is *a procedure in which magnetic pulses are applied to the brain of living persons with the goal of temporarily and safely deactivating a small brain region*. In TMS studies the research participant is first scanned in an fMRI machine to determine the exact location of the brain area to be tested. Then the electrical stimulation is provided to the brain before or while the participant is working on a cognitive task, and the effects of the stimulation on performance are assessed. If the participant's ability to perform the task is influenced by the presence of the stimulation, then the researchers can conclude that this particular area of the brain is important to carrying out the task.

The primary advantage of TMS is that it allows the researcher to draw causal conclusions about the influence of brain structures on thoughts, feelings, and behaviors. When the TMS pulses are applied, the brain region becomes less active, and this deactivation is expected to influence the research participant's responses. Current research has used TMS to study the brain areas responsible for emotion and cognition and their roles in how people perceive intention and approach moral reasoning (Kalbe et al., 2010; Van den Eynde et al., 2010; Young, Camprodon, Hauser, Pascual-Leone, & Saxe, 2010). TMS is also used as a treatment for a variety of psychological conditions, including migraine, Parkinson's disease, and major depressive disorder.

Research Focus: Cyberostracism

Neuroimaging techniques have important implications for understanding our behavior, including our responses to those around us. Naomi Eisenberger and her colleagues (2003) tested the hypothesis that people who were excluded by others would report emotional distress and that images of their brains would show that they experienced pain in the same part of the brain where physical pain is normally experienced. In the experiment, 13 participants were each placed into an fMRI brain-imaging machine. The participants were told that they would be playing a computer "Cyberball" game with two other players who were also in fMRI machines (the two opponents did not actually exist, and their responses were controlled by the computer).

Each of the participants was measured under three different conditions. In the first part of the experiment, the participants were told that as a result of technical difficulties, the link to the other two scanners could not yet be made, and thus at first they could not engage in, but only watch, the game play. This allowed the researchers to take a baseline fMRI reading. Then, during a second inclusion scan, the participants played the game, supposedly with the two other players. During this time, the other players threw the ball to the participants. In the third, exclusion, scan, however, the participants initially received seven throws

from the other two players but were then excluded from the game because the two players stopped throwing the ball to the participants for the remainder of the scan (45 throws).

The results of the analyses showed that activity in two areas of the frontal lobe was significantly greater during the exclusion scan than during the inclusion scan. Because these brain regions are known from prior research to be active for individuals who are experiencing physical pain, the authors concluded that these results show that the physiological brain responses associated with being socially excluded by others are similar to brain responses experienced upon physical injury.

Further research (Chen, Williams, Fitness, & Newton, 2008; Wesselmann, Bagg, & Williams, 2009) has documented that people react to being excluded in a variety of situations with a variety of emotions and behaviors. People who feel that they are excluded, or even those who observe other people being excluded, not only experience pain, but feel worse about themselves and their relationships with people more generally, and they may work harder to try to restore their connections with others.

Key Takeaways

- Studying the brains of cadavers can lead to discoveries about brain structure, but these studies are limited due to the fact that the brain is no longer active.
- Lesion studies are informative about the effects of lesions on different brain regions.
- Electrophysiological recording may be used in animals to directly measure brain activity.
- Measures of electrical activity in the brain, such as electroencephalography (EEG), are used to assess brain-wave patterns and activity.
- Functional magnetic resonance imaging (fMRI) measures blood flow in the brain during different activities, providing information about the activity of neurons and thus the functions of brain regions.
- Transcranial magnetic stimulation (TMS) is used to temporarily and safely deactivate a small brain region, with the goal of testing the causal effects of the deactivation on behavior.

Exercise and Critical Thinking

1. Consider the different ways that psychologists study the brain, and think of a psychological characteristic or behavior that could be studied using each of the different techniques.

References

Chen, Z., Williams, K. D., Fitness, J., & Newton, N. C. (2008). When hurt will not heal: Exploring the capacity to relive social and physical pain. *Psychological Science*, *19*(8), 789–795.

Damasio, H., Grabowski, T., Frank, R., Galaburda, A. M., Damasio, A. R., Cacioppo, J. T., & Berntson, G. G. (2005). The return of Phineas Gage: Clues about the brain from the skull of a famous patient. In *Social neuroscience: Key readings* (pp. 21–28). New York, NY: Psychology Press.

Diamond, M. C. (1999). Why Einstein's brain? *New Horizons for Learning*. Retrieved from http://www.newhorizons.org/neuro/diamond_einstein.htm

Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, *302*(5643), 290–292.

Kalbe, E., Schlegel, M., Sack, A. T., Nowak, D. A., Dafotakis, M., Bangard, C.,…Kessler, J. (2010). Dissociating cognitive from affective theory of mind: A TMS study. *Cortex: A Journal Devoted to the Study of the Nervous System and Behavior*, *46*(6), 769–780.

Kanwisher, N. (2000). Domain specificity in face perception. *Nature Neuroscience*, *3*(8), 759–763.

Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., & Damasio, A. (2007). Damage to the prefontal cortex increases utilitarian moral judgments. *Nature*, *446*(7138), 908–911.

Kotowicz, Z. (2007). The strange case of Phineas Gage. *History of the Human Sciences*, *20*(1), 115–131.

Macmillan, M. (2000). *An odd kind of fame: Stories of Phineas Gage*. Cambridge, MA: MIT Press.

Miller, G. (2008). The roots of morality. *Science, 320*, 734–737.

Van den Eynde, F., Claudino, A. M., Mogg, A., Horrell, L., Stahl, D.,…Schmidt, U. (2010). Repetitive transcranial magnetic stimulation reduces cue-induced food craving in bulimic disorders. *Biological Psychiatry*, *67*(8), 793–795.

Wesselmann, E. D., Bagg, D., & Williams, K. D. (2009). “I feel your pain”: The effects of observing ostracism on the ostracism detection system. *Journal of Experimental Social Psychology*, *45*(6), 1308–1311.

Young, L., Camprodon, J. A., Hauser, M., Pascual-Leone, A., & Saxe, R. (2010). Disruption of the right temporoparietal junction with transcranial magnetic stimulation reduces the role of beliefs in moral judgments. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, *107*(15), 6753–6758.

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2.4: Putting It All Together- The Nervous System and the Endocrine System

Learning Objectives

1. Summarize the primary functions of the CNS and of the subsystems of the PNS.
2. Explain how the electrical components of the nervous system and the chemical components of the endocrine system work together to influence behavior.

Now that we have considered how individual neurons operate and the roles of the different brain areas, it is time to ask how the body manages to "put it all together." How do the complex activities in the various parts of the brain, the simple all-or-nothing firings of billions of interconnected neurons, and the various chemical systems within the body, work together to allow the body to respond to the social environment and engage in everyday behaviors? In this section we will see that the complexities of human behavior are accomplished through the joint actions of electrical and chemical processes in the nervous system and the endocrine system.

Electrical Control of Behavior: The Nervous System

The nervous system (Figure **2.4.17**), the electrical information highway of the body, is made up of nerves—*bundles of interconnected neurons that fire in synchrony to carry messages*. The *central nervous system (CNS)*, made up of the brain and spinal cord, is the major controller of the body's functions, charged with interpreting sensory information and responding to it with its own directives. The CNS interprets information coming in from the senses, formulates an appropriate reaction, and sends responses to the appropriate system to respond accordingly. Everything that we see, hear, smell, touch, and taste is conveyed to us from our sensory organs as neural impulses, and each of the commands that the brain sends to the body, both consciously and unconsciously, travels through this system as well.

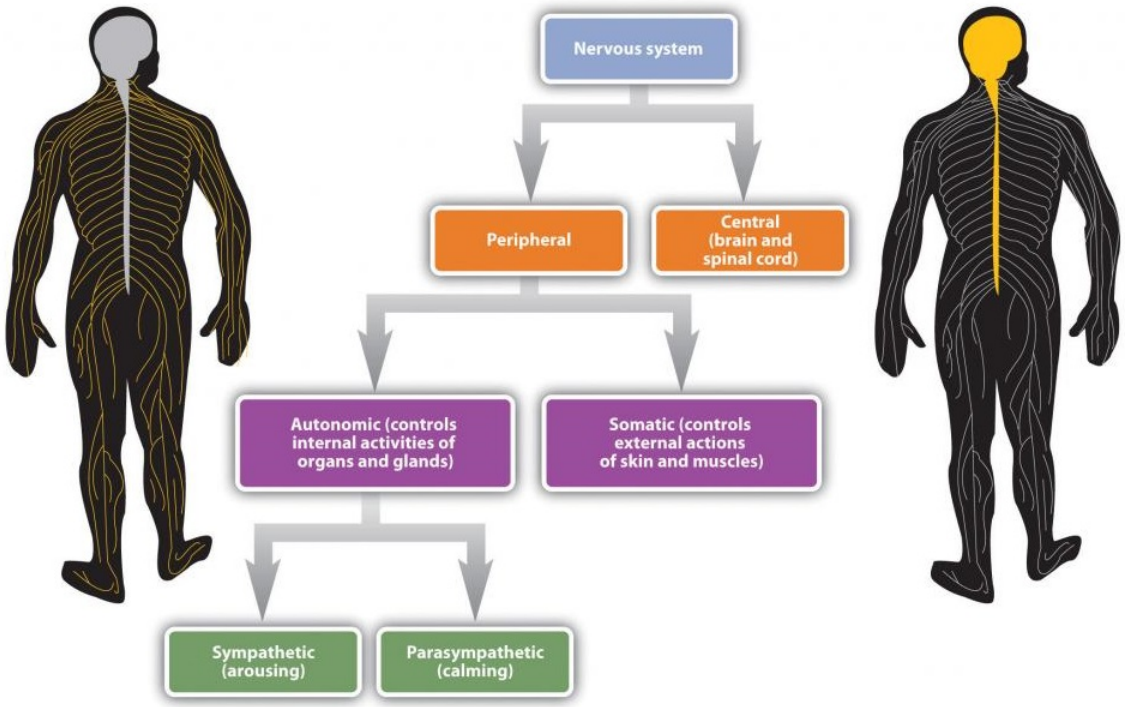


Figure **2.4.17** : The Functional Divisions of the Nervous System

Nerves are differentiated according to their function. A sensory (or afferent) neuron*carries information from the sensory receptors*, whereas a motor (or efferent) neuron*transmits information to the muscles and glands*. An interneuron, which is by far the most common type of neuron, is located primarily within the CNS and is *responsible for communicating among the neurons*.

Interneurons allow the brain to combine the multiple sources of available information to create a coherent picture of the sensory information being conveyed.

The spinal cord is *the long, thin, tubular bundle of nerves and supporting cells that extends down from the brain*. It is the central throughway of information for the body. Within the spinal cord, ascending tracts of sensory neurons relay sensory information from the sense organs to the brain while descending tracts of motor neurons relay motor commands back to the body. When a quicker-than-usual response is required, the spinal cord can do its own processing, bypassing the brain altogether. A reflex is *an involuntary and nearly instantaneous movement in response to a stimulus*. Reflexes are triggered when sensory information is powerful enough to reach a given threshold and the interneurons in the spinal cord act to send a message back through the motor neurons without relaying the information to the brain (Figure **2.4.18**). When you touch a hot stove and immediately pull your hand back, or when you fumble your cell phone and instinctively reach to catch it before it falls, reflexes in your spinal cord order the appropriate responses before your brain even knows what is happening.

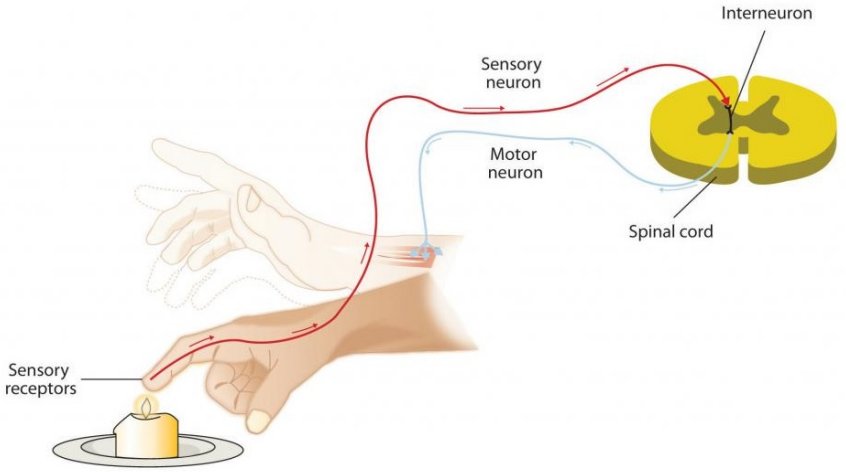


Figure **2.4.18** The Reflex. The central nervous system can interpret signals from sensory neurons and respond to them extremely quickly via the motor neurons without any need for the brain to be involved. These quick responses, known as reflexes, can reduce the damage that we might experience as a result of, for instance, touching a hot stove.

If the central nervous system is the command center of the body, the *peripheral nervous system (PNS)* represents the front line. The PNS links the CNS to the body's sense receptors, muscles, and glands. As you can see in Figure **2.4.19**, the peripheral nervous system is itself divided into two subsystems, one controlling internal responses and one controlling external responses.

The autonomic nervous system (ANS) is *the division of the PNS that governs the internal activities of the human body, including heart rate, breathing, digestion, salivation, perspiration, urination, and sexual arousal*. Many of the actions of the ANS, such as heart rate and digestion, are automatic and out of our conscious control, but others, such as breathing and sexual activity, can be controlled and influenced by conscious processes.

The somatic nervous system (SNS) is *the division of the PNS that controls the external aspects of the body*, including the skeletal muscles, skin, and sense organs. The somatic nervous system consists primarily of motor nerves responsible for sending brain signals for muscle contraction.

The autonomic nervous system itself can be further subdivided into the *sympathetic* and *parasympathetic* systems (Figure **2.4.19**). The sympathetic division of the ANS is *involved in preparing the body for behavior, particularly in response to stress, by activating the organs and the glands in the endocrine system*. The parasympathetic division of the ANS*tends to calm the body by slowing the heart and breathing and by allowing the body to recover from the activities that the sympathetic system causes*. The sympathetic and the parasympathetic divisions normally function in opposition to each other, such that the sympathetic division acts a bit like the accelerator pedal on a car and the parasympathetic division acts like the brake.

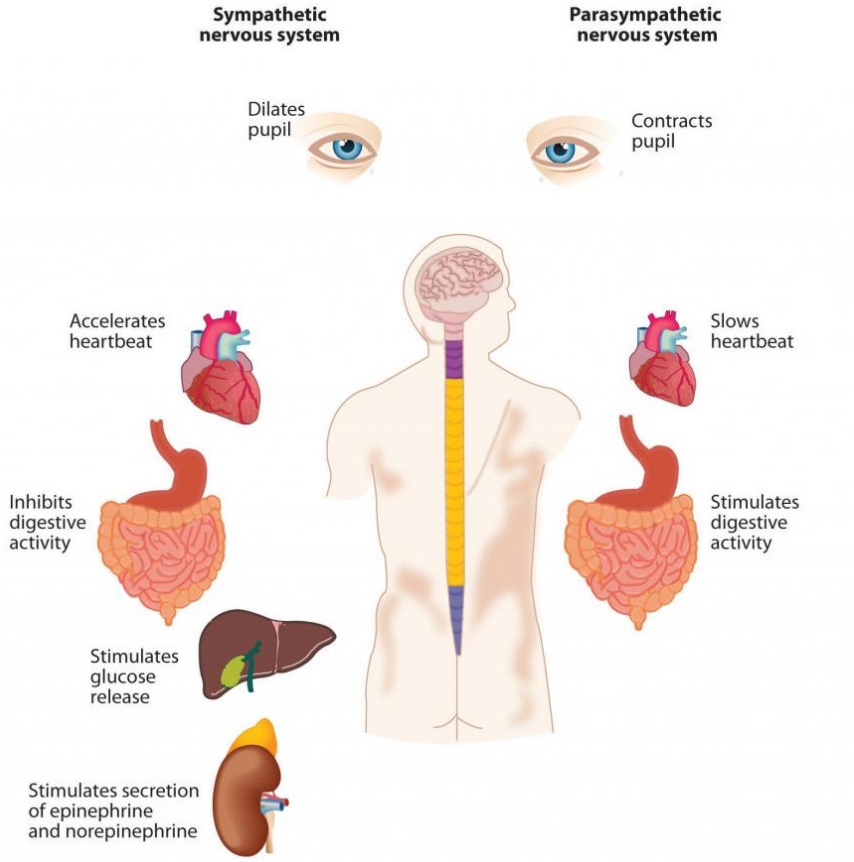


Figure **2.4.19**: The Autonomic Nervous System. The autonomic nervous system has two divisions: The sympathetic division acts to energize the body, preparing it for action. The parasympathetic division acts to calm the body, allowing it to rest.

Our everyday activities are controlled by the interaction between the sympathetic and parasympathetic nervous systems. For example, when we get out of bed in the morning, we would experience a sharp drop in blood pressure if it were not for the action of the sympathetic system, which automatically increases blood flow through the body. Similarly, after we eat a big meal, the parasympathetic system automatically sends more blood to the stomach and intestines, allowing us to efficiently digest the food. And perhaps you've had the experience of not being at all hungry before a stressful event, such as a sports game or an exam (when the sympathetic division was primarily in action), but suddenly finding yourself starved afterward, as the parasympathetic takes over. The two systems work together to maintain vital bodily functions, resulting in homeostasis, *the natural balance in the body's systems*.

The Body's Chemicals Help Control Behavior: The Endocrine System

The nervous system is designed to protect us from danger through its interpretation of and reactions to stimuli. But a primary function of the sympathetic and parasympathetic nervous systems is to interact with the *endocrine system* to elicit chemicals that provide another system for influencing our feelings and behaviors.

A gland in the endocrine system is made up of *groups of cells that function to secrete hormones*. A hormone is *a chemical that moves throughout the body to help regulate emotions and behaviors*. When the hormones released by one gland arrive at receptor tissues or other glands, these receiving receptors may trigger the release of other hormones, resulting in a series of complex chemical chain reactions. The endocrine system works together with the nervous system to influence many aspects of human behavior, including growth, reproduction, and metabolism. And the endocrine system plays a vital role in emotions. Because the glands in men and women differ, hormones also help explain some of the observed behavioral differences between men and women. The major glands in the endocrine system are shown in Figure **2.4.20**.

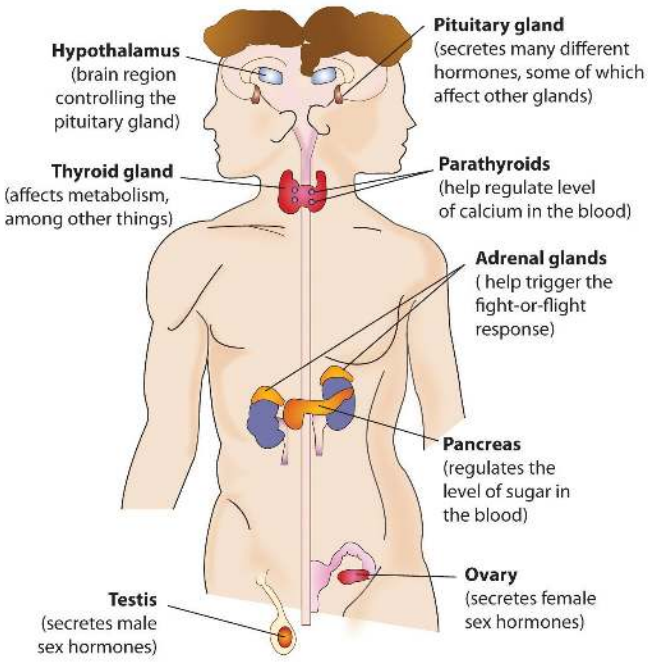


Figure **2.4.20**: The Major Glands of the Endocrine System. The male is shown on the left and the female on the right.

The pituitary gland, *a small pea-sized gland located near the center of the brain, is responsible for controlling the body's growth*, but it also has many other influences that make it of primary importance to regulating behavior. The pituitary secretes hormones that influence our responses to pain as well as hormones that signal the ovaries and testes to make sex hormones. The pituitary gland also controls ovulation and the menstrual cycle in women. Because the pituitary has such an important influence on other glands, it is sometimes known as the "master gland."

Other glands in the endocrine system include the *pancreas*, which secretes hormones designed to keep the body supplied with fuel to produce and maintain stores of energy; the *pineal gland*, located in the middle of the brain, which secretes melatonin, a hormone that helps regulate the wake-sleep cycle; and the *thyroid* and *parathyroid glands*, which are responsible for determining how quickly the body uses energy and hormones, and controlling the amount of calcium in the blood and bones.

The body has two triangular *adrenal glands*, one atop each kidney. The adrenal glands*produce hormones that regulate salt and water balance in the body, and they are involved in metabolism, the immune system, and sexual development and function*. The most important function of the adrenal glands is to secrete the hormones *epinephrine* (also known as *adrenaline*) and *norepinephrine* (also known as *noradrenaline*) when we are excited, threatened, or stressed. Epinephrine and norepinephrine stimulate the sympathetic division of the ANS, causing increased heart and lung activity, dilation of the pupils, and increases in blood sugar, which give the body a surge of energy to respond to a threat. The activity and role of the adrenal glands in response to stress provides an excellent example of the close relationship and interdependency of the nervous and endocrine systems. A quick-acting nervous system is essential for immediate activation of the adrenal glands, while the endocrine system mobilizes the body for action.

The male sex glands, known as the testes, secrete a number of hormones, the most important of which is testosterone, *the male sex hormone*. Testosterone regulates body changes associated with sexual development, including enlargement of the penis, deepening of the voice, growth of facial and pubic hair, and the increase in muscle growth and strength. The ovaries, *the female sex glands*, are located in the pelvis. They produce eggs and secrete the female hormones *estrogen* and *progesterone*. Estrogen is involved in the development of female sexual features, including breast growth, the accumulation of body fat around the hips and thighs, and the growth spurt that occurs during puberty. Both estrogen and progesterone are also involved in pregnancy and the regulation of the menstrual cycle.

Recent research has pinpointed some of the important roles of the sex hormones in social behavior. Dabbs, Hargrove, and Heusel (1996) measured the testosterone levels of 240 men who were members of 12 fraternities at two universities. They also obtained descriptions of the fraternities from university officials, fraternity officers, yearbook and chapter house photographs, and researcher

field notes. The researchers correlated the testosterone levels and the descriptions of each fraternity. They found that the fraternities with the highest average testosterone levels were also more wild and unruly, and one of these fraternities was known across campus for the crudeness of its behavior. On the other hand, the fraternities with the lowest average testosterone levels were more well behaved, friendly and pleasant, academically successful, and socially responsible. Banks and Dabbs (1996) found that juvenile delinquents and prisoners who had high levels of testosterone also acted more violently, and Tremblay et al. (1998) found that testosterone was related to toughness and leadership behaviors in adolescent boys. Although testosterone levels are higher in men than in women, the relationship between testosterone and aggression is not limited to males. Studies have also shown a positive relationship between testosterone and aggression and related behaviors (such as competitiveness) in women (Cashdan, 2003).

It must be kept in mind that the observed relationships between testosterone levels and aggressive behavior that have been found in these studies do not prove that testosterone causes aggression—the relationships are only correlational. In fact, there is evidence that the relationship between violence and testosterone also goes in the other direction: Playing an aggressive game, such as tennis or even chess, increases the testosterone levels of the winners and decreases the testosterone levels of losers (Gladue, Boechler, & McCaul, 1989; Mazur, Booth, & Dabbs, 1992), and perhaps this is why excited soccer fans sometimes riot when their team wins.

Recent research has also begun to document the role that female sex hormones may play in reactions to others. A study about hormonal influences on social-cognitive functioning (Macrae, Alnwick, Milne, & Schloerscheidt, 2002) found that women were more easily able to perceive and categorize male faces during the more fertile phases of their menstrual cycles. Although researchers did not directly measure the presence of hormones, it is likely that phase-specific hormonal differences influenced the women's perceptions.

At this point you can begin to see the important role the hormones play in behavior. But the hormones we have reviewed in this section represent only a subset of the many influences that hormones have on our behaviors. In the chapters to come we will consider the important roles that hormones play in many other behaviors, including sleeping, sexual activity, and helping and harming others.

Key Takeaways

- The body uses both electrical and chemical systems to create homeostasis.
- The CNS is made up of bundles of nerves that carry messages to and from the PNS
- The peripheral nervous system is composed of the autonomic nervous system (ANS) and the peripheral nervous system (PNS). The ANS is further divided into the sympathetic (activating) and parasympathetic (calming) nervous systems. These divisions are activated by glands and organs in the endocrine system.
- Specific nerves, including sensory neurons, motor neurons, and interneurons, each have specific functions.
- The spinal cord may bypass the brain by responding rapidly using reflexes.
- The pituitary gland is a master gland, affecting many other glands.
- Hormones produced by the pituitary and adrenal glands regulate growth, stress, sexual functions, and chemical balance in the body.
- The adrenal glands produce epinephrine and norepinephrine, the hormones responsible for our reactions to stress.
- The sex hormones, testosterone, estrogen, and progesterone, play an important role in sex differences.

Exercises and Critical Thinking

1. Recall a time when you were threatened or stressed. What physiological reactions did you experience in the situation, and what aspects of the endocrine system do you think created those reactions?
2. Consider the emotions that you have experienced over the past several weeks. What hormones do you think might have been involved in creating those emotions?

References

Banks, T., & Dabbs, J. M., Jr. (1996). Salivary testosterone and cortisol in delinquent and violent urban subculture. *Journal of Social Psychology, 136*(1), 49–56.

Cashdan, E. (2003). Hormones and competitive aggression in women. *Aggressive Behavior, 29*(2), 107–115.

Dabbs, J. M., Jr., Hargrove, M. F., & Heusel, C. (1996). Testosterone differences among college fraternities: Well-behaved vs. rambunctious. *Personality and Individual Differences*, *20*(2), 157–161.

Gladue, B. A., Boechler, M., & McCaul, K. D. (1989). Hormonal response to competition in human males. *Aggressive Behavior*, *15*(6), 409–422; Mazur, A., Booth, A., & Dabbs, J. M. (1992). Testosterone and chess competition. *Social Psychology Quarterly*, *55*(1), 70–77.

Macrae, C. N., Alnwick, K. A., Milne, A. B., & Schloerscheidt, A. M. (2002). Person perception across the menstrual cycle: Hormonal influences on social-cognitive functioning. *Psychological Science*, *13*(6), 532–536.

Tremblay, R. E., Schaal, B., Boulerice, B., Arseneault, L., Soussignan, R. G., Paquette, D., & Laurent, D. (1998). Testosterone, physical aggression, dominance, and physical development in early adolescence. *International Journal of Behavioral Development*, *22*(4), 753–777.

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CHAPTER OVERVIEW

3: States of Consciousness

3.1: Sleeping and Dreaming Revitalize Us for Action

3.2: Psychoactive Drugs

3.3: Substance Use Disorders

3.4: Other States of Consciousness

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3.1: Sleeping and Dreaming Revitalize Us for Action

Learning Objectives

1. Draw a graphic showing the usual phases of sleep during a normal night and notate the characteristics of each phase.
2. Review the disorders that affect sleep and the costs of sleep deprivation.
3. Outline and explain the similarities and differences among the different theories of dreaming.

The lives of all organisms, including humans, are influenced by *regularly occurring cycles of behaviors* known as biological rhythms. One important biological rhythm is the annual cycle that guides the migration of birds and the hibernation of bears. Women also experience a 28-day cycle that guides their fertility and menstruation. But perhaps the strongest and most important biorhythm is the daily circadian rhythm (from the Latin *circa*, meaning "about" or "approximately," and *dian*, meaning "daily") *that guides the daily waking and sleeping cycle in many animals*.

Many biological rhythms are coordinated by changes in the level and duration of ambient light, for instance, as winter turns into summer and as night turns into day. In some animals, such as birds, the pineal gland in the brain is directly sensitive to light and its activation influences behavior, such as mating and annual migrations. Light also has a profound effect on humans. We are more likely to experience depression during the dark winter months than during the lighter summer months, an experience known as *seasonal affective disorder (SAD)*, and exposure to bright lights can help reduce this depression (McGinnis, 2007).

Sleep is also influenced by ambient light. In addition to sending visual information to the thalamus, the ganglion cells in the retina send signals to a the *suprachiasmatic nucleus* (SCN) of the hypothalamus, located below the thalamus. The suprachiasmatic nucleus is the body's primary circadian "pacemaker" and contains cells that analyze the strength and duration of the light stimulus and send signals to the pineal gland when the ambient light level is low or its duration is short. In response, the pineal gland secretes *melatonin*, a powerful hormone that facilitates the onset of sleep.

Sleep Stages: Moving Through the Night

Although we lose consciousness as we sleep, the brain nevertheless remains active. The patterns of sleep have been tracked in thousands of research participants who have spent nights sleeping in research labs while their brain waves were recorded by monitors, such as an *electroencephalogram*, or *EEG* (Figure **3.1.3**).

Sleep researchers have found that sleeping people undergo a fairly consistent pattern of sleep stages, each lasting about 90 minutes. As you can see in Figure **3.1.4**, these stages are of two major types: Rapid eye movement (REM) sleep is *a sleep stage characterized by the presence of quick fast eye movements and dreaming.* REM sleep accounts for about 25% of our total sleep time. During REM sleep, our awareness of external events is dramatically reduced, and consciousness is dominated primarily by internally generated images and a lack of overt thinking (Hobson, 2004). During this sleep stage our muscles shut down, and this is probably a good thing as it protects us from hurting ourselves or trying to act out the scenes that are playing in our dreams. The second major sleep type, non-rapid eye movement (non-REM) sleep is *a deep sleep, characterized by very slow brain waves, that is further subdivided into three stages: N1, N2, and N3*. Each of the sleep stages has its own distinct pattern of brain activity (Dement & Kleitman, 1957).

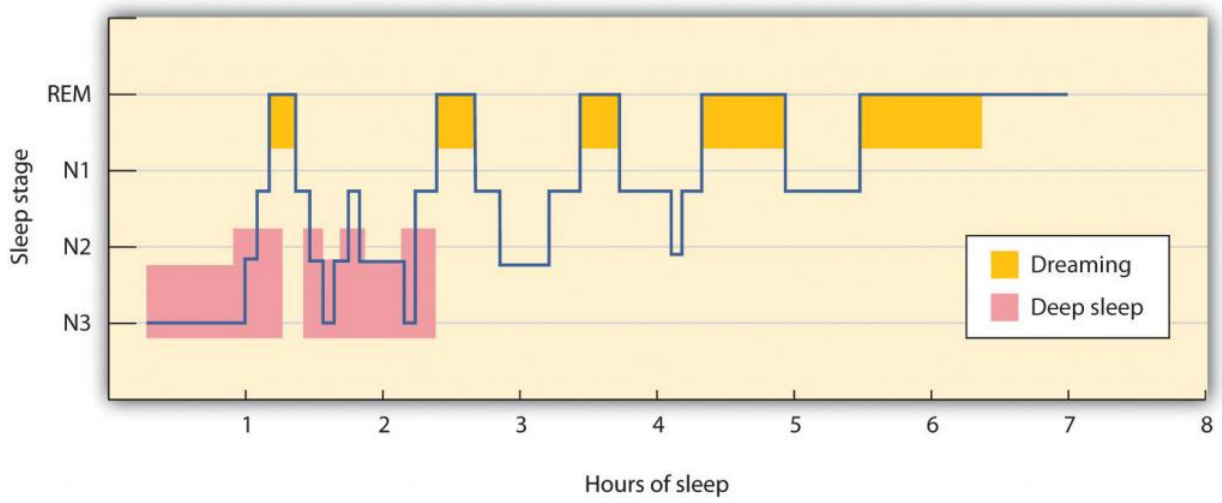


Figure **3.1.4** Stages of Sleep. During a typical night, our sleep cycles move between REM and non-REM sleep, with each cycle repeating at about 90-minute intervals. The deeper non-REM sleep stages usually occur earlier in the night.

As you can see in Figure **3.1.5**, the brain waves that are recorded by an EEG as we sleep show that the brain's activity changes during each stage of sleeping. When we are awake, our brain activity is characterized by the presence of very fast *beta waves*. When we first begin to fall asleep, the waves get longer (*alpha waves*), and as we move into stage N1 sleep, which is characterized by the experience of drowsiness, the brain begins to produce even slower *theta waves*. During stage N1 sleep, some muscle tone is lost, as well as most awareness of the environment. Some people may experience sudden jerks or twitches and even vivid hallucinations during this initial stage of sleep.

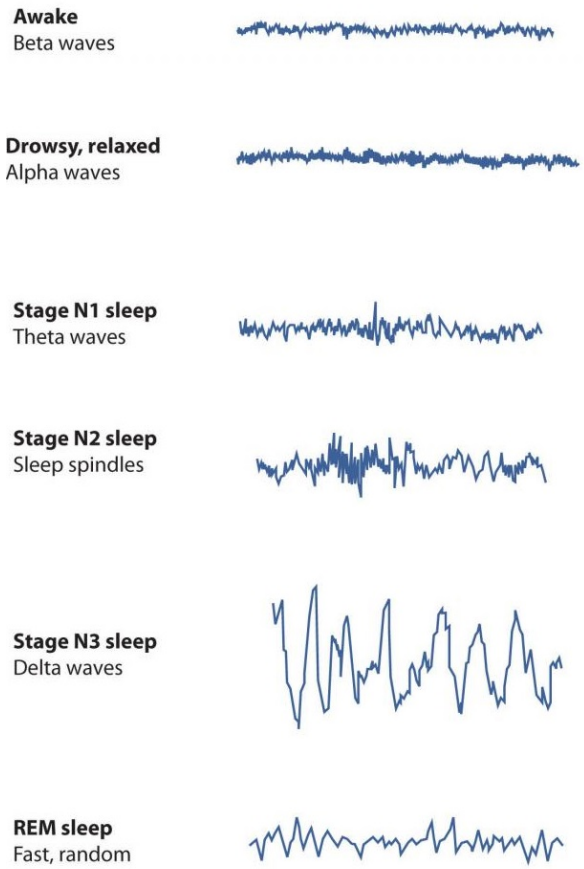


Figure **3.1.5** EEG Recordings of Brain Patterns During Sleep. Each stage of sleep has its own distinct pattern of brain activity.

Normally, if we are allowed to keep sleeping, we will move from stage N1 to stage N2 sleep. During stage N2, muscular activity is further decreased and conscious awareness of the environment is lost. This stage typically represents about half of the total sleep time in normal adults. Stage N2 sleep is characterized by theta waves interspersed with bursts of rapid brain activity known as *sleep spindles*.

Stage N3, also known as *slow wave sleep*, is the deepest level of sleep, characterized by an increased proportion of very slow *delta waves*. This is the stage in which most sleep abnormalities, such as sleepwalking, sleeptalking, nightmares, and bed-wetting occur. Some skeletal muscle tone remains, making it possible for affected individuals to rise from their beds and engage in sometimes very complex behaviors, but consciousness is distant. Even in the deepest sleep, however, we are still aware of the external world. If smoke enters the room or if we hear the cry of a baby we are likely to react, even though we are sound asleep. These occurrences again demonstrate the extent to which we process information outside consciousness.

After falling initially into a very deep sleep, the brain begins to become more active again, and we normally move into the first period of REM sleep about 90 minutes after falling asleep. REM sleep is accompanied by an increase in heart rate, facial twitches, and the repeated rapid eye movements that give this stage its name. People who are awakened during REM sleep almost always report that they were dreaming, while those awakened in other stages of sleep report dreams much less often.

Normally we will go through several cycles of REM and non-REM sleep each night (Figure **3.1.5**). The length of the REM portion of the cycle tends to increase through the night, from about 5 to 10 minutes early in the night to 15 to 20 minutes shortly before awakening in the morning. Dreams also tend to become more elaborate and vivid as the night goes on. Eventually, as the sleep cycle finishes, the brain resumes its faster alpha and beta waves and we awake, normally refreshed.

Sleep Disorders: Problems in Sleeping

According to a recent poll (National Sleep Foundation, 2009), about one-fourth of American adults say they get a good night's sleep only a few nights a month or less. These people are suffering from a sleep disorder known as insomnia, defined as *persistent difficulty falling or staying asleep*. Most cases of insomnia are temporary, lasting from a few days to several weeks, but in some cases insomnia can last for years.

Insomnia can result from physical disorders such as pain due to injury or illness, or from psychological problems such as stress, financial worries, or relationship difficulties. Changes in sleep patterns, such as jet lag, changes in work shift, or even the movement to or from daylight savings time can produce insomnia. Sometimes the sleep that the insomniac does get is disturbed and nonrestorative, and the lack of quality sleep produces impairment of functioning during the day. Ironically, the problem may be compounded by people's anxiety over insomnia itself: Their fear of being unable to sleep may wind up keeping them awake. Some people may also develop a conditioned anxiety to the bedroom or the bed.

People who have difficulty sleeping may turn to drugs to help them sleep. Barbiturates, benzodiazepines, and other sedatives are frequently marketed and prescribed as sleep aids, but they may interrupt the natural stages of the sleep cycle, and in the end are likely to do more harm than good. In some cases they may also promote dependence. Most practitioners of sleep medicine today recommend making environmental and scheduling changes first, followed by therapy for underlying problems, with pharmacological remedies used only as a last resort.



Figure **3.1.6**: Sarah – Big giant ouchie – CC BY 2.0.

Taking pills to sleep is not recommended unless all other methods of improving sleep have been tried. According to the National Sleep Foundation, some steps that can be used to combat insomnia include the following:

- Use the bed and bedroom for sleep and sex only. Do not spend time in bed during the day.
- Establish a regular bedtime routine and a regular sleep-wake schedule.

- Think positively about your sleeping—try not to get anxious just because you are losing a little sleep.
- Do not eat or drink too much close to bedtime.
- Create a sleep-promoting environment that is dark, cool, and comfortable.
- Avoid disturbing noises—consider a bedside fan or white-noise machine to block out disturbing sounds.
- Consume less or no caffeine, particularly late in the day.
- Avoid alcohol and nicotine, especially close to bedtime.
- Exercise, but not within 3 hours before bedtime.
- Avoid naps, particularly in the late afternoon or evening.
- Keep a sleep diary to identify your sleep habits and patterns that you can share with your doctor.

Another common sleep problem is sleep apnea, *a sleep disorder characterized by pauses in breathing that last at least 10 seconds during sleep* (Morgenthaler, Kagramanov, Hanak, & Decker, 2006). In addition to preventing restorative sleep, sleep apnea can also cause high blood pressure and may raise the risk of stroke and heart attack (Yaggi et al., 2005).

Most sleep apnea is caused by an obstruction of the walls of the throat that occurs when we fall asleep. It is most common in obese or older individuals who have lost muscle tone and is particularly common in men. Sleep apnea caused by obstructions is usually treated with an air machine that uses a mask to create a continuous pressure that prevents the airway from collapsing, or with mouthpieces that keep the airway open. If all other treatments have failed, sleep apnea may be treated with surgery to open the airway.

Narcolepsy is *a disorder characterized by extreme daytime sleepiness with frequent episodes of "nodding off."* The syndrome may also be accompanied by attacks of *cataplexy*, in which the individual loses muscle tone, resulting in a partial or complete collapse. It is estimated that at least 200,000 Americans suffer from narcolepsy, although only about a quarter of these people have been diagnosed (National Heart, Lung, and Blood Institute, 2008).

Narcolepsy is in part the result of genetics—people who suffer from the disease lack neurotransmitters that are important in keeping us alert (Taheri, Zeitzer, & Mignot, 2002)—and is also the result of a lack of deep sleep. While most people descend through the sequence of sleep stages, then move back up to REM sleep soon after falling asleep, narcolepsy sufferers move directly into REM and undergo numerous awakenings during the night, often preventing them from getting good sleep.

Narcolepsy can be treated with stimulants, such as amphetamines, to counteract the daytime sleepiness, or with antidepressants to treat a presumed underlying depression. However, since these drugs further disrupt already-abnormal sleep cycles, these approaches may, in the long run, make the problem worse. Many sufferers find relief by taking a number of planned short naps during the day, and some individuals may find it easier to work in jobs that allow them to sleep during the day and work at night.

Other sleep disorders occur when cognitive or motor processes that should be turned off or reduced in magnitude during sleep operate at higher than normal levels (Mahowald & Schenck, 2000). One example is *somnamulism* (sleepwalking), in which the person leaves the bed and moves around while still asleep. Sleepwalking is more common in childhood, with the most frequent occurrences around the age of 12 years. About 4% of adults experience somnambulism (Mahowald & Schenck, 2000).

Sleep terrors is a disruptive sleep disorder, most frequently experienced in childhood, that may involve loud screams and intense panic. The sufferer cannot wake from sleep even though he or she is trying to. In extreme cases, sleep terrors may result in bodily harm or property damage as the sufferer moves about abruptly. Up to 3% of adults suffer from sleep terrors, which typically occur in sleep stage N3 (Mahowald & Schenck, 2000).

Other sleep disorders include *bruxism*, in which the sufferer grinds his teeth during sleep; *restless legs syndrome*, in which the sufferer reports an itching, burning, or otherwise uncomfortable feeling in his legs, usually exacerbated when resting or asleep; and *periodic limb movement disorder*, which involves sudden involuntary movement of limbs. The latter can cause sleep disruption and injury for both the sufferer and bed partner.

Although many sleep disorders occur during non-REM sleep, *REM sleep behavior disorder* (Mahowald & Schenck, 2005) is a condition in which people (usually middle-aged or older men) engage in vigorous and bizarre physical activities during REM sleep in response to intense, violent dreams. As their actions may injure themselves or their sleeping partners, this disorder, thought to be neurological in nature, is normally treated with hypnosis and medications.

The Heavy Costs of Not Sleeping

Our preferred sleep times and our sleep requirements vary throughout our life cycle. Newborns tend to sleep between 16 and 18 hours per day, preschoolers tend to sleep between 10 and 12 hours per day, school-aged children and teenagers usually prefer at least 9 hours of sleep per night, and most adults say that they require 7 to 8 hours per night (Mercer, Merritt, & Cowell, 1998; National Sleep Foundation, 2008). There are also individual differences in need for sleep. Some people do quite well with fewer than 6 hours of sleep per night, whereas others need 9 hours or more. The most recent study by the National Sleep Foundation suggests that adults should get between 7 and 9 hours of sleep per night (Figure **3.1.8**), and yet Americans now average fewer than 7 hours.

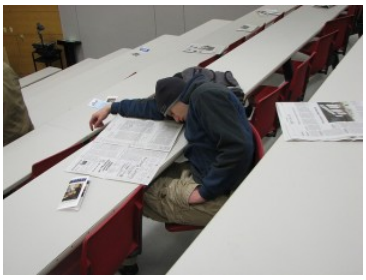


Figure **3.1.7**: Are you getting enough sleep to maintain your health and abilities to concentrate? This student doesn't seem to be.. Hope For Gorilla – sleeping kid in NSC – CC BY 2.0.

Getting needed rest is difficult in part because school and work schedules still follow the early-to-rise timetable that was set years ago. We tend to stay up late to enjoy activities in the evening but then are forced to get up early to go to work or school. The situation is particularly bad for college students, who are likely to combine a heavy academic schedule with an active social life and who may, in some cases, also work. Getting enough sleep is a luxury that many of us seem to be unable or unwilling to afford, and yet sleeping is one of the most important things we can do for ourselves. Continued over time, a nightly deficit of even only 1 or 2 hours can have a substantial impact on mood and performance.

How much sleep do you really need?

Age	Sleep needs
Newborns (0–2 months)	12 to 18 hours
Infants (3–11 months)	14 to 15 hours
Toddlers (1–3 years)	12 to 14 hours
Preschoolers (3–5 years)	11 to 13 hours
School-age children (5–10 years)	10 to 11 hours
Teens (10–17 years)	8.5 to 9.25 hours
Adults	7 to 9 hours

Figure **3.1.8**: Average Hours of Required Sleep per Night. The average U.S. adult reported getting only 6.7 hours of sleep per night, which is less than the recommended range propose by the National Sleep Foundation. Adapted from National Sleep Foundation. (2008). *Sleep in America Poll*. Washington, DC: Author. Retrieved from www.sleepfoundation.org/sites/default/files/2008%20POLL%20SOF.PDF.

Sleep has a vital restorative function, and a prolonged lack of sleep results in increased anxiety, diminished performance, and, if severe and extended, may even result in death. Many road accidents involve sleep deprivation, and people who are sleep deprived show decrements in driving performance similar to those who have ingested alcohol (Hack, Choi, Vijayapalan, Davies, & Stradling, 2001; Williamson & Feyer, 2000). Poor treatment by doctors (Smith-Coggins, Rosekind, Hurd, & Buccino, 1994) and a variety of industrial accidents have also been traced in part to the effects of sleep deprivation.

Good sleep is also important to our health and longevity. It is no surprise that we sleep more when we are sick, because sleep works to fight infection. Sleep deprivation suppresses immune responses that fight off infection, and can lead to obesity, hypertension, and memory impairment (Ferrie et al., 2007; Kushida, 2005). Sleeping well can even save our lives. Dew et al. (2003) found that older adults who had better sleep patterns also lived longer.



Figure **3.1.9**: The Effects of Sleep Deprivation. In 1964, 17-year-old high school student Randy Gardner remained awake for 264 hours (11 days) in order to set a new Guinness World Record. At the request of his worried parents, he was monitored by a U.S. Navy psychiatrist, Lt. Cmdr. John J. Ross. This chart maps the progression of his behavioral changes over the 11 days. Adapted from Ross, J. J. (1965). Neurological findings after prolonged sleep deprivation. *Archives of Neurology, 12*, 399–403.

Dreams and Dreaming

Dreams are *the succession of images, thoughts, sounds, and emotions that passes through our minds while sleeping*. When people are awakened from REM sleep, they normally report that they have been dreaming, suggesting that people normally dream several times a night but that most dreams are forgotten on awakening (Dement, 1997). The content of our dreams generally relates to our everyday experiences and concerns, and frequently our fears and failures (Cartwright, Agargun, Kirkby, & Friedman, 2006; Domhoff, Meyer-Gomes, & Schredl, 2005).

One question that frequently arises is "why do we dream"? Several theories have attempted to answer that question, including the following:

Wish Fulfillment: Many cultures regard dreams as having great significance for the dreamer, either by revealing something important about the dreamer's present circumstances or predicting his future. The Austrian psychologist Sigmund Freud (1913/1988) analyzed the dreams of his patients to help him understand their unconscious needs and desires, and psychotherapists still make use of this technique today. Freud believed that the primary function of dreams was *wish fulfillment*, or the idea that dreaming allows us to act out the desires that we must repress during the day. He differentiated between the *manifest content* of the dream (i.e., its literal actions) and its *latent content* (i.e., the hidden psychological meaning of the dream). Freud believed that the real meaning of dreams is often suppressed by the unconscious mind in order to protect the individual from thoughts and feelings that are hard to cope with. For instance, if a woman dreams about being chased by a snake, Freud might have argued that this represents the woman's fear of sexual intimacy, with the snake serving as a symbol of a man's penis. By uncovering the real meaning of dreams through *psychoanalysis*, Freud believed that people could better understand their problems and resolve the issues that create difficulties in their lives.

Processing important life events: The sleep and dreaming researcher Rosalind Cartwright, however, believes that dreams simply reflect life events that are important to the dreamer. Unlike Freud and Jung, Cartwright's ideas about dreaming have found empirical support. For example, she and her colleagues published a study in which women going through divorce were asked several times over a five month period to report the degree to which their former spouses were on their minds. These same women were awakened during REM sleep in order to provide a detailed account of their dream content. There was a significant positive correlation between the degree to which women thought about their former spouses during waking hours and the number of times

their former spouses appeared as characters in their dreams (Cartwright, Agargun, Kirkby, & Friedman, 2006). Recent research (Horikawa, Tamaki, Miyawaki, & Kamitani, 2013) has uncovered new techniques by which researchers may effectively detect and classify the visual images that occur during dreaming by using fMRI for neural measurement of brain activity patterns, opening the way for additional research in this area.

Memory Consolidation: One possibility is that we dream primarily to help with consolidation, or the moving of information into long-term memory (Alvarenga et al., 2008; Zhang (2004). Rauchs, Desgranges, Foret, and Eustache (2005) found that rats that had been deprived of REM sleep after learning a new task were less able to perform the task again later than were rats that had been allowed to dream, and these differences were greater on tasks that involved learning unusual information or developing new behaviors. Payne and Nadel (2004) argued that the content of dreams is the result of consolidation—we dream about the things that are being moved into long-term memory. Thus dreaming may be an important part of the learning that we do while sleeping (Hobson, Pace-Schott, and Stickgold, 2000).

Activation-synthesis: The *activation-synthesis theory* of dreaming (Hobson & McCarley, 1977; Hobson, 2004) proposes still another explanation for dreaming—namely, that dreams are our brain's interpretation of the random firing of neurons in the brain stem. According to this approach, the signals from the brain stem are sent to the cortex, just as they are when we are awake, but because the pathways from the cortex to skeletal muscles are disconnected during REM sleep, the cortex does not know how to interpret the signals. As a result, the cortex strings the messages together into the coherent stories we experience as dreams.

Protoconsciousness: Recent adaptations to the activation-synthesis theory (e.g., Hobson, 2002) continue to update the theory based on accumulating evidence. For example, Hobson (2009) suggests that dreaming may represent a state of protoconsciousness. In other words, dreaming involves constructing a virtual reality in our heads that we might use to help us during wakefulness. Among a variety of neurobiological evidence, John Hobson cites research on lucid dreams as an opportunity to better understand dreaming in general. **Lucid dreams** are dreams in which certain aspects of wakefulness are maintained during a dream state. In a lucid dream, a person becomes aware of the fact that they are dreaming, and as such, they can control the dream's content (LaBerge, 1990).

Although researchers are still trying to determine the exact causes of dreaming, one thing remains clear—we need to dream. If we are deprived of REM sleep, we quickly become less able to engage in the important tasks of everyday life, until we are finally able to dream again.

Key Takeaways

- Consciousness, our subjective awareness of ourselves and our environment, is functional because it allows us to plan activities and monitor our goals.
- Psychologists believe the consciousness is the result of neural activity in the brain.
- Human and animal behavior is influenced by biological rhythms, including annual, monthly, and circadian rhythms.
- Sleep consists of two major stages: REM and non-REM sleep. Non-REM sleep has three substages, known as stage N1, N2, and N3.
- Each sleep stage is marked by a specific pattern of biological responses and brain wave patterns.
- Sleep is essential for adequate functioning during the day. Sleep disorders, including insomnia, sleep apnea, and narcolepsy, may make it hard for us to sleep well.
- Dreams occur primarily during REM sleep. Some theories of dreaming, such Freud's, are based on the content of the dreams. Other theories of dreaming propose that dreaming is related to memory consolidation. The activation-synthesis theory of dreaming is based only on neural activity.

Exercises and Critical Thinking

1. If you happen to be home alone one night, try this exercise: At nightfall, leave the lights and any other powered equipment off. Does this influence what time you go to sleep as opposed to your normal sleep time?
2. Review your own sleep patterns. Are you getting enough sleep? What makes you think so?
3. Review some of the dreams that you have had recently. Consider how each of the theories of dreaming we have discussed would explain your dreams.

References

Alvarenga, T. A., Patti, C. L., Andersen, M. L., Silva, R. H., Calzavara, M. B., Lopez, G.B.,…Tufik, S. (2008). Paradoxical sleep deprivation impairs acquisition, consolidation and retrieval of a discriminative avoidance task in rats. *Neurobiology of Learning and Memory, 90*, 624–632;

Bodenhausen, G. V. (1990). Stereotypes as judgmental heuristics: Evidence of circadian variations in discrimination. *Psychological Science, 1*, 319–322.

Cartwright, R., Agargun, M., Kirkby, J., & Friedman, J. (2006). Relation of dreams to waking concerns. *Psychiatry Research, 141*(3), 261–270;

Dement, W. (1997) What all undergraduates should know about how their sleeping lives affect their waking lives. *Sleepless at Stanford*. Retrieved from http://www.Stanford.edu/~dement/sleepless.html(opens in new window)

Dement, W., & Kleitman, N. (1957). Cyclic variations in EEG during sleep. *Electroencephalography & Clinical Neurophysiology, 9*, 673–690.

Dew, M. A., Hoch, C. C., Buysse, D. J., Monk, T. H., Begley, A. E., Houck, P. R.,…Reynolds, C. F., III. (2003). Healthy older adults' sleep predicts all-cause mortality at 4 to 19 years of follow-up. *Psychosomatic Medicine, 65*(1), 63–73.

Domhoff, G. W., Meyer-Gomes, K., & Schredl, M. (2005). Dreams as the expression of conceptions and concerns: A comparison of German and American college students. *Imagination, Cognition and Personality, 25*(3), 269–282.

Ferrie, J. E., Shipley, M. J., Cappuccio, F. P., Brunner, E., Miller, M. A., Kumari, M., & Marmot, M. G. (2007). A prospective study of change in sleep duration: Associations with mortality in the Whitehall II cohort. *Sleep, 30*(12), 1659;

Freud, S., & Classics of Medicine Library. (1988). *The interpretation of dreams* (Special ed.). Birmingham, AL: The Classics of Medicine Library. (Original work published 1913)

Hack, M. A., Choi, S. J., Vijayapalan, P., Davies, R. J. O., & Stradling, J. R. S. (2001). Comparison of the effects of sleep deprivation, alcohol and obstructive sleep apnoea (OSA) on simulated steering performance. *Respiratory medicine, 95*(7), 594–601;

Hobson, A. (2004). A model for madness? Dream consciousness: Our understanding of the neurobiology of sleep offers insight into abnormalities in the waking brain. *Nature, 430*, 69–95.

Hobson, J. A., Pace-Schott, E. F., & Stickgold, R. (2000). Dreaming and the brain: Toward a cognitive neuroscience of conscious states. *Behavioral and Brain Sciences, 23*(6), 793–842, 904–1018, 1083–1121.

Hobson, J. A., & McCarley, R. (1977). The brain as a dream state generator: An activation-synthesis hypothesis of the dream process. *American Journal of Psychiatry, 134*, 1335–1348; Hobson, J. A. (2004). *Dreams Freud never had: A new mind science.* New York, NY: Pi Press.

Kushida, C. (2005). *Sleep deprivation: basic science, physiology, and behavior*. London, England: Informa Healthcare.

Mahowald, M., & Schenck, C. (2000). REM sleep parasomnias. *Principles and Practice of Sleep Medicine*, 724–741.

Mahowald, M., & Schenck, C. (2005). REM sleep behavior disorder. *Handbook of Clinical Neurophysiology, 6*, 245–253.

McGinniss, P. (2007). Seasonal affective disorder (SAD)—Treatment and drugs. Mayo Clinic. Retrieved from http://www.mayoclinic.com/health/sea...%2Ddrugs(opens in new window)

Mercer, P., Merritt, S., & Cowell, J. (1998). Differences in reported sleep need among adolescents. *Journal of Adolescent Health, 23*(5), 259–263; National Sleep Foundation. (2008). *Sleep in America Poll*. Washington, DC: Author. Retrieved from www.sleepfoundation.org/sites/default/files/2008%20POLL%20SOF.PDF

Morgenthaler, T. I., Kagramanov, V., Hanak, V., & Decker, P. A. (2006). Complex sleep apnea syndrome: Is it a unique clinical syndrome? *Sleep, 29*(9), 1203–1209. Retrieved from http://www.journalsleep.org/ViewAbst...aspx?pid=26630

National Heart, Lung, and Blood Institute. (2008). Who is at risk for narcolepsy? Retrieved from http://www.nhlbi.nih.gov/health/dci/...r/nar_who.html

National Sleep Foundation. (2009). *Sleep in America Poll*. Washington, DC: Author. Retrieved from www.sleepfoundation.org/sites/default/files/2009%20Sleep%20in%20America%20SOF%20EMBARGOED.pdf

Payne, J., & Nadel, L. (2004). Sleep, dreams, and memory consolidation: The role of the stress hormone cortisol. *Learning & Memory, 11*(6), 671.

Rauchs, G., Desgranges, B., Foret, J., & Eustache, F. (2005). The relationships between memory systems and sleep stages. *Journal of Sleep Research, 14*, 123–140.

Smith-Coggins, R., Rosekind, M. R., Hurd, S., & Buccino, K. R. (1994). Relationship of day versus night sleep to physician performance and mood. *Annals of Emergency Medicine, 24*(5), 928–934.

Taheri, S., Zeitzer, J. M., & Mignot, E. (2002). The role of hypocretins (Orexins) in sleep regulation and narcolepsy. *Annual Review of Neuroscience, 25*, 283–313.

Williamson, A., & Feyer, A. (2000). Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occupational and Environmental Medicine, 57*(10), 649.

Yaggi, H. K., Concato, J., Kernan, W. N., Lichtman, J. H., Brass, L. M., & Mohsenin, V. (2005). Obstructive sleep apnea as a risk factor for stroke and death. *The New England Journal of Medicine, 353*(19), 2034–2041. doi:10.1056/NEJMoa043104

Zhang, J. (2004). Memory process and the function of sleep. *Journal of Theoretics, 6*(6), 1–7.

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3.2: Psychoactive Drugs

By Robert Biswas-Diener and Jake Teeny

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Psychoactive Drugs

On April 16, 1943, Albert Hoffman—a Swiss chemist working in a pharmaceutical company—accidentally ingested a newly synthesized drug. The drug—lysergic acid diethylimide (LSD)—turned out to be a powerful hallucinogen. Hoffman went home and later reported the effects of the drug, describing them as seeing the world through a "warped mirror" and experiencing visions of "extraordinary shapes with intense, kaleidoscopic play of colors." Hoffman had discovered what members of many traditional cultures around the world already knew: there are substances that, when ingested, can have a powerful effect on perception and on consciousness.

Drugs operate on human physiology in a variety of ways and researchers and medical doctors tend to classify drugs according to their effects. Here we will briefly cover 3 categories of drugs: hallucinogens, depressants, and stimulants.

Hallucinogens

It is possible that hallucinogens are the substance that have, historically, been used the most widely. Traditional societies have used plant-based hallucinogens such as peyote, ebene, and psilocybin mushrooms in a wide range of religious ceremonies. **Hallucinogens** are substances that alter a person's perceptions, often by creating visions or hallucinations that are not real. There are a wide range of hallucinogens and many are used as recreational substances in industrialized societies. Common examples include marijuana, LSD, and MDMA (also known as "ecstasy"). Marijuana is the dried flowers of the hemp plant and is often smoked to produce **euphoria**. The active ingredient in marijuana is called THC and can produce distortions in the perception of time, can create a sense of rambling, unrelated thoughts, and is sometimes associated with increased hunger or excessive laughter. The use and possession of marijuana is illegal in most places but this appears to be a trend that is changing. Uruguay, Bangladesh, and several of the United States, have recently legalized marijuana. This may be due, in part, to changing public attitudes or to the fact that marijuana is increasingly used for medical purposes such as the management of nausea or treating glaucoma.

Depressants

Depressants are substances that, as their name suggests, slow down the body's physiology and mental processes. Alcohol is the most widely used depressant. Alcohol's effects include the reduction of inhibition, meaning that intoxicated people are more likely to act in ways they would otherwise be reluctant to. Alcohol's psychological effects are the result of it increasing the neurotransmitter GABA. There are also physical effects, such as loss of balance and coordination, and these stem from the way that alcohol interferes with the coordination of the visual and motor systems of the brain. Despite the fact that alcohol is so widely accepted in many cultures it is also associated with a variety of dangers. First, alcohol is toxic, meaning that it acts like a poison because it is possible to drink more alcohol than the body can effectively remove from the bloodstream. When a person's **blood alcohol content (BAC)** reaches .3 to .4% there is a serious risk of death. Second, the lack of judgment and physical control associated with alcohol is associated with more risk taking behavior or dangerous behavior such as drunk driving. Finally, alcohol is addictive and heavy drinkers often experience significant interference with their ability to work effectively or in their close relationships.

Other common depressants include opiates (also called "narcotics"), which are substances synthesized from the poppy flower. Opiates stimulate endorphin production in the brain and because of this they are often used as pain killers by medical professionals. Unfortunately, because opiates such as Oxycontin so reliably produce euphoria they are increasingly used—illegally—as recreational substances. Opiates are highly addictive.



Caffeine is the most widely consumed stimulant in the world. Be honest, how many cups of , tea, or energy drinks have you had today? [Image: Personeelsnet, https://goo.gl/h0GQ3R, CC BY-SA 2.0, goo.gl/iZlxAE]

Stimulants are substances that "speed up" the body's physiological and mental processes. Two commonly used stimulants are caffeine—the drug found in coffee and tea—and nicotine, the active drug in cigarettes and other tobacco products. These substances are both legal and relatively inexpensive, leading to their widespread use. Many people are attracted to stimulants because they feel more alert when under the influence of these drugs. As with any drug there are health risks associated with consumption. For example, excessive consumption of these types of stimulants can result in anxiety, headaches, and insomnia. Similarly, smoking cigarettes—the most common means of ingesting nicotine—is associated with higher risks of cancer. For instance, among heavy smokers 90% of lung cancer is directly attributable to smoking (Stewart & Kleihues, 2003).

There are other stimulants such as cocaine and methamphetamine (also known as "crystal meth" or "ice") that are illegal substances that are commonly used. These substances act by blocking "re-uptake" of dopamine in the brain. This means that the brain does not naturally clear out the dopamine and that it builds up in the synapse, creating euphoria and alertness. As the effects wear off it stimulates strong cravings for more of the drug. Because of this these powerful stimulants are highly addictive.

References

- Abbot, N. C., Stead, L. F., White, A. R., Barnes, J., & Ernst, E. (1998). Hypnotherapy for smoking cessation. *Cochrane Database of Systematic Reviews*, 2.
- Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, *71*(2), 230.
- Buboltz, W., Brown, F. & Soper, B. (2001). Sleep habits and patterns of college students: A preliminary study. *Journal of American College Health*, 50, 131-135.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, *39*(5), 752.
- Ewin, D. M. (1978). *Clinical use of hypnosis for attenuation of burn depth. Hypnosis at its Bicentennial-Selected Papers from the Seventh International Congress of Hypnosis and Psychosomatic Medicine*. New York: Plenum Press.
- Freud, S. (2001). *The Standard Edition of the Complete Psychological Works of Sigmund Freud: The Interpretation of Dreams* (First Part) (Vol. 4). Random House.
- Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology*, *60*(4), 509.
- Greenwald, A. G., & Farnham, S. D. (2000). Using the Implicit Association Test to measure self-esteem and self-concept. *Journal of Personality and Social Psychology*, 79, 1022-1038.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. K. L. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 74, 1464-1480.

- Kihlstrom, J.F. (2003). Hypnosis and memory. In J.F. Byrne (Ed.), *Learning and memory*, 2nd ed. (pp. 240-242). Farmington Hills, Mi.: Macmillan Reference
- Kirsch, I., & Lynn, S. J. (1995). Altered state of hypnosis: Changes in the theoretical landscape. *American Psychologist*, *50*(10), 846.
- Lynn S. J., and Kirsch I. (2006). *Essentials of clinical hypnosis*. Washington, DC: American Psychological Association.
- Lynn, S. J., Rhue, J. W., & Weekes, J. R. (1990). Hypnotic involuntariness: A social-cognitive analysis. *Psychological Review*, 97, 169–184.
- Manoach, D. S., Thakkar, K. N., Stroynowski, E., Ely, A., McKinley, S. K., Wamsley, E., ... & Stickgold, R. (2010). Reduced overnight consolidation of procedural learning in chronic medicated schizophrenia is related to specific sleep stages. *Journal of Psychiatric Research*, *44*(2), 112-120.
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration website. *Group Dynamics*, *6*(1), 101-115.
- Patterson, D. R., Everett, J. J., Burns, G. L., & Marvin, J. A. (1992). Hypnosis for the treatment of burn pain. *Journal of Consulting and Clinical Psychology*, 60, 713-17
- Pekala, R. J., Kumar, V. K., Maurer, R., Elliott-Carter, N., Moon, E., & Mullen, K. (2010). Suggestibility, expectancy, trance state effects, and hypnotic depth: I. Implications for understanding hypnotism. *American Journal of Clinical Hypnosis*, *52*(4), 275-290.
- Petty, R. E., & Cacioppo, J. T. (1986). The Elaboration Likelihood Model of persuasion. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 19, pp. 123-205). New York: Academic Press.
- Raichle, M. E. (2015). The brain's default mode network. *Annual Review of Neuroscience*, *38*, 433-447.
- Stewart, B. & Kleinhues, P. (2003). *World cancer report*. World Health Organization.
- Syrjala, K. L., Cummings, C., & Donaldson, G. W. (1992). Hypnosis or cognitive behavioral training for the reduction of pain and nausea during cancer treatment: A controlled clinical trial. *Pain*, 48, 137-46.
- Wegener, D. T., & Petty, R. E. (1997). The flexible correction model: The role of naive theories of bias in bias correction. *Advances in Experimental Social Psychology*, 29, 142-208.
- Wickramasekera II, I. E., & Szlyk, J. (2003). Could empathy be a predictor of hypnotic ability? *International Journal of Clinical and Experimental Hypnosis*, *51*(4), 390–399.
- Williams, L. E., & Bargh, J. A. (2008). Experiencing physical warmth promotes interpersonal warmth. *Science*, *322*(5901), 606-607.
- Öhman, A., & Soares, J. J. (1994). \"Unconscious anxiety\": phobic responses to masked stimuli. *Journal of Abnormal Psychology*, *103*(2), 231.
- Šušmáková, K., & Krakovská, A. (2008). Discrimination ability of individual measures used in sleep stages classification. *Artificial Intelligence in Medicine*, *44*(3), 261-277.

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3.3: Substance Use Disorders

Learning Objectives

- Describe the diagnostic criteria for substance use disorders

Substance Use Disorders

The fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, *Fifth Edition* (DSM-5) is used by clinicians to diagnose individuals suffering from various psychological disorders. Drug use disorders are addictive disorders, and the criteria for specific substance (drug) use disorders are described in DSM-5. A person who has a **substance use disorder** often uses more of the substance than they originally intended to and continues to use that substance despite experiencing significant adverse consequences. In individuals diagnosed with a substance use disorder, there is a compulsive pattern of drug use that is often associated with both physical and psychological dependence.

Physical dependence involves changes in normal bodily functions—the user will experience withdrawal from the drug upon cessation of use. In contrast, a person who has **psychological dependence** has an emotional, rather than physical, need for the drug and may use the drug to relieve psychological distress. **Tolerance** is linked to physiological dependence, and it occurs when a person requires more and more drug to achieve effects previously experienced at lower doses. Tolerance can cause the user to increase the amount of drug used to a dangerous level—even to the point of overdose and death.

Drug **withdrawal** includes a variety of negative symptoms experienced when drug use is discontinued. These symptoms usually are opposite of the effects of the drug. For example, withdrawal from sedative drugs often produces unpleasant arousal and agitation. In addition to withdrawal, many individuals who are diagnosed with substance use disorders will also develop tolerance to these substances. Psychological dependence, or drug craving, is a recent addition to the diagnostic criteria for substance use disorder in DSM-5. This is an important factor because we can develop tolerance and experience withdrawal from any number of drugs that we do not abuse. In other words, physical dependence in and of itself is of limited utility in determining whether or not someone has a substance use disorder.

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3.4: Other States of Consciousness

Our states of consciousness change as we move from wakefulness to sleep. We also alter our consciousness through the use of various psychoactive drugs. This final section will consider hypnotic as an additional example of altered states of consciousness experienced by some individuals.

Hypnosis

Hypnosis is a state of extreme self-focus and attention in which minimal attention is given to external stimuli. In the therapeutic setting, a clinician may use relaxation and suggestion in an attempt to alter the thoughts and perceptions of a patient. For individuals who are especially open to the power of suggestion, hypnosis can prove to be a very effective technique, and brain imaging studies have demonstrated that hypnotic states are associated with global changes in brain functioning (Del Casale et al., 2012; Guldenmund, Vanhaudenhuyse, Boly, Laureys, & Soddu, 2012).

Historically, hypnosis has been viewed with some suspicion because of its portrayal in popular media and entertainment. Therefore, it is important to make a distinction between hypnosis as an empirically based therapeutic approach versus as a form of entertainment. Contrary to popular belief, individuals undergoing hypnosis usually have clear memories of the hypnotic experience and are in control of their own behaviors.



Figure 3.4.1: Popular portrayals of hypnosis have led to some widely-held misconceptions.

How exactly does a hypnotist bring a participant to a state of hypnosis? While there are variations, there are four parts that appear consistent in bringing people into the state of suggestibility associated with hypnosis (National Research Council, 1994). These components include:

- The participant is guided to focus on one thing, such as the hypnotist's words or a ticking watch.
- The participant is made comfortable and is directed to be relaxed and sleepy.
- The participant is told to be open to the process of hypnosis, trust the hypnotist and let go.
- The participant is encouraged to use his or her imagination.

These steps are conducive to being open to the heightened suggestibility of hypnosis.

People vary in terms of their ability to be hypnotized, but a review of available research suggests that most people are at least moderately hypnotizable (Kihlstrom, 2013). Hypnosis in conjunction with other techniques is used for a variety of therapeutic purposes and has shown to be at least somewhat effective for pain management, treatment of depression and anxiety, smoking cessation, and weight loss (Alladin, 2012; Elkins, Johnson, & Fisher, 2012; Golden, 2012; Montgomery, Schnur, & Kravits, 2012).

Some hypnotists have tried to use hypnosis to help people remember events, such as childhood experiences or details of crime scenes, that they have forgotten or repressed. The idea is that some memories have been stored but can no longer be retrieved, and that hypnosis can aid in the retrieval process. But research finds that this is not successful: People who are hypnotized and then asked to relive their childhood act like children, but they do not accurately recall the things that occurred to them in their own childhood (Silverman & Retzlaff, 1986). Furthermore, the suggestibility produced through hypnosis may lead people to erroneously recall experiences that they did not have (Newman & Baumeister, 1996). Many states and jurisdictions have therefore banned the use of hypnosis in criminal trials because the "evidence" recovered through hypnosis is likely to be fabricated and inaccurate.

How does hypnosis work? Two theories attempt to answer this question: One theory views hypnosis as dissociation and the other theory views it as the performance of a social role. According to the dissociation view, hypnosis is effectively a dissociated state of consciousness, much like our earlier example where you may drive to work, but you are only minimally aware of the process of driving because your attention is focused elsewhere. This theory is supported by Ernest Hilgard's research into hypnosis and pain. In Hilgard's experiments, he induced participants into a state of hypnosis, and placed their arms into ice water. Participants were told they would not feel pain, but they could press a button if they did; while they reported not feeling pain, they did, in fact, press the button, suggesting a dissociation of consciousness while in the hypnotic state (Hilgard & Hilgard, 1994).

Taking a different approach to explain hypnosis, the social-cognitive theory of hypnosis sees people in hypnotic states as performing the social role of a hypnotized person. As you will learn when you study social roles, people's behavior can be shaped by their expectations of how they should act in a given situation. Some view a hypnotized person's behavior not as an altered or dissociated state of consciousness, but as their fulfillment of the social expectations for that role.

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CHAPTER OVERVIEW

4: Growing and Developing

4.1: Conception and Prenatal Development

4.2: Infancy and Childhood- Exploring and Learning

4.3: Adolescence - Developing Independence and Identity

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4.1: Conception and Prenatal Development

Learning Objectives

1. Review the stages of prenatal development.
2. Explain how the developing embryo and fetus may be harmed by the presence of teratogens and describe what a mother can do to reduce her risk.

Conception occurs when an egg from the mother is fertilized by a sperm from the father. In humans, the conception process begins with ovulation, *when an ovum, or egg (the largest cell in the human body), which has been stored in one of the mother's two ovaries, matures and is released into the fallopian tube*. Ovulation occurs about halfway through the woman's menstrual cycle and is aided by the release of a complex combination of hormones. In addition to helping the egg mature, the hormones also cause the lining of the uterus to grow thicker and more suitable for implantation of a fertilized egg.

If the woman has had sexual intercourse within 1 or 2 days of the egg's maturation, one of the up to 500 million sperm deposited by the man's ejaculation, which are traveling up the fallopian tube, may fertilize the egg. Although few of the sperm are able to make the long journey, some of the strongest swimmers succeed in meeting the egg. As the sperm reach the egg in the fallopian tube, they release enzymes that attack the outer jellylike protective coating of the egg, each trying to be the first to enter. As soon as one of the millions of sperm enters the egg's coating, the egg immediately responds by both blocking out all other challengers and at the same time pulling in the single successful sperm.

The Zygote

Within several hours, half of the 23 chromosomes from the egg and half of the 23 chromosomes from the sperm fuse together, creating a zygote—*a fertilized ovum*. The zygote continues to travel down the fallopian tube to the uterus. Although the uterus is only about 4 inches away in the woman's body, this is nevertheless a substantial journey for a microscopic organism, and fewer than half of zygotes survive beyond this earliest stage of life. If the zygote is still viable when it completes the journey, it will attach itself to the wall of the uterus, but if it is not, it will be flushed out in the woman's menstrual flow. During this time, the cells in the zygote continue to divide: The original two cells become four, those four become eight, and so on, until there are thousands (and eventually trillions) of cells. Soon the cells begin to *differentiate*, each taking on a separate function. The earliest differentiation is between the cells on the inside of the zygote, which will begin to form the developing human being, and the cells on the outside, which will form the protective environment that will provide support for the new life throughout the pregnancy.

The Embryo

Once the zygote attaches to the wall of the uterus, it is known as the embryo. During the embryonic phase, which will last for the next 6 weeks, the major internal and external organs are formed, each beginning at the microscopic level, with only a few cells. The changes in the embryo's appearance will continue rapidly from this point until birth.

While the inner layer of embryonic cells is busy forming the embryo itself, the outer layer is forming the surrounding protective environment that will help the embryo survive the pregnancy. This environment consists of three major structures: The amniotic sac is *the fluid-filled reservoir in which the embryo (soon to be known as a fetus) will live until birth, and which acts as both a cushion against outside pressure and as a temperature regulator*. The placenta is *an organ that allows the exchange of nutrients between the embryo and the mother, while at the same time filtering out harmful material*. The filtering occurs through a thin membrane that separates the mother's blood from the blood of the fetus, allowing them to share only the material that is able to pass through the filter. Finally, the umbilical cord*links the embryo directly to the placenta and transfers all material to the fetus*. Thus the placenta and the umbilical cord protect the fetus from many foreign agents in the mother's system that might otherwise pose a threat.

The Fetus

Beginning in the 9th week after conception, the embryo becomes a fetus. The defining characteristic of the fetal stage is growth. All the major aspects of the growing organism have been formed in the embryonic phase, and now the fetus has approximately six months to go from weighing less than an ounce to weighing an average of 6 to 8 pounds. That's quite a growth spurt.

The fetus begins to take on many of the characteristics of a human being, including moving (by the 3rd month the fetus is able to curl and open its fingers, form fists, and wiggle its toes), sleeping, as well as early forms of swallowing and breathing. The fetus begins to develop its senses, becoming able to distinguish tastes and respond to sounds. Research has found that the fetus even develops some initial preferences. A newborn prefers the mother's voice to that of a stranger, the languages heard in the womb over other languages (DeCasper & Fifer, 1980; Moon, Cooper, & Fifer, 1993), and even the kinds of foods that the mother ate during the pregnancy (Mennella, Jagnow, & Beauchamp, 2001). By the end of the 3rd month of pregnancy, the sexual organs are visible.

How the Environment Can Affect the Vulnerable Fetus

Prenatal development is a complicated process and may not always go as planned. About 45% of pregnancies result in a miscarriage, often without the mother ever being aware it has occurred (Moore & Persaud, 1993). Although the amniotic sac and the placenta are designed to protect the embryo, *substances that can harm the fetus*, known as teratogens, may nevertheless cause problems. Teratogens include general environmental factors, such as air pollution and radiation, but also the cigarettes, alcohol, and drugs that the mother may use. Teratogens do not always harm the fetus, but they are more likely to do so when they occur in larger amounts, for longer time periods, and during the more sensitive phases, as when the fetus is growing most rapidly. The most vulnerable period for many of the fetal organs is very early in the pregnancy—before the mother even knows she is pregnant.

Harmful substances that the mother ingests may harm the child. Cigarette smoking, for example, reduces the blood oxygen for both the mother and child and can cause a fetus to be born severely underweight. Another serious threat is fetal alcohol syndrome (FAS), *a condition caused by maternal alcohol drinking that can lead to numerous detrimental developmental effects, including limb and facial abnormalities, genital anomalies, and mental retardation*. One in about every 500 babies in the United States is born with fetal alcohol syndrome, and it is considered one of the leading causes of retardation in the world today (Niccols, 1994). Because there is no known safe level of alcohol consumption for a pregnant woman, the U.S. Centers for Disease Control and Prevention indicates that "a pregnant woman should not drink alcohol" (Centers for Disease Control and Prevention, 2005). Therefore, the best approach for expectant mothers is to avoid alcohol completely. Maternal drug abuse is also of major concern and is considered one of the greatest risk factors facing unborn children.



Figure **4.1.1**: Prenatal screenings, including a sonogram, help detect potential birth defects and other potentially dangerous conditions. (Daniel Lobo – Ecografía – CC BY 2.0).

The environment in which the mother is living also has a major impact on infant development (Duncan & Brooks-Gunn, 2000; Haber & Toro, 2004). Children born into homelessness or poverty are more likely to have mothers who are malnourished, who suffer from domestic violence, stress, and other psychological problems, and who smoke or abuse drugs. And children born into poverty are also more likely to be exposed to teratogens. Poverty's impact may also amplify other issues, creating substantial problems for healthy child development (Evans & English, 2002; Gunnar & Quevedo, 2007).

Mothers normally receive genetic and blood tests during the first months of pregnancy to determine the health of the embryo or fetus. They may undergo sonogram, ultrasound, amniocentesis, or other testing. The screenings detect potential birth defects, including neural tube defects, chromosomal abnormalities (such as Down syndrome), genetic diseases, and other potentially dangerous conditions. Early diagnosis of prenatal problems can allow medical treatment to improve the health of the fetus.

Key Takeaways

- Development begins at the moment of conception, when the sperm from the father merges with the egg from the mother.
- Within a span of 9 months, development progresses from a single cell into a zygote and then into an embryo and fetus.
- The fetus is connected to the mother through the umbilical cord and the placenta, which allow the fetus and mother to exchange nourishment and waste. The fetus is protected by the amniotic sac.

- The embryo and fetus are vulnerable and may be harmed by the presence of teratogens.
- Smoking, alcohol use, and drug use are all likely to be harmful to the developing embryo or fetus, and the mother should entirely refrain from these behaviors during pregnancy or if she expects to become pregnant.
- Environmental factors, especially homelessness and poverty, have a substantial negative effect on healthy child development.

Exercises and Critical Thinking

1. What behaviors must a woman avoid engaging in when she decides to try to become pregnant, or when she finds out she is pregnant? Do you think the ability of a mother to engage in healthy behaviors should influence her choice to have a child?
2. Given the negative effects of poverty on human development, what steps do you think that societies should take to try to reduce poverty?

References

Centers for Disease Control and Prevention (2005). *Alcohol use and pregnancy*. Retrieved from www.cdc.gov/ncbddd/factsheets/FAS_alcoholuse.pdf

DeCasper, A. J., & Fifer, W. P. (1980). Of human bonding: Newborns prefer their mothers' voices. *Science, 208*, 1174–1176;

Duncan, G., & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development, 71*(1), 188–196;

Evans, G. W., & English, K. (2002). The environment of poverty: Multiple stressor exposure, psychophysiological stress, and socio-emotional adjustment. *Child Development, 73*(4), 1238–1248;

Gunnar, M., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology, 58*, 145–173.

Haber, M., & Toro, P. (2004). Homelessness among families, children, and adolescents: An ecological–developmental perspective. *Clinical Child and Family Psychology Review, 7*(3), 123–164.

Mennella, J. A., Jagnow, C. P., & Beauchamp, G. K. (2001). Prenatal and postnatal flavor learning by human infants. *Pediatrics, 107*(6), e88.

Moon, C., Cooper, R. P., & Fifer, W. P. (1993). Two-day-olds prefer their native language. *Infant Behavior & Development, 16*, 495–500.

Moore, K., & Persaud, T. (1993). *The developing human: Clinically oriented embryology* (5th ed.). Philadelphia, PA: Saunders.

Niccols, G. A. (1994). Fetal alcohol syndrome: Implications for psychologists. *Clinical Psychology Review, 14*, 91–111.

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4.2: Infancy and Childhood- Exploring and Learning

Learning Objectives

1. Describe the abilities that newborn infants possess and how they actively interact with their environments.
2. List the stages in Piaget's model of cognitive development and explain the concepts that are mastered in each stage
3. Critique Piaget's theory of cognitive development and describe other theories that complement and expand on it.
4. Summarize the important processes of social development that occur in infancy and childhood.

If all has gone well, a baby is born sometime around the 38th week of pregnancy. The fetus is responsible, at least in part, for its own birth because chemicals released by the developing fetal brain trigger the muscles in the mother's uterus to start the rhythmic contractions of childbirth. The contractions are initially spaced at about 15-minute intervals but come more rapidly with time. When the contractions reach an interval of 2 to 3 minutes, the mother is requested to assist in the labor and help push the baby out.

The Newborn Arrives With Many Behaviors Intact

Newborns are already prepared to face the new world they are about to experience. As you can see in Table **4.2.2**, babies are equipped with a variety of reflexes, each providing an ability that will help them survive their first few months of life as they continue to learn new routines to help them survive in and manipulate their environments.

Table **4.2.2**: Survival Reflexes in Newborns

Name	Stimulus	Response	Significance
Rooting reflex	The baby's cheek is stroked.	The baby turns its head toward the stroking, opens its mouth, and tries to suck.	Ensures the infant's feeding will be a reflexive habit
(click to see video)			
Blink reflex	A light is flashed in the baby's eyes.	The baby closes both eyes.	Protects eyes from strong and potentially dangerous stimuli
(click to see video)			
Withdrawal reflex	A soft pinprick is applied to the sole of the baby's foot.	The baby flexes the leg.	Keeps the exploring infant away from painful stimuli
(click to see video)			
Tonic neck reflex	The baby is laid down on its back.	The baby turns its head to one side and extends the arm on the same side.	Helps develop hand-eye coordination
(click to see video)			
Grasp reflex	An object is pressed into the palm of the baby.	The baby grasps the object pressed and can even hold its own weight for a brief period.	Helps in exploratory learning
(click to see video)			
Moro reflex	Loud noises or a sudden drop in height while holding the baby.	The baby extends arms and legs and quickly brings them in as if trying to grasp something.	Protects from falling; could have assisted infants in holding onto their mothers during rough traveling
(click to see video)			
Stepping reflex	The baby is suspended with bare feet just above a surface and is moved forward.	Baby makes stepping motions as if trying to walk.	Helps encourage motor development
(click to see video)			

In addition to reflexes, newborns have preferences—they like sweet tasting foods at first, while becoming more open to salty items by 4 months of age (Beauchamp, Cowart, Menellia, & Marsh, 1994; Blass & Smith, 1992). Newborns also prefer the smell of their mothers. An infant only 6 days old is significantly more likely to turn toward its own mother's breast pad than to the breast pad of another baby's mother (Porter, Makin, Davis, & Christensen, 1992), and a newborn also shows a preference for the face of its own mother (Bushnell, Sai, & Mullin, 1989).

Although infants are born ready to engage in some activities, they also contribute to their own development through their own behaviors. The child's knowledge and abilities increase as it babbles, talks, crawls, tastes, grasps, plays, and interacts with the objects in the environment (Gibson, Rosenzweig, & Porter, 1988; Gibson & Pick, 2000; Smith & Thelen, 2003). Parents may help in this process by providing a variety of activities and experiences for the child. Research has found that animals raised in environments with more novel objects and that engage in a variety of stimulating activities have more brain synapses and larger cerebral cortexes, and they perform better on a variety of learning tasks compared with animals raised in more impoverished environments (Juraska, Henderson, & Müller, 1984). Similar effects are likely occurring in children who have opportunities to play, explore, and interact with their environments (Soska, Adolph, & Johnson, 2010).

Research Focus: Using the Habituation Technique to Study What Infants Know

It may seem to you that babies have little ability to view, hear, understand, or remember the world around them. Indeed, the famous psychologist William James presumed that the newborn experiences a “blooming, buzzing confusion” (James, 1890, p. 462). And you may think that, even if babies do know more than James gave them credit for, it might not be possible to find out what they know. After all, infants can’t talk or respond to questions, so how would we ever find out? But over the past two decades, developmental psychologists have created new ways to determine what babies know, and they have found that they know much more than you, or William James, might have expected.

One way that we can learn about the cognitive development of babies is by measuring their behavior in response to the stimuli around them. For instance, some researchers have given babies the chance to control which shapes they get to see or which sounds they get to hear according to how hard they suck on a pacifier (Trehub & Rabinovitch, 1972). The sucking behavior is used as a measure of the infants’ interest in the stimuli—the sounds or images they suck hardest in response to are the ones we can assume they prefer.

Another approach to understanding cognitive development by observing the behavior of infants is through the use of the habituation technique. Habituation refers to *the decreased responsiveness toward a stimulus after it has been presented numerous times in succession*. Organisms, including infants, tend to be more interested in things the first few times they experience them and become less interested in them with more frequent exposure. Developmental psychologists have used this general principle to help them understand what babies remember and understand.

In the habituation procedure, a baby is placed in a high chair and presented with visual stimuli while a video camera records the infant’s eye and face movements. When the experiment begins, a stimulus (e.g., the face of an adult) appears in the baby’s field of view, and the amount of time the baby looks at the face is recorded by the camera. Then the stimulus is removed for a few seconds before it appears again and the gaze is again measured. Over time, the baby starts to habituate to the face, such that each presentation elicits less gazing at the stimulus. Then, a new stimulus (e.g., the face of a different adult or the same face looking in a different direction) is presented, and the researchers observe whether the gaze time significantly increases. You can see that, if the infant’s gaze time increases when a new stimulus is presented, this indicates that the baby can differentiate the two stimuli.



Figure **4.2.2**: The habituation procedure is used to assess the cognitive abilities of infants. Toshimasa Ishibashi – CC BY 2.0.

Although this procedure is very simple, it allows researchers to create variations that reveal a great deal about a newborn’s cognitive ability. The trick is simply to change the stimulus in controlled ways to see if the baby “notices the difference.” Research using the habituation procedure has found that babies can notice changes in colors, sounds, and even principles of numbers and physics. For instance, in one experiment reported by Karen Wynn (1995), 6-month-old babies were shown a presentation of a puppet that repeatedly jumped up and down either two or three times, resting for a couple of seconds between sequences (the length of time and the speed of the jumping were controlled). After the infants habituated to this display, the presentation was changed such that the puppet jumped a different number of times. As you can see in Figure **4.2.3**, the infants’ gaze time increased when Wynn changed the presentation, suggesting that the infants could tell the difference between the number of jumps.

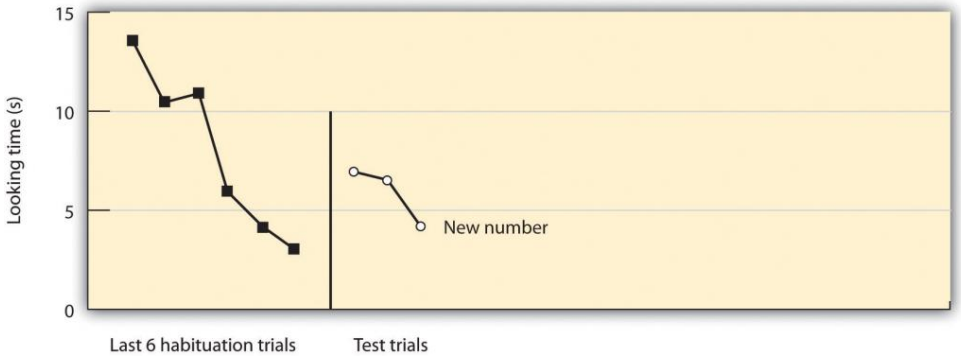


Figure **4.2.3**: Can Infants Do Math? Karen Wynn found that babies that had habituated to a puppet jumping either two or three times significantly increased their gaze when the puppet began to jump a different number of times. Adapted from Wynn, K. (1995). Infants possess a system of numerical knowledge. *Current Directions in Psychological Science, 4*, 172–176.

Cognitive Development During Childhood

Childhood is a time in which changes occur quickly. The child is growing physically, and cognitive abilities are also developing. During this time the child learns to actively manipulate and control the environment, and is first exposed to the requirements of society, particularly the need to control the bladder and bowels. According to Erik Erikson, the challenges that the child must attain in childhood relate to the development of *initiative*, *competence*, and *independence*. Children need to learn to explore the world, to become self-reliant, and to make their own way in the environment.



Figure **4.2.4**: Jean Piaget developed his theories of child development by observing the behaviors of children. (mirjoran – Jean Piaget – CC BY 2.0)

These skills do not come overnight. Neurological changes during childhood provide children the ability to do some things at certain ages, and yet make it impossible for them to do other things. This fact was made apparent through the groundbreaking work of the Swiss psychologist Jean Piaget. During the 1920s, Piaget was administering intelligence tests to children in an attempt to determine the kinds of logical thinking that children were capable of. In the process of testing the children, Piaget became intrigued, not so much by the answers that the children got right, but more by the answers they got wrong. Piaget believed that the incorrect answers that the children gave were not mere shots in the dark but rather represented specific ways of thinking unique to the children's developmental stage. Just as almost all babies learn to roll over before they learn to sit up by themselves, and learn to crawl before they learn to walk, Piaget believed that children gain their cognitive ability in a developmental order. These insights—that children at different ages think in fundamentally different ways—led to Piaget's *stage model of cognitive development*.

Piaget argued that children do not just passively learn but also actively try to make sense of their worlds. He argued that, as they learn and mature, children develop schemas—*patterns of knowledge in long-term memory—that help them remember, organize, and respond to information*. Furthermore, Piaget thought that when children experience new things, they attempt to reconcile the new knowledge with existing schemas. Piaget believed that the children use two distinct methods in doing so, methods that he called *assimilation* and *accommodation* (Figure **4.2.5**).

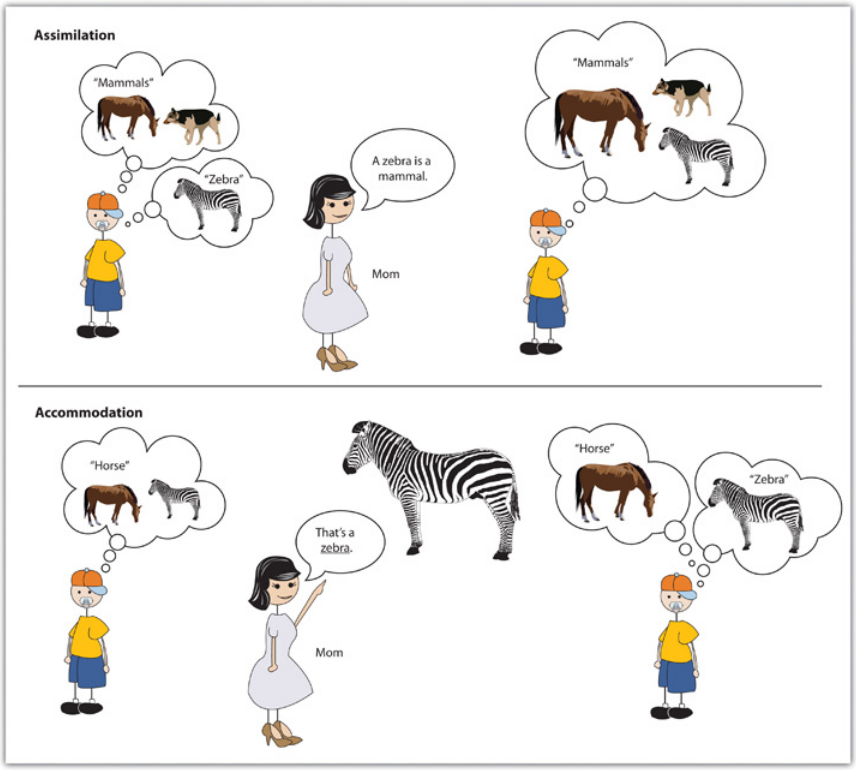


Figure 4.2.5: Assimilation and Accommodation. When children employ assimilation, they *use already developed schemas to understand new information*. If children have learned a schema for horses, then they may call the striped animal they see at the zoo a horse rather than a zebra. In this case, children fit the existing schema to the new information and label the new information with the existing knowledge. Accommodation, on the other hand, involves *learning new information, and thus changing the schema*. When a mother says, "No, honey, that's a zebra, not a horse," the child may adapt the schema to fit the new stimulus, learning that there are different types of four-legged animals, only one of which is a horse.

Piaget's most important contribution to understanding cognitive development, and the fundamental aspect of his theory, was the idea that development occurs in unique and distinct stages, with each stage occurring at a specific time, in a sequential manner, and in a way that allows the child to think about the world using new capacities. Piaget's stages of cognitive development are summarized in Table 4.2.3.

Table 4.2.3 Piaget's Stages of Cognitive Development

Stage	Approximate age range	Characteristics	Stage attainments
Sensorimotor	Birth to about 2 years	The child experiences the world through the fundamental senses of seeing, hearing, touching, and tasting.	Object permanence
Preoperational	2 to 7 years	Children acquire the ability to internally represent the world through language and mental imagery. They also start to see the world from other people's perspectives.	Theory of mind; rapid increase in language ability
Concrete operational	7 to 11 years	Children become able to think logically. They can increasingly perform operations on objects that are only imagined.	Conservation
Formal operational	11 years to adulthood	Adolescents can think systematically, can reason about abstract concepts, and can understand ethics and scientific reasoning.	Abstract logic

The first developmental stage for Piaget was the sensorimotor stage, *the cognitive stage that begins at birth and lasts until around the age of 2. It is defined by the direct physical interactions that babies have with the objects around them*. During this stage, babies form their first schemas by using their primary senses—they stare at, listen to, reach for, hold, shake, and taste the things in their environments.

During the sensorimotor stage, babies' use of their senses to perceive the world is so central to their understanding that whenever babies do not directly perceive objects, as far as they are concerned, the objects do not exist. Piaget found, for instance, that if he first interested babies in a toy and then covered the toy with a blanket, children who were younger than 6 months of age would act as if the toy had disappeared completely—they never tried to find it under the blanket but would nevertheless smile and reach for it when the blanket was removed. Piaget found that it was not until about 8 months that the children realized that the object was merely covered and not gone. Piaget used the term object permanence to refer to *the child's ability to know that an object exists even when the object cannot be perceived*.



Video Clip: Object [redacted] bject permanence.

At about 2 years of age, and until about 7 years of age, children move into the preoperational stage. During this stage, *children begin to use language and to think more abstractly about objects, but their understanding is more intuitive and without much ability to deduce or reason*. The thinking is preoperational, meaning that the child lacks the ability to operate on or transform objects mentally. In one study that showed the extent of this inability, Judy DeLoache (1987) showed children a room within a small dollhouse. Inside the room, a small toy was visible behind a small couch. The researchers took the children to another lab room, which was an exact replica of the dollhouse room, but full-sized. When children who were 2.5 years old were asked to find the toy, they did not know where to look—they were simply unable to make the transition across the changes in room size. Three-year-old children, on the other hand, immediately looked for the toy behind the couch, demonstrating that they were improving their operational skills.

The inability of young children to view transitions also leads them to be *egocentric*—unable to readily see and understand other people's viewpoints. Developmental psychologists define the theory of mind as *the ability to take another person's viewpoint*, and the ability to do so increases rapidly during the preoperational stage. In one demonstration of the development of theory of mind, a researcher shows a child a video of another child (let's call her Anna) putting a ball in a red box. Then Anna leaves the room, and the video shows that while she is gone, a researcher moves the ball from the red box into a blue box. As the video continues, Anna comes back into the room. The child is then asked to point to the box where Anna will probably look to find her ball. Children who are younger than 4 years of age typically are unable to understand that Anna does not know that the ball has been moved, and they predict that she will look for it in the blue box. After 4 years of age, however, children have developed a theory of mind—they realize that different people can have different viewpoints, and that (although she will be wrong) Anna will nevertheless think that the ball is still in the red box.

After about 7 years of age, the child moves into the concrete operational stage, which is *marked by more frequent and more accurate use of transitions, operations, and abstract concepts, including those of time, space, and numbers*. An important milestone during the concrete operational stage is the development of conservation—*the understanding that changes in the form of an object do not necessarily mean changes in the quantity of the object*. Children younger than 7 years generally think that a glass of milk that is tall holds more milk than a glass of milk that is shorter and wider, and they continue to believe this even when they see the same milk poured back and forth between the glasses. It appears that these children focus only on one dimension (in this case, the height of the glass) and ignore the other dimension (width). However, when children reach the concrete operational stage, their abilities to understand such transformations make them aware that, although the milk looks different in the different glasses, the amount must be the same.

Video Clip: Conservation

(click to see video)

Children younger than about 7 years of age do not understand the principles of conservation.

At about 11 years of age, children enter the formal operational stage, which is *marked by the ability to think in abstract terms and to use scientific and philosophical lines of thought*. Children in the formal operational stage are better able to systematically test alternative ideas to determine their influences on outcomes. For instance, rather than haphazardly changing different aspects of a situation that allows no clear conclusions to be drawn, they systematically make changes in one thing at a time and observe what difference that particular change makes. They learn to use deductive reasoning, such as "if this, then that," and they become capable of imagining situations that "might be," rather than just those that actually exist.

Piaget's theories have made a substantial and lasting contribution to developmental psychology. His contributions include the idea that children are not merely passive receptacles of information but rather actively engage in acquiring new knowledge and making sense of the world around them. This general idea has generated many other theories of cognitive development, each designed to help us better understand the development of the child's information-processing skills (Klahr & McWinney, 1998; Shrager & Siegler, 1998). Furthermore, the extensive research that Piaget's theory has stimulated has generally supported his beliefs about the order in which cognition develops. Piaget's work has also been applied in many domains—for instance, many teachers make use of Piaget's stages to develop educational approaches aimed at the level children are developmentally prepared for (Driscoll, 1994; Levin, Siegler, & Druyan, 1990).

Over the years, Piagetian ideas have been refined. For instance, it is now believed that object permanence develops gradually, rather than more immediately, as a true stage model would predict, and that it can sometimes develop much earlier than Piaget expected. Renée Baillargeon and her colleagues (Baillargeon, 2004; Wang, Baillargeon, & Brueckner, 2004) placed babies in a habituation setup, having them watch as an object was placed behind a screen, entirely hidden from view. The researchers then arranged for the object to reappear from behind another screen in a different place. Babies who saw this pattern of events looked longer at the display than did babies who witnessed the same object physically being moved between the screens. These data suggest that the babies were aware that the object still existed even though it was hidden behind the screen, and thus that they were displaying object permanence as early as 3 months of age, rather than the 8 months that Piaget predicted.

Another factor that might have surprised Piaget is the extent to which a child's social surroundings influence learning. In some cases, children progress to new ways of thinking and retreat to old ones depending on the type of task they are performing, the circumstances they find themselves in, and the nature of the language used to instruct them (Courage & Howe, 2002). And children in different cultures show somewhat different patterns of cognitive development. Dasen (1972) found that children in non-Western cultures moved to the next developmental stage about a year later than did children from Western cultures, and that level of schooling also influenced cognitive development. In short, Piaget's theory probably understated the contribution of environmental factors to social development.

More recent theories (Cole, 1996; Rogoff, 1990; Tomasello, 1999), based in large part on the *sociocultural theory* of the Russian scholar Lev Vygotsky (1962, 1978), argue that cognitive development is not isolated entirely within the child but occurs at least in part through social interactions. These scholars argue that children's thinking develops through constant interactions with more competent others, including parents, peers, and teachers.

An extension of Vygotsky's sociocultural theory is the idea of *community learning*, in which children serve as both teachers and learners. This approach is frequently used in classrooms to improve learning as well as to increase responsibility and respect for others. When children work cooperatively together in groups to learn material, they can help and support each other's learning as well as learn about each other as individuals, thereby reducing prejudice (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978; Brown, 1997).

Social Development During Childhood

It is through the remarkable increases in cognitive ability that children learn to interact with and understand their environments. But these cognitive skills are only part of the changes that are occurring during childhood. Equally crucial is the development of the child's social skills—the ability to understand, predict, and create bonds with the other people in their environments.

Knowing the Self: The Development of the Self-Concept

One of the important milestones in a child's social development is learning about his or her own self-existence. This self-awareness is known as *consciousness*, and the content of consciousness is known as the *self-concept*. The self-concept is *a knowledge representation or schema that contains knowledge about us, including our beliefs about our personality traits, physical characteristics, abilities, values, goals, and roles, as well as the knowledge that we exist as individuals* (Kagan, 1991).



Figure **4.2.6**: A simple test of self-awareness is the ability to recognize oneself in a mirror. Humans and chimpanzees can pass the test; dogs never do. Kona Gallagher – Hey baby, want to play? – CC BY-SA 2.0; Chi King – Hey, What's Going On? – CC BY 2.0; Molly Marshall – Brentley's Reflection – CC BY-NC 2.0.

Some animals, including chimpanzees, orangutans, and perhaps dolphins, have at least a primitive sense of self (Boysen & Himes, 1999). In one study (Gallup, 1970), researchers painted a red dot on the foreheads of anesthetized chimpanzees and then placed each animal in a cage with a mirror. When the chimps woke up and looked in the mirror, they touched the dot on their faces, not the

dot on the faces in the mirror. These actions suggest that the chimps understood that they were looking at themselves and not at other animals, and thus we can assume that they are able to realize that they exist as individuals. On the other hand, most other animals, including, for instance dogs, cats, and monkeys, never realize that it is they themselves in the mirror.

Infants who have a similar red dot painted on their foreheads recognize themselves in a mirror in the same way that the chimps do, and they do this by about 18 months of age (Povinelli, Landau, & Perilloux, 1996). The child's knowledge about the self continues to develop as the child grows. By age 2, the infant becomes aware of his or her sex, as a boy or a girl. By age 4, self-descriptions are likely to be based on physical features, such as hair color and possessions, and by about age 6, the child is able to understand basic emotions and the concepts of traits, being able to make statements such as, "I am a nice person" (Harter, 1998).

Soon after children enter grade school (at about age 5 or 6), they begin to make comparisons with other children, a process known as *social comparison*. For example, a child might describe himself as being faster than one boy but slower than another (Moretti & Higgins, 1990). According to Erikson, the important component of this process is the development of *competence* and *autonomy*—the recognition of one's own abilities relative to other children. And children increasingly show awareness of social situations—they understand that other people are looking at and judging them the same way that they are looking at and judging others (Doherty, 2009).

Successfully Relating to Others: Attachment

One of the most important behaviors a child must learn is how to be accepted by others—the development of close and meaningful social relationships. *The emotional bonds that we develop with those with whom we feel closest, and particularly the bonds that an infant develops with the mother or primary caregiver*, are referred to as attachment (Cassidy & Shaver, 1999).



Figure **4.2.7**: Children develop appropriate attachment styles through their interactions with caregivers. Sharon Mollerus – Moms and Boys at the Fountain – CC BY 2.0.

As late as the 1930s, psychologists believed that children who were raised in institutions such as orphanages, and who received good physical care and proper nourishment, would develop normally, even if they had little interaction with their caretakers. But studies by the developmental psychologist John Bowlby (1953) and others showed that these children did not develop normally—they were usually sickly, emotionally slow, and generally unmotivated. These observations helped make it clear that normal infant development requires successful attachment with a caretaker.

In one classic study showing the importance of attachment, Wisconsin University psychologists Harry and Margaret Harlow investigated the responses of young monkeys, separated from their biological mothers, to two surrogate mothers introduced to their cages. One—the wire mother—consisted of a round wooden head, a mesh of cold metal wires, and a bottle of milk from which the baby monkey could drink. The second mother was a foam-rubber form wrapped in a heated terry-cloth blanket. The Harlows found that, although the infant monkeys went to the wire mother for food, they overwhelmingly preferred and spent significantly more time with the warm terry-cloth mother that provided no food but did provide comfort (Harlow, 1958).

The Harlows' studies confirmed that babies have social as well as physical needs. Both monkeys and human babies need a *secure base* that allows them to feel safe. From this base, they can gain the confidence they need to venture out and explore their worlds. Erikson (Table **4.2.1**) was in agreement on the importance of a secure base, arguing that the most important goal of infancy was the development of a basic sense of trust in one's caregivers.

Developmental psychologist Mary Ainsworth, a student of John Bowlby, was interested in studying the development of attachment in infants. Ainsworth created a laboratory test that measured an infant's attachment to his or her parent. The test is called the strange situation because it is *conducted in a context that is unfamiliar to the child and therefore likely to heighten the child's need for his or her parent* (Ainsworth, Blehar, Waters, & Wall, 1978). During the procedure, which lasts about 20 minutes, the parent and the infant are first left alone, while the infant explores the room full of toys. Then a strange adult enters the room and talks for a

minute to the parent, after which the parent leaves the room. The stranger stays with the infant for a few minutes, and then the parent again enters and the stranger leaves the room. During the entire session, a video camera records the child's behaviors, which are later coded by trained coders.



Video Clip: The Strange Situation. In the strange situation, children are observed responding to the comings and goings of parents and unfamiliar adults in their environments. https://youtu.be/QTsewNrHUHU

On the basis of their behaviors, the children are categorized into one of four groups, where each group reflects a different kind of attachment relationship with the caregiver. A child with a *secure* attachment style usually explores freely while the mother is present and engages with the stranger. The child may be upset when the mother departs but is also happy to see the mother return. A child with an *ambivalent* (sometimes called *insecure-resistant*) attachment style is wary about the situation in general, particularly the stranger, and stays close or even clings to the mother rather than exploring the toys. When the mother leaves, the child is extremely distressed and is ambivalent when she returns. The child may rush to the mother but then fail to cling to her when she picks up the child. A child with an *avoidant* (sometimes called *insecure-avoidant*) attachment style will avoid or ignore the mother, showing little emotion when the mother departs or returns. The child may run away from the mother when she approaches. The child will not explore very much, regardless of who is there, and the stranger will not be treated much differently from the mother.

Finally, a child with a *disorganized* attachment style seems to have no consistent way of coping with the stress of the strange situation—the child may cry during the separation but avoid the mother when she returns, or the child may approach the mother but then freeze or fall to the floor. Although some cultural differences in attachment styles have been found (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000), research has also found that the proportion of children who fall into each of the attachment categories is relatively constant across cultures (Figure **4.2.8**).

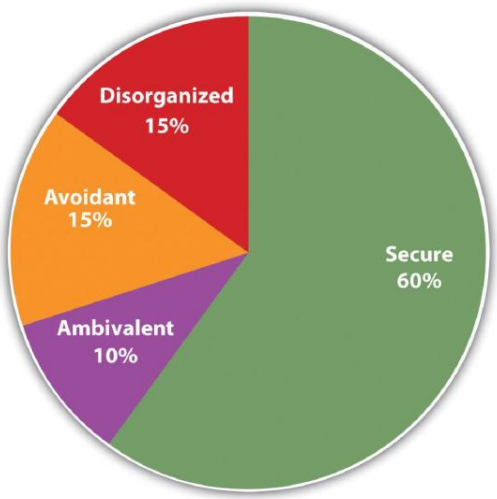


Figure 4.2.8

Proportion of Children With Different Attachment Styles. The graph shows the approximate proportion of children who have each of the four attachment styles. These proportions are fairly constant across cultures.

You might wonder whether differences in attachment style are determined more by the child (nature) or more by the parents (nurture). Most developmental psychologists believe that socialization is primary, arguing that a child becomes securely attached when the mother is available and able to meet the needs of the child in a responsive and appropriate manner, but that the insecure styles occur when the mother is insensitive and responds inconsistently to the child's needs. In a direct test of this idea, Dutch researcher Dymphna van den Boom (1994) randomly assigned some babies' mothers to a training session in which they learned to better respond to their children's needs. The research found that these mothers' babies were more likely to show a secure attachment style in comparison to the mothers in a control group that did not receive training.

But the attachment behavior of the child is also likely influenced, at least in part, by temperament, *the innate personality characteristics of the infant*. Some children are warm, friendly, and responsive, whereas others tend to be more irritable, less manageable, and difficult to console. These differences may also play a role in attachment (Gillath, Shaver, Baek, & Chun, 2008; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996). Taken together, it seems safe to say that attachment, like most other developmental processes, is affected by an interplay of genetic and socialization influences.

Parenting Styles

What can parents do to nurture a healthy self-concept? Diana Baumrind (1971, 1991) thinks parenting style may be a factor. The way we parent is an important factor in a child's socioemotional growth. Baumrind developed and refined a theory describing four parenting styles: authoritative, authoritarian, permissive, and uninvolved. With the **authoritative style**, the parent gives reasonable demands and consistent limits, expresses warmth and affection, and listens to the child's point of view. Parents set rules and explain the reasons behind them. They are also flexible and willing to make exceptions to the rules in certain cases—for example, temporarily relaxing bedtime rules to allow for a nighttime swim during a family vacation. Of the four parenting styles, the authoritative style is the one that is most encouraged in modern American society. American children raised by authoritative parents tend to have high self-esteem and social skills. However, effective parenting styles vary as a function of culture and, as Small (1999) points out, the authoritative style is not necessarily preferred or appropriate in all cultures.

In **authoritarian style**, the parent places high value on conformity and obedience. The parents are often strict, tightly monitor their children, and express little warmth. In contrast to the authoritative style, authoritarian parents probably would not relax bedtime rules during a vacation because they consider the rules to be set, and they expect obedience. This style can create anxious, withdrawn, and unhappy kids. However, it is important to point out that authoritarian parenting is as beneficial as the authoritative style in some ethnic groups (Russell, Crockett, & Chao, 2010). For instance, first-generation Chinese American children raised by authoritarian parents did just as well in school as their peers who were raised by authoritative parents (Russell et al., 2010).

For parents who employ the **permissive style** of parenting, the kids run the show and anything goes. Permissive parents make few demands and rarely use punishment. They tend to be very nurturing and loving, and may play the role of friend rather than parent.

In terms of our example of vacation bedtimes, permissive parents might not have bedtime rules at all—instead they allow the child to choose his bedtime whether on vacation or not. Not surprisingly, children raised by permissive parents tend to lack self-discipline, and the permissive parenting style is negatively associated with grades (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). The permissive style may also contribute to other risky behaviors such as alcohol abuse (Bahr & Hoffman, 2010), risky sexual behavior especially among female children (Donenberg, Wilson, Emerson, & Bryant, 2002), and increased display of disruptive behaviors by male children (Parent et al., 2011). However, there are some positive outcomes associated with children raised by permissive parents. They tend to have higher self-esteem, better social skills, and report lower levels of depression (Darling, 1999).

With the **uninvolved style** of parenting, the parents are indifferent, uninvolved, and sometimes referred to as neglectful. They don't respond to the child's needs and make relatively few demands. This could be because of severe depression or substance abuse, or other factors such as the parents' extreme focus on work. These parents may provide for the child's basic needs, but little else. The children raised in this parenting style are usually emotionally withdrawn, fearful, anxious, perform poorly in school, and are at an increased risk of substance abuse (Darling, 1999).

As you can see, parenting styles influence childhood adjustment, but could a child's temperament likewise influence parenting? **Temperament** refers to innate traits that influence how one thinks, behaves, and reacts with the environment. Children with easy temperaments demonstrate positive emotions, adapt well to change, and are capable of regulating their emotions. Conversely, children with difficult temperaments demonstrate negative emotions and have difficulty adapting to change and regulating their emotions. Difficult children are much more likely to challenge parents, teachers, and other caregivers (Thomas, 1984). Therefore, it's possible that easy children (i.e., social, adaptable, and easy to soothe) tend to elicit warm and responsive parenting, while demanding, irritable, withdrawn children evoke irritation in their parents or cause their parents to withdraw (Sanson & Rothbart, 1995).

Research Focus: Using a Longitudinal Research Design to Assess the Stability of Attachment

You might wonder whether the attachment style displayed by infants has much influence later in life. In fact, research has found that the attachment styles of children predict their emotions and their behaviors many years later (Cassidy & Shaver, 1999). Psychologists have studied the persistence of attachment styles over time using longitudinal research designs—*research designs in which individuals in the sample are followed and contacted over an extended period of time, often over multiple developmental stages*.

In one such study, Waters, Merrick, Treboux, Crowell, and Albersheim (2000) examined the extent of stability and change in attachment patterns from infancy to early adulthood. In their research, 60 middle-class infants who had been tested in the strange situation at 1 year of age were recontacted 20 years later and interviewed using a measure of adult attachment. Waters and colleagues found that 72% of the infants received the same secure versus insecure attachment classification in early adulthood as they had received as infants. The adults who changed categorization (usually from secure to insecure) were primarily those who had experienced traumatic events, such as the death or divorce of parents, severe illnesses (contracted by the parents or the children themselves), or physical or sexual abuse by a family member.

In addition to finding that people generally display the same attachment style over time, longitudinal studies have also found that the attachment classification received in infancy (as assessed using the strange situation or other measures) predicts many childhood and adult behaviors. Securely attached infants have closer, more harmonious relationship with peers, are less anxious and aggressive, and are better able to understand others' emotions than are those who were categorized as insecure as infants (Lucas-Thompson & Clarke-Stewart, (2007). And securely attached adolescents also have more positive peer and romantic relationships than their less securely attached counterparts (Carlson, Sroufe, & Egeland, 2004).

Conducting longitudinal research is a very difficult task, but one that has substantial rewards. When the sample is large enough and the time frame long enough, the potential findings of such a study can provide rich and important information about how people change over time and the causes of those changes. The drawbacks of longitudinal studies include the cost and the difficulty of finding a large sample that can be tracked accurately over time and the time (many years) that it takes to get the

data. In addition, because the results are delayed over an extended period, the research questions posed at the beginning of the study may become less relevant over time as the research continues.

Cross-sectional research designs represent an alternative to longitudinal designs. In a cross-sectional research design, *age comparisons are made between samples of different people at different ages at one time*. In one example, Jang, Livesley, and Vernon (1996) studied two groups of identical and nonidentical (fraternal) twins, one group in their 20s and the other group in their 50s, to determine the influence of genetics on personality. They found that genetics played a more significant role in the older group of twins, suggesting that genetics became more significant for personality in later adulthood.

Cross-sectional studies have a major advantage in that the scientist does not have to wait for years to pass to get results. On the other hand, the interpretation of the results in a cross-sectional study is not as clear as those from a longitudinal study, in which the same individuals are studied over time. Most important, the interpretations drawn from cross-sectional studies may be confounded by *cohort effects*. Cohort effects refer to *the possibility that differences in cognition or behavior at two points in time may be caused by differences that are unrelated to the changes in age. The differences might instead be due to environmental factors that affect an entire age group*. For instance, in the study by Jang, Livesley, and Vernon (1996) that compared younger and older twins, cohort effects might be a problem. The two groups of adults necessarily grew up in different time periods, and they may have been differentially influenced by societal experiences, such as economic hardship, the presence of wars, or the introduction of new technology. As a result, it is difficult in cross-sectional studies such as this one to determine whether the differences between the groups (e.g., in terms of the relative roles of environment and genetics) are due to age or to other factors.

Key Takeaways

- Babies are born with a variety of skills and abilities that contribute to their survival, and they also actively learn by engaging with their environments.
- The habituation technique is used to demonstrate the newborn's ability to remember and learn from experience.
- Children use both assimilation and accommodation to develop functioning schemas of the world.
- Piaget's theory of cognitive development proposes that children develop in a specific series of sequential stages: sensorimotor, preoperational, concrete operational, and formal operational.
- Piaget's theories have had a major impact, but they have also been critiqued and expanded.
- Social development requires the development of a secure base from which children feel free to explore. Attachment styles refer to the security of this base and more generally to the type of relationship that people, and especially children, develop with those who are important to them.
- Longitudinal and cross-sectional studies are each used to test hypotheses about development, and each approach has advantages and disadvantages.

Exercises and Critical Thinking

1. Give an example of a situation in which you or someone else might show cognitive assimilation and cognitive accommodation. In what cases do you think each process is most likely to occur?
2. Consider some examples of how Piaget's and Vygotsky's theories of cognitive development might be used by teachers who are teaching young children.
3. Consider the attachment styles of some of your friends in terms of their relationships with their parents and other friends. Do you think their style is secure?

References

Ainsworth, M. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Aronson, E., Blaney, N., Stephan, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage.

Baillargeon, R. (2004). Infants' physical world. *Current Directions in Psychological Science, 13*(3), 89–94;

Beauchamp, D. K., Cowart, B. J., Menellia, J. A., & Marsh, R. R. (1994). Infant salt taste: Developmental, methodological, and contextual factors. *Developmental Psychology, 27*, 353–365;

Blass, E. M., & Smith, B. A. (1992). Differential effects of sucrose, fructose, glucose, and lactose on crying in 1- to 3-day-old human infants: Qualitative and quantitative considerations. *Developmental Psychology, 28*, 804–810.

Bowlby, J. (1953). Some pathological processes set in train by early mother-child separation. *Journal of Mental Science, 99*, 265–272.

Boysen, S. T., & Himes, G. T. (1999). Current issues and emerging theories in animal cognition. *Annual Review of Psychology, 50*, 683–705.

Bushnell, I. W. R., Sai, F., & Mullin, J. T. (1989). Neonatal recognition of the mother's face. *British Journal of developmental psychology, 7*, 3–15.

Brown, A. L. (1997). Transforming schools into communities of thinking and learning about serious matters. *American Psychologist, 52*(4), 399–413.

Carlson, E. A., Sroufe, L. A., & Egeland, B. (2004). The construction of experience: A longitudinal study of representation and behavior. *Child Development, 75*(1), 66–83.

Cassidy, J. E., & Shaver, P. R. E. (1999). *Handbook of attachment: Theory, research, and clinical applications*. New York, NY: Guilford Press.

Cole, M. (1996). *Culture in mind*. Cambridge, MA: Harvard University Press; Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York, NY: Oxford University Press;

Courage, M. L., & Howe, M. L. (2002). From infant to child: The dynamics of cognitive change in the second year of life. *Psychological Bulletin, 128*(2), 250–276.

Dasen, P. R. (1972). Cross-cultural Piagetian research: A summary. *Journal of Cross-Cultural Psychology, 3*, 23–39.

DeLoache, J. S. (1987). Rapid change in the symbolic functioning of very young children. *Science, 238*(4833), 1556–1556.

Doherty, M. J. (2009). *Theory of mind: How children understand others' thoughts and feelings*. New York, NY: Psychology Press.

Driscoll, M. P. (1994). *Psychology of learning for instruction*. Boston, MA: Allyn & Bacon; Levin, I., Siegler, S. R., & Druyan, S. (1990). Misconceptions on motion: Development and training effects. *Child Development, 61*, 1544–1556.

Gallup, G. G., Jr. (1970). Chimpanzees: Self-recognition. *Science, 167*(3914), 86–87.

Gibson, E. J., & Pick, A. D. (2000). *An ecological approach to perceptual learning and development*. New York, NY: Oxford University Press.

>Gibson, E. J., Rosenzweig, M. R., & Porter, L. W. (1988). Exploratory behavior in the development of perceiving, acting, and the acquiring of knowledge. In *Annual review of psychology* (Vol. 39, pp. 1–41). Palo Alto, CA: Annual Reviews.

Gillath, O., Shaver, P. R., Baek, J.-M., & Chun, D. S. (2008). Genetic correlates of adult attachment style. *Personality and Social Psychology Bulletin, 34*(10), 1396–1405;

Harlow, H. (1958). The nature of love. *American Psychologist, 13*, 573–685.

Harter, S. (1998). The development of self-representations. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology: Social, emotional, & personality development* (5th ed., Vol. 3, pp. 553–618). New York, NY: John Wiley & Sons.

James, W. (1890). *The principles of psychology*. New York, NY: Dover.

Jang, K. L., Livesley, W. A., & Vernon, P. A. (1996). The genetic basis of personality at different ages: A cross-sectional twin study. *Personality and Individual Differences, 21*, 299–301.

Juraska, J. M., Henderson, C., & Müller, J. (1984). Differential rearing experience, gender, and radial maze performance. *Developmental Psychobiology, 17*(3), 209–215.

Kagan, J. (1991). The theoretical utility of constructs of self. *Developmental Review, 11*, 244–250.

Klahr, D., & McWhinney, B. (1998). Information Processing. In D. Kuhn & R. S. Siegler (Eds.), *Handbook of child psychology: Cognition, perception, & language* (5th ed., Vol. 2, pp. 631–678). New York, NY: John Wiley & Sons.

Lucas-Thompson, R., & Clarke-Stewart, K. A. (2007). Forecasting friendship: How marital quality, maternal mood, and attachment security are linked to children's peer relationships. *Journal of Applied Developmental Psychology, 28*(5–6), 499–514.

Moretti, M. M., & Higgins, E. T. (1990). The development of self-esteem vulnerabilities: Social and cognitive factors in developmental psychopathology. In R. J. Sternberg & J. Kolligian, Jr. (Eds.), *Competence considered* (pp. 286–314). New Haven, CT: Yale University Press.

Porter, R. H., Makin, J. W., Davis, L. B., & Christensen, K. M. (1992). Breast-fed infants respond to olfactory cues from their own mother and unfamiliar lactating females. *Infant Behavior & Development, 15*(1), 85–93.

Povinelli, D. J., Landau, K. R., & Perilloux, H. K. (1996). Self-recognition in young children using delayed versus live feedback: Evidence of a developmental asynchrony. *Child Development, 67*(4), 1540–1554.

Rothbaum, F., Weisz, J., Pott, M., Miyake, K., & Morelli, G. (2000). Attachment and culture: Security in the United States and Japan. *American Psychologist, 55*(10), 1093–1104.

Seifer, R., Schiller, M., Sameroff, A. J., Resnick, S., & Riordan, K. (1996). Attachment, maternal sensitivity, and infant temperament during the first year of life. *Developmental Psychology, 32*(1), 12–25.

Shrager, J., & Siegler, R. S. (1998). SCADS: A model of children's strategy choices and strategy discoveries. *Psychological Science, 9*, 405–422.

Smith, L. B., & Thelen, E. (2003). Development as a dynamic system. *Trends in Cognitive Sciences, 7*(8), 343–348.

Soska, K. C., Adolph, K. E., & Johnson, S. P. (2010). Systems in development: Motor skill acquisition facilitates three-dimensional object completion. *Developmental Psychology, 46*(1), 129–138.

Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA: Harvard University Press.

Trehub, S., & Rabinovitch, M. (1972). Auditory-linguistic sensitivity in early infancy. *Developmental Psychology, 6*(1), 74–77.

van den Boom, D. C. (1994). The influence of temperament and mothering on attachment and exploration: An experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Development, 65*(5), 1457–1476.

Vygotsky, L. S. (1962). *Thought and language*. Cambridge, MA: MIT Press; Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Wang, S. H., Baillargeon, R., & Brueckner, L. (2004). Young infants' reasoning about hidden objects: Evidence from violation-of-expectation tasks with test trials only. *Cognition, 93*, 167–198.

Waters, E., Merrick, S., Treboux, D., Crowell, J., & Albersheim, L. (2000). Attachment security in infancy and early adulthood: A twenty-year longitudinal study. *Child Development, 71*(3), 684–689.

Wynn, K. (1995). Infants possess a system of numerical knowledge. *Current Directions in Psychological Science, 4*, 172–176.

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4.3: Adolescence - Developing Independence and Identity

Learning Objectives

1. Summarize the physical and cognitive changes that occur for boys and girls during adolescence.
2. Explain how adolescents develop a sense of morality and of self-identity.

Adolescence is defined as the years between the onset of puberty and the beginning of adulthood. In the past, when people were likely to marry in their early 20s or younger, this period might have lasted only 10 years or less—starting roughly between ages 12 and 13 and ending by age 20, at which time the child got a job or went to work on the family farm, married, and started his or her own family. Today, children mature more slowly, move away from home at later ages, and maintain ties with their parents longer. For instance, children may go away to college but still receive financial support from parents, and they may come home on weekends or even to live for extended time periods. Thus the period between puberty and adulthood may well last into the late 20s, merging into adulthood itself. In fact, it is appropriate now to consider the period of adolescence and that of emerging adulthood (*the ages between 18 and the middle or late 20s*) together.

During adolescence, the child continues to grow physically, cognitively, and emotionally, changing from a child into an adult. The body grows rapidly in size and the sexual and reproductive organs become fully functional. At the same time, as adolescents develop more advanced patterns of reasoning and a stronger sense of self, they seek to forge their own identities, developing important attachments with people other than their parents. Particularly in Western societies, where the need to forge a new independence is critical (Baumeister & Tice, 1986; Twenge, 2006), this period can be stressful for many children, as it involves new emotions, the need to develop new social relationships, and an increasing sense of responsibility and independence.

Although adolescence can be a time of stress for many teenagers, most of them weather the trials and tribulations successfully. For example, the majority of adolescents experiment with alcohol sometime before high school graduation. Although many will have been drunk at least once, relatively few teenagers will develop long-lasting drinking problems or permit alcohol to adversely affect their school or personal relationships. Similarly, a great many teenagers break the law during adolescence, but very few young people develop criminal careers (Farrington, 1995). These facts do not, however, mean that using drugs or alcohol is a good idea. The use of recreational drugs can have substantial negative consequences, and the likelihood of these problems (including dependence, addiction, and even brain damage) is significantly greater for young adults who begin using drugs at an early age.

Physical Changes in Adolescence

Adolescence begins with the onset of puberty, *a developmental period in which hormonal changes cause rapid physical alterations in the body, culminating in sexual maturity*. Although the timing varies to some degree across cultures, the average age range for reaching puberty is between 9 and 14 years for girls and between 10 and 17 years for boys (Marshall & Tanner, 1986).

Puberty begins when the pituitary gland begins to stimulate the production of the male sex hormone *testosterone* in boys and the female sex hormones *estrogen* and *progesterone* in girls. The release of these sex hormones triggers the development of the primary sex characteristics, *the sex organs concerned with reproduction* (Figure **4.3.9**). These changes include the enlargement of the testicles and the penis in boys and the development of the ovaries, uterus, and vagina in girls. In addition, secondary sex characteristics (*features that distinguish the two sexes from each other but are not involved in reproduction*) are also developing, such as an enlarged Adam's apple, a deeper voice, and pubic and underarm hair in boys and enlargement of the breasts, hips, and the appearance of pubic and underarm hair in girls (Figure **4.3.9**). The enlargement of breasts is usually the first sign of puberty in girls and, on average, occurs between ages 10 and 12 (Marshall & Tanner, 1986). Boys typically begin to grow facial hair between ages 14 and 16, and both boys and girls experience a rapid growth spurt during this stage. The growth spurt for girls usually occurs earlier than that for boys, with some boys continuing to grow into their 20s.

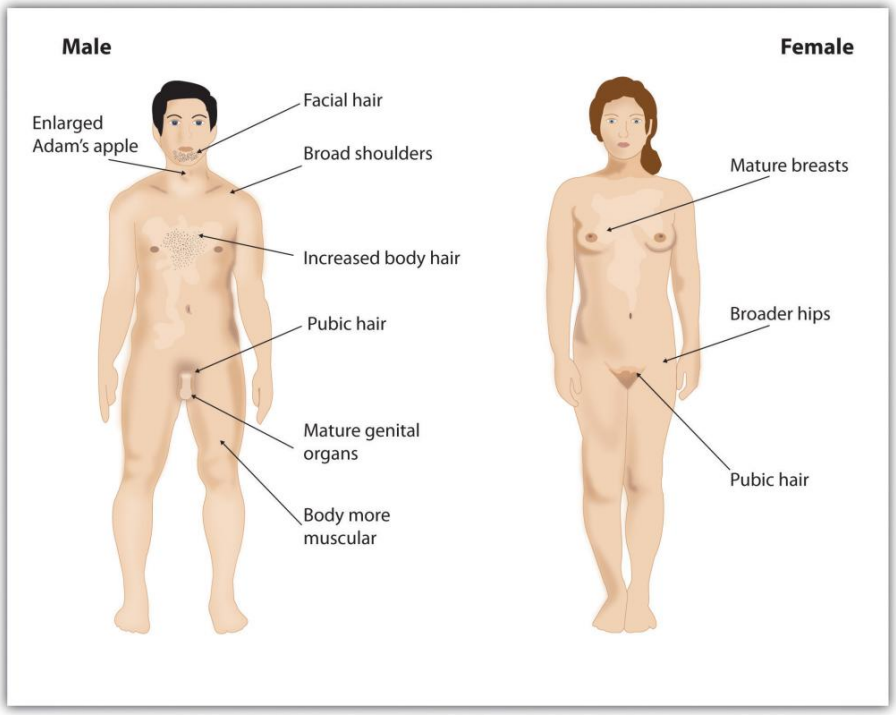


Figure **4.3.9**: Sex Characteristics. Puberty brings dramatic changes in the body, including the development of primary and secondary sex characteristics.

A major milestone in puberty for girls is menarche, *the first menstrual period*, typically experienced at around 12 or 13 years of age (Anderson, Dannal, & Must, 2003). The age of menarche varies substantially and is determined by genetics, as well as by diet and lifestyle, since a certain amount of body fat is needed to attain menarche. Girls who are very slim, who engage in strenuous athletic activities, or who are malnourished may begin to menstruate later. Even after menstruation begins, girls whose level of body fat drops below the critical level may stop having their periods. The sequence of events for puberty is more predictable than the age at which they occur. Some girls may begin to grow pubic hair at age 10 but not attain menarche until age 15. In boys, facial hair may not appear until 10 years after the initial onset of puberty.

The timing of puberty in both boys and girls can have significant psychological consequences. Boys who mature earlier attain some social advantages because they are taller and stronger and, therefore, often more popular (Lynne, Graber, Nichols, Brooks-Gunn, & Botvin, 2007). At the same time, however, early-maturing boys are at greater risk for delinquency and are more likely than their peers to engage in antisocial behaviors, including drug and alcohol use, truancy, and precocious sexual activity. Girls who mature early may find their maturity stressful, particularly if they experience teasing or sexual harassment (Mendle, Turkheimer, & Emery, 2007; Pescovitz & Walvoord, 2007). Early-maturing girls are also more likely to have emotional problems, a lower self-image, and higher rates of depression, anxiety, and disordered eating than their peers (Ge, Conger, & Elder, 1996).

Cognitive Development in Adolescence

Although the most rapid cognitive changes occur during childhood, the brain continues to develop throughout adolescence, and even into the 20s (Weinberger, Elvevåg, & Giedd, 2005). During adolescence, the brain continues to form new neural connections, but also casts off unused neurons and connections (Blakemore, 2008). As teenagers mature, the prefrontal cortex, the area of the brain responsible for reasoning, planning, and problem solving, also continues to develop (Goldberg, 2001). And myelin, the fatty tissue that forms around axons and neurons and helps speed transmissions between different regions of the brain, also continues to grow (Rapoport et al., 1999).

Adolescents often seem to act impulsively, rather than thoughtfully, and this may be in part because the development of the prefrontal cortex is, in general, slower than the development of the emotional parts of the brain, including the limbic system (Blakemore, 2008). Furthermore, the hormonal surge that is associated with puberty, which primarily influences emotional responses, may create strong emotions and lead to impulsive behavior. It has been hypothesized that adolescents may engage in

risky behavior, such as smoking, drug use, dangerous driving, and unprotected sex in part because they have not yet fully acquired the mental ability to curb impulsive behavior or to make entirely rational judgments (Steinberg, 2007).

The new cognitive abilities that are attained during adolescence may also give rise to new feelings of egocentrism, in which adolescents believe that they can do anything and that they know better than anyone else, including their parents (Elkind, 1978, p. 199). Teenagers are likely to be highly self-conscious, often creating an *imaginary audience* in which they feel that everyone is constantly watching them (Goossens, Beyers, Emmen, & van Aken, 2002). Because teens think so much about themselves, they mistakenly believe that others must be thinking about them, too (Rycek, Stuhr, McDermott, Benker, & Swartz, 1998). It is no wonder that everything a teen's parents do suddenly feels embarrassing to them when they are in public.

Social Development in Adolescence

Some of the most important changes that occur during adolescence involve the further development of the self-concept and the development of new attachments. Whereas young children are most strongly attached to their parents, the important attachments of adolescents move increasingly away from parents and increasingly toward peers (Harris, 1998). As a result, parents' influence diminishes at this stage.

According to Erikson (Table **4.3.1**), the main social task of the adolescent is the search for a unique identity—the ability to answer the question, "Who am I?" In the search for identity, the adolescent may experience role confusion in which he or she is balancing or choosing among identities, taking on negative or undesirable identities, or temporarily giving up looking for an identity altogether if things are not going well.

One approach to assessing identity development was proposed by James Marcia (1980). In his approach, adolescents are asked questions regarding their exploration of and commitment to issues related to occupation, politics, religion, and sexual behavior. The responses to the questions allow the researchers to classify the adolescent into one of four identity categories (Table **4.3.4**).

Table **4.3.4** James Marcia's Stages of Identity Development

Identity-diffusion status	The individual does not have firm commitments regarding the issues in question and is not making progress toward them.
Foreclosure status	The individual has not engaged in any identity experimentation and has established an identity based on the choices or values of others.
Moratorium status	The individual is exploring various choices but has not yet made a clear commitment to any of them.
Identity-achievement status	The individual has attained a coherent and committed identity based on personal decisions.

Source: Adapted from Marcia, J. (1980). Identity in adolescence. *Handbook of adolescent psychology, 5*, 145–160.

Studies assessing how teens pass through Marcia's stages show that, although most teens eventually succeed in developing a stable identity, the path to it is not always easy and there are many routes that can be taken. Some teens may simply adopt the beliefs of their parents or the first role that is offered to them, perhaps at the expense of searching for other, more promising possibilities (foreclosure status). Other teens may spend years trying on different possible identities (moratorium status) before finally choosing one.



Figure 4.3.1: Adolescents search for stable attachments through the development of social identities. Russell Mondy – Mission vs. Balboa – CC BY-NC 2.0; Gage Skidmore – Teen Titans cosplay – CC BY-SA 2.0; Toni Protto – Mistura Freak – CC BY 2.0.

To help them work through the process of developing an identity, teenagers may well try out different identities in different social situations. They may maintain one identity at home and a different type of persona when they are with their peers. Eventually, most teenagers do integrate the different possibilities into a single self-concept and a comfortable sense of identity (identity-achievement status).

For teenagers, the peer group provides valuable information about the self-concept. For instance, in response to the question "What were you like as a teenager? (e.g., cool, nerdy, awkward?)," posed on the website Answerbag, one teenager replied in this way:

I'm still a teenager now, but from 8th–9th grade I didn't really know what I wanted at all. I was smart, so I hung out with the nerdy kids. I still do; my friends mean the world to me. But in the middle of 8th I started hanging out with whom you may call the "cool" kids…and I also hung out with some stoners, just for variety. I pierced various parts of my body and kept my grades up. Now, I'm just trying to find who I am. I'm even doing my sophomore year in China so I can get a better view of what I want. (Answerbag, 2007)

Responses like this one demonstrate the extent to which adolescents are developing their self-concepts and self-identities and how they rely on peers to help them do that. The writer here is trying out several (perhaps conflicting) identities, and the identities any teen experiments with are defined by the group the person chooses to be a part of. The friendship groups (cliques, crowds, or gangs) that are such an important part of the adolescent experience allow the young adult to try out different identities, and these groups provide a sense of belonging and acceptance (Rubin, Bukowski, & Parker, 2006). A big part of what the adolescent is learning is social identity, *the part of the self-concept that is derived from one's group memberships*. Adolescents define their social identities according to how they are similar to and differ from others, finding meaning in the sports, religious, school, gender, and ethnic categories they belong to.

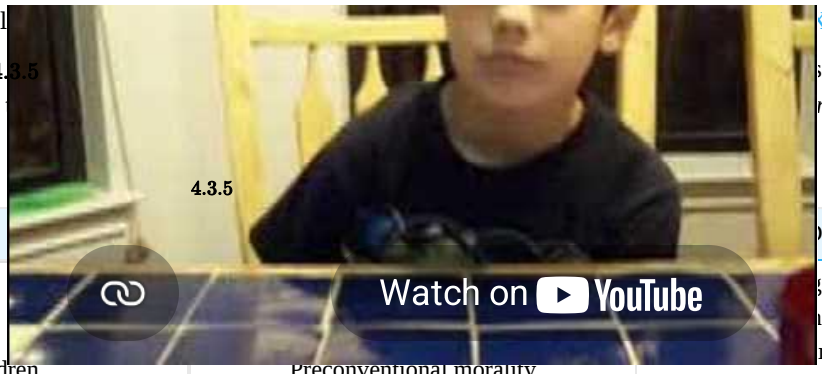
Developing Moral Reasoning: Kohlberg's Theory

The independence that comes with adolescence requires independent thinking as well as the development of *morality*—standards of behavior that are generally agreed on within a culture to be right or proper. Just as Piaget believed that children's cognitive development follows specific patterns, Lawrence Kohlberg (1984) argued that children learn their moral values through active thinking and reasoning, and that moral development follows a series of stages. To study moral development, Kohlberg posed moral dilemmas to children, teenagers, and adults, such as the following:

A man's wife is dying of cancer and there is only one drug that can save her. The only place to get the drug is at the store of a pharmacist who is known to overcharge people for drugs. The man can only pay $1,000, but the pharmacist wants $2,000, and refuses to sell it to him for less, or to let him pay later. Desperate, the man later breaks into the pharmacy and steals the medicine. Should he have done that? Was it right or wrong? Why? (Kohlberg, 1984)



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As you can see in Table 4.3.5 , that, as children develop intellectually, they pass through three levels of moral development: the *preconventional level*, the *conventional level*, and the *postconventional level*.

Age		Description
Young children	Preconventional morality	e of 9, children, focus on is stage, punishment is rds are sought. A person at this level will argue, “The man shouldn’t steal the drug, as he may get caught and go to jail.”
Older children, adolescents, most adults	Conventional morality	By early adolescence, the child begins to care about how situational outcomes impact others and wants to please and be accepted. At this developmental phase, people are able to value the good that can be derived from holding to social norms in the form of laws or less formalized rules. For example, a person at this level may say, “He should not steal the drug, as everyone will see him as a thief, and his wife, who needs the drug, wouldn’t want to be cured because of thievery,” or, “No matter what, he should obey the law because stealing is a crime.”
Many adults	Postconventional morality	At this stage, individuals employ abstract reasoning to justify behaviors. Moral behavior is based on self-chosen ethical principles that are generally comprehensive and universal, such as justice, dignity, and equality. Someone with self-chosen principles may say, “The man should steal the drug to cure his wife and then tell the authorities that he has done so. He may have to pay a penalty, but at least he has saved a human life.”

Although research has supported Kohlberg’s idea that moral reasoning changes from an early emphasis on punishment and social rules and regulations to an emphasis on more general ethical principles, as with Piaget’s approach, Kohlberg’s stage model is probably too simple. For one, children may use higher levels of reasoning for some types of problems, but revert to lower levels in situations where doing so is more consistent with their goals or beliefs (Rest, 1979). Second, it has been argued that the stage model is particularly appropriate for Western, rather than non-Western, samples in which allegiance to social norms (such as respect for authority) may be particularly important (Haidt, 2001). And there is frequently little correlation between how children score on the moral stages and how they behave in real life.

Perhaps the most important critique of Kohlberg’s theory is that it may describe the moral development of boys better than it describes that of girls. Carol Gilligan (1982) has argued that, because of differences in their socialization, males tend to value principles of justice and rights, whereas females value caring for and helping others. Although there is little evidence that boys and girls score differently on Kohlberg’s stages of moral development (Turiel, 1998), it is true that girls and women tend to focus more

on issues of caring, helping, and connecting with others than do boys and men (Jaffee & Hyde, 2000).If you don't believe this, ask yourself when you last got a thank-you note from a man.

Key Takeaways

- Adolescence is the period of time between the onset of puberty and emerging adulthood.
- Emerging adulthood is the period from age 18 years until the mid-20s in which young people begin to form bonds outside the family, attend college, and find work. Even so, they tend not to be fully independent and have not taken on all the responsibilities of adulthood. This stage is most prevalent in Western cultures.
- Puberty is a developmental period in which hormonal changes cause rapid physical alterations in the body.
- The cerebral cortex continues to develop during adolescence and early adulthood, enabling improved reasoning, judgment, impulse control, and long-term planning.
- A defining aspect of adolescence is the development of a consistent and committed self-identity. The process of developing an identity can take time but most adolescents succeed in developing a stable identity.
- Kohlberg's theory proposes that moral reasoning is divided into the following stages: preconventional morality, conventional morality, and postconventional morality.
- Kohlberg's theory of morality has been expanded and challenged, particularly by Gilligan, who has focused on differences in morality between boys and girls.

Exercises and Critical Thinking

1. Based on what you learned in this chapter, do you think that people should be allowed to drive at age 16? Why or why not? At what age do you think they should be allowed to vote and to drink alcohol?
2. Think about your experiences in high school. What sort of cliques or crowds were there? How did people express their identities in these groups? How did you use your groups to define yourself and develop your own identity?

References

Anderson, S. E., Dannal, G. E., & Must, A. (2003). Relative weight and race influence average age at menarche: Results from two nationally representative surveys of U.S. girls studied 25 years apart. *Pediatrics, 111*, 844–850.

Answerbag. (2007, March 20). What were you like as a teenager? (e.g., cool, nerdy, awkward?). Retrieved from http://www.answerbag.com/q_view/171753

Baumeister, R. F., & Tice, D. M. (1986). How adolescence became the struggle for self: A historical transformation of psychological development. In J. Suls & A. G. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. 3, pp. 183–201). Hillsdale, NJ: Lawrence Erlbaum Associates.

Blakemore, S. J. (2008). Development of the social brain during adolescence. *Quarterly Journal of Experimental Psychology, 61*, 40–49.

Elkind, D. (1978). *The child's reality: Three developmental themes*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Farrington, D. P. (1995). The challenge of teenage antisocial behavior. In M. Rutter & M. E. Rutter (Eds.), *Psychosocial disturbances in young people: Challenges for prevention* (pp. 83–130). New York, NY: Cambridge University Press.

Ge, X., Conger, R. D., & Elder, G. H., Jr. (1996). Coming of age too early: Pubertal influences on girls' vulnerability to psychological distress. *Child Development, 67*(6), 3386–3400.

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.

Goldberg, E. (2001). *The executive brain: Frontal lobes and the civilized mind*. New York, NY: Oxford University Press.

Goossens, L., Beyers, W., Emmen, M., & van Aken, M. (2002). The imaginary audience and personal fable: Factor analyses and concurrent validity of the "new look" measures. *Journal of Research on Adolescence, 12*(2), 193–215.

Harris, J. (1998), *The nurture assumption—Why children turn out the way they do*. New York, NY: Free Press.

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review, 108*(4), 814–834.

Kohlberg, L. (1984). *The psychology of moral development: Essays on moral development* (Vol. 2, p. 200). San Francisco, CA: Harper & Row.

Jaffee, S., & Hyde, J. S. (2000). Gender differences in moral orientation: A meta-analysis. *Psychological Bulletin, 126*(5), 703–726.

Lynne, S. D., Graber, J. A., Nichols, T. R., Brooks-Gunn, J., & Botvin, G. J. (2007). Links between pubertal timing, peer influences, and externalizing behaviors among urban students followed through middle school. *Journal of Adolescent Health, 40*, 181.e7–181.e13 (p. 198).

Mendle, J., Turkheimer, E., & Emery, R. E. (2007). Detrimental psychological outcomes associated with early pubertal timing in adolescent girls. *Developmental Review, 27*, 151–171; Pescovitz, O. H., & Walvoord, E. C. (2007). *When puberty is precocious: Scientific and clinical aspects*. Totowa, NJ: Humana Press.

Marcia, J. (1980). Identity in adolescence. *Handbook of Adolescent Psychology, 5*, 145–160.

Marshall, W. A., & Tanner, J. M. (1986). Puberty. In F. Falkner & J. M. Tanner (Eds.), *Human growth: A comprehensive treatise* (2nd ed., pp. 171–209). New York, NY: Plenum Press.

Rapoport, J. L., Giedd, J. N., Blumenthal, J., Hamburger, S., Jeffries, N., Fernandez, T.,…Evans, A. (1999). Progressive cortical change during adolescence in childhood-onset schizophrenia: A longitudinal magnetic resonance imaging study. *Archives of General Psychiatry, 56*(7), 649–654.

Rest, J. (1979). *Development in judging moral issues*. Minneapolis: University of Minnesota Press.

Rubin, K. H., Bukowski, W. M., & Parker, J. G. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (6th ed., Vol. 3, pp. 571–645). Hoboken, NJ: John Wiley & Sons.

Rycek, R. F., Stuhr, S. L., Mcdermott, J., Benker, J., & Swartz, M. D. (1998). Adolescent egocentrism and cognitive functioning during late adolescence. *Adolescence, 33*, 746–750.

Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science, 16*, 55–59.

Turiel, E. (1998). The development of morality. In W. Damon (Ed.), *Handbook of child psychology: Socialization* (5th ed., Vol. 3, pp. 863–932). New York, NY: John Wiley & Sons.

Twenge, J. M. (2006). *Generation me: Why today's young Americans are more confident, assertive, entitled—and more miserable than ever before*. New York, NY: Free Press.

Weinberger, D. R., Elvevåg, B., & Giedd, J. N. (2005). The adolescent brain: A work in progress. National Campaign to Prevent Teen Pregnancy. Retrieved from www.thenationalcampaign.org/resources/pdf/BRAIN.pdf

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CHAPTER OVERVIEW

5: Sensation and Perception

5.1: Sensation versus Perception

5.2: Seeing

5.3: Hearing

5.4: Tasting, Smelling, and Touching

5.5: Accuracy and Inaccuracy in Perception

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5.1: Sensation versus Perception

Learning Objectives

- Distinguish between sensation and perception
- Describe the concepts of absolute threshold and difference threshold

Sensation

What does it mean to sense something? Sensory receptors are specialized neurons that respond to specific types of stimuli. When sensory information is detected by a sensory receptor, **sensation** has occurred. For example, light that enters the eye causes chemical changes in cells that line the back of the eye. These cells relay messages, in the form of action potentials (as you learned when studying biopsychology), to the central nervous system. The conversion from sensory stimulus energy to action potential is known as **transduction**.

You have probably known since elementary school that we have five senses: vision, hearing (audition), smell (olfaction), taste (gustation), and touch (somatosensation). It turns out that this notion of five senses is oversimplified. We also have sensory systems that provide information about balance (the vestibular sense), body position and movement (proprioception and kinesthesia), pain (nociception), and temperature (thermoception).

The sensitivity of a given sensory system to the relevant stimuli can be expressed as an absolute threshold. **Absolute threshold** refers to the minimum amount of stimulus energy that must be present for the stimulus to be detected 50% of the time. Another way to think about this is by asking how dim can a light be or how soft can a sound be and still be detected half of the time. The sensitivity of our sensory receptors can be quite amazing. It has been estimated that on a clear night, the most sensitive sensory cells in the back of the eye can detect a candle flame 30 miles away (Okawa & Sampath, 2007). Under quiet conditions, the hair cells (the receptor cells of the inner ear) can detect the tick of a clock 20 feet away (Galanter, 1962).

It is also possible for us to get messages that are presented below the threshold for conscious awareness—these are called **subliminal messages**. A stimulus reaches a physiological threshold when it is strong enough to excite sensory receptors and send nerve impulses to the brain: This is an absolute threshold. A message below that threshold is said to be subliminal: We receive it, but we are not consciously aware of it. Over the years there has been a great deal of speculation about the use of subliminal messages in advertising, rock music, and self-help audio programs. Research evidence shows that in laboratory settings, people can process and respond to information outside of awareness. But this does not mean that we obey these messages like zombies; in fact, hidden messages have little effect on behavior outside the laboratory (Kunst-Wilson & Zajonc, 1980; Rensink, 2004; Nelson, 2008; Radel, Sarrazin, Legrain, & Gobancé, 2009; Loersch, Durso, & Petty, 2013).

Absolute thresholds are generally measured under incredibly controlled conditions in situations that are optimal for sensitivity. Sometimes, we are more interested in how much difference in stimuli is required to detect a difference between them. This is known as the **just noticeable difference (jnd)** or **difference threshold**. Unlike the absolute threshold, the difference threshold changes depending on the stimulus intensity. As an example, imagine yourself in a very dark movie theater. If an audience member were to receive a text message on her cell phone which caused her screen to light up, chances are that many people would notice the change in illumination in the theater. However, if the same thing happened in a brightly lit arena during a basketball game, very few people would notice. The cell phone brightness does not change, but its ability to be detected as a change in illumination varies dramatically between the two contexts. Ernst Weber proposed this theory of change in difference threshold in the 1830s, and it has become known as Weber's law: The difference threshold is a constant fraction of the original stimulus, as the example illustrates.

Perception

While our sensory receptors are constantly collecting information from the environment, it is ultimately how we interpret that information that affects how we interact with the world. **Perception** refers to the way sensory information is organized, interpreted, and consciously experienced. Perception involves both bottom-up and top-down processing. **Bottom-up processing** refers to the fact that perceptions are built from sensory input. On the other hand, how we interpret those sensations is influenced by our available knowledge, our experiences, and our thoughts. This is called **top-down processing**.

One way to think of this concept is that sensation is a physical process, whereas perception is psychological. For example, upon walking into a kitchen and smelling the scent of baking cinnamon rolls, the *sensation* is the scent receptors detecting the odor of cinnamon, but the *perception* may be "Mmm, this smells like the bread Grandma used to bake when the family gathered for holidays."

Although our perceptions are built from sensations, not all sensations result in perception. In fact, we often don't perceive stimuli that remain relatively constant over prolonged periods of time. This is known as **sensory adaptation**. Imagine entering a classroom with an old analog clock. Upon first entering the room, you can hear the ticking of the clock; as you begin to engage in conversation with classmates or listen to your professor greet the class, you are no longer aware of the ticking. The clock is still ticking, and that information is still affecting sensory receptors of the auditory system. The fact that you no longer perceive the sound demonstrates sensory adaptation and shows that while closely associated, sensation and perception are different.

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5.2: Seeing

Charles Stangor and Jennifer Walinga

Learning Objectives

- Identify the key structures of the eye and the role they play in vision.
- Summarize how the eye and the visual cortex work together to sense and perceive the visual stimuli in the environment, including processing colours, shape, depth, and motion.

Whereas other animals rely primarily on hearing, smell, or touch to understand the world around them, human beings rely in large part on vision. A large part of our cerebral cortex is devoted to seeing, and we have substantial visual skills. Seeing begins when light falls on the eyes, initiating the process of transduction. Once this visual information reaches the visual cortex, it is processed by a variety of neurons that detect colours, shapes, and motion, and that create meaningful perceptions out of the incoming stimuli.

The air around us is filled with a sea of **electromagnetic energy**: *pulses of energy waves that can carry information from place to place*. As you can see in Figure 6.6, "The Electromagnetic Spectrum," electromagnetic waves vary in their **wavelength** — *the distance between one wave peak and the next wave peak* — with the shortest gamma waves being only a fraction of a millimeter in length and the longest radio waves being hundreds of kilometers long. Humans are blind to almost all of this energy — *our eyes detect only the range from about 400 to 700 billionths of a meter, the part of the electromagnetic spectrum known* as the **visible spectrum**.

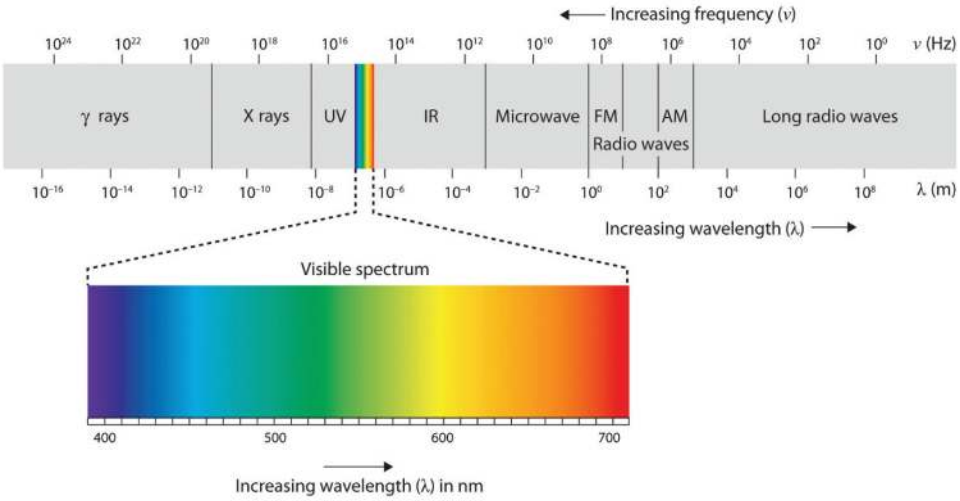


Figure 6.6 The Electromagnetic Spectrum

The Sensing Eye and the Perceiving Visual Cortex

As you can see in Figure 6.7, "Anatomy of the Human Eye," light enters the eye through the **cornea**, *a clear covering that protects the eye and begins to focus the incoming light.* The light then passes through the **pupil,** *a small opening in the centre of the eye*. The pupil is surrounded by the **iris**, *the coloured part of the eye that controls the size of the pupil by constricting or dilating in response to light intensity*. When we enter a dark movie theatre on a sunny day, for instance, muscles in the iris open the pupil and allow more light to enter. Complete adaptation to the dark may take up to 20 minutes.

Behind the pupil is the **lens**, *a structure that focuses the incoming light on the* **retina**, *the layer of tissue at the back of the eye that contains photoreceptor cells*. As our eyes move from near objects to distant objects, a process known as *visual accommodation* occurs. **Visual accommodation** is *the process of changing the curvature of the lens to keep the light entering the eye focused on the retina.* Rays from the top of the image strike the bottom of the retina and vice versa, and rays from the left side of the image strike the right part of the retina and vice versa, causing the image on the retina to be upside down and backward. Furthermore, the image projected on the retina is flat, and yet our final perception of the image will be three dimensional.

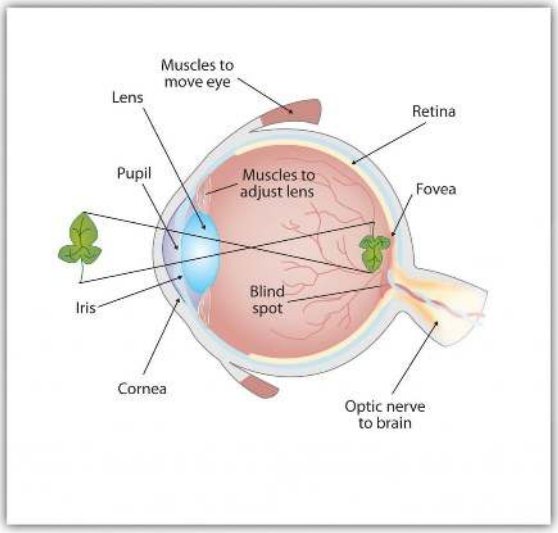


Figure 6.7 Anatomy of the Human Eye. Light enters the eye through the transparent cornea, passing through the pupil at the centre of the iris. The lens adjusts to focus the light on the retina, where it appears upside down and backward. Receptor cells on the retina send information via the optic nerve to the visual cortex.

Accommodation is not always perfect (Figure 6.8) *if the focus is in front of the retina*, we say that the person is **nearsighted**, and *when the focus is behind the retina*, we say that the person is **farsighted**. Eyeglasses and contact lenses correct this problem by adding another lens in front of the eye, and laser eye surgery corrects the problem by reshaping the eye's own lens.



Figure 6.8 Normal, Nearsighted, and Farsighted Eyes. For people with normal vision (left), the lens properly focuses incoming light on the retina. For people who are nearsighted (centre), images from far objects focus too far in front of the retina, whereas for people who are farsighted (right), images from near objects focus too far behind the retina. Eyeglasses solve the problem by adding a secondary, corrective lens.

The retina contains layers of neurons specialized to respond to light (see Figure 6.9, "The Retina with Its Specialized Cells"). As light falls on the retina, it first activates receptor cells known as *rods* and *cones.* The activation of these cells then spreads to the *bipolar cells* and then to the *ganglion cells*, which gather together and converge, like the strands of a rope, forming the *optic nerve*. The **optic nerve** is *a collection of millions of ganglion neurons that sends vast amounts of visual information, via the thalamus, to the brain*. Because the retina and the optic nerve are active processors and analyzers of visual information, it is appropriate to think of these structures as an extension of the brain itself.

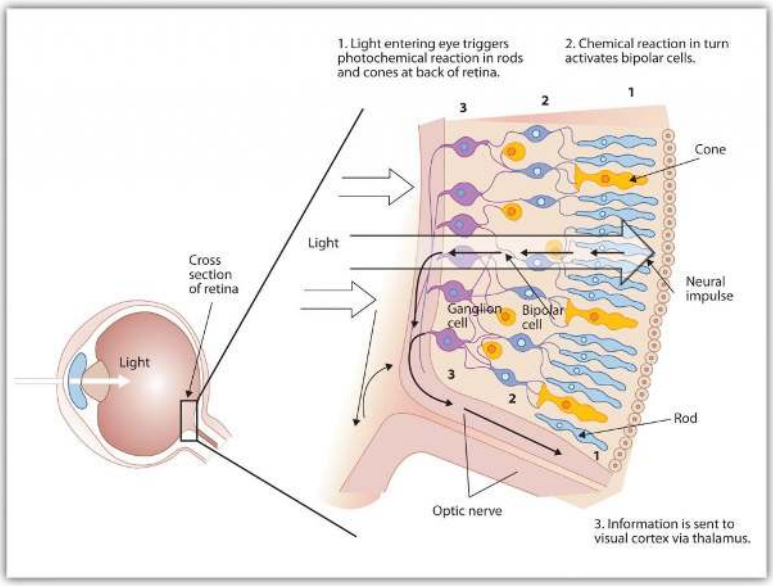


Figure 6.9 The Retina with Its Specialized Cells. When light falls on the retina, it creates a photochemical reaction in the rods and cones at the back of the retina. The reactions then continue to the bipolar cells, the ganglion cells, and eventually to the optic nerve.

Rods are *visual neurons that specialize in detecting black, white, and gray colours*. There are about 120 million rods in each eye. The rods do not provide a lot of detail about the images we see, but because they are highly sensitive to shorter-waved (darker) and weak light, they help us see in dim light — for instance, at night. Because the rods are located primarily around the edges of the retina, they are particularly active in peripheral vision (when you need to see something at night, try looking away from what you want to see). **Cones** are *visual neurons that are specialized in detecting fine detail and colours*. The five million or so cones in each eye enable us to see in colour, but they operate best in bright light. The cones are located primarily in and around the **fovea**, which is *the central point of the retina*.

To demonstrate the difference between rods and cones in attention to detail, choose a word in this text and focus on it. Do you notice that the words a few inches to the side seem more blurred? This is because the word you are focusing on strikes the detail-oriented cones, while the words surrounding it strike the less-detail-oriented rods, which are located on the periphery.

Margaret Livingstone (2000) (Figure 6.10) found an interesting effect that demonstrates the different processing capacities of the eye's rods and cones — namely, that the Mona Lisa's smile, which is widely referred to as "elusive," is perceived differently depending on how one looks at the painting. Because Leonardo da Vinci painted the smile in low-detail brush strokes, these details are better perceived by our peripheral vision (the rods) than by the cones. Livingstone found that people rated the Mona Lisa as more cheerful when they were instructed to focus on her eyes than they did when they were asked to look directly at her mouth. As Livingstone put it, "She smiles until you look at her mouth, and then it fades, like a dim star that disappears when you look directly at it."



Figure 6.10 Mona Lisa's Smile.

As you can see in Figure 6.11, "Pathway of Visual Images through the Thalamus and into the Visual Cortex," the sensory information received by the retina is relayed through the thalamus to corresponding areas in the visual cortex, which is located in the occipital lobe at the back of the brain. Although the principle of contralateral control might lead you to expect that the left eye would send information to the right brain hemisphere and vice versa, nature is smarter than that. In fact, the left and right eyes each send information to both the left and the right hemisphere, and the visual cortex processes each of the cues separately and in parallel. This is an adaptational advantage to an organism that loses sight in one eye, because even if only one eye is functional, both hemispheres will still receive input from it.

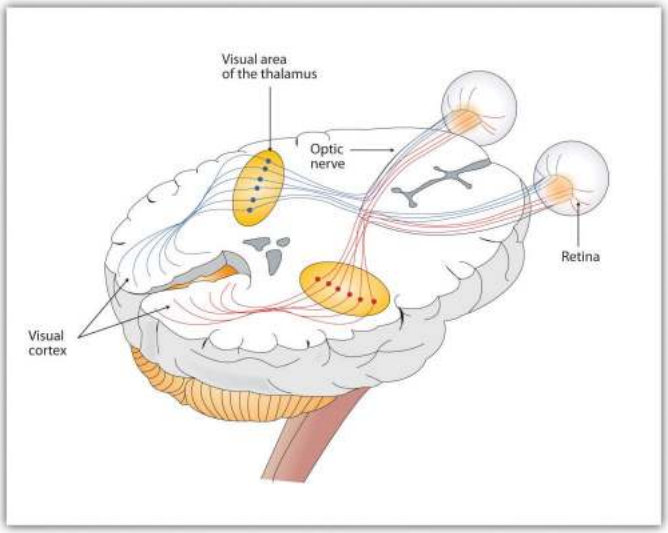


Figure 6.11 Pathway of Visual Images through the Thalamus and into the Visual Cortex. The left and right eyes each send information to both the left and the right brain hemisphere.

The visual cortex is made up of specialized neurons that turn the sensations they receive from the optic nerve into meaningful images. Because there are no photoreceptor cells at the place where the optic nerve leaves the retina, a *hole* or **blind spot** *in our vision* is created (see Figure 6.12, "Blind Spot Demonstration"). When both of our eyes are open, we don't experience a problem because our eyes are constantly moving, and one eye makes up for what the other eye misses. But the visual system is also designed to deal with this problem if only one eye is open — the visual cortex simply fills in the small hole in our vision with similar patterns from the surrounding areas, and we never notice the difference. The ability of the visual system to cope with the blind spot is another example of how sensation and perception work together to create meaningful experience.



Figure 6.12 Blind Spot Demonstration. You can get an idea of the extent of your blind spot (the place where the optic nerve leaves the retina) by trying this: close your left eye and stare with your right eye at the cross in the diagram. You should be able to see the elephant image to the right (don't look at it, just notice that it is there). If you can't see the elephant, move closer or farther away until you can. Now slowly move so that you are closer to the image while you keep looking at the cross. At one distance (probably a foot or so), the elephant will completely disappear from view because its image has fallen on the blind spot.

Perception is created in part through the simultaneous action of thousands of **feature detector neurons** — *specialized neurons, located in the visual cortex, that respond to the strength, angles, shapes, edges, and movements of a visual stimulus* (Kelsey, 1997; Livingstone & Hubel, 1988). The feature detectors work in parallel, each performing a specialized function. When faced with a red square, for instance, the parallel line feature detectors, the horizontal line feature detectors, and the red colour feature detectors all become activated. This activation is then passed on to other parts of the visual cortex, where other neurons compare the information supplied by the feature detectors with images stored in memory. Suddenly, in a flash of recognition, the many neurons fire together, creating the single image of the red square that we experience (Rodriguez et al., 1999). See Figure 6.13 for an explanation about the Necker cube.

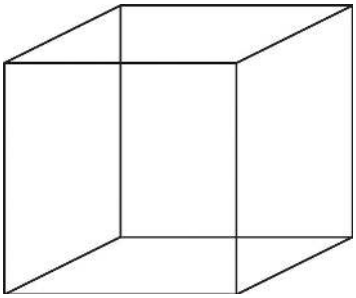


Figure 6.13 The Necker Cube. The Necker cube is an example of how the visual system creates perceptions out of sensations. We do not see a series of lines but, rather, a cube. Which cube we see varies depending on the momentary outcome of perceptual processes in the visual cortex.

Some feature detectors are tuned to selectively respond to particularly important objects, such as faces, smiles, and other parts of the body (Downing, Jiang, Shuman, & Kanwisher, 2001; Haxby et al., 2001). When researchers disrupted face recognition areas of the cortex using the magnetic pulses of transcranial magnetic stimulation (TMS), people were temporarily unable to recognize faces, and yet they were still able to recognize houses (McKone, Kanwisher, & Duchaine, 2007; Pitcher, Walsh, Yovel, & Duchaine, 2007).

Perceiving Colour

It has been estimated that the human visual system can detect and discriminate among seven million colour variations (Geldard, 1972), but these variations are all created by the combinations of the three primary colours: red, green, and blue. *The shade of a colour*, known as **hue**, is conveyed by the wavelength of the light that enters the eye (we see shorter wavelengths as more blue and longer wavelengths as more red), and we detect brightness from the *intensity* or height of the wave (bigger or more intense waves are perceived as brighter), as shown in Figure 6.14.

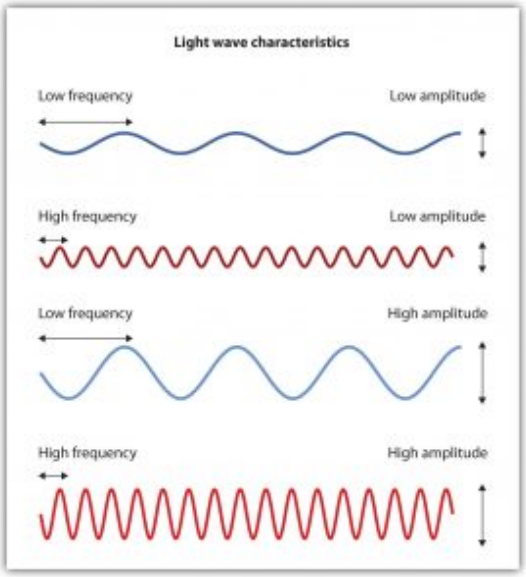


Figure 6.14 Low- and High-Frequency Sine Waves and Low- and High-Intensity Sine Waves and Their Corresponding Colours. Light waves with shorter frequencies are perceived as more blue than red; light waves with higher intensity are seen as brighter.

In his important research on colour vision, Hermann von Helmholtz (1821-1894) theorized that colour is perceived because the cones in the retina come in three types. One type of cone reacts primarily to blue light (short wavelengths), another reacts primarily to green light (medium wavelengths), and a third reacts primarily to red light (long wavelengths). The visual cortex then detects and compares the strength of the signals from each of the three types of cones, creating the experience of colour. According to this Young-Helmholtz **trichromatic colour theory** *what colour we see depends on the mix of the signals from the three types of cones*. If the brain is receiving primarily red and blue signals, for instance, it will perceive purple; if it is receiving primarily red and green signals it will perceive yellow; and if it is receiving messages from all three types of cones it will perceive white.

The different functions of the three types of cones are apparent in people who experience **colour blindness** — *the inability to detect green and/or red colours.* About one in 50 people, mostly men, lack functioning in the red- or green-sensitive cones, leaving them only able to experience either one or two colours (Figure 6.15).

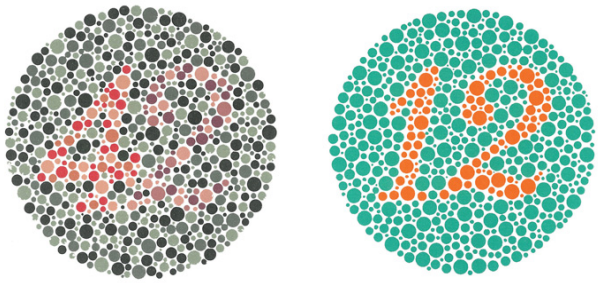


Figure 6.15 Colour Blindness. People with normal colour vision can see the number 42 in the first image and the number 12 in the second (they are vague but apparent). However, people who are colour blind cannot see the numbers at all.

The trichromatic colour theory cannot explain all of human vision, however. For one, although the colour purple does appear to us as a mix of red and blue, yellow does not appear to be a mix of red and green. And people with colour blindness, who cannot see either green or red, nevertheless can still see yellow. An alternative approach to the Young-Helmholtz theory, known as the **opponent-process colour theory**, *proposes that we analyze sensory information not in terms of three colours but rather in three sets of "opponent colours": red-green, yellow-blue, and white-black.* Evidence for the opponent-process theory comes from the fact that some neurons in the retina and in the visual cortex are excited by one colour (e.g., red) but inhibited by another colour (e.g., green).

One example of opponent processing occurs in the experience of an afterimage. If you stare at the shape on the top left side of Figure 6.16, “Afterimages,” for about 30 seconds (the longer you look, the better the effect), and then move your eyes to the blank area to the right of it, you will see the afterimage. Now try this by staring at the image of the Italian flag below and then shifting your eyes to the blank area beside it. When we stare at the green stripe, our green receptors habituate and begin to process less strongly, whereas the red receptors remain at full strength. When we switch our gaze, we see primarily the red part of the opponent process. Similar processes create blue after yellow and white after black.

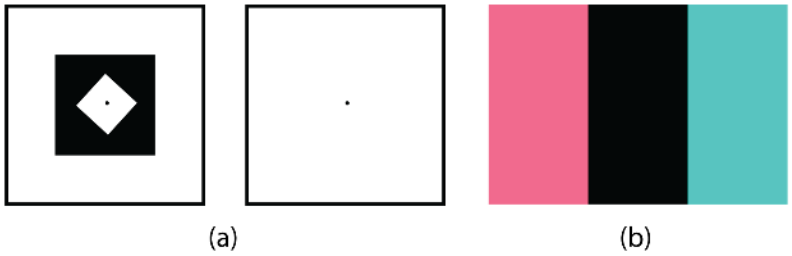


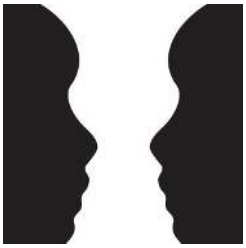
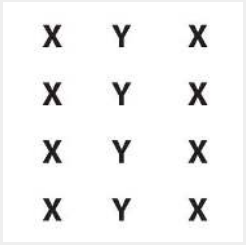
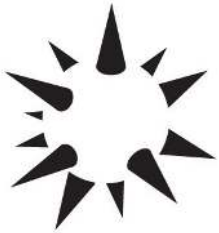
Figure 6.16 Afterimages.

The tricolour and the opponent-process mechanisms work together to produce colour vision. When light rays enter the eye, the red, blue, and green cones on the retina respond in different degrees and send different strength signals of red, blue, and green through the optic nerve. The colour signals are then processed both by the ganglion cells and by the neurons in the visual cortex (Gegenfurtner & Kiper, 2003).

Perceiving Form

One of the important processes required in vision is the perception of form. German psychologists in the 1930s and 1940s, including Max Wertheimer (1880-1943), Kurt Koffka (1886-1941), and Wolfgang Köhler (1887-1967), argued that we create forms out of their component sensations based on the idea of the **gestalt**, *a meaningfully organized whole*. The idea of the gestalt is that the “whole is more than the sum of its parts.” Some examples of how gestalt principles lead us to see more than what is actually there are summarized in Table 6.1, “Summary of Gestalt Principles of Form Perception.”

Table 6.1 Summary of Gestalt Principles of Form Perception.

Principle	Description	Example	Image
Figure and ground	We structure input so that we always see a figure (image) against a ground (background).	At right, you may see a vase or you may see two faces, but in either case, you will organize the image as a figure against a ground.	
Similarity	Stimuli that are similar to each other tend to be grouped together.	You are more likely to see three similar columns among the *XYX* characters at right than you are to see four rows.	
Proximity	We tend to group nearby figures together.	Do you see four or eight images at right? Principles of proximity suggest that you might see only four.	
Continuity	We tend to perceive stimuli in smooth, continuous ways rather than in more discontinuous ways.	At right, most people see a line of dots that moves from the lower left to the upper right, rather than a line that moves from the left and then suddenly turns down. The principle of continuity leads us to see most lines as following the smoothest possible path.	
Closure	We tend to fill in gaps in an incomplete image to create a complete, whole object.	Closure leads us to see a single spherical object at right rather than a set of unrelated cones.	

Principle	Description	Example	Image

Perceiving Depth

Depth perception is *the ability to perceive three-dimensional space and to accurately judge distance*. Without depth perception, we would be unable to drive a car, thread a needle, or simply navigate our way around the supermarket (Howard & Rogers, 2001). Research has found that depth perception is in part based on innate capacities and in part learned through experience (Witherington, 2005).

Psychologists Eleanor Gibson and Richard Walk (1960) tested the ability to perceive depth in six- to 14-month-old infants by placing them on a **visual cliff**, *a mechanism that gives the perception of a dangerous drop-off, in which infants can be safely tested for their perception of depth* (Figure 6.17 "Visual Cliff"). The infants were placed on one side of the "cliff," while their mothers called to them from the other side. Gibson and Walk found that most infants either crawled away from the cliff or remained on the board and cried because they wanted to go to their mothers, but the infants perceived a chasm that they instinctively could not cross. Further research has found that even very young children who cannot yet crawl are fearful of heights (Campos, Langer, & Krowitz, 1970). On the other hand, studies have also found that infants improve their hand-eye coordination as they learn to better grasp objects and as they gain more experience in crawling, indicating that depth perception is also learned (Adolph, 2000).

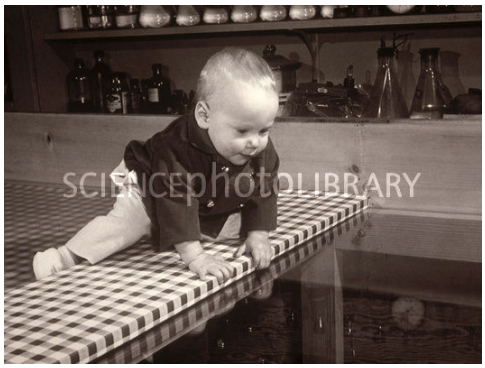


Figure 6.17 Visual Cliff. Babies appear to have the innate ability to perceive depth, as seen by this baby's reluctance to cross the "visual cliff."

Depth perception is the result of our use of **depth cues**, *messages from our bodies and the external environment that supply us with information about space and distance*. **Binocular depth cues** are *depth cues that are created by retinal image disparity — that is, the space between our eyes — and which thus require the coordination of both eyes.* One outcome of retinal disparity is that the images projected on each eye are slightly different from each other. The visual cortex automatically merges the two images into one, enabling us to perceive depth. Three-dimensional movies make use of retinal disparity by using 3-D glasses that the viewer wears to create a different image on each eye. The perceptual system quickly, easily, and unconsciously turns the disparity into 3-D.

An important binocular depth cue is **convergence**, *the inward turning of our eyes that is required to focus on objects that are less than about 50 feet away from us*. The visual cortex uses the size of the convergence angle between the eyes to judge the object's distance. You will be able to feel your eyes converging if you slowly bring a finger closer to your nose while continuing to focus on it. When you close one eye, you no longer feel the tension — convergence is a binocular depth cue that requires both eyes to work.

The visual system also uses **accommodation** to *help determine depth*. As the lens changes its curvature to focus on distant or close objects, information relayed from the muscles attached to the lens helps us determine an object's distance. Accommodation is only effective at short viewing distances, however, so while it comes in handy when threading a needle or tying shoelaces, it is far less effective when driving or playing sports.

Although the best cues to depth occur when both eyes work together, we are able to see depth even with one eye closed. **Monocular depth cues** are *depth cues that help us perceive depth using only one eye* (Sekuler & Blake, 2006). Some of the most important are summarized in Table 6.2, "Monocular Depth Cues That Help Us Judge Depth at a Distance."

Table 6.2 Monocular Depth Cues That Help Us Judge Depth at a Distance.

Name	Description	Example	Image
Position	We tend to see objects higher up in our field of vision as farther away.	The fence posts at right appear farther away not only because they become smaller but also because they appear higher up in the picture.	
Relative size	Assuming that the objects in a scene are the same size, smaller objects are perceived as farther away.	At right, the cars in the distance appear smaller than those nearer to us.	
Linear perspective	Parallel lines appear to converge at a distance.	We know that the tracks at right are parallel. When they appear closer together, we determine they are farther away.	
Light and shadow	The eye receives more reflected light from objects that are closer to us. Normally, light comes from above, so darker images are in shadow.	We see the images at right as extending and indented according to their shadowing. If we invert the picture, the images will reverse.	
Interposition	When one object overlaps another object, we view it as closer.	At right, because the blue star covers the pink bar, it is seen as closer than the yellow moon.	
Aerial perspective	Objects that appear hazy, or that are covered with smog or dust, appear farther away.	The artist who painted the picture on the right used aerial perspective to make the clouds more hazy and thus appear farther away.	

Perceiving Motion

Many animals, including human beings, have very sophisticated perceptual skills that allow them to coordinate their own motion with the motion of moving objects in order to create a collision with that object. Bats and birds use this mechanism to catch up with prey, dogs use it to catch a Frisbee, and humans use it to catch a moving football. The brain detects motion partly from the changing size of an image on the retina (objects that look bigger are usually closer to us) and in part from the relative brightness of objects.

We also experience motion when objects near each other change their appearance. The **beta effect** refers to *the perception of motion that occurs when different images are presented next to each other in succession* (see “Beta Effect and Phi Phenomenon”). The visual cortex fills in the missing part of the motion and we see the object moving. The beta effect is used in movies to create the experience of motion. A related effect is the **phi phenomenon**, in which *we perceive a sensation of motion caused by the appearance and disappearance of objects that are near each other*. The phi phenomenon looks like a moving zone or cloud of background colour surrounding the flashing objects. The beta effect and the phi phenomenon are other examples of the importance of the gestalt — our tendency to “see more than the sum of the parts.”

Beta Effect and Phi Phenomenon

In the beta effect, our eyes detect motion from a series of still images, each with the object in a different place. This is the fundamental mechanism of motion pictures (movies). In the phi phenomenon, the perception of motion is based on the momentary hiding of an image.

Phi phenomenon: http://upload.wikimedia.org/wikipedia/commons/6/6e/Lilac-Chaser.gif

Beta effect: http://upload.wikimedia.org/wikipedia/commons/0/09/Phi_phenomenom_no_watermark.gif

Key Takeaways

- Vision is the process of detecting the electromagnetic energy that surrounds us. Only a small fraction of the electromagnetic spectrum is visible to humans.
- The visual receptor cells on the retina detect shape, colour, motion, and depth.
- Light enters the eye through the transparent cornea and passes through the pupil at the centre of the iris. The lens adjusts to focus the light on the retina, where it appears upside down and backward. Receptor cells on the retina are excited or inhibited by the light and send information to the visual cortex through the optic nerve.
- The retina has two types of photoreceptor cells: rods, which detect brightness and respond to black and white, and cones, which respond to red, green, and blue. Colour blindness occurs when people lack function in the red- or green-sensitive cones.
- Feature detector neurons in the visual cortex help us recognize objects, and some neurons respond selectively to faces and other body parts.
- The Young-Helmholtz trichromatic colour theory proposes that colour perception is the result of the signals sent by the three types of cones, whereas the opponent-process colour theory proposes that we perceive colour as three sets of opponent colours: red-green, yellow-blue, and white-black.
- The ability to perceive depth occurs as the result of binocular and monocular depth cues.
- Motion is perceived as a function of the size and brightness of objects. The beta effect and the phi phenomenon are examples of perceived motion.

Exercises and Critical Thinking

1. Consider some ways that the processes of visual perception help you engage in an everyday activity, such as driving a car or riding a bicycle.
2. Imagine for a moment what your life would be like if you couldn't see. Do you think you would be able to compensate for your loss of sight by using other senses?

Image Attributions

Figure 6.10: Mona Lisa detail face (http://commons.wikimedia.org/wiki/Fi...etail_face.jpg) is in the public domain.

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Figure 6.16: Nachbild by Freddy2001 (http://commons.wikimedia.org/wiki/File:Nachbild-1.svg) and Italian Flag Inverted by Pcessna (http://commons.wikimedia.org/wiki/Fi...agInverted.gif) is in the public domain.

Figure 6.17: Perception-Conception (http://perception-connection.wikispaces.com/3)+Key+Findings) used with CC-BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0/).

References

Adolph, K. E. (2000). Specificity of learning: Why infants fall over a veritable cliff. *Psychological Science*, *11*(4), 290–295.

Campos, J. J., Langer, A., & Krowitz, A. (1970). Cardiac responses on the visual cliff in prelocomotor human infants. *Science*, *170*(3954), 196–197.

Downing, P. E., Jiang, Y., Shuman, M., & Kanwisher, N. (2001). A cortical area selective for visual processing of the human body. *Science*, *293*(5539), 2470–2473.

Gegenfurtner, K. R., & Kiper, D. C. (2003). Color vision. *Annual Review of Neuroscience*, *26*, 181–206.

Geldard, F. A. (1972). *The human senses* (2nd ed.). New York, NY: John Wiley & Sons.

Gibson, E. J., & Walk, R. D. (1960). The "visual cliff." *Scientific American*, *202*(4), 64–71.

Haxby, J. V., Gobbini, M. I., Furey, M. L., Ishai, A., Schouten, J. L., & Pietrini, P. (2001). Distributed and overlapping representations of faces and objects in ventral temporal cortex. *Science*, *293*(5539), 2425–2430.

Howard, I. P., & Rogers, B. J. (2001). *Seeing in depth: Basic mechanisms* (Vol. 1). Toronto, ON: Porteous.

Kelsey, C.A. (1997). Detection of visual information. In W. R. Hendee & P. N. T. Wells (Eds.), *The perception of visual information* (2nd ed.). New York, NY: Springer Verlag.

Livingstone, M., & Hubel, D. (1998). Segregation of form, color, movement, and depth: Anatomy, physiology, and perception. *Science*, *240*, 740–749.

Livingstone M. S. (2000). Is it warm? Is it real? Or just low spatial frequency? Science, 290, 1299.

McKone, E., Kanwisher, N., & Duchaine, B. C. (2007). Can generic expertise explain special processing for faces? *Trends in Cognitive Sciences*, *11*, 8–15.

Pitcher, D., Walsh, V., Yovel, G., & Duchaine, B. (2007). TMS evidence for the involvement of the right occipital face area in early face processing. *Current Biology*, *17*, 1568–1573.

Rodriguez, E., George, N., Lachaux, J.-P., Martinerie, J., Renault, B., & Varela, F. J. (1999). Perception's shadow: Long-distance synchronization of human brain activity. *Nature*, *397*(6718), 430–433.

Sekuler, R., & Blake, R. (2006). *Perception* (5th ed.). New York, NY: McGraw-Hill.

Witherington, D. C. (2005). The development of prospective grasping control between 5 and 7 months: A longitudinal study. *Infancy*, *7*(2), 143–161.

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5.3: Hearing

Learning Objectives

1. Draw a picture of the ear and label its key structures and functions, and describe the role they play in hearing.
2. Describe the process of transduction in hearing.

Like vision and all the other senses, hearing begins with transduction. Sound waves that are collected by our ears are converted into neural impulses, which are sent to the brain where they are integrated with past experience and interpreted as the sounds we experience. The human ear is sensitive to a wide range of sounds, ranging from the faint tick of a clock in a nearby room to the roar of a rock band at a nightclub, and we have the ability to detect very small variations in sound. But the ear is particularly sensitive to sounds in the same frequency as the human voice. A mother can pick out her child's voice from a host of others, and when we pick up the phone we quickly recognize a familiar voice. In a fraction of a second, our auditory system receives the sound waves, transmits them to the auditory cortex, compares them to stored knowledge of other voices, and identifies the identity of the caller.

The Ear

Just as the eye detects light waves, the ear detects sound waves. Vibrating objects (such as the human vocal chords or guitar strings) cause air molecules to bump into each other and produce sound waves, which travel from their source as peaks and valleys much like the ripples that expand outward when a stone is tossed into a pond. Unlike light waves, which can travel in a vacuum, sound waves are carried within mediums such as air, water, or metal, and it is the changes in pressure associated with these mediums that the ear detects.

As with light waves, we detect both the wavelength and the *amplitude* of sound waves. The *wavelength of the sound wave* (known as frequency) is measured in terms of the number of waves that arrive per second and determines our perception of pitch, *the perceived frequency of a sound.* Longer sound waves have lower frequency and produce a lower pitch, whereas shorter waves have higher frequency and a higher pitch.

The amplitude, or *height of the sound wave*, determines how much energy it contains and is perceived as loudness (*the degree of sound volume*). Larger waves are perceived as louder. Loudness is measured using *the unit of relative loudness* known as the decibel. Zero decibels represent the absolute threshold for human hearing, below which we cannot hear a sound. Each increase in 10 decibels represents a tenfold increase in the loudness of the sound (Figure **5.3.29**). The sound of a typical conversation (about 60 decibels) is 1,000 times louder than the sound of a faint whisper (30 decibels), whereas the sound of a jackhammer (130 decibels) is 10 billion times louder than the whisper.

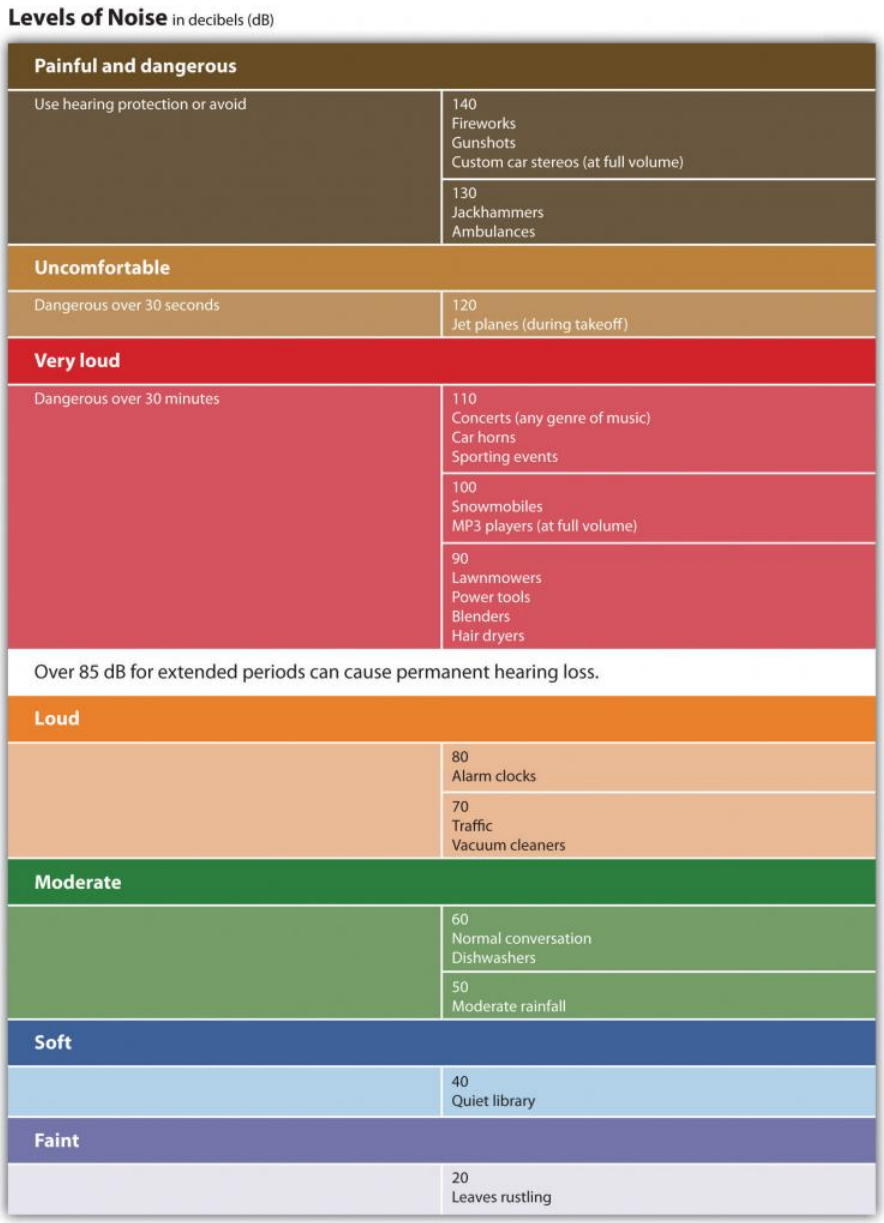


Figure **5.3.29**: Sounds in Everyday Life

The human ear can comfortably hear sounds up to 80 decibels. Prolonged exposure to sounds above 80 decibels can cause hearing loss.

Audition begins in the pinna, *the external and visible part of the ear*, which is shaped like a funnel to draw in sound waves and guide them into the auditory canal. At the end of the canal, the sound waves strike the *tightly stretched, highly sensitive membrane* known as the tympanic membrane (or eardrum), which vibrates with the waves. The resulting vibrations are relayed into the middle ear through three tiny bones, known as the ossicles—the hammer (or malleus), anvil (or incus), and stirrup (or stapes)—to the cochlea, *a snail-shaped liquid-filled tube in the inner ear*. The vibrations cause the oval window, *the membrane covering the opening of the cochlea*, to vibrate, disturbing the fluid inside the cochlea.

The movements of the fluid in the cochlea bend the hair cells of the inner ear, much in the same way that a gust of wind bends over wheat stalks in a field. The movements of the hair cells trigger nerve impulses in the attached neurons, which are sent to the auditory nerve and then to the auditory cortex in the brain. The cochlea contains about 16,000 hair cells, each of which holds a bundle of fibers known as *cilia* on its tip. The cilia are so sensitive that they can detect a movement that pushes them the width of a

single atom. To put things in perspective, cilia swaying at the width of an atom is equivalent to the tip of the Eiffel Tower swaying by half an inch (Corey et al., 2004).

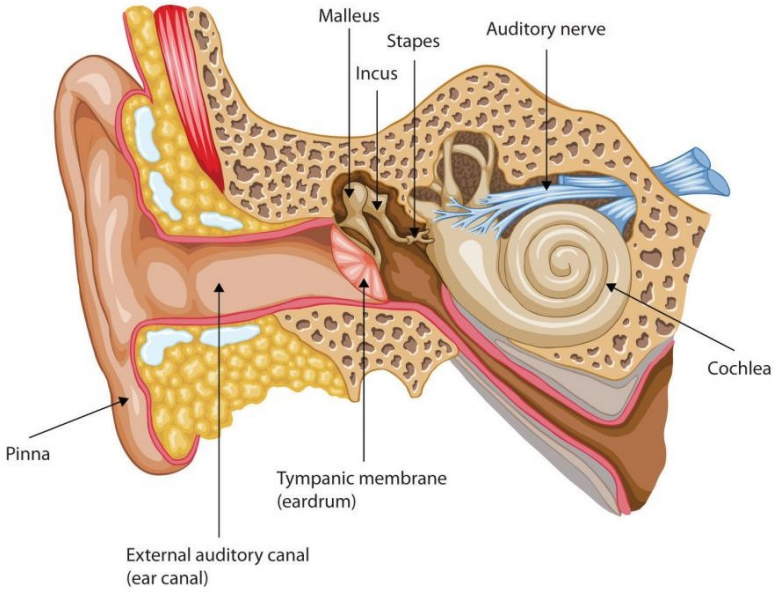


Figure **5.3.30** The Human Ear

Sound waves enter the outer ear and are transmitted through the auditory canal to the eardrum. The resulting vibrations are moved by the three small ossicles into the cochlea, where they are detected by hair cells and sent to the auditory nerve.

Hearing Loss

More than 31 million Americans suffer from some kind of hearing impairment (Kochkin, 2005). *Conductive hearing loss* is caused by physical damage to the ear (such as to the eardrums or ossicles) that reduce the ability of the ear to transfer vibrations from the outer ear to the inner ear. *Sensorineural hearing loss*, which is caused by damage to the cilia or to the auditory nerve, is less common overall but frequently occurs with age (Tennesen, 2007). The cilia are extremely fragile, and by the time we are 65 years old, we will have lost 40% of them, particularly those that respond to high-pitched sounds (Chisolm, Willott, & Lister, 2003).

Prolonged exposure to loud sounds will eventually create sensorineural hearing loss as the cilia are damaged by the noise. People who constantly operate noisy machinery without using appropriate ear protection are at high risk of hearing loss, as are people who listen to loud music on their headphones or who engage in noisy hobbies, such as hunting or motorcycling. Sounds that are 85 decibels or more can cause damage to your hearing, particularly if you are exposed to them repeatedly. Sounds of more than 130 decibels are dangerous even if you are exposed to them infrequently. People who experience *tinnitus* (a ringing or a buzzing sensation) after being exposed to loud sounds have very likely experienced some damage to their cilia. Taking precautions when being exposed to loud sound is important, as cilia do not grow back.

While conductive hearing loss can often be improved through hearing aids that amplify the sound, they are of little help to sensorineural hearing loss. But if the auditory nerve is still intact, a *cochlear implant* may be used. A cochlear implant is a device made up of a series of electrodes that are placed inside the cochlea. The device serves to bypass the hair cells by stimulating the auditory nerve cells directly. The latest implants utilize place theory, enabling different spots on the implant to respond to different levels of pitch. The cochlear implant can help children hear who would normally be deaf, and if the device is implanted early enough, these children can frequently learn to speak, often as well as normal children do (Dettman, Pinder, Briggs, Dowell, & Leigh, 2007; Dorman & Wilson, 2004).

References

Chisolm, T. H., Willott, J. F., & Lister, J. J. (2003). The aging auditory system: Anatomic and physiologic changes and implications for rehabilitation. *International Journal of Audiology, 42*(Suppl. 2), 2S3–2S10.

Corey, D. P., García-Añoveros, J., Holt, J. R., Kwan, K. Y., Lin, S.-Y., Vollrath, M. A., Amalfitano, A.,…Zhang, D.-S. (2004). TRPA1 is a candidate for the mechano-sensitive transduction channel of vertebrate hair cells. *Nature, 432*, 723–730. Retrieved from http://www.nature.com/nature/journal/v432/n7018/full/nature03066.html

Dettman, S. J., Pinder, D., Briggs, R. J. S., Dowell, R. C., & Leigh, J. R. (2007). Communication development in children who receive the cochlear implant younger than 12 months: Risk versus benefits. *Ear and Hearing, 28*(2, Suppl.), 11S–18S;

Dorman, M. F., & Wilson, B. S. (2004). The design and function of cochlear implants. *American Scientist, 92*, 436–445.

Kochkin, S. (2005). MarkeTrak VII: Hearing loss population tops 31 million people. *Hearing Review, 12*(7) 16–29.

Middlebrooks, J. C., & Green, D. M. (1991). Sound localization by human listeners. *Annual Review of Psychology, 42*, 135–159.

Tennesen, M. (2007, March 10). Gone today, hear tomorrow. *New Scientist, 2594*, 42–45.

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5.4: Tasting, Smelling, and Touching

Learning Objectives

1. Summarize how the senses of taste and olfaction transduce stimuli into perceptions.
2. Describe the process of transduction in the senses of touch and proprioception.
3. Outline the gate control theory of pain. Explain why pain matters and how it may be controlled.

Although vision and hearing are by far the most important, human sensation is rounded out by four other senses, each of which provides an essential avenue to a better understanding of and response to the world around us. These other senses are *touch*, *taste*, *smell*, and our *sense of body position and movement (proprioception)*.

Tasting

Taste is important not only because it allows us to enjoy the food we eat, but even more crucial, because it leads us toward foods that provide energy (sugar, for instance) and away from foods that could be harmful. Many children are picky eaters for a reason—they are biologically predisposed to be very careful about what they eat. Together with the sense of smell, taste helps us maintain appetite, assess potential dangers (such as the odor of a gas leak or a burning house), and avoid eating poisonous or spoiled food.

Our ability to taste begins at the taste receptors on the tongue. The tongue detects six different taste sensations, known respectively as *sweet, salty, sour, bitter, piquancy (spicy)*, and *umami (savory)*. Umami is a meaty taste associated with meats, cheeses, soy, seaweed, and mushrooms, and particularly found in monosodium glutamate (MSG), a popular flavor enhancer (Ikeda, 1909/2002; Sugimoto & Ninomiya, 2005).

Our tongues are covered with *taste buds*, which are designed to sense chemicals in the mouth. Most taste buds are located in the top outer edges of the tongue, but there are also receptors at the back of the tongue as well as on the walls of the mouth and at the back of the throat. As we chew food, it dissolves and enters the taste buds, triggering nerve impulses that are transmitted to the brain (Northcutt, 2004). Human tongues are covered with 2,000 to 10,000 taste buds, and each bud contains between 50 and 100 taste receptor cells. Taste buds are activated very quickly; a salty or sweet taste that touches a taste bud for even one tenth of a second will trigger a neural impulse (Kelling & Halpern, 1983). On average, taste buds live for about 5 days, after which new taste buds are created to replace them. As we get older, however, the rate of creation decreases making us less sensitive to taste. This change helps explain why some foods that seem so unpleasant in childhood are more enjoyable in adulthood.

The area of the sensory cortex that responds to taste is in a very similar location to the area that responds to smell, a fact that helps explain why the sense of smell also contributes to our experience of the things we eat. You may remember having had difficulty tasting food when you had a bad cold, and if you block your nose and taste slices of raw potato, apple, and parsnip, you will not be able to taste the differences between them. Our experience of texture in a food (the way we feel it on our tongues) also influences how we taste it.

Smelling

As we breathe in air through our nostrils, we inhale airborne chemical molecules, which are detected by the 10 million to 20 million receptor cells embedded in the *olfactory membrane* of the upper nasal passage. The *olfactory receptor cells* are topped with tentacle-like protrusions that contain receptor proteins. When an odor receptor is stimulated, the membrane sends neural messages up the olfactory nerve to the brain (Figure **5.4.31**).

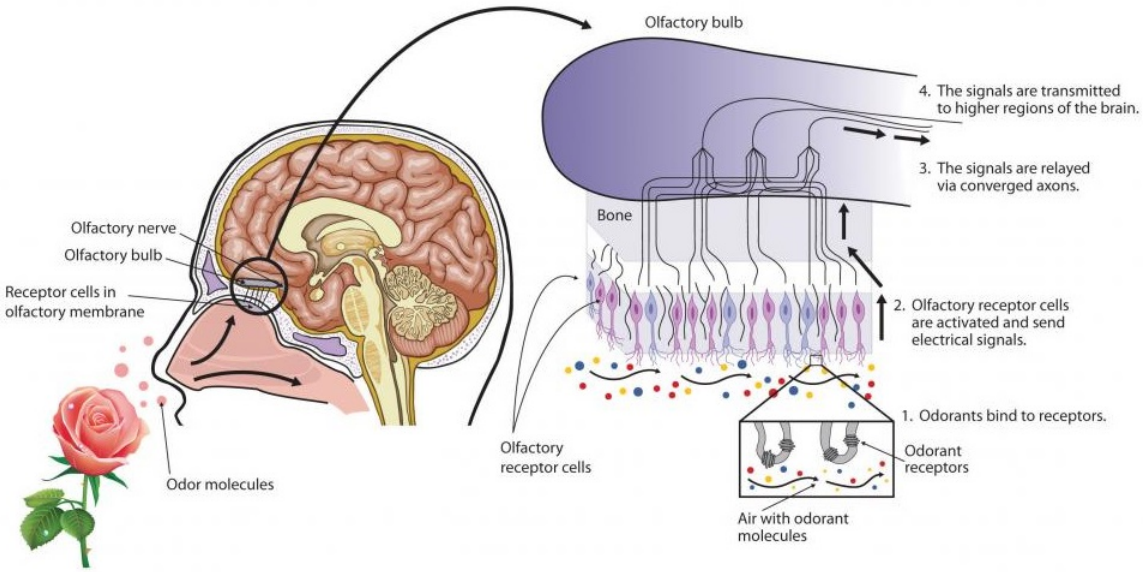


Figure 5.4.31: Smell Receptors. There are more than 1,000 types of odor receptor cells in the olfactory membrane.

We have approximately 1,000 types of odor receptor cells (Bensafi et al., 2004), and it is estimated that we can detect 10,000 different odors (Malnic, Hirono, Sato, & Buck, 1999). The receptors come in many different shapes and respond selectively to different smells. Like a lock and key, different chemical molecules "fit" into different receptor cells, and odors are detected according to their influence on a combination of receptor cells. Just as the 10 digits from *0* to *9* can combine in many different ways to produce an endless array of phone numbers, odor molecules bind to different combinations of receptors, and these combinations are decoded in the olfactory cortex. As you can see in Figure 5.4.32, women tend to have a more acute sense of smell than men. The sense of smell peaks in early adulthood and then begins a slow decline. By ages 60 to 70, the sense of smell has become sharply diminished.

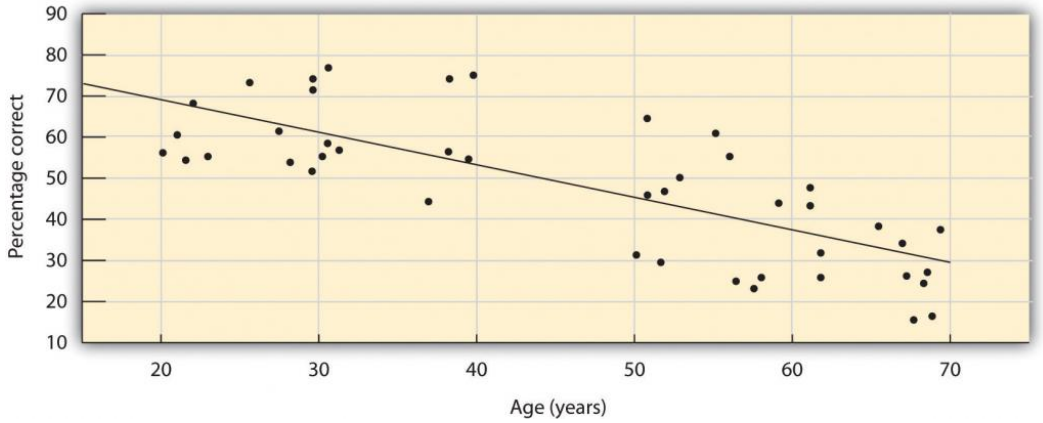


Figure 5.4.32: Age Differences in Smell. The ability to identify common odorants declines markedly between 20 and 70 years of age. Adapted from Murphy, C. (1986). Taste and smell in the elderly. In H. L. Meiselman & R. S. Rivlin (Eds.), *Clinical measurement of taste and smell* (Vol. 1, pp. 343–371). New York, NY: Macmillan.

Touching

The sense of touch is essential to human development. Infants thrive when they are cuddled and attended to, but not if they are deprived of human contact (Baysinger, Plubell, & Harlow, 1973; Feldman, 2007; Haradon, Bascom, Dragomir, & Scripcaru, 1994). Touch communicates warmth, caring, and support, and is an essential part of the enjoyment we gain from our social interactions with close others (Field et al., 1997; Kelter, 2009).

The skin, the largest organ in the body, is the sensory organ for touch. The skin contains a variety of nerve endings, combinations of which respond to particular types of pressures and temperatures. When you touch different parts of the body, you will find that some areas are more ticklish, whereas other areas respond more to pain, cold, or heat.

The thousands of nerve endings in the skin respond to four basic sensations: *Pressure*, *hot*, *cold*, and *pain*, but only the sensation of pressure has its own specialized receptors. Other sensations are created by a combination of the other four. For instance:

- The experience of a tickle is caused by the stimulation of neighboring pressure receptors.
- The experience of heat is caused by the stimulation of hot and cold receptors.
- The experience of itching is caused by repeated stimulation of pain receptors.
- The experience of wetness is caused by repeated stimulation of cold and pressure receptors.

The skin is important not only in providing information about touch and temperature but also in proprioception—*the ability to sense the position and movement of our body parts*. Proprioception is accomplished by specialized neurons located in the skin, joints, bones, ears, and tendons, which send messages about the compression and the contraction of muscles throughout the body. Without this feedback from our bones and muscles, we would be unable to play sports, walk, or even stand upright.

The ability to keep track of where the body is moving is also provided by the vestibular system, *a set of liquid-filled areas in the inner ear that monitors the head's position and movement, maintaining the body's balance*. As you can see in Figure **5.4.33**, the vestibular system includes the *semicircular canals* and the *vestibular sacs*. These sacs connect the canals with the cochlea. The semicircular canals sense the rotational movements of the body and the vestibular sacs sense linear accelerations. The vestibular system sends signals to the neural structures that control eye movement and to the muscles that keep the body upright.

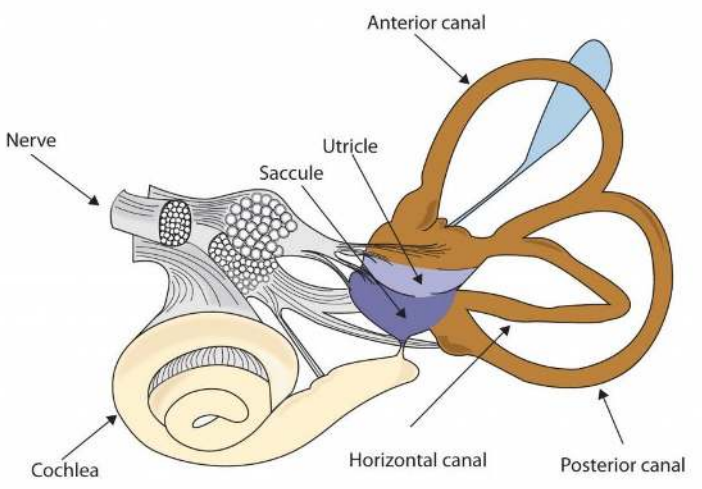


Figure **5.4.33**: The Vestibular System

The vestibular system includes the semicircular canals (brown) that transduce the rotational movements of the body and the vestibular sacs (blue) that sense linear accelerations.

Experiencing Pain

We do not enjoy it, but the experience of pain is how the body informs us that we are in danger. The burn when we touch a hot radiator and the sharp stab when we step on a nail lead us to change our behavior, preventing further damage to our bodies. People who cannot experience pain are in serious danger of damage from wounds that others with pain would quickly notice and attend to.

The gate control theory of pain*proposes that pain is determined by the operation of two types of nerve fibers in the spinal cord*. One set of smaller nerve fibers carries pain from the body to the brain, whereas a second set of larger fibers is designed to stop or start (as a gate would) the flow of pain (Melzack & Wall, 1996). It is for this reason that massaging an area where you feel pain may help alleviate it—the massage activates the large nerve fibers that block the pain signals of the small nerve fibers (Wall, 2000).

Experiencing pain is a lot more complicated than simply responding to neural messages, however. It is also a matter of perception. We feel pain less when we are busy focusing on a challenging activity (Bantick, Wise, Ploghaus, Clare, Smith, & Tracey, 2002), which can help explain why sports players may feel their injuries only after the game. We also feel less pain when we are distracted by humor (Zweyer, Velker, & Ruch, 2004). And pain is soothed by the brain's release of endorphins, natural hormonal pain killers. The release of endorphins can explain the euphoria experienced in the running of a marathon (Sternberg, Bailin, Grant, & Gracely, 1998).

Key Takeaways

- The ability to taste, smell, and touch are important because they help us avoid harm from environmental toxins.
- The many taste buds on our tongues and inside our mouths allow us to detect six basic taste sensations: sweet, salty, sour, bitter, piquancy, and umami.
- In olfaction, transduction occurs as airborne chemicals that are inhaled through the nostrils are detected by receptors in the olfactory membrane. Different chemical molecules fit into different receptor cells, creating different smells.
- On average, women have a better sense of smell than men, and the ability to smell diminishes with age.
- We have a range of different nerve endings embedded in the skin, combinations of which respond to the four basic sensations of pressure, hot, cold, and pain. But only the sensation of pressure has its own specialized receptors.
- Proprioception is our ability to sense the positions and movements of our body parts. Postural and movement information is detected by special neurons located in the skin, joints, bones, ears, and tendons, which pick up messages from the compression and the contraction of muscles throughout the body.
- The vestibular system, composed of structures in the inner ear, monitors the head's position and movement, maintaining the body's balance.
- Gate control theory explains how large and small neurons work together to transmit and regulate the flow of pain to the brain.

Exercises and Critical Thinking

1. Think of the foods that you like to eat the most. Which of the six taste sensations do these foods have, and why do you think that you like these particular flavors?
2. Why do you think that women might have a better developed sense of smell than do men?
3. Why is experiencing pain a benefit for human beings?

References

Bantick, S. J., Wise, R. G., Ploghaus, A., Clare, S., Smith, S. M., & Tracey, I. (2002). Imaging how attention modulates pain in humans using functional MRI. *Brain: A Journal of Neurology, 125*(2), 310–319.

Baysinger, C. M., Plubell, P. E., & Harlow, H. F. (1973). A variable-temperature surrogate mother for studying attachment in infant monkeys. *Behavior Research Methods & Instrumentation*, *5*(3), 269–272.

Bensafi, M., Zelano, C., Johnson, B., Mainland, J., Kahn, R., & Sobel, N. (2004). Olfaction: From sniff to percept. In M. S. Gazzaniga (Ed.), *The cognitive neurosciences* (3rd ed.). Cambridge, MA: MIT Press.

Feldman, R. (2007). Maternal-infant contact and child development: Insights from the kangaroo intervention. In L. L'Abate (Ed.), *Low-cost approaches to promote physical and mental health: Theory, research, and practice* (pp. 323–351). New York, NY: Springer Science + Business Media.

Field, T., Lasko, D., Mundy, P., Henteleff, T., Kabat, S., Talpins, S., & Dowling, M. (1997). Brief report: Autistic children's attentiveness and responsivity improve after touch therapy. *Journal of Autism and Developmental Disorders*, *27*(3), 333–338.

Haradon, G., Bascom, B., Dragomir, C., & Scripcaru, V. (1994). Sensory functions of institutionalized Romanian infants: A pilot study. *Occupational Therapy International*, *1*(4), 250–260.

Ikeda, K. (2002). [New seasonings]. *Chemical Senses, 27*(9), 847–849. Translated and shortened to 75% by Y. Ogiwara & Y. Ninomiya from the *Journal of the Chemical Society of Tokyo*, *30*, 820–836. (Original work published 1909).

Kelling, S. T., & Halpern, B. P. (1983). Taste flashes: Reaction times, intensity, and quality. *Science*, *219*, 412–414.

Keltner, D. (2009). *Born to be good: The science of a meaningful life*. New York, NY: Norton.

Malnic, B., Hirono, J., Sato, T., & Buck, L. B. (1999). Combinatorial receptor codes for odors. *Cell*, *96*, 713–723.

Melzack, R., & Wall, P. (1996). *The challenge of pain.* London, England: Penguin.

Northcutt, R. G. (2004). Taste buds: Development and evolution. *Brain, Behavior and Evolution*, *64*(3), 198–206.

Sternberg, W. F., Bailin, D., Grant, M., & Gracely, R. H. (1998). Competition alters the perception of noxious stimuli in male and female athletes. *Pain*, *76*(1–2), 231–238.

Sugimoto, K., & Ninomiya, Y. (2005). Introductory remarks on umami research: Candidate receptors and signal transduction mechanisms on umami. *Chemical Senses*, *30*(Suppl. 1), Pi21–i22.

Wall, P. (2000). *Pain: The science of suffering*. New York, NY: Columbia University Press.

Zweyer, K., Velker, B., & Ruch, W. (2004). Do cheerfulness, exhilaration, and humor production moderate pain tolerance? A FACS study. *Humor: International Journal of Humor Research*, *17*(1-2), 85–119.

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5.5: Accuracy and Inaccuracy in Perception

Learning Objectives

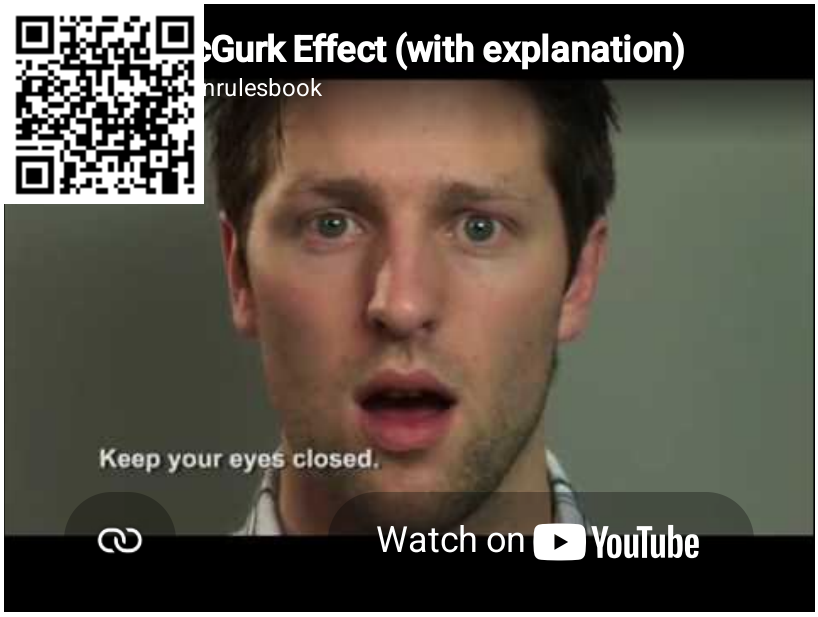
1. Describe how sensation and perception work together through sensory interaction, selective attention, sensory adaptation, and perceptual constancy.
2. Give examples of how our expectations may influence our perception, resulting in illusions and potentially inaccurate judgments.

The eyes, ears, nose, tongue, and skin sense the world around us, and in some cases perform preliminary information processing on the incoming data. But by and large, we do not experience sensation—we experience the outcome of perception—the total package that the brain puts together from the pieces it receives through our senses and that the brain creates for us to experience. When we look out the window at a view of the countryside, or when we look at the face of a good friend, we don't just see a jumble of colors and shapes—we see, instead, an image of a countryside or an image of a friend (Goodale & Milner, 2006).

How the Perceptual System Interprets the Environment

This meaning-making involves the automatic operation of a variety of essential perceptual processes. One of these is sensory interaction—*the working together of different senses to create experience*. Sensory interaction is involved when taste, smell, and texture combine to create the flavor we experience in food. It is also involved when we enjoy a movie because of the way the images and the music work together.

Although you might think that we understand speech only through our sense of hearing, it turns out that the visual aspect of speech is also important. One example of sensory interaction is shown in the *McGurk effect*—an error in perception that occurs when we misperceive sounds because the audio and visual parts of the speech are mismatched. You can witness the effect yourself by viewing the following video.



Video Clip: The McGurk Effect. The McGurk effect is an error in sound perception that occurs when there is a mismatch between the senses of hearing and seeing. https://youtu.be/jtsfidRq2tw

Other examples of sensory interaction include the experience of nausea that can occur when the sensory information being received from the eyes and the body does not match information from the vestibular system (Flanagan, May, & Dobie, 2004) and *synesthesia*—an experience in which one sensation (e.g., hearing a sound) creates experiences in another (e.g., vision). Most people do not experience synesthesia, but those who do link their perceptions in unusual ways, for instance, by experiencing color when

they taste a particular food or by hearing sounds when they see certain objects (Ramachandran, Hubbard, Robertson, & Sagiv, 2005).

Another important perceptual process is selective attention—*the ability to focus on some sensory inputs while tuning out others*. View Note 4.71 "Video Clip: Selective Attention" and count the number of times the people playing with the ball pass it to each other. You may find that, like many other people who view it for the first time, you miss something important because you selectively attend to only one aspect of the video (Simons & Chabris, 1999).



Video Clip: Selective Attention. https://youtu.be/vJG698U2Mvo

Watch this video and carefully count how many times the people pass the ball to each other.

Selective attention also allows us to focus on a single talker at a party while ignoring other conversations that are occurring around us (Broadbent, 1958; Cherry, 1953). Without this automatic selective attention, we'd be unable to focus on the single conversation we want to hear. But selective attention is not complete; we also at the same time monitor what's happening in the channels we are not focusing on. Perhaps you have had the experience of being at a party and talking to someone in one part of the room, when suddenly you hear your name being mentioned by someone in another part of the room. This *cocktail party phenomenon* shows us that although selective attention is limiting what we processes, we are nevertheless at the same time doing a lot of unconscious monitoring of the world around us—you didn't know you were attending to the background sounds of the party, but evidently you were.

Illusions

Although our perception is very accurate, it is not perfect. Illusions *occur when the perceptual processes that normally help us correctly perceive the world around us are fooled by a particular situation so that we see something that does not exist or that is incorrect*.

One well-known illusion is the *Mueller-Lyer illusion* (Figure **5.5.35**). The line segment in the bottom arrow looks longer to us than the one on the top, even though they are both actually the same length. It is likely that the illusion is, in part, the result of the failure of monocular depth cues—the bottom line looks like an edge that is normally farther away from us, whereas the top one looks like an edge that is normally closer.

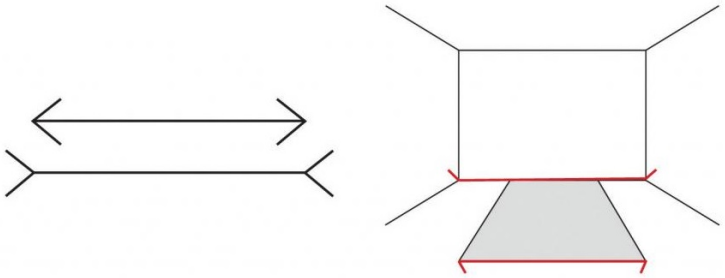


Figure **5.5.35**: The Mueller-Lyre Illusion. The Mueller-Lyre illusion makes the line segment at the top of the left picture appear shorter than the one at the bottom. The illusion is caused, in part, by the monocular distance cue of depth—the bottom line looks like an edge that is normally farther away from us, whereas the top one looks like an edge that is normally closer.

The *moon illusion* refers to the fact that the moon is perceived to be about 50% larger when it is near the horizon than when it is seen overhead, despite the fact that both moons are the same size and cast the same size retinal image. The monocular depth cues of position and aerial perspective create the illusion that things that are lower and more hazy are farther away. The skyline of the horizon (trees, clouds, outlines of buildings) also gives a cue that the moon is far away, compared to a moon at its zenith. If we look at a horizon moon through a tube of rolled up paper, taking away the surrounding horizon cues, the moon will immediately appear smaller.

The *Ponzo illusion* operates on the same principle. As you can see in Figure **5.5.37**, the top yellow bar seems longer than the bottom one, but if you measure them you'll see that they are exactly the same length. The monocular depth cue of linear perspective leads us to believe that, given two similar objects, the distant one can only cast the same size retinal image as the closer object if it is larger. The topmost bar therefore appears longer.

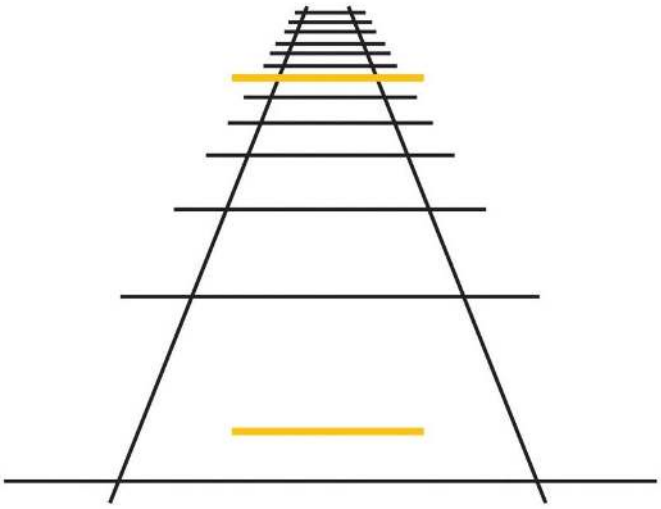


Figure **5.5.37**: The Ponzo Illusion. The Ponzo illusion is caused by a failure of the monocular depth cue of linear perspective: Both bars are the same size even though the top one looks larger.

Illusions demonstrate that our perception of the world around us may be influenced by our prior knowledge. But the fact that some illusions exist in some cases does not mean that the perceptual system is generally inaccurate—in fact, humans normally become so closely in touch with their environment that that the physical body and the particular environment that we sense and perceive becomes *embodied*—that is, built into and linked with—our cognition, such that the worlds around us become part of our brain (Calvo & Gamila, 2008). The close relationship between people and their environments means that, although illusions can be created in the lab and under some unique situations, they may be less common with active observers in the real world (Runeson, 1988).

The Important Role of Expectations in Perception

Our emotions, mind-set, expectations, and the contexts in which our sensations occur all have a profound influence on perception. People who are warned that they are about to taste something bad rate what they do taste more negatively than people who are told

that the taste won't be so bad (Nitschke et al., 2006), and people perceive a child and adult pair as looking more alike when they are told that they are parent and child (Bressan & Dal Martello, 2002). Similarly, participants who see images of the same baby rate it as stronger and bigger when they are told it is a boy as opposed to when they are told it is a girl (Stern & Karraker, 1989),and research participants who learn that a child is from a lower-class background perceive the child's scores on an intelligence test as lower than people who see the same test taken by a child they are told is from an upper-class background (Darley & Gross, 1983). Plassmann, O'Doherty, Shiv, and Rangel (2008)< found that wines were rated more positively and caused greater brain activity in brain areas associated with pleasure when they were said to cost more than when they were said to cost less. And even experts can be fooled: Professional referees tended to assign more penalty cards to soccer teams for videotaped fouls when they were told that the team had a history of aggressive behavior than when they had no such expectation (Jones, Paull, & Erskine, 2002).

Our perceptions are also influenced by our desires and motivations. When we are hungry, food-related words tend to grab our attention more than non-food-related words (Mogg, Bradley, Hyare, & Lee, 1998), we perceive objects that we can reach as bigger than those that we cannot reach (Witt & Proffitt, 2005), and people who favor a political candidate's policies view the candidate's skin color more positively than do those who oppose the candidate's policies (Caruso, Mead, & Balcetis, 2009). Even our culture influences perception. Chua, Boland, and Nisbett (2005) showed American and Asian graduate students different images, such as an airplane, an animal, or a train, against complex backgrounds. They found that (consistent with their overall individualistic orientation) the American students tended to focus more on the foreground image, while Asian students (consistent with their interdependent orientation) paid more attention to the image's context. Furthermore, Asian-American students focused more or less on the context depending on whether their Asian or their American identity had been activated.

References

Bressan, P., & Dal Martello, M. F. (2002). Talis pater, talis filius: Perceived resemblance and the belief in genetic relatedness. *Psychological Science, 13*, 213–218.

Broadbent, D. E. (1958). *Perception and communication*. New York, NY: Pergamon.

Calvo, P., & Gomila, T. (Eds.). (2008). *Handbook of cognitive science: An embodied approach*. San Diego, CA: Elsevier.

Caruso, E. M., Mead, N. L., & Balcetis, E. (2009). Political partisanship influences perception of biracial candidates' skin tone. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 106*(48), 20168–20173.

Cherry, E. C. (1953). Some experiments on the recognition of speech, with one and with two ears. *Journal of the Acoustical Society of America*, 25, 975–979.

Chua, H. F., Boland, J. E., & Nisbett, R. E. (2005). Cultural variation in eye movements during scene perception. *Proceedings of the National Academy of Sciences, 102*, 12629–12633.

Darley, J. M., & Gross, P. H. (1983). A hypothesis-confirming bias in labeling effects. *Journal of Personality and Social Psychology, 44*, 20–33.

Flanagan, M. B., May, J. G., & Dobie, T. G. (2004). The role of vection, eye movements, and postural instability in the etiology of motion sickness. *Journal of Vestibular Research: Equilibrium and Orientation, 14*(4), 335–346.

Goodale, M., & Milner, D. (2006). One brain—Two visual systems. *Psychologist, 19*(11), 660–663.

Jones, M. V., Paull, G. C., & Erskine, J. (2002). The impact of a team's aggressive reputation on the decisions of association football referees. *Journal of Sports Sciences, 20*, 991–1000.

Kraft, C. (1978). A psychophysical approach to air safety: Simulator studies of visual illusions in night approaches. In H. L. Pick, H. W. Leibowitz, J. E. Singer, A. Steinschneider, & H. W. Steenson (Eds.), *Psychology: From research to practice.* New York, NY: Plenum Press.

Lee, J., & Strayer, D. (2004). Preface to the special section on driver distraction. *Human Factors, 46*(4), 583.

McCann, J. J. (1992). Rules for color constancy. *Ophthalmic and Physiologic Optics, 12*(2), 175–177.

Mogg, K., Bradley, B. P., Hyare, H., & Lee, S. (1998). Selective attention to food related stimuli in hunger. *Behavior Research & Therapy, 36*(2), 227–237.

Nickerson, R. S. (1998). Applied experimental psychology. *Applied Psychology: An International Review, 47*, 155–173.

Nitschke, J. B., Dixon, G. E., Sarinopoulos, I., Short, S. J., Cohen, J. D., Smith, E. E.,…Davidson, R. J. (2006). Altering expectancy dampens neural response to aversive taste in primary taste cortex. *Nature Neuroscience 9*, 435–442.

Plassmann, H., O'Doherty, J., Shiv, B., & Rangel, A. (2008). Marketing actions can moderate neural representations of experienced pleasantness. *Proceedings of the National Academy of Sciences, 105*(3), 1050–1054.

Proctor, R. W., & Van Zandt, T. (2008). Human factors in simple and complex systems (2nd ed.). Boca Raton, FL: CRC Press.

Ramachandran, V. S., Hubbard, E. M., Robertson, L. C., & Sagiv, N. (2005). The emergence of the human mind: Some clues from synesthesia. In *Synesthesia: Perspectives From Cognitive Neuroscience* (pp. 147–190). New York, NY: Oxford University Press.

Runeson, S. (1988). The distorted room illusion, equivalent configurations, and the specificity of static optic arrays. *Journal of Experimental Psychology: Human Perception and Performance, 14*(2), 295–304.

Silverstein, L. D., Krantz, J. H., Gomer, F. E., Yeh, Y., & Monty, R. W. (1990). The effects of spatial sampling and luminance quantization on the image quality of color matrix displays. *Journal of the Optical Society of America, Part A, 7*, 1955–1968.

Silverstein, L. D., & Merrifield, R. M. (1985). *The development and evaluation of color systems for airborne applications: Phase I Fundamental visual, perceptual, and display systems considerations* (Tech. Report DOT/FAA/PM085019). Washington, DC: Federal Aviation Administration.

Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattentional blindness for dynamic events. *Perception, 28*(9), 1059–1074.

Stern, M., & Karraker, K. H. (1989). Sex stereotyping of infants: A review of gender labeling studies. *Sex Roles, 20*(9–10), 501–522.

Witt, J. K., & Proffitt, D. R. (2005). See the ball, hit the ball: Apparent ball size is correlated with batting average. *Psychological Science, 16*(12), 937–938.

Yarbus, A. L. (1967). *Eye movements and vision*. New York, NY: Plenum Press.

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CHAPTER OVERVIEW

6: Learning

6.1: Introduction

6.2: What Is Learning?

6.3: Classical Conditioning

6.4: Operant Conditioning

6.5: Observational Learning (Modeling)

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6.1: Introduction

Chapter Outline

6.1 What Is Learning?

6.2 Classical Conditioning

6.3 Operant Conditioning

6.4 Observational Learning (Modeling)



Figure **6.1** Loggerhead sea turtle hatchlings are born knowing how to find the ocean and how to swim. Unlike the sea turtle, humans must learn how to swim (and surf). (credit "turtle": modification of work by Becky Skiba, USFWS; credit "surfer": modification of work by Mike Baird)

The summer sun shines brightly on a deserted stretch of beach. Suddenly, a tiny grey head emerges from the sand, then another and another. Soon the beach is teeming with loggerhead sea turtle hatchlings (Figure 6.1). Although only minutes old, the hatchlings know exactly what to do. Their flippers are not very efficient for moving across the hot sand, yet they continue onward, instinctively. Some are quickly snapped up by gulls circling overhead and others become lunch for hungry ghost crabs that dart out of their holes. Despite these dangers, the hatchlings are driven to leave the safety of their nest and find the ocean.

Not far down this same beach, Ben and his son, Julian, paddle out into the ocean on surfboards. A wave approaches. Julian crouches on his board, then jumps up and rides the wave for a few seconds before losing his balance. He emerges from the water in time to watch his father ride the face of the wave.

Unlike baby sea turtles, which know how to find the ocean and swim with no help from their parents, we are not born knowing how to swim (or surf). Yet we humans pride ourselves on our ability to learn. In fact, over thousands of years and across cultures, we have created institutions devoted entirely to learning. But have you ever asked yourself how exactly it is that we learn? What processes are at work as we come to know what we know? This chapter focuses on the primary ways in which learning occurs.

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6.2: What Is Learning?

Learning Objectives

- Explain how learned behaviors are different from instincts and reflexes
- Define learning
- Recognize and define three basic forms of learning—classical conditioning, operant conditioning, and observational learning

Birds build nests and migrate as winter approaches. Infants suckle at their mother's breast. Dogs shake water off wet fur. Salmon swim upstream to spawn, and spiders spin intricate webs. What do these seemingly unrelated behaviors have in common? They all are *unlearned* behaviors. Both instincts and reflexes are innate (unlearned) behaviors that organisms are born with. **Reflexes** are a motor or neural reaction to a specific stimulus in the environment. They tend to be simpler than instincts, involve the activity of specific body parts and systems (e.g., the knee-jerk reflex and the contraction of the pupil in bright light), and involve more primitive centers of the central nervous system (e.g., the spinal cord and the medulla). In contrast, **instincts** are innate behaviors that are triggered by a broader range of events, such as maturation and the change of seasons. They are more complex patterns of behavior, involve movement of the organism as a whole (e.g., sexual activity and migration), and involve higher brain centers.

Both reflexes and instincts help an organism adapt to its environment and do not have to be learned. For example, every healthy human baby has a sucking reflex, present at birth. Babies are born knowing how to suck on a nipple, whether artificial (from a bottle) or human. Nobody teaches the baby to suck, just as no one teaches a sea turtle hatchling to move toward the ocean. Learning, like reflexes and instincts, allows an organism to adapt to its environment. But unlike instincts and reflexes, learned behaviors involve change and experience: **learning** is a relatively permanent change in behavior or knowledge that results from experience. In contrast to the innate behaviors discussed above, learning involves acquiring knowledge and skills through experience. Looking back at our surfing scenario, Julian will have to spend much more time training with his surfboard before he learns how to ride the waves like his father.

Learning to surf, as well as any complex learning process (e.g., learning about the discipline of psychology), involves a complex interaction of conscious and unconscious processes. Learning has traditionally been studied in terms of its simplest components—the associations our minds automatically make between events. Our minds have a natural tendency to connect events that occur closely together or in sequence. **Associative learning** occurs when an organism makes connections between stimuli or events that occur together in the environment. You will see that associative learning is central to all three basic learning processes discussed in this chapter; classical conditioning tends to involve unconscious processes, operant conditioning tends to involve conscious processes, and observational learning adds social and cognitive layers to all the basic associative processes, both conscious and unconscious. These learning processes will be discussed in detail later in the chapter, but it is helpful to have a brief overview of each as you begin to explore how learning is understood from a psychological perspective.

In classical conditioning, also known as Pavlovian conditioning, organisms learn to associate events—or stimuli—that repeatedly happen together. We experience this process throughout our daily lives. For example, you might see a flash of lightning in the sky during a storm and then hear a loud boom of thunder. The sound of the thunder naturally makes you jump (loud noises have that effect by reflex). Because lightning reliably predicts the impending boom of thunder, you may associate the two and jump when you see lightning. Psychological researchers study this associative process by focusing on what can be seen and measured—behaviors. Researchers ask if one stimulus triggers a reflex, can we train a different stimulus to trigger that same reflex? In operant conditioning, organisms learn, again, to associate events—a behavior and its consequence (reinforcement or punishment). A pleasant consequence encourages more of that behavior in the future, whereas a punishment deters the behavior. Imagine you are teaching your dog, Hodor, to sit. You tell Hodor to sit, and give him a treat when he does. After repeated experiences, Hodor begins to associate the act of sitting with receiving a treat. He learns that the consequence of sitting is that he gets a doggie biscuit (Figure 6.2). Conversely, if the dog is punished when exhibiting a behavior, it becomes conditioned to avoid that behavior (e.g., receiving a small shock when crossing the boundary of an invisible electric fence).



Figure **6.2** In operant conditioning, a response is associated with a consequence. This dog has learned that certain behaviors result in receiving a treat. (credit: Crystal Rolfe)

Observational learning extends the effective range of both classical and operant conditioning. In contrast to classical and operant conditioning, in which learning occurs only through direct experience, observational learning is the process of watching others and then imitating what they do. A lot of learning among humans and other animals comes from observational learning. To get an idea of the extra effective range that observational learning brings, consider Ben and his son Julian from the introduction. How might observation help Julian learn to surf, as opposed to learning by trial and error alone? By watching his father, he can imitate the moves that bring success and avoid the moves that lead to failure. Can you think of something you have learned how to do after watching someone else?

All of the approaches covered in this chapter are part of a particular tradition in psychology, called behaviorism, which we discuss in the next section. However, these approaches do not represent the entire study of learning. Separate traditions of learning have taken shape within different fields of psychology, such as memory and cognition, so you will find that other chapters will round out your understanding of the topic. Over time these traditions tend to converge. For example, in this chapter you will see how cognition has come to play a larger role in behaviorism, whose more extreme adherents once insisted that behaviors are triggered by the environment with no intervening thought.

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6.3: Classical Conditioning

Learning Objectives

- Explain how classical conditioning occurs
- Summarize the processes of acquisition, extinction, spontaneous recovery, generalization, and discrimination

Does the name Ivan Pavlov ring a bell? Even if you are new to the study of psychology, chances are that you have heard of Pavlov and his famous dogs.

Pavlov (1849–1936), a Russian scientist, performed extensive research on dogs and is best known for his experiments in classical conditioning (Figure 6.3). As we discussed briefly in the previous section, **classical conditioning** is a process by which we learn to associate stimuli and, consequently, to anticipate events.

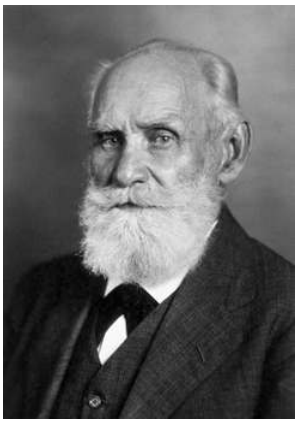


Figure **6.3** Ivan Pavlov's research on the digestive system of dogs unexpectedly led to his discovery of the learning process now known as classical conditioning.

Pavlov came to his conclusions about how learning occurs completely by accident. Pavlov was a physiologist, not a psychologist. Physiologists study the life processes of organisms, from the molecular level to the level of cells, organ systems, and entire organisms. Pavlov's area of interest was the digestive system (Hunt, 2007). In his studies with dogs, Pavlov measured the amount of saliva produced in response to various foods. Over time, Pavlov (1927) observed that the dogs began to salivate not only at the taste of food, but also at the sight of food, at the sight of an empty food bowl, and even at the sound of the laboratory assistants' footsteps. Salivating to food in the mouth is reflexive, so no learning is involved. However, dogs don't naturally salivate at the sight of an empty bowl or the sound of footsteps.

These unusual responses intrigued Pavlov, and he wondered what accounted for what he called the dogs' "psychic secretions" (Pavlov, 1927). To explore this phenomenon in an objective manner, Pavlov designed a series of carefully controlled experiments to see which stimuli would cause the dogs to salivate. He was able to train the dogs to salivate in response to stimuli that clearly had nothing to do with food, such as the sound of a bell, a light, and a touch on the leg. Through his experiments, Pavlov realized that an organism has two types of responses to its environment: (1) unconditioned (unlearned) responses, or reflexes, and (2) conditioned (learned) responses.

In Pavlov's experiments, the dogs salivated each time meat powder was presented to them. The meat powder in this situation was an **unconditioned stimulus (UCS)**: a stimulus that elicits a reflexive response in an organism. The dogs' salivation was an **unconditioned response (UCR)**: a natural (unlearned) reaction to a given stimulus. Before conditioning, think of the dogs' stimulus and response like this:

Meat powder (UCS) → Salivation (UCR)Meat powder (UCS) → Salivation (UCR)

In classical conditioning, a neutral stimulus is presented immediately before an unconditioned stimulus. Pavlov would sound a tone (like ringing a bell) and then give the dogs the meat powder (Figure 6.4). The tone was the **neutral stimulus (NS)**, which is a stimulus that does not naturally elicit a response. Prior to conditioning, the dogs did not salivate when they just heard the tone because the tone had no association for the dogs.

Tone (NS) + Meat Powder (UCS) → Salivation (UCR)Tone (NS) + Meat Powder (UCS) → Salivation (UCR)

When Pavlov paired the tone with the meat powder over and over again, the previously neutral stimulus (the tone) also began to elicit salivation from the dogs. Thus, the neutral stimulus became the **conditioned stimulus (CS)**, which is a stimulus that elicits a response after repeatedly being paired with an unconditioned stimulus. Eventually, the dogs began to salivate to the tone alone, just as they previously had salivated at the sound of the assistants' footsteps. The behavior caused by the conditioned stimulus is called the **conditioned response (CR)**. In the case of Pavlov's dogs, they had learned to associate the tone (CS) with being fed, and they began to salivate (CR) in anticipation of food.

Tone (CS) → Salivation (CR)

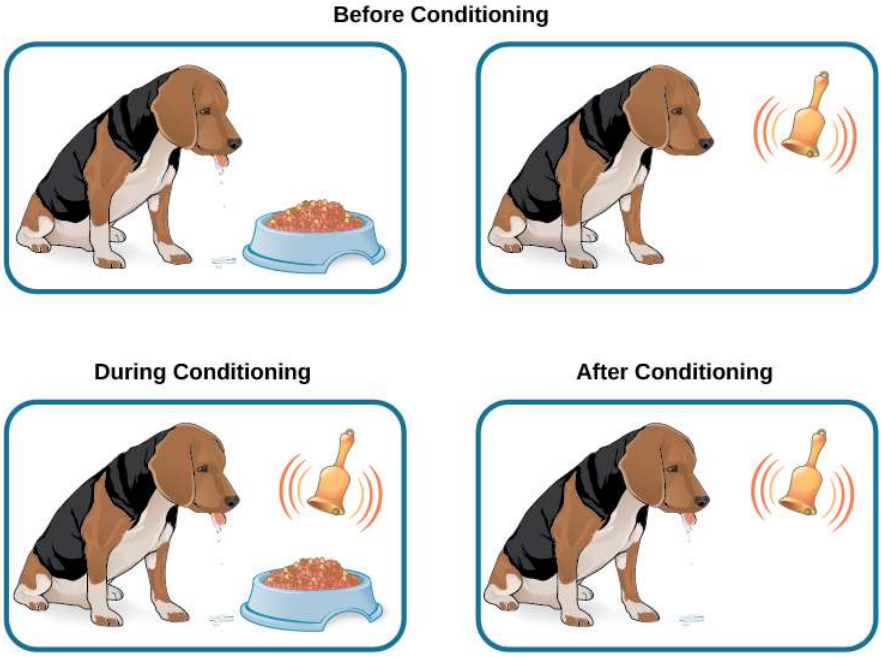


Figure **6.4** Before conditioning, an unconditioned stimulus (food) produces an unconditioned response (salivation), and a neutral stimulus (bell) does not produce a response. During conditioning, the unconditioned stimulus (food) is presented repeatedly just after the presentation of the neutral stimulus (bell). After conditioning, the neutral stimulus alone produces a conditioned response (salivation), thus becoming a conditioned stimulus.

Link to Learning

View this video about Pavlov and his dogs to learn more.

Real World Application of Classical Conditioning

How does classical conditioning work in the real world? Consider the case of Moisha, who was diagnosed with cancer. When she received her first chemotherapy treatment, she vomited shortly after the chemicals were injected. In fact, every trip to the doctor for chemotherapy treatment shortly after the drugs were injected, she vomited. Moisha's treatment was a success and her cancer went into remission. Now, when she visits her oncologist's office every 6 months for a check-up, she becomes nauseous. In this case, the chemotherapy drugs are the unconditioned stimulus (UCS), vomiting is the unconditioned response (UCR), the doctor's office is the conditioned stimulus (CS) after being paired with the UCS, and nausea is the conditioned response (CR). Let's assume that the chemotherapy drugs that Moisha takes are given through a syringe injection. After entering the doctor's office, Moisha sees a syringe, and then gets her medication. In addition to the doctor's office, Moisha will learn to associate the syringe will the medication and will respond to syringes with nausea. This is an example of higher-order (or second-order) conditioning, when the conditioned stimulus (the doctor's office) serves to condition another stimulus (the syringe). It is hard to achieve anything above second-order conditioning. For example, if someone rang a bell every time Moisha received a syringe injection of chemotherapy drugs in the doctor's office, Moisha likely will never get sick in response to the bell.

Consider another example of classical conditioning. Let's say you have a cat named Tiger, who is quite spoiled. You keep her food in a separate cabinet, and you also have a special electric can opener that you use only to open cans of cat food. For every meal, Tiger hears the distinctive sound of the electric can opener ("zzhzhz") and then gets her food. Tiger quickly learns that when she hears "zzhzhz" she is about to get fed. What do you think Tiger does when she hears the electric can opener? She will likely get excited and run to where you are preparing her food. This is an example of classical conditioning. In this case, what are the UCS, CS, UCR, and CR?

What if the cabinet holding Tiger's food becomes squeaky? In that case, Tiger hears "squeak" (the cabinet), "zzhzhz" (the electric can opener), and then she gets her food. Tiger will learn to get excited when she hears the "squeak" of the cabinet. Pairing a new neutral stimulus ("squeak") with the conditioned stimulus ("zzhzhz") is called **higher-order conditioning**, or **second-order conditioning**. This means you are using the conditioned stimulus of the can opener to condition another stimulus: the squeaky cabinet (Figure 6.5). It is hard to achieve anything above second-order conditioning. For example, if you ring a bell, open the cabinet ("squeak"), use the can opener ("zzhzhz"), and then feed Tiger, Tiger will likely never get excited when hearing the bell alone.

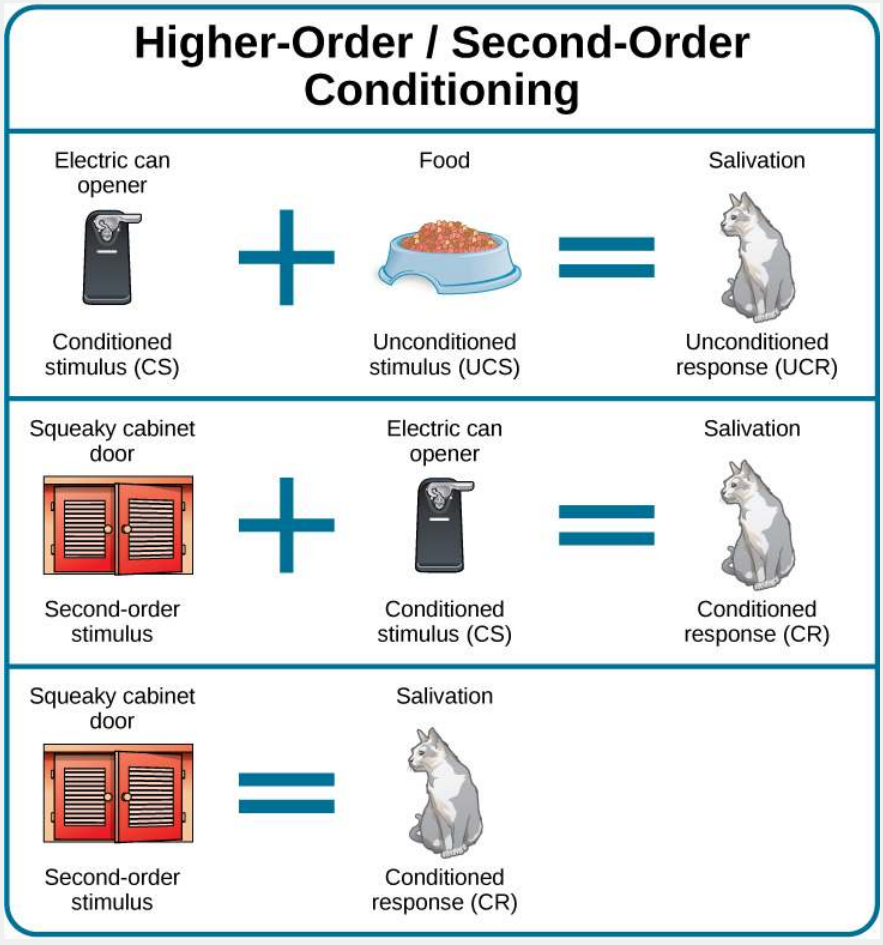


Figure **6.5** In higher-order conditioning, an established conditioned stimulus is paired with a new neutral stimulus (the second-order stimulus), so that eventually the new stimulus also elicits the conditioned response, without the initial conditioned stimulus being presented.

EVERYDAY CONNECTION: Classical Conditioning at Stingray City

Kate and her spouse recently vacationed in the Cayman Islands, and booked a boat tour to Stingray City, where they could feed and swim with the southern stingrays. The boat captain explained how the normally solitary stingrays have become accustomed to interacting with humans. About 40 years ago, fishermen began to clean fish and conch (unconditioned stimulus) at a particular sandbar near a barrier reef, and large numbers of stingrays would swim in to eat (unconditioned response) what the fishermen threw into the water; this continued for years. By the late 1980s, word of the large group of

stingrays spread among scuba divers, who then started feeding them by hand. Over time, the southern stingrays in the area were classically conditioned much like Pavlov's dogs. When they hear the sound of a boat engine (neutral stimulus that becomes a conditioned stimulus), they know that they will get to eat (conditioned response).

As soon as they reached Stingray City, over two dozen stingrays surrounded their tour boat. The couple slipped into the water with bags of squid, the stingrays' favorite treat. The swarm of stingrays bumped and rubbed up against their legs like hungry cats (Figure 6.6). Kate was able to feed, pet, and even kiss (for luck) these amazing creatures. Then all the squid was gone, and so were the stingrays.



Figure **6.6** Kate holds a southern stingray at Stingray City in the Cayman Islands. These stingrays have been classically conditioned to associate the sound of a boat motor with food provided by tourists. (credit: Kathryn Dumper)

Classical conditioning also applies to humans, even babies. For example, Sara buys formula in blue canisters for her six-month-old daughter, Angelina. Whenever Sara takes out a formula container, Angelina gets excited, tries to reach toward the food, and most likely salivates. Why does Angelina get excited when she sees the formula canister? What are the UCS, CS, UCR, and CR here?

So far, all of the examples have involved food, but classical conditioning extends beyond the basic need to be fed. Consider our earlier example of a dog whose owners install an invisible electric dog fence. A small electrical shock (unconditioned stimulus) elicits discomfort (unconditioned response). When the unconditioned stimulus (shock) is paired with a neutral stimulus (the edge of a yard), the dog associates the discomfort (unconditioned response) with the edge of the yard (conditioned stimulus) and stays within the set boundaries. In this example, the edge of the yard elicits fear and anxiety in the dog. Fear and anxiety are the conditioned response.

Link to Learning

Watch this video clip from the television show, *The Office*, for a humorous look at conditioning in which Jim conditions Dwight to expect a breath mint every time Jim's computer makes a specific sound.

General Processes in Classical Conditioning

Now that you know how classical conditioning works and have seen several examples, let's take a look at some of the general processes involved. In classical conditioning, the initial period of learning is known as **acquisition**, when an organism learns to connect a neutral stimulus and an unconditioned stimulus. During acquisition, the neutral stimulus begins to elicit the conditioned response, and eventually the neutral stimulus becomes a conditioned stimulus capable of eliciting the conditioned response by itself. Timing is important for conditioning to occur. Typically, there should only be a brief interval between presentation of the conditioned stimulus and the unconditioned stimulus. Depending on what is being conditioned, sometimes this interval is as little as five seconds (Chance, 2009). However, with other types of conditioning, the interval can be up to several hours.

Taste aversion is a type of conditioning in which an interval of several hours may pass between the conditioned stimulus (something ingested) and the unconditioned stimulus (nausea or illness). Here's how it works. Between classes, you and a friend grab a quick lunch from a food cart on campus. You share a dish of chicken curry and head off to your next class. A few hours later, you feel nauseous and become ill. Although your friend is fine and you determine that you have intestinal flu (the food is not the culprit), you've developed a taste aversion; the next time you are at a restaurant and someone orders curry, you immediately feel ill. While the chicken dish is not what made you sick, you are experiencing taste aversion: you've been conditioned to be averse to a food after a single, bad experience.

How does this occur—conditioning based on a single instance and involving an extended time lapse between the event and the negative stimulus? Research into taste aversion suggests that this response may be an evolutionary adaptation designed to help

organisms quickly learn to avoid harmful foods (Garcia & Rusiniak, 1980; Garcia & Koelling, 1966). Not only may this contribute to species survival via natural selection, but it may also help us develop strategies for challenges such as helping cancer patients through the nausea induced by certain treatments (Holmes, 1993; Jacobsen et al., 1993; Hutton, Baracos, & Wismer, 2007; Skolin et al., 2006). Garcia and Koelling (1966) showed not only that taste aversions could be conditioned, but also that there were biological constraints to learning. In their study, separate groups of rats were conditioned to associate either a flavor with illness, or lights and sounds with illness. Results showed that all rats exposed to flavor-illness pairings learned to avoid the flavor, but none of the rats exposed to lights and sounds with illness learned to avoid lights or sounds. This added evidence to the idea that classical conditioning could contribute to species survival by helping organisms learn to avoid stimuli that posed real dangers to health and welfare.

Robert Rescorla demonstrated how powerfully an organism can learn to predict the UCS from the CS. Take, for example, the following two situations. Ari's dad always has dinner on the table every day at 6:00. Soraya's mom switches it up so that some days they eat dinner at 6:00, some days they eat at 5:00, and other days they eat at 7:00. For Ari, 6:00 reliably and consistently predicts dinner, so Ari will likely start feeling hungry every day right before 6:00, even if he's had a late snack. Soraya, on the other hand, will be less likely to associate 6:00 with dinner, since 6:00 does not always predict that dinner is coming. Rescorla, along with his colleague at Yale University, Alan Wagner, developed a mathematical formula that could be used to calculate the probability that an association would be learned given the ability of a conditioned stimulus to predict the occurrence of an unconditioned stimulus and other factors; today this is known as the Rescorla-Wagner model (Rescorla & Wagner, 1972)

Once we have established the connection between the unconditioned stimulus and the conditioned stimulus, how do we break that connection and get the dog, cat, or child to stop responding? In Tiger's case, imagine what would happen if you stopped using the electric can opener for her food and began to use it only for human food. Now, Tiger would hear the can opener, but she would not get food. In classical conditioning terms, you would be giving the conditioned stimulus, but not the unconditioned stimulus. Pavlov explored this scenario in his experiments with dogs: sounding the tone without giving the dogs the meat powder. Soon the dogs stopped responding to the tone. **Extinction** is the decrease in the conditioned response when the unconditioned stimulus is no longer presented with the conditioned stimulus. When presented with the conditioned stimulus alone, the dog, cat, or other organism would show a weaker and weaker response, and finally no response. In classical conditioning terms, there is a gradual weakening and disappearance of the conditioned response.

What happens when learning is not used for a while—when what was learned lies dormant? As we just discussed, Pavlov found that when he repeatedly presented the bell (conditioned stimulus) without the meat powder (unconditioned stimulus), extinction occurred; the dogs stopped salivating to the bell. However, after a couple of hours of resting from this extinction training, the dogs again began to salivate when Pavlov rang the bell. What do you think would happen with Tiger's behavior if your electric can opener broke, and you did not use it for several months? When you finally got it fixed and started using it to open Tiger's food again, Tiger would remember the association between the can opener and her food—she would get excited and run to the kitchen when she heard the sound. The behavior of Pavlov's dogs and Tiger illustrates a concept Pavlov called **spontaneous recovery**: the return of a previously extinguished conditioned response following a rest period (Figure 6.7).

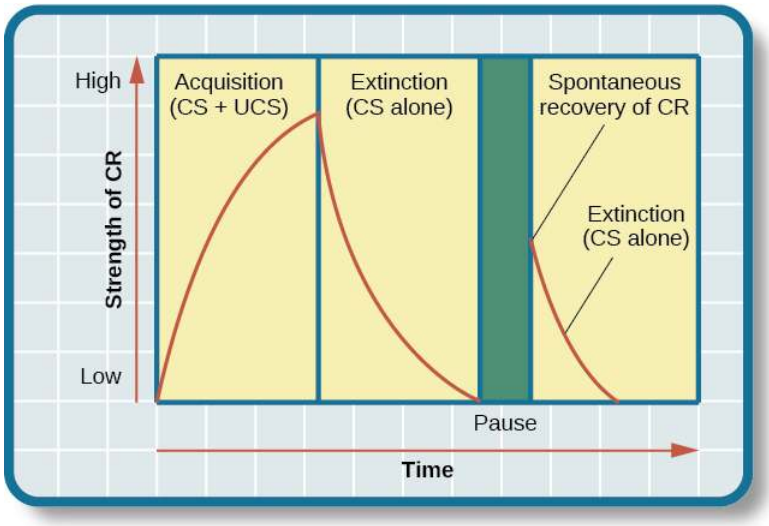


Figure **6.7** This is the curve of acquisition, extinction, and spontaneous recovery. The rising curve shows the conditioned response quickly getting stronger through the repeated pairing of the conditioned stimulus and the unconditioned stimulus (acquisition). Then the curve decreases, which shows how the conditioned response weakens when only the conditioned stimulus is presented (extinction). After a break or pause from conditioning, the conditioned response reappears (spontaneous recovery).

Of course, these processes also apply in humans. For example, let's say that every day when you walk to campus, an ice cream truck passes your route. Day after day, you hear the truck's music (neutral stimulus), so you finally stop and purchase a chocolate ice cream bar. You take a bite (unconditioned stimulus) and then your mouth waters (unconditioned response). This initial period of learning is known as acquisition, when you begin to connect the neutral stimulus (the sound of the truck) and the unconditioned stimulus (the taste of the chocolate ice cream in your mouth). During acquisition, the conditioned response gets stronger and stronger through repeated pairings of the conditioned stimulus and unconditioned stimulus. Several days (and ice cream bars) later, you notice that your mouth begins to water (conditioned response) as soon as you hear the truck's musical jingle—even before you bite into the ice cream bar. Then one day you head down the street. You hear the truck's music (conditioned stimulus), and your mouth waters (conditioned response). However, when you get to the truck, you discover that they are all out of ice cream. You leave disappointed. The next few days you pass by the truck and hear the music, but don't stop to get an ice cream bar because you're running late for class. You begin to salivate less and less when you hear the music, until by the end of the week, your mouth no longer waters when you hear the tune. This illustrates extinction. The conditioned response weakens when only the conditioned stimulus (the sound of the truck) is presented, without being followed by the unconditioned stimulus (chocolate ice cream in the mouth). Then the weekend comes. You don't have to go to class, so you don't pass the truck. Monday morning arrives and you take your usual route to campus. You round the corner and hear the truck again. What do you think happens? Your mouth begins to water again. Why? After a break from conditioning, the conditioned response reappears, which indicates spontaneous recovery.

Acquisition and extinction involve the strengthening and weakening, respectively, of a learned association. Two other learning processes—stimulus discrimination and stimulus generalization—are involved in determining which stimuli will trigger learned responses. Animals (including humans) need to distinguish between stimuli—for example, between sounds that predict a threatening event and sounds that do not—so that they can respond appropriately (such as running away if the sound is threatening). When an organism learns to respond differently to various stimuli that are similar, it is called **stimulus discrimination**. In classical conditioning terms, the organism demonstrates the conditioned response only to the conditioned stimulus. Pavlov's dogs discriminated between the basic tone that sounded before they were fed and other tones (e.g., the doorbell), because the other sounds did not predict the arrival of food. Similarly, Tiger, the cat, discriminated between the sound of the can opener and the sound of the electric mixer. When the electric mixer is going, Tiger is not about to be fed, so she does not come running to the kitchen looking for food. In our other example, Moisha, the cancer patient, discriminated between oncologists and other types of doctors. She learned not to feel ill when visiting doctors for other types of appointments, such as her annual physical.

On the other hand, when an organism demonstrates the conditioned response to stimuli that are similar to the condition stimulus, it is called **stimulus generalization**, the opposite of stimulus discrimination. The more similar a stimulus is to the condition stimulus, the more likely the organism is to give the conditioned response. For instance, if the electric mixer sounds very similar to the

electric can opener, Tiger may come running after hearing its sound. But if you do not feed her following the electric mixer sound, and you continue to feed her consistently after the electric can opener sound, she will quickly learn to discriminate between the two sounds (provided they are sufficiently dissimilar that she can tell them apart). In our other example, Moisha continued to feel ill whenever visiting other oncologists or other doctors in the same building as her oncologist.

Behaviorism

John B. Watson, shown in Figure 6.8, is considered the founder of behaviorism. Behaviorism is a school of thought that arose during the first part of the 20th century, which incorporates elements of Pavlov's classical conditioning (Hunt, 2007). In stark contrast with Freud, who considered the reasons for behavior to be hidden in the unconscious, Watson championed the idea that all behavior can be studied as a simple stimulus-response reaction, without regard for internal processes. Watson argued that in order for psychology to become a legitimate science, it must shift its concern away from internal mental processes because mental processes cannot be seen or measured. Instead, he asserted that psychology must focus on outward observable behavior that can be measured.



Figure **6.8** John B. Watson used the principles of classical conditioning in the study of human emotion.

Watson's ideas were influenced by Pavlov's work. According to Watson, human behavior, just like animal behavior, is primarily the result of conditioned responses. Whereas Pavlov's work with dogs involved the conditioning of reflexes, Watson believed the same principles could be extended to the conditioning of human emotions (Watson, 1919). Thus began Watson's work with his graduate student Rosalie Rayner and a baby called Little Albert. Through their experiments with Little Albert, Watson and Rayner (1920) demonstrated how fears can be conditioned.

In 1920, Watson was the chair of the psychology department at Johns Hopkins University. Through his position at the university he came to meet Little Albert's mother, Arvilla Merritte, who worked at a campus hospital (DeAngelis, 2010). Watson offered her a dollar to allow her son to be the subject of his experiments in classical conditioning. Through these experiments, Little Albert was exposed to and conditioned to fear certain things. Initially he was presented with various neutral stimuli, including a rabbit, a dog, a monkey, masks, cotton wool, and a white rat. He was not afraid of any of these things. Then Watson, with the help of Rayner, conditioned Little Albert to associate these stimuli with an emotion—fear. For example, Watson handed Little Albert the white rat, and Little Albert enjoyed playing with it. Then Watson made a loud sound, by striking a hammer against a metal bar hanging behind Little Albert's head, each time Little Albert touched the rat. Little Albert was frightened by the sound—demonstrating a reflexive fear of sudden loud noises—and began to cry. Watson repeatedly paired the loud sound with the white rat. Soon Little Albert became frightened by the white rat alone. In this case, what are the UCS, CS, UCR, and CR? Days later, Little Albert demonstrated stimulus generalization—he became afraid of other furry things: a rabbit, a furry coat, and even a Santa Claus mask (Figure 6.9). Watson had succeeded in conditioning a fear response in Little Albert, thus demonstrating that emotions could become conditioned responses. It had been Watson's intention to produce a phobia—a persistent, excessive fear of a specific object or situation— through conditioning alone, thus countering Freud's view that phobias are caused by deep, hidden conflicts in the mind. However, there is no evidence that Little Albert experienced phobias in later years. Little Albert's mother moved away, ending the experiment. While Watson's research provided new insight into conditioning, it would be considered unethical by today's standards.



Figure **6.9** Through stimulus generalization, Little Albert came to fear furry things, including Watson in a Santa Claus mask

Link to Learning

View scenes from this video on John Watson's experiment in which Little Albert was conditioned to respond in fear to furry objects to learn more.

As you watch the video, look closely at Little Albert's reactions and the manner in which Watson and Rayner present the stimuli before and after conditioning. Based on what you see, would you come to the same conclusions as the researchers?

Everyday Connection

Advertising and Associative Learning

Advertising executives are pros at applying the principles of associative learning. Think about the car commercials you have seen on television. Many of them feature an attractive model. By associating the model with the car being advertised, you come to see the car as being desirable (Cialdini, 2008). You may be asking yourself, does this advertising technique actually work? According to Cialdini (2008), men who viewed a car commercial that included an attractive model later rated the car as being faster, more appealing, and better designed than did men who viewed an advertisement for the same car minus the model.

Have you ever noticed how quickly advertisers cancel contracts with a famous athlete following a scandal? As far as the advertiser is concerned, that athlete is no longer associated with positive feelings; therefore, the athlete cannot be used as an unconditioned stimulus to condition the public to associate positive feelings (the unconditioned response) with their product (the conditioned stimulus).

Now that you are aware of how associative learning works, see if you can find examples of these types of advertisements on television, in magazines, or on the Internet.

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6.4: Operant Conditioning

Learning Objectives

- Define operant conditioning
- Explain the difference between reinforcement and punishment
- Distinguish between reinforcement schedules

The previous section of this chapter focused on the type of associative learning known as classical conditioning. Remember that in classical conditioning, something in the environment triggers a reflex automatically, and researchers train the organism to react to a different stimulus. Now we turn to the second type of associative learning, **operant conditioning**. In operant conditioning, organisms learn to associate a behavior and its consequence (Table 6.1). A pleasant consequence makes that behavior more likely to be repeated in the future. For example, Spirit, a dolphin at the National Aquarium in Baltimore, does a flip in the air when her trainer blows a whistle. The consequence is that she gets a fish.

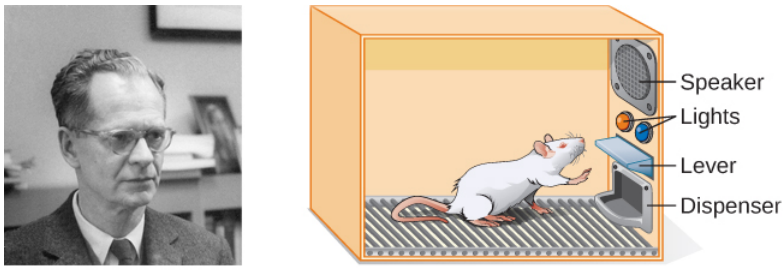
Classical and Operant Conditioning Compared

	Classical Conditioning	Operant Conditioning
Conditioning approach	An unconditioned stimulus (such as food) is paired with a neutral stimulus (such as a bell). The neutral stimulus eventually becomes the conditioned stimulus, which brings about the conditioned response (salivation).	The target behavior is followed by reinforcement or punishment to either strengthen or weaken it, so that the learner is more likely to exhibit the desired behavior in the future.
Stimulus timing	The stimulus occurs immediately before the response.	The stimulus (either reinforcement or punishment) occurs soon after the response.

Table 6.1

Psychologist B. F. Skinner saw that classical conditioning is limited to existing behaviors that are reflexively elicited, and it doesn't account for new behaviors such as riding a bike. He proposed a theory about how such behaviors come about. Skinner believed that behavior is motivated by the consequences we receive for the behavior: the reinforcements and punishments. His idea that learning is the result of consequences is based on the law of effect, which was first proposed by psychologist Edward Thorndike. According to the **law of effect**, behaviors that are followed by consequences that are satisfying to the organism are more likely to be repeated, and behaviors that are followed by unpleasant consequences are less likely to be repeated (Thorndike, 1911). Essentially, if an organism does something that brings about a desired result, the organism is more likely to do it again. If an organism does something that does not bring about a desired result, the organism is less likely to do it again. An example of the law of effect is in employment. One of the reasons (and often the main reason) we show up for work is because we get paid to do so. If we stop getting paid, we will likely stop showing up—even if we love our job.

Working with Thorndike's law of effect as his foundation, Skinner began conducting scientific experiments on animals (mainly rats and pigeons) to determine how organisms learn through operant conditioning (Skinner, 1938). He placed these animals inside an operant conditioning chamber, which has come to be known as a "Skinner box" (Figure 6.10). A Skinner box contains a lever (for rats) or disk (for pigeons) that the animal can press or peck for a food reward via the dispenser. Speakers and lights can be associated with certain behaviors. A recorder counts the number of responses made by the animal.



(a) (b)

Figure **6.10** (a) B. F. Skinner developed operant conditioning for systematic study of how behaviors are strengthened or weakened according to their consequences. (b) In a Skinner box, a rat presses a lever in an operant conditioning chamber to receive a food reward. (credit a: modification of work by "Silly rabbit"/Wikimedia Commons)

Link to Learning

Watch this brief video to see Skinner's interview and a demonstration of operant conditioning of pigeons to learn more.

In discussing operant conditioning, we use several everyday words—positive, negative, reinforcement, and punishment—in a specialized manner. In operant conditioning, positive and negative do not mean good and bad. Instead, *positive* means you are adding something, and *negative* means you are taking something away. *Reinforcement* means you are increasing a behavior, and *punishment* means you are decreasing a behavior. Reinforcement can be positive or negative, and punishment can also be positive or negative. All reinforcers (positive or negative) *increase* the likelihood of a behavioral response. All punishers (positive or negative) *decrease* the likelihood of a behavioral response. Now let's combine these four terms: positive reinforcement, negative reinforcement, positive punishment, and negative punishment (Table 6.2).

Positive and Negative Reinforcement and Punishment

	Reinforcement	Punishment
Positive	Something is *added* to *increase* the likelihood of a behavior.	Something is *added* to *decrease* the likelihood of a behavior.
Negative	Something is *removed* to *increase* the likelihood of a behavior.	Something is *removed* to *decrease* the likelihood of a behavior.

Table 6.2

Reinforcement

The most effective way to teach a person or animal a new behavior is with positive reinforcement. In **positive reinforcement**, a desirable stimulus is added to increase a behavior.

For example, you tell your five-year-old son, Jerome, that if he cleans his room, he will get a toy. Jerome quickly cleans his room because he wants a new art set. Let's pause for a moment. Some people might say, "Why should I reward my child for doing what is expected?" But in fact we are constantly and consistently rewarded in our lives. Our paychecks are rewards, as are high grades and acceptance into our preferred school. Being praised for doing a good job and for passing a driver's test is also a reward. Positive reinforcement as a learning tool is extremely effective. It has been found that one of the most effective ways to increase achievement in school districts with below-average reading scores was to pay the children to read. Specifically, second-grade students in Dallas were paid $2 each time they read a book and passed a short quiz about the book. The result was a significant increase in reading comprehension (Fryer, 2010). What do you think about this program? If Skinner were alive today, he would probably think this was a great idea. He was a strong proponent of using operant conditioning principles to influence students' behavior at school. In fact, in addition to the Skinner box, he also invented what he called a teaching machine that was designed to reward small steps in learning (Skinner, 1961)—an early forerunner of computer-assisted learning. His teaching machine tested students' knowledge as they worked through various school subjects. If students answered questions correctly, they received immediate positive reinforcement and could continue; if they answered incorrectly, they did not receive any reinforcement. The

idea was that students would spend additional time studying the material to increase their chance of being reinforced the next time (Skinner, 1961).

In **negative reinforcement**, an undesirable stimulus is removed to increase a behavior. For example, car manufacturers use the principles of negative reinforcement in their seatbelt systems, which go "beep, beep, beep" until you fasten your seatbelt. The annoying sound stops when you exhibit the desired behavior, increasing the likelihood that you will buckle up in the future. Negative reinforcement is also used frequently in horse training. Riders apply pressure—by pulling the reins or squeezing their legs—and then remove the pressure when the horse performs the desired behavior, such as turning or speeding up. The pressure is the negative stimulus that the horse wants to remove.

Shaping

In his operant conditioning experiments, Skinner often used an approach called shaping. Instead of rewarding only the target behavior, in **shaping**, we reward successive approximations of a target behavior. Why is shaping needed? Remember that in order for reinforcement to work, the organism must first display the behavior. Shaping is needed because it is extremely unlikely that an organism will display anything but the simplest of behaviors spontaneously. In shaping, behaviors are broken down into many small, achievable steps. The specific steps used in the process are the following:

1. Reinforce any response that resembles the desired behavior.
2. Then reinforce the response that more closely resembles the desired behavior. You will no longer reinforce the previously reinforced response.
3. Next, begin to reinforce the response that even more closely resembles the desired behavior.
4. Continue to reinforce closer and closer approximations of the desired behavior.
5. Finally, only reinforce the desired behavior.

Shaping is often used in teaching a complex behavior or chain of behaviors. Skinner used shaping to teach pigeons not only such relatively simple behaviors as pecking a disk in a Skinner box, but also many unusual and entertaining behaviors, such as turning in circles, walking in figure eights, and even playing ping pong; the technique is commonly used by animal trainers today. An important part of shaping is stimulus discrimination. Recall Pavlov's dogs—he trained them to respond to the tone of a bell, and not to similar tones or sounds. This discrimination is also important in operant conditioning and in shaping behavior.

Link to Learning

Watch this brief video of Skinner's pigeons playing ping pong to learn more.

It's easy to see how shaping is effective in teaching behaviors to animals, but how does shaping work with humans? Let's consider parents whose goal is to have their child learn to clean his room. They use shaping to help him master steps toward the goal. Instead of performing the entire task, they set up these steps and reinforce each step. First, he cleans up one toy. Second, he cleans up five toys. Third, he chooses whether to pick up ten toys or put his books and clothes away. Fourth, he cleans up everything except two toys. Finally, he cleans his entire room.

Reinforcement Schedules

Remember, the best way to teach a person or animal a behavior is to use positive reinforcement. For example, Skinner used positive reinforcement to teach rats to press a lever in a Skinner box. At first, the rat might randomly hit the lever while exploring the box, and out would come a pellet of food. After eating the pellet, what do you think the hungry rat did next? It hit the lever again, and received another pellet of food. Each time the rat hit the lever, a pellet of food came out. When an organism receives a reinforcer each time it displays a behavior, it is called **continuous reinforcement**. This reinforcement schedule is the quickest way to teach someone a behavior, and it is especially effective in training a new behavior. Let's look back at the dog that was learning to sit earlier in the chapter. Now, each time he sits, you give him a treat. Timing is important here: you will be most successful if you present the reinforcer immediately after he sits, so that he can make an association between the target behavior (sitting) and the consequence (getting a treat).

Link to Learning

Watch this video clip of veterinarian Dr. Sophia Yin shaping a dog's behavior using the steps outlined above to learn more.

Once a behavior is trained, researchers and trainers often turn to another type of reinforcement schedule—partial reinforcement. In **partial reinforcement**, also referred to as intermittent reinforcement, the person or animal does not get reinforced every time they perform the desired behavior. By switch to partial reinforcement after a behavior is established, a trainer can ensure that the behavior will be more resistant to extinction than if the behavior were trained on continuous reinforcement alone.

Punishment

Many people confuse negative reinforcement with punishment in operant conditioning, but they are two very different mechanisms. Remember that reinforcement, even when it is negative, always increases a behavior. In contrast, **punishment** always decreases a behavior. In **positive punishment**, you add an undesirable stimulus to decrease a behavior. An example of positive punishment is scolding a student to get the student to stop texting in class. In this case, a stimulus (the reprimand) is added in order to decrease the behavior (texting in class). In **negative punishment**, you remove a pleasant stimulus to decrease behavior. For example, when a child misbehaves, a parent can take away a favorite toy. In this case, a stimulus (the toy) is removed in order to decrease the behavior.

Punishment, especially when it is immediate, is one way to decrease undesirable behavior. For example, imagine your four-year-old son, Brandon, hit his younger brother. You have Brandon write 100 times “I will not hit my brother" (positive punishment). Chances are he won’t repeat this behavior. While strategies like this are common today, in the past children were often subject to physical punishment, such as spanking. It’s important to be aware of some of the drawbacks in using physical punishment on children. First, punishment may teach fear. Brandon may become fearful of the street, but he also may become fearful of the person who delivered the punishment—you, his parent. Similarly, children who are punished by teachers may come to fear the teacher and try to avoid school (Gershoff et al., 2010). Consequently, most schools in the United States have banned corporal punishment. Second, punishment may cause children to become more aggressive and prone to antisocial behavior and delinquency (Gershoff, 2002). They see their parents resort to spanking when they become angry and frustrated, so, in turn, they may act out this same behavior when they become angry and frustrated. For example, because you spank Brenda when you are angry with her for her misbehavior, she might start hitting her friends when they won’t share their toys.

While punishment can be effective in some cases, Skinner suggested that the use of punishment should be weighed against the possible adverse effects. Today’s psychologists and parenting experts favor reinforcement over punishment—they recommend that you catch your child doing something good and reward her for it.

Primary and Secondary Reinforcers

Rewards such as stickers, praise, money, toys, and more can be used to reinforce learning. Let’s go back to Skinner’s rats again. How did the rats learn to press the lever in the Skinner box? They were rewarded with food each time they pressed the lever. For animals, food would be an obvious reinforcer.

What would be a good reinforcer for humans? For your child Chris, it was the promise of a toy when they cleaned their room. How about Sydney, the soccer player? If you gave Sydney a piece of candy every time Sydney scored a goal, you would be using a **primary reinforcer**. Primary reinforcers are reinforcers that have innate reinforcing qualities. These kinds of reinforcers are not learned. Water, food, sleep, shelter, sex, and touch, among others, are primary reinforcers. Pleasure is also a primary reinforcer. Organisms do not lose their drive for these things. For most people, jumping in a cool lake on a very hot day would be reinforcing and the cool lake would be innately reinforcing—the water would cool the person off (a physical need), as well as provide pleasure.

A **secondary reinforcer** has no inherent value and only has reinforcing qualities when linked with a primary reinforcer. Praise, linked to affection, is one example of a secondary reinforcer, as when you called out “Great shot!” every time Sydney made a goal. Another example, money, is only worth something when you can use it to buy other things—either things that satisfy basic needs (food, water, shelter—all primary reinforcers) or other secondary reinforcers. If you were on a remote island in the middle of the Pacific Ocean and you had stacks of money, the money would not be useful if you could not spend it. What about the stickers on the behavior chart? They also are secondary reinforcers.

Sometimes, instead of stickers on a sticker chart, a token is used. Tokens, which are also secondary reinforcers, can then be traded in for rewards and prizes. Entire behavior management systems, known as token economies, are built around the use of these kinds of token reinforcers. Token economies have been found to be very effective at modifying behavior in a variety of settings such as schools, prisons, and mental hospitals. For example, a study by Cangi and Daly (2013) found that use of a token economy increased appropriate social behaviors and reduced inappropriate behaviors in a group of autistic school children. Autistic children tend to exhibit disruptive behaviors such as pinching and hitting. When the children in the study exhibited appropriate behavior (not hitting or pinching), they received a "quiet hands" token. When they hit or pinched, they lost a token. The children could then exchange specified amounts of tokens for minutes of playtime.

EVERYDAY CONNECTION: Behavior Modification in Children

Parents and teachers often use behavior modification to change a child's behavior. Behavior modification uses the principles of operant conditioning to accomplish behavior change so that undesirable behaviors are switched for more socially acceptable ones. Some teachers and parents create a sticker chart, in which several behaviors are listed (Figure 6.11). Sticker charts are a form of token economies, as described in the text. Each time children perform the behavior, they get a sticker, and after a certain number of stickers, they get a prize, or reinforcer. The goal is to increase acceptable behaviors and decrease misbehavior. Remember, it is best to reinforce desired behaviors, rather than to use punishment. In the classroom, the teacher can reinforce a wide range of behaviors, from students raising their hands, to walking quietly in the hall, to turning in their homework. At home, parents might create a behavior chart that rewards children for things such as putting away toys, brushing their teeth, and helping with dinner. In order for behavior modification to be effective, the reinforcement needs to be connected with the behavior; the reinforcement must matter to the child and be done consistently.



Figure 6.11 Sticker charts are a form of positive reinforcement and a tool for behavior modification. Once this child earns a certain number of stickers for demonstrating a desired behavior, she will be rewarded with a trip to the ice cream parlor. (credit: Abigail Batchelder)

Time-out is another popular technique used in behavior modification with children. It operates on the principle of negative punishment. When a child demonstrates an undesirable behavior, she is removed from the desirable activity at hand (Figure 6.12). For example, say that Sophia and her brother Mario are playing with building blocks. Sophia throws some blocks at her brother, so you give her a warning that she will go to time-out if she does it again. A few minutes later, she throws more blocks at Mario. You remove Sophia from the room for a few minutes. When she comes back, she doesn't throw blocks.

There are several important points that you should know if you plan to implement time-out as a behavior modification technique. First, make sure the child is being removed from a desirable activity and placed in a less desirable location. If the activity is something undesirable for the child, this technique will backfire because it is more enjoyable for the child to be removed from the activity. Second, the length of the time-out is important. The general rule of thumb is one minute for each year of the child's age. Sophia is five; therefore, she sits in a time-out for five minutes. Setting a timer helps children know how long they have to sit in time-out. Finally, as a caregiver, keep several guidelines in mind over the course of a time-out: remain calm when directing your child to time-out; ignore your child during time-out (because caregiver attention may reinforce misbehavior); and give the child a hug or a kind word when time-out is over.



(a)



(b)

Figure **6.12** Time-out is a popular form of negative punishment used by caregivers. When a child misbehaves, he or she is removed from a desirable activity in an effort to decrease the unwanted behavior. For example, (a) a child might be playing on the playground with friends and push another child; (b) the child who misbehaved would then be removed from the activity for a short period of time. (credit a: modification of work by Simone Ramella; credit b: modification of work by "Spring Dew"/Flickr)

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6.5: Observational Learning (Modeling)

Learning Objectives

- Define observational learning
- Discuss the steps in the modeling process
- Explain the prosocial and antisocial effects of observational learning

Previous sections of this chapter focused on classical and operant conditioning, which are forms of associative learning. In **observational learning**, we learn by watching others and then imitating, or modeling, what they do or say. For instance, have you ever gone to YouTube to find a video showing you how to do something? The individuals performing the imitated behavior are called **models**. Research suggests that this imitative learning involves a specific type of neuron, called a mirror neuron (Hickock, 2010; Rizzolatti, Fadiga, Fogassi, & Gallese, 2002; Rizzolatti, Fogassi, & Gallese, 2006).

Humans and other animals are capable of observational learning. As you will see, the phrase “monkey see, monkey do” really is accurate (Figure 6.16). The same could be said about other animals. For example, in a study of social learning in chimpanzees, researchers gave juice boxes with straws to two groups of captive chimpanzees. The first group dipped the straw into the juice box, and then sucked on the small amount of juice at the end of the straw. The second group sucked through the straw directly, getting much more juice. When the first group, the “dippers,” observed the second group, “the suckers,” what do you think happened? All of the “dippers” in the first group switched to sucking through the straws directly. By simply observing the other chimps and modeling their behavior, they learned that this was a more efficient method of getting juice (Yamamoto, Humle, and Tanaka, 2013).



Figure **6.16** This spider monkey learned to drink water from a plastic bottle by seeing the behavior modeled by a human. (credit: U.S. Air Force, Senior Airman Kasey Close)

Imitation is much more obvious in humans, but is imitation really the sincerest form of flattery? Consider Claire’s experience with observational learning. Claire’s nine-year-old son, Jay, was getting into trouble at school and was defiant at home. Claire feared that Jay would end up like her brothers, two of whom were in prison. One day, after yet another bad day at school and another negative note from the teacher, Claire, at her wit’s end, beat her son with a belt to get him to behave. Later that night, as she put her children to bed, Claire witnessed her four-year-old daughter, Anna, take a belt to her teddy bear and whip it. Claire was horrified, realizing that Anna was imitating her mother. It was then that Claire knew she wanted to discipline her children in a different manner.

Bandura's Research

Bandura researched modeling behavior, particularly children’s modeling of adults’ aggressive and violent behaviors (Bandura, Ross, & Ross, 1961). He conducted an experiment with a five-foot inflatable doll that he called a Bobo doll. In the experiment, children’s aggressive behavior was influenced by whether the teacher was punished for her behavior. In one scenario, a teacher acted aggressively with the doll, hitting, throwing, and even punching the doll, while a child watched. There were two types of responses by the children to the teacher’s behavior. When the teacher was punished for her bad behavior, the children decreased their tendency to act as she had. When the teacher was praised or ignored (and not punished for her behavior), the children imitated what she did, and even what she said. They punched, kicked, and yelled at the doll.

Link to Learning

Watch this video clip about the famous Bobo doll experiment to see a portion of the experiment and an interview with Albert Bandura.

What are the implications of this study? Bandura concluded that we watch and learn, and that this learning can have both prosocial and antisocial effects. Prosocial (positive) models can be used to encourage socially acceptable behavior. Parents in particular should take note of this finding. If you want your children to read, then read to them. Let them see you reading. Keep books in your home. Talk about your favorite books. If you want your children to be healthy, then let them see you eat right and exercise, and spend time engaging in physical fitness activities together. The same holds true for qualities like kindness, courtesy, and honesty. The main idea is that children observe and learn from their parents, even their parents' morals, so be consistent and toss out the old adage "Do as I say, not as I do," because children tend to copy what you do instead of what you say. Besides parents, many public figures, such as Martin Luther King, Jr. and Mahatma Gandhi, are viewed as prosocial models who are able to inspire global social change. Can you think of someone who has been a prosocial model in your life?

The antisocial effects of observational learning are also worth mentioning. As you saw from the example of Claire at the beginning of this section, her daughter viewed Claire's aggressive behavior and copied it. Research suggests that this may help to explain why abused children often grow up to be abusers themselves (Murrell, Christoff, & Henning, 2007). In fact, about 30% of abused children become abusive parents (U.S. Department of Health & Human Services, 2013). We tend to do what we know. Abused children, who grow up witnessing their parents deal with anger and frustration through violent and aggressive acts, often learn to behave in that manner themselves. Sadly, it's a vicious cycle that's difficult to break.

Some studies suggest that violent television shows, movies, and video games may also have antisocial effects (Figure 6.18) although further research needs to be done to understand the correlational and causational aspects of media violence and behavior. Some studies have found a link between viewing violence and aggression seen in children (Anderson & Gentile, 2008; Kirsch, 2010; Miller, Grabell, Thomas, Bermann, & Graham-Bermann, 2012). These findings may not be surprising, given that a child graduating from high school has been exposed to around 200,000 violent acts including murder, robbery, torture, bombings, beatings, and rape through various forms of media (Huston et al., 1992). Not only might viewing media violence affect aggressive behavior by teaching people to act that way in real life situations, but it has also been suggested that repeated exposure to violent acts also desensitizes people to it. Psychologists are working to understand this dynamic.



Figure **6.18** Can video games make us violent? Psychological researchers study this topic. (credit: "woodleywonderworks"/Flickr)

Link to Learning

View this video about the connection between violent video games and violent behavior to learn more.

What do you think?

Violent Media and Aggression

Does watching violent media or playing violent video games cause aggression? Albert Bandura's early studies suggested television violence increased aggression in children, and more recent studies support these findings. For example, research by Craig Anderson and colleagues (Anderson, Bushman, Donnerstein, Hummer, & Warbuten, 2015; Anderson et al., 2010; Bushman et al., 2016) found extensive evidence to suggest a causal link between hours of exposure to violent media and aggressive thoughts and behaviors. However, studies by Christopher Ferguson and others suggests that while there may be a

> link between violent media exposure and aggression, research to date has not accounted for other risk factors for aggression including mental health and family life (Ferguson, 2011; Gentile, 2016). What do think?

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CHAPTER OVERVIEW

7: Memory

Memory is the process in which information is encoded, stored, and retrieved. Encoding allows information from the outside world to be sensed in the form of chemical and physical stimuli. We have an amazing capacity for memory, but how, exactly, do we process and store information? Are there different kinds of memory, and if so, what characterizes the different types? How, exactly, do we retrieve our memories? And why do we forget? This chapter will explore these questions as we learn about memory.

7.1: Prelude to Memory

7.2: How Memory Functions

7.3: The Role of External and Internal Context in Retrieval

7.4: Parts of the Brain Involved with Memory

7.5: Problems with Memory

7.6: Ways to Enhance Memory

Thumbnail: This is a knuckle mnemonic to help you remember the number of days in each month. Months with 31 days are represented by the protruding knuckles and shorter months fall in the spots between knuckles. (credit: modification of work by Cory Zanker).

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7.1: Prelude to Memory

Learning Objectives

- How do we process and store information



Figure **7.1.1**: Photographs can trigger our memories and bring past experiences back to life. (credit: modification of work by Cory Zanker)

We may be top-notch learners, but if we don't have a way to store what we've learned, what good is the knowledge we've gained?

Take a few minutes to imagine what your day might be like if you could not remember anything you had learned. You would have to figure out how to get dressed. What clothing should you wear, and how do buttons and zippers work? You would need someone to teach you how to brush your teeth and tie your shoes. Who would you ask for help with these tasks, since you wouldn't recognize the faces of these people in your house? Wait . . . is this even your house? Uh oh, your stomach begins to rumble and you feel hungry. You'd like something to eat, but you don't know where the food is kept or even how to prepare it. Oh dear, this is getting confusing. Maybe it would be best just go back to bed. A bed . . . what is a bed?

We have an amazing capacity for memory, but how, exactly, do we process and store information? Are there different kinds of memory, and if so, what characterizes the different types? How, exactly, do we retrieve our memories? And why do we forget? This chapter will explore these questions as we learn about memory.

References

Abel, M., & Bäuml, K.-H. T. (2013). Sleep can reduce proactive interference. *Memory, 22*(4), 332–339. doi:10.1080/09658211.2013.785570.

Anderson, N. S. (1969). The influence of acoustic similarity on serial recall of letter sequences. *Quarterly Journal of Experimental Psychology, 21*(3), 248–255.

Anderson, R. C. (1984). Role of the reader's schema in comprehension, learning, and memory. In R. C. Anderson, J. Osborn, & R. J. Tierney (Eds.), *Learning to read in American schools: Basal Readers and Content Texts* (pp. 243–257). Hillsdale, NJ: Erlbaum.

Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation: Volume 2* (pp. 89–195). New York, NY: Academic Press.

Baddeley, A. (2004). *Your memory: A user's guide*. Richmond Hill, Canada: Firefly Books.

Baddeley, A. D., & Hitch, G. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 8, pp. 47–89). New York, NY: Academic Press.

Bayley, P. J., & Squire, L. R. (2002). Medial temporal lobe amnesia: Gradual acquisition of factual information by nondeclarative memory. *Journal of Neuroscience, 22*, 5741–5748.

Bellezza, F. S. (1981). Mnemonic devices: Classification, characteristics and criteria. *Review of Educational Research, 51*, 247–275.

Benjamin N. Cardozo School of Law, Yeshiva University. (2009). Reevaluating lineups: Why witnesses make mistakes and how to reduce the chance of a misidentification.

Blockland, A. (1996). Acetylcholine: A neurotransmitter for learning and memory? *Brain Research Reviews, 21*, 285–300.

Bodie, G. D., Powers, W. G., & Fitch-Hauser, M. (2006). Chunking, priming, and active learning: Toward an innovative approach to teaching communication-related skills. *Interactive Learning Environment, 14*(2), 119–135.

Bousfield, W. (1935). The occurrence of clustering in the recall of randomly arranged associates. *Journal of General Psychology, 49*, 229–240.

Bransford, J. D., & McCarrell, N. S. (1974). A sketch of a cognitive approach to comprehension. In W. B. Weimer & D. J. Palermo (Eds.), *Cognition and the symbolic processes* (pp. 189–229). Hillsdale, NJ: Lawrence Erlbaum Associates.

Briere, J., & Conte, J. (1993). Self-reported amnesia for abuse in adults molested as children. *Journal of Traumatic Stress, 6*, 21–31.

Carli, L. (1999). Cognitive reconstruction, hindsight, and reactions to victims and perpetrators. *Personality and Social Psychology Bulletin, 25*(8), 966–979. doi:10.1177/01461672992511005

Ceci, S. J., & Bruck, M. (1993). Child witness: Translating research into policy. *Social Policy Report, 7*(3), 1–30.

Ceci, S. J., & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony.* Washington, DC: American Psychological Association.

Cheit, R. E. (2007). *The recovered memory project.* Retrieved from http://blogs.brown.edu/recoveredmemory/.

Christianson, S. A. (1992). *The handbook of emotion and memory: Research and theory*. Hillsdale, NJ: Erlbaum.

Clark, R. E., Zola, S. M., & Squire, L. R. (2000). Impaired recognition memory in rats after damage to the hippocampus. *The Journal of Neuroscience, 20*(23), 8853–8860.

Corkin, S. (1965). Tactually-guided maze learning in man: Effects of unilateral cortical excisions and bilateral hippocampal lesions. *Neuropsychologia, 3*, 339–351.

Corkin, S. (1968). Acquisition of motor skill after bilateral medial temporal-lobe excision. *Neuropsychologia, 6*, 255–264.

Corkin, S., Amaral D. G., González, R. G., Johnson, K. A., & Hyman, B. T. (1997). H. M.'s medial temporal lobe lesion: Findings from magnetic resonance imaging. *Journal of Neuroscience, 17*(10), 3964–3979.

Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior, 11*, 671–684.

Craik, F. I. M., Moroz, T. M., Moscovitch, M., Stuss, D. T., Winocur, G., Tulving, E., & Kapur, S. (1999). In search of the self: A positron emission tomography study. *Psychological Science, 10*(1), 26–34.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology, 104*(3), 268–294.

Craik, F. I. M., & Watkins, M. J. (1973). The role of rehearsal in short-term memory. *Journal of Verbal Learning and Verbal Behavior, 12*, 599–607.

Green, J. T., & Woodruff-Pak, D. S. (2000). Eyeblink classical conditioning in aging animals. In D. S. Woodruff-Pak & J. E. Steinmetz (Eds.), *Eyeblink classical conditioning: Animal models* (Vol. 2, pp.155–178). Boston, MA: Kluwer Academic.

Greenberg, D. L. (2004). President Bush's false [flashbulb] memory of 9/11/01. *Applied. Cognitive Psychology, 18*(3), 363–370. doi:10.1002/acp.1016

Devilly, G. J. (2007). If nothing happened why do I still hurt? An update on the memory wars. *InPsych*, *29*(2), 16–18.

Ebbinghaus, H. (1964). *Memory: A contribution to experimental psychology* (H. A. Ruger & C. E. Bussenius, Trans.). New York, NY: Dover. (Original work published 1885)

Goodman, G. S. (2006). Children's eyewitness memory: A modern history and contemporary commentary. *Journal of Social Issues*, *62*, 811–832.

Hassabis D., & Maguire E. A. (2007). Deconstructing episodic memory with construction. *Trends in Cognitive Sciences*, *11*(7), 299–306.

Jacobs, J. (1887). Experiments on "prehension." *Mind*, *12*, 75–79.

Josselyn, J. A. (2010). Continuing the search for the engram: Examining the mechanism of fear memories. *Journal of Psychiatry Neuroscience*, *35*(4), 221–228.

Kapur, S., Craik, F. I. M., Tulving, E., Wilson, A. A., Houle, S., & Brown, G. M. (1994). Neuroanatomical correlates of encoding in episodic memory: Levels of processing effect. *Proceedings of the National Academy of Sciences of the United States of America*, *91*(6), 208–2011.

Lashley K. S. (1950). In search of the engram. *Society of Experimental Biology Symposium, 4: Psychological Mechanisms in Animal Behavior*. Cambridge, UK: Cambridge University Press.

Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of auto-mobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior, 13*, 585–589.

MacLeod, C. M., Gopie, N., Hourihan, K. L., Neary, K. R., & Ozubko, J. D. (2010). The production effect: Delineation of a phenomenon. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *36*(3), 671–685.

Mayford, M., Siegelbaum, S. A., & Kandel, E. R. (2012). *Synapses and memory storage.* New York, NY: Cold Spring Harbor Perspectives in Biology, Cold Spring Harbor Laboratory Press.

McGaugh, J. L. (2003). *Memory and emotion: The making of lasting memories*. New York, NY: Columbia University Press.

McLeod, S. A. (2011). Anterograde amnesia [Web log post]. Retrieved from www.simplypsychology.org/ante...e-amnesia.html

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review, 68*, 81–87.

Myhrer, T. (2003). Neurotransmitter systems involved in learning and memory in the rat: A meta-analysis based on studies of four behavioral tasks. *Brain Research Reviews*, *41*(2–3), 268–287.

Newseum. (n.d.). G-men and journalists: D. C. sniper [Web log post].

Nickerson, R. S., & Adams, M. J. (1979). Long-term memory for a common object. *Cognitive Psychology, 11*(3), 287–307.

Paivio, A. (1986). *Mental representations: A dual coding approach*. New York, NY: Oxford University Press.

Parker, E. S., Cahill, L., & McGaugh, J. L. (2006). A case of unusual autobiographical remembering. *Neurocase*, *12*, 35–49.

Payne, B. K., Jacoby, L. L., & Lambert, A. J. (2004). Memory monitoring and the control of stereotype distortion. *Journal of Experimental Social Psychology, 40*, 52–64.

Pew Research Center (2011, September 1). *Ten years after 9/11: United in remembrance, divided over policies.* Washington, DC: People Press.

Pipe, M.-E. (1996). Children's eyewitness memory. *New Zealand Journal of Psychology, 25*(2), 36–43.

Pipe, M.-E., Lamb, M., Orbach, Y., & Esplin, P. W. (2004). Recent research on children's testimony about experienced and witnessed events. *Developmental Review, 24*, 440–468.

Roediger, H. L., & DeSoto, K. A. (in press). The psychology of reconstructive memory. In J. Wright (Ed.), *International Encyclopedia of the Social and Behavioral sciences*, 2e. Oxford, UK: Elsevier.

Roediger, H. L., III, & McDermott, K. B. (2000). Tricks of memory. *Current Directions in Psychological Science*, *9*, 123–127.

Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personal Social Psychology*, *35*(9), 677–688.

Schacter, D. (2001). *The seven sins of memory: How the mind forgets and remembers.* New York, NY: Houghton Mifflin.

Steinmetz, J. E. (1999). A renewed interest in human classical eyeblink conditioning. *Psychological Science*, *10*, 24–25.

Tigner, R. B. (1999). Putting memory research to good use. *College Teaching*, *47*(4), 149–152.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Dolandson (Eds.), *Organization of memory* (pp. 381–403). New York, NY: Academic Press.

Tulving, E. (2002, February). Episodic memory: From mind to brain. *Annual Review of Psychology*, *53*, 1–25. doi:10.1146/annurev.psych.53.100901.135114

van Praag, H. (2008). Neurogenesis and exercise: Past and future directions. *NeuroMolecular Medicine*, *10*(2), 128–140.

Wells, G. L., & Quinlivan, D. S. (2009). Suggestive eyewitness identification procedures and the Supreme Court's reliability test in light of eyewitness science: 30 years later. *Law and Human Behavior, 33*, 1–24. doi:10.1007/s10979-008-9130-3

Wrubel, B. (Writer), & Spiller, M. (Director). (2010). The Old Wagon [Television series episode]. In S. Levitan & C. Lloyd (Executive producers), *Modern Family*. 20th Century Fox Television.

Yogo, M., & Fujihara, S. (2008). Working memory capacity can be improved by expressive writing: A randomized experiment in a Japanese sample. *British Journal of Health Psychology*, *13*(1), 77–80. doi:10.1348/135910707X252440

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7.2: How Memory Functions

Learning Objectives

- Discuss the three basic functions of memory
- Describe the three stages of memory storage
- Describe and distinguish between procedural and declarative memory and semantic and episodic memory

Memory is an information processing system; therefore, we often compare it to a computer. **Memory** is the set of processes used to encode, store, and retrieve information over different periods of time.



Figure 7.2.1: Encoding involves the input of information into the memory system. Storage is the retention of the encoded information. Retrieval, or getting the information out of memory and back into awareness, is the third function.

Encoding

We get information into our brains through a process called **encoding**, which is the input of information into the memory system. Once we receive sensory information from the environment, our brains label or code it. We organize the information with other similar information and connect new concepts to existing concepts. Encoding information occurs through automatic processing and effortful processing.

If someone asks you what you ate for lunch today, more than likely you could recall this information quite easily. This is known as **automatic processing**, or the encoding of details like time, space, frequency, and the meaning of words. Automatic processing is usually done without any conscious awareness. Recalling the last time you studied for a test is another example of automatic processing. But what about the actual test material you studied? It probably required a lot of work and attention on your part in order to encode that information. This is known as **effortful processing.**



Figure 7.2.2: When you first learn new skills such as driving a car, you have to put forth effort and attention to encode information about how to start a car, how to brake, how to handle a turn, and so on. Once you know how to drive, you can encode additional information about this skill automatically. (credit: Robert Couse-Baker)

What are the most effective ways to ensure that important memories are well encoded? Even a simple sentence is easier to recall when it is meaningful (Anderson, 1984). Read the following sentences (Bransford & McCarrell, 1974), then look away and count backwards from 30 by threes to zero, and then try to write down the sentences (no peeking back at this page!).

1. The notes were sour because the seams split.
2. The voyage wasn't delayed because the bottle shattered.
3. The haystack was important because the cloth ripped.

How well did you do? By themselves, the statements that you wrote down were most likely confusing and difficult for you to recall. Now, try writing them again, using the following prompts: bagpipe, ship christening, and parachutist. Next count backwards from 40 by fours, then check yourself to see how well you recalled the sentences this time. You can see that the sentences are now

much more memorable because each of the sentences was placed in context. Material is far better encoded when you make it meaningful.

There are three types of encoding. The encoding of words and their meaning is known as **semantic encoding**. It was first demonstrated by William Bousfield (1935) in an experiment in which he asked people to memorize words. The 60 words were actually divided into 4 categories of meaning, although the participants did not know this because the words were randomly presented. When they were asked to remember the words, they tended to recall them in categories, showing that they paid attention to the meanings of the words as they learned them.

Visual encoding is the encoding of images, and **acoustic encoding** is the encoding of sounds, words in particular. To see how visual encoding works, read over this list of words: *car, level, dog, truth, book, value*. If you were asked later to recall the words from this list, which ones do you think you'd most likely remember? You would probably have an easier time recalling the words *car, dog,* and *book*, and a more difficult time recalling the words *level, truth,* and *value*. Why is this? Because you can recall images (mental pictures) more easily than words alone. When you read the words *car, dog,* and *book* you created images of these things in your mind. These are concrete, high-imagery words. On the other hand, abstract words like *level, truth,* and *value* are low-imagery words. High-imagery words are encoded both visually and semantically (Paivio, 1986), thus building a stronger memory.

Now let's turn our attention to acoustic encoding. You are driving in your car and a song comes on the radio that you haven't heard in at least 10 years, but you sing along, recalling every word. In the United States, children often learn the alphabet through song, and they learn the number of days in each month through rhyme: "Thirty days hath September, / April, June, and November; / All the rest have thirty-one, / Save February, with twenty-eight days clear, / And twenty-nine each leap year." These lessons are easy to remember because of acoustic encoding. We encode the sounds the words make. This is one of the reasons why much of what we teach young children is done through song, rhyme, and rhythm.

Which of the three types of encoding do you think would give you the best memory of verbal information? Some years ago, psychologists Fergus Craik and Endel Tulving (1975) conducted a series of experiments to find out. Participants were given words along with questions about them. The questions required the participants to process the words at one of the three levels. The visual processing questions included such things as asking the participants about the font of the letters. The acoustic processing questions asked the participants about the sound or rhyming of the words, and the semantic processing questions asked the participants about the meaning of the words. After participants were presented with the words and questions, they were given an unexpected recall or recognition task.

Words that had been encoded semantically were better remembered than those encoded visually or acoustically. Semantic encoding involves a deeper level of processing than the shallower visual or acoustic encoding. Craik and Tulving concluded that we process verbal information best through semantic encoding, especially if we apply what is called the self-reference effect. The **self-reference effect** is the tendency for an individual to have better memory for information that relates to oneself in comparison to material that has less personal relevance (Rogers, Kuiper & Kirker, 1977). Could semantic encoding be beneficial to you as you attempt to memorize the concepts in this chapter?

Storage

Once the information has been encoded, we have to somehow have to retain it. Our brains take the encoded information and place it in storage. **Storage** is the creation of a permanent record of information.

In order for a memory to go into storage (i.e., long-term memory), it has to pass through three distinct stages: **Sensory Memory**, **Short-Term Memory**, and finally **Long-Term Memory**. These stages were first proposed by Richard **Atkinson** and Richard **Shiffrin** (1968). Their model of human memory, called Atkinson-Shiffrin (A-S), is based on the belief that we process memories in the same way that a computer processes information.

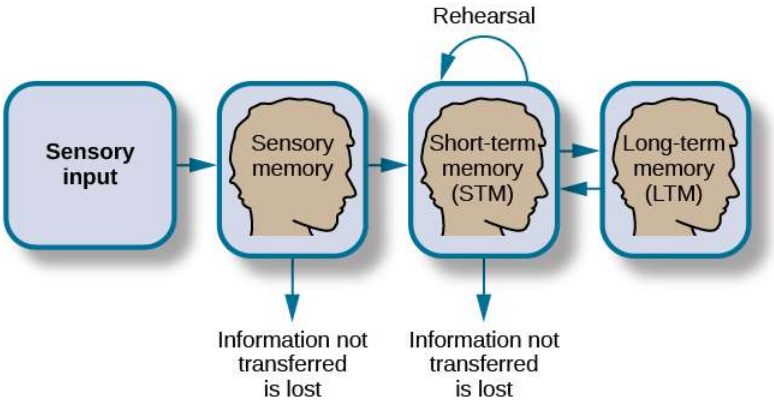


Figure 7.2.3: According to the Atkinson-Shiffrin model of memory, information passes through three distinct stages in order for it to be stored in long-term memory.

But A-S is just one model of memory. Others, such as Baddeley and Hitch (1974), have proposed a model where short-term memory itself has different forms. In this model, storing memories in short-term memory is like opening different files on a computer and adding information. The type of short-term memory (or computer file) depends on the type of information received. There are memories in visual-spatial form, as well as memories of spoken or written material, and they are stored in three short-term systems: a visuospatial sketchpad, an episodic buffer, and a phonological loop. According to Baddeley and Hitch, a central executive part of memory supervises or controls the flow of information to and from the three short-term systems.

Sensory Memory

In the Atkinson-Shiffrin model, stimuli from the environment are processed first in **sensory memory**: storage of brief sensory events, such as sights, sounds, and tastes. It is very brief storage—up to a couple of seconds. We are constantly bombarded with sensory information. We cannot absorb all of it, or even most of it. And most of it has no impact on our lives. For example, what was your professor wearing the last class period? As long as the professor was dressed appropriately, it does not really matter what she was wearing. Sensory information about sights, sounds, smells, and even textures, which we do not view as valuable information, we discard. If we view something as valuable, the information will move into our short-term memory system.

One study of sensory memory researched the significance of valuable information on short-term memory storage. J. R. Stroop discovered a memory phenomenon in the 1930s: you will name a color more easily if it appears printed in that color, which is called the **Stroop effect**. In other words, the word "red" will be named more quickly, regardless of the color the word appears in, than any word that is colored red. Try an experiment: name the colors of the words you are given in Figure. Do not read the words, but say the color the word is printed in. For example, upon seeing the word "yellow" in green print, you should say "green," not "yellow." This experiment is fun, but it's not as easy as it seems.



Figure 7.2.4: The Stroop effect describes why it is difficult for us to name a color when the word and the color of the word are different.

Short-Term Memory

Short-term memory (STM) is a temporary storage system that processes incoming sensory memory; sometimes it is called working memory. Short-term memory takes information from sensory memory and sometimes connects that memory to something already in long-term memory. Short-term memory storage lasts about 20 seconds. George Miller (1956), in his research on the capacity of memory, found that most people can retain about 7 items in STM. Some remember 5, some 9, so he called the capacity of STM 7 plus or minus 2.

Think of short-term memory as the information you have displayed on your computer screen—a document, a spreadsheet, or a web page. Then, information in short-term memory goes to long-term memory (you save it to your hard drive), or it is discarded (you delete a document or close a web browser). This step of **rehearsal**, the conscious repetition of information to be remembered, to move STM into long-term memory is called **memory consolidation**.

You may find yourself asking, "How much information can our memory handle at once?" To explore the capacity and duration of your short-term memory, have a partner read the strings of random numbers out loud to you, beginning each string by saying, "Ready?" and ending each by saying, "Recall," at which point you should try to write down the string of numbers from memory.

9754 68259 913825 5316842 86951372 719384273
6419 67148 648327 5963827 51739826 163875942

Figure 7.2.5: Work through this series of numbers using the recall exercise explained above to determine the longest string of digits that you can store.

Note the longest string at which you got the series correct. For most people, this will be close to 7, Miller's famous 7 plus or minus 2. Recall is somewhat better for random numbers than for random letters (Jacobs, 1887), and also often slightly better for information we hear (acoustic encoding) rather than see (visual encoding) (Anderson, 1969).

Long-term Memory

Long-term memory (LTM) is the continuous storage of information. Unlike short-term memory, the storage capacity of LTM has no limits. It encompasses all the things you can remember that happened more than just a few minutes ago to all of the things that you can remember that happened days, weeks, and years ago. In keeping with the computer analogy, the information in your LTM would be like the information you have saved on the hard drive. It isn't there on your desktop (your short-term memory), but you can pull up this information when you want it, at least most of the time. Not all long-term memories are strong memories. Some memories can only be recalled through prompts. For example, you might easily recall a fact— "What is the capital of the United States?"—or a procedure—"How do you ride a bike?"—but you might struggle to recall the name of the restaurant you had dinner when you were on vacation in France last summer. A prompt, such as that the restaurant was named after its owner, who spoke to you about your shared interest in soccer, may help you recall the name of the restaurant.

Long-term memory is divided into two types: explicit and implicit. Understanding the different types is important because a person's age or particular types of brain trauma or disorders can leave certain types of LTM intact while having disastrous consequences for other types. **Explicit memories** are those we consciously try to remember and recall. For example, if you are studying for your chemistry exam, the material you are learning will be part of your explicit memory. (Note: Sometimes, but not always, the terms explicit memory and declarative memory are used interchangeably.)

Implicit memories are memories that are not part of our consciousness. They are memories formed from behaviors. Implicit memory is also called non-declarative memory.

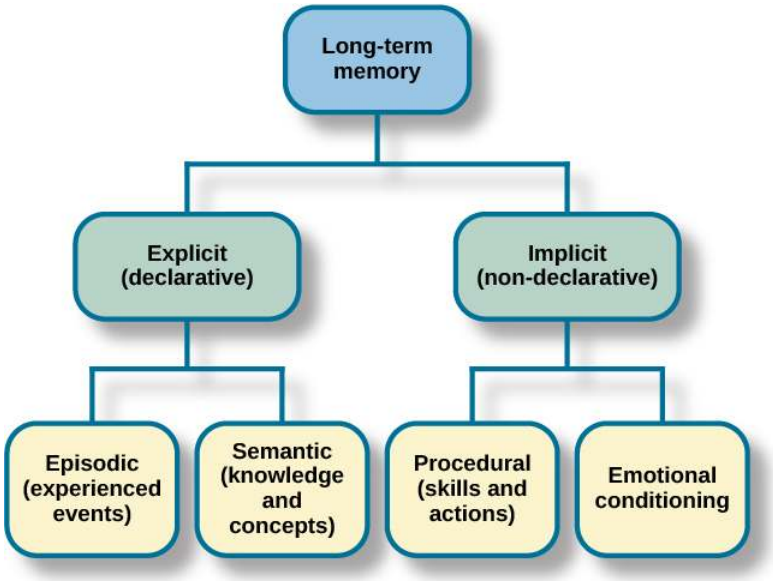


Figure 7.2.6: There are two components of long-term memory: explicit and implicit. Explicit memory includes episodic and semantic memory. Implicit memory includes procedural memory and things learned through conditioning.

Procedural memory is a type of implicit memory: it stores information about how to do things. It is the memory for skilled actions, such as how to brush your teeth, how to drive a car, how to swim the crawl (freestyle) stroke. If you are learning how to swim freestyle, you practice the stroke: how to move your arms, how to turn your head to alternate breathing from side to side, and how to kick your legs. You would practice this many times until you become good at it. Once you learn how to swim freestyle and your body knows how to move through the water, you will never forget how to swim freestyle, even if you do not swim for a couple of decades. Similarly, if you present an accomplished guitarist with a guitar, even if he has not played in a long time, he will still be able to play quite well.

Declarative memory has to do with the storage of facts and events we personally experienced. Explicit (declarative) memory has two parts: semantic memory and episodic memory. Semantic means having to do with language and knowledge about language. An example would be the question "what does *argumentative* mean?" Stored in our **semantic memory** is knowledge about words, concepts, and language-based knowledge and facts. For example, answers to the following questions are stored in your semantic memory:

- Who was the first President of the United States?
- What is democracy?
- What is the longest river in the world?

Episodic memory is information about events we have personally experienced. The concept of episodic memory was first proposed about 40 years ago (Tulving, 1972). Since then, Tulving and others have looked at scientific evidence and reformulated the theory. Currently, scientists believe that episodic memory is memory about happenings in particular places at particular times, the what, where, and when of an event (Tulving, 2002). It involves recollection of visual imagery as well as the feeling of familiarity (Hassabis & Maguire, 2007).

EVERYDAY CONNECTIONS: Can You Remember Everything You Ever Did or Said?

Episodic memories are also called autobiographical memories. Let's quickly test your autobiographical memory. What were you wearing exactly five years ago today? What did you eat for lunch on April 10, 2009? You probably find it difficult, if not impossible, to answer these questions. Can you remember every event you have experienced over the course of your life—meals, conversations, clothing choices, weather conditions, and so on? Most likely none of us could even come close to answering these questions; however, American actress Marilu **Henner**, best known for the television show *Taxi*, can remember. She has an amazing and highly superior autobiographical memory.



Figure **7.2.7**: Marilu Henner's super autobiographical memory is known as hyperthymesia. (credit: Mark Richardson)

Very few people can recall events in this way; right now, only **12** known individuals have this ability, and only a few have been studied (Parker, Cahill & McGaugh 2006). And although **hyperthymesia** normally appears in adolescence, two children in the United States appear to have memories from well before their tenth birthdays.

Retrieval

So you have worked hard to encode (via effortful processing) and store some important information for your upcoming final exam. How do you get that information back out of storage when you need it? The act of getting information out of memory storage and back into conscious awareness is known as **retrieval**. This would be similar to finding and opening a paper you had previously saved on your computer's hard drive. Now it's back on your desktop, and you can work with it again. Our ability to retrieve information from long-term memory is vital to our everyday functioning. You must be able to retrieve information from memory in order to do everything from knowing how to brush your hair and teeth, to driving to work, to knowing how to perform your job once you get there.

There are three ways you can retrieve information out of your long-term memory storage system: recall, recognition, and relearning. **Recall** is what we most often think about when we talk about memory retrieval: it means you can access information without cues. For example, you would use recall for an essay test. **Recognition** happens when you identify information that you have previously learned after encountering it again. It involves a process of comparison. When you take a multiple-choice test, you are relying on recognition to help you choose the correct answer. Here is another example. Let's say you graduated from high school 10 years ago, and you have returned to your hometown for your 10-year reunion. You may not be able to recall all of your classmates, but you recognize many of them based on their yearbook photos.

The third form of retrieval is **relearning**, and it's just what it sounds like. It involves learning information that you previously learned. Whitney took Spanish in high school, but after high school she did not have the opportunity to speak Spanish. Whitney is now 31, and her company has offered her an opportunity to work in their Mexico City office. In order to prepare herself, she enrolls in a Spanish course at the local community center. She's surprised at how quickly she's able to pick up the language after not speaking it for 13 years; this is an example of relearning.

Summary

Memory is a system or process that stores what we learn for future use.

Our memory has three basic functions: encoding, storing, and retrieving information. Encoding is the act of getting information into our memory system through automatic or effortful processing. Storage is retention of the information, and retrieval is the act of getting information out of storage and into conscious awareness through recall, recognition, and relearning. The idea that information is processed through three memory systems is called the Atkinson-Shiffrin (A-S) model of memory. First, environmental stimuli enter our sensory memory for a period of less than a second to a few seconds. Those stimuli that we notice and pay attention to then move into short-term memory (also called working memory). According to the A-S model, if we rehearse this information, then it moves into long-term memory for permanent storage. Other models like that of Baddeley and Hitch suggest there is more of a feedback loop between short-term memory and long-term memory. Long-term memory has a practically limitless storage capacity and is divided into implicit and explicit memory. Finally, retrieval is the act of getting memories out of storage and back into conscious awareness. This is done through recall, recognition, and relearning.

Glossary

acoustic encoding
input of sounds, words, and music

Atkinson-Shiffrin model (A-S)
memory model that states we process information through three systems: sensory memory, short-term memory, and long-term memory

automatic processing
encoding of informational details like time, space, frequency, and the meaning of words

declarative memory
type of long-term memory of facts and events we personally experience

effortful processing
encoding of information that takes effort and attention

encoding
input of information into the memory system

episodic memory
type of declarative memory that contains information about events we have personally experienced, also known as autobiographical memory

explicit memory
memories we consciously try to remember and recall

implicit memory
memories that are not part of our consciousness

long-term memory (LTM)
continuous storage of information

memory
system or process that stores what we learn for future use

memory consolidation
active rehearsal to move information from short-term memory into long-term memory

procedural memory
type of long-term memory for making skilled actions, such as how to brush your teeth, how to drive a car, and how to swim

recall
accessing information without cues

recognition
identifying previously learned information after encountering it again, usually in response to a cue

rehearsal
conscious repetition of information to be remembered

relearning
learning information that was previously learned

retrieval

act of getting information out of long-term memory storage and back into conscious awareness

self-reference effect

tendency for an individual to have better memory for information that relates to oneself in comparison to material that has less personal relevance

semantic encoding

input of words and their meaning

semantic memory

type of declarative memory about words, concepts, and language-based knowledge and facts

sensory memory

storage of brief sensory events, such as sights, sounds, and tastes

short-term memory (STM)

(also, working memory) holds about seven bits of information before it is forgotten or stored, as well as information that has been retrieved and is being used

storage

creation of a permanent record of information

visual encoding

input of images

Contributors

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7.3: The Role of External and Internal Context in Retrieval

We are more likely to be able to retrieve items from memory when conditions at retrieval are similar to the conditions under which we encoded them. **Context-dependent memory** refers to *an increase in retrieval when the external situation in which information is learned matches the situation in which it is remembered*. Godden and Baddeley (1975) conducted a study to test this idea using scuba divers. They asked the divers to learn a list of words either when they were on land or when they were underwater. Then they tested the divers on their memory, either in the same or the opposite situation. As you can see in Figure **7.3.12**, the divers' memory was better when they were tested in the same context in which they had learned the words than when they were tested in the other context.

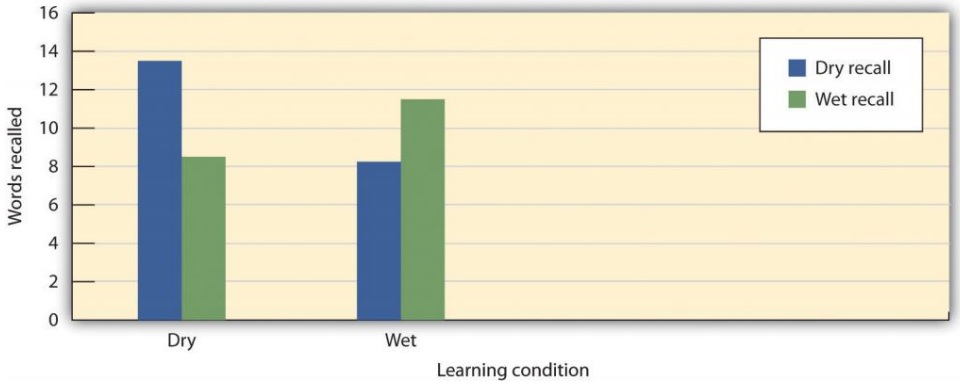


Figure **7.3.12**: Results From Godden and Baddeley, 1975. Godden and Baddeley (1975) tested the memory of scuba divers to learn and retrieve information in different contexts and found strong evidence for context-dependent learning. Adapted from Godden, D. R., & Baddeley, A. D. (1975). Context-dependent memory in two natural environments: On land and underwater. *British Journal of Psychology, 66*(3), 325–331.

You can see that context-dependent memory might also be important in improving your memory. For instance, you might want to try to study for an exam in a situation that is similar to the one in which you are going to take the exam.

Whereas context-dependent memory refers to a match in the external situation between learning and remembering, **state-dependent memory** refers to *superior retrieval of memories when the individual is in the same physiological or psychological state as during encoding*. Research has found, for instance, that animals that learn a maze while under the influence of one drug tend to remember their learning better when they are tested under the influence of the same drug than when they are tested without the drug (Jackson, Koek, & Colpaert, 1992). And research with humans finds that bilinguals remember better when tested in the same language in which they learned the material (Marian & Kaushanskaya, 2007). Mood states may also produce a special form of state-dependent learning, known as **mood-dependent memory**. People who learn information when they are in a bad (rather than a good) mood find it easier to recall these memories when they are tested while they are in a bad mood, and vice versa. It is easier to recall unpleasant memories than pleasant ones when we're sad, and easier to recall pleasant memories than unpleasant ones when we're happy (Bower, 1981; Eich, 2008).

References

Baddeley, A., Eysenck, M. W., & Anderson, M. C. (2009). *Memory*. New York, NY: Psychology Press.

Bahrick, H. P. (1984). Semantic memory content in permastore: Fifty years of memory for Spanish learned in school. *Journal of Experimental Psychology: General*, *113*(1), 1–29.

Bayley, P. J., & Squire, L. R. (2005). Failure to acquire new semantic knowledge in patients with large medial temporal lobe lesions. *Hippocampus*, *15*(2), 273–280.

Bower, G. H. (1981). Mood and memory. *American Psychologist*, *36*, 129–148.

Bransford, J. D., & Johnson, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning & Verbal Behavior, 11*(6), 717–726.

Chester, B. (2001). Restoring remembering: Hormones and memory. *McGill Reporter, 33*(10). Retrieved from http://www.mcgill.ca/reporter/33/10/sherwin(opens in new window)

Corkin, S., Amaral, D. G., González, R. G., Johnson, K. A., & Hyman, B. T. (1997). H. M.'s medial temporal lobe lesion: Findings from magnetic resonance imaging. *The Journal of Neuroscience, 17*(10), 3964–3979.

Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning & Verbal Behavior, 11*(6), 671–684.

Driskell, J. E., Willis, R. P., & Copper, C. (1992). Effect of overlearning on retention. *Journal of Applied Psychology, 77*(5), 615–622.

Eich, E. (2008). Mood and memory at 26: Revisiting the idea of mood mediation in drug-dependent and place-dependent memory. In M. A. Gluck, J. R. Anderson, & S. M. Kosslyn (Eds.), *Memory and mind: A festschrift for Gordon H. Bower* (pp. 247–260). Mahwah, NJ: Lawrence Erlbaum Associates.

Eichenbaum, H. (1999). Conscious awareness, memory, and the hippocampus. *Nature Neuroscience, 2*(9), 775–776.

Farah, M. J., Illes, J., Cook-Deegan, R., Gardner, H., Kandel, E., King, P.,…Wolpe, P. R. (2004). Neurocognitive enhancement: What can we do and what should we do? *Nature Reviews Neuroscience, 5*(5), 421–425.

Godden, D. R., & Baddeley, A. D. (1975). Context-dependent memory in two natural environments: On land and underwater. *British Journal of Psychology, 66*(3), 325–331.

Gold, P. E., Cahill, L., & Wenk, G. L. (2002). Ginkgo biloba: A cognitive enhancer? *Psychological Science in the Public Interest, 3*(1), 2–11.

Harris, J. L., & Qualls, C. D. (2000). The association of elaborative or maintenance rehearsal with age, reading comprehension and verbal working memory performance. *Aphasiology, 14*(5–6), 515–526.

Helmuth, Laura. (1999). New role found for the hippocampus. *Science, 285*, 1339–1341;

Jackson, A., Koek, W., & Colpaert, F. (1992). NMDA antagonists make learning and recall state-dependent. *Behavioural Pharmacology, 3*(4), 415.

Jonides, J., Lacey, S. C., & Nee, D. E. (2005). Processes of working memory in mind and brain. *Current Directions in Psychological Science, 14*(1), 2–5.

Krupa, D. J., Thompson, J. K., & Thompson, R. F. (1993). Localization of a memory trace in the mammalian brain. *Science, 260*(5110), 989–991.

Lashley, K. S. (1929). The effects of cerebral lesions subsequent to the formation of the maze habit: Localization of the habit. In *Brain mechanisms and intelligence: A quantitative study of injuries to the brain* (pp. 86–108). Chicago, IL: University of Chicago Press.

Lynch, G. (2002). Memory enhancement: The search for mechanism-based drugs. *Nature Neuroscience, 5*(Suppl.), 1035–1038.

Lynch, G., Larson, J., Staubli, U., Ambros-Ingerson, J., Granger, R., Lister, R. G.,…Weingartner, H. J. (1991). Long-term potentiation and memory operations in cortical networks. In C. A. Wickliffe, M. Corballis, & G. White (Eds.), *Perspectives on cognitive neuroscience* (pp. 110–131). New York, NY: Oxford University Press.

Maki, P. M., & Resnick, S. M. (2000). Longitudinal effects of estrogen replacement therapy on PET cerebral blood flow and cognition. *Neurobiology of Aging, 21*, 373–383.

Marian, V. & Kaushanskaya, M. (2007). Language context guides memory content. *Psychonomic Bulletin and Review, 14*(5), 925–933.

McDaniel, M. A., Maier, S. F., & Einstein, G. O. (2002). "Brain-specific" nutrients: A memory cure? *Psychological Science in the Public Interest, 3*(1), 12–38.

McEntee, W., & Crook, T. (1993). Glutamate: Its role in learning, memory, and the aging brain. *Psychopharmacology*, *111*(4), 391–401.

McGaugh, J. L. (2003). *Memory and emotion: The making of lasting memories*. New York, NY: Columbia University Press.

Nickerson, R. S., & Adams, M. J. (1979). Long-term memory for a common object. *Cognitive Psychology*, *11*(3), 287–307.

Paller, K. A. (2004). Electrical signals of memory and of the awareness of remembering. *Current Directions in Psychological Science*, *13*(2), 49–55.

Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personality & Social Psychology*, *35*(9), 677–688.

Rosch, E. (1975). Cognitive representations of semantic categories. *Journal of Experimental Psychology: General*, *104*(3), 192–233.

Sherwin, B. B. (1998). Estrogen and cognitive functioning in women. *Proceedings of the Society for Experimental Biological Medicine*, *217*, 17–22.

Sigurdsson, T., Doyère, V., Cain, C. K., & LeDoux, J. E. (2007). Long-term potentiation in the amygdala: A cellular mechanism of fear learning and memory. *Neuropharmacology*, *52*(1), 215–227.

Squire, L. R. (1992). Memory and the hippocampus: A synthesis from findings with rats, monkeys, and humans. *Psychological Review*, *99*(2), 195–231.

Srull, T., & Wyer, R. (1989). Person memory and judgment. *Psychological Review*, *96*(1), 58–83.

Symons, C. S., & Johnson, B. T. (1997). The self-reference effect in memory: A meta-analysis. *Psychological Bulletin*, *121*(3), 371–394.

Turner, D. C., & Sahakian, B. J. (2006). Analysis of the cognitive enhancing effects of modafinil in schizophrenia. In J. L. Cummings (Ed.), *Progress in neurotherapeutics and neuropsychopharmacology* (pp. 133–147). New York, NY: Cambridge University Press.

Woodruff-Pak, D. S., Goldenberg, G., Downey-Lamb, M. M., Boyko, O. B., & Lemieux, S. K. (2000). Cerebellar volume in humans related to magnitude of classical conditioning. *Neuroreport: For Rapid Communication of Neuroscience Research*, *11*(3), 609–615.

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7.4: Parts of the Brain Involved with Memory

Learning Objectives

- Explain the brain functions involved in memory
- Recognize the roles of the hippocampus, amygdala, and cerebellum

Are memories stored in just one part of the brain, or are they stored in many different parts of the brain? Karl Lashley began exploring this problem, about 100 years ago, by making lesions in the brains of animals such as rats and monkeys. He was searching for evidence of the **engram**: the group of neurons that serve as the "physical representation of memory" (Josselyn, 2010). First, Lashley (1950) trained rats to find their way through a maze. Then, he used the tools available at the time—in this case a soldering iron—to create lesions in the rats' brains, specifically in the cerebral cortex. He did this because he was trying to erase the engram, or the original memory trace that the rats had of the maze.

Lashley did not find evidence of the engram, and the rats were still able to find their way through the maze, regardless of the size or location of the lesion. Based on his creation of lesions and the animals' reaction, he formulated the **equipotentiality hypothesis**: if part of one area of the brain involved in memory is damaged, another part of the same area can take over that memory function (Lashley, 1950). Although Lashley's early work did not confirm the existence of the engram, modern psychologists are making progress locating it. Eric Kandel, for example, spent decades working on the synapse, the basic structure of the brain, and its role in controlling the flow of information through neural circuits needed to store memories (Mayford, Siegelbaum, & Kandel, 2012).

Many scientists believe that the entire brain is involved with memory. However, since Lashley's research, other scientists have been able to look more closely at the brain and memory. They have argued that memory is located in specific parts of the brain, and specific neurons can be recognized for their involvement in forming memories. The main parts of the brain involved with memory are the amygdala, the hippocampus, the cerebellum, and the prefrontal cortex.

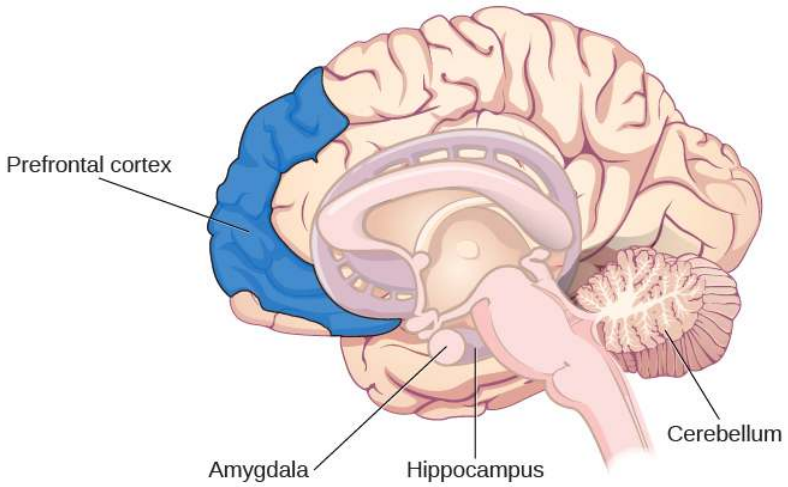


Figure **7.4.1**: The amygdala is involved in fear and fear memories. The hippocampus is associated with declarative and episodic memory as well as recognition memory. The cerebellum plays a role in processing procedural memories, such as how to play the piano. The prefrontal cortex appears to be involved in remembering semantic tasks.

The Amygdala

First, let's look at the role of the **amygdala** in memory formation. The main job of the amygdala is to regulate emotions, such as fear and aggression (Figure). The amygdala plays a part in how memories are stored because storage is influenced by stress hormones. For example, one researcher experimented with rats and the fear response (Josselyn, 2010). Using Pavlovian conditioning, a neutral tone was paired with a foot shock to the rats. This produced a fear memory in the rats. After being conditioned, each time they heard the tone, they would freeze (a defense response in rats), indicating a memory for the impending shock. Then the researchers induced cell death in neurons in the lateral amygdala, which is the specific area of the brain responsible for fear memories. They found the fear memory faded (became extinct). Because of its role in processing emotional information,

the amygdala is also involved in memory consolidation: the process of transferring new learning into long-term memory. The amygdala seems to facilitate encoding memories at a deeper level when the event is emotionally arousing.

The Hippocampus

Another group of researchers also experimented with rats to learn how the **hippocampus** functions in memory processing (Figure). They created lesions in the hippocampi of the rats, and found that the rats demonstrated memory impairment on various tasks, such as object recognition and maze running. They concluded that the hippocampus is involved in memory, specifically normal recognition memory as well as spatial memory (when the memory tasks are like recall tests) (Clark, Zola, & Squire, 2000). Another job of the hippocampus is to project information to cortical regions that give memories meaning and connect them with other connected memories. It also plays a part in memory consolidation: the process of transferring new learning into long-term memory.

Injury to this area leaves us unable to process new declarative memories. One famous patient, known for years only as H. M., had both his left and right temporal lobes (hippocampi) removed in an attempt to help control the seizures he had been suffering from for years (Corkin, Amaral, González, Johnson, & Hyman, 1997). As a result, his declarative memory was significantly affected, and he could not form new semantic knowledge. He lost the ability to form new memories, yet he could still remember information and events that had occurred prior to the surgery.

The Cerebellum and Prefrontal Cortex

Although the hippocampus seems to be more of a processing area for explicit memories, you could still lose it and be able to create implicit memories (procedural memory, motor learning, and classical conditioning), thanks to your **cerebellum**. For example, one classical conditioning experiment is to accustom subjects to blink when they are given a puff of air. When researchers damaged the cerebellums of rabbits, they discovered that the rabbits were not able to learn the conditioned eye-blink response (Steinmetz, 1999; Green & Woodruff-Pak, 2000).

Other researchers have used brain scans, including positron emission tomography (PET) scans, to learn how people process and retain information. From these studies, it seems the prefrontal cortex is involved. In one study, participants had to complete two different tasks: either looking for the letter *a* in words (considered a perceptual task) or categorizing a noun as either living or non-living (considered a semantic task) (Kapur et al., 1994). Participants were then asked which words they had previously seen. Recall was much better for the semantic task than for the perceptual task. According to PET scans, there was much more activation in the left inferior prefrontal cortex in the semantic task. In another study, encoding was associated with left frontal activity, while retrieval of information was associated with the right frontal region (Craik et al., 1999).

Neurotransmitters

There also appear to be specific neurotransmitters involved with the process of memory, such as epinephrine, dopamine, serotonin, glutamate, and acetylcholine (Myhrer, 2003). There continues to be discussion and debate among researchers as to which **neurotransmitter** plays which specific role (Blockland, 1996). Although we don't yet know which role each neurotransmitter plays in memory, we do know that communication among neurons via neurotransmitters is critical for developing new memories. Repeated activity by neurons leads to increased neurotransmitters in the synapses and more efficient and more synaptic connections. This is how memory consolidation occurs.

It is also believed that strong emotions trigger the formation of strong memories, and weaker emotional experiences form weaker memories; this is called **arousal theory** (Christianson, 1992). For example, strong emotional experiences can trigger the release of neurotransmitters, as well as hormones, which strengthen memory; therefore, our memory for an emotional event is usually better than our memory for a non-emotional event. When humans and animals are stressed, the brain secretes more of the neurotransmitter glutamate, which helps them remember the stressful event (McGaugh, 2003). This is clearly evidenced by what is known as the flashbulb memory phenomenon.

A **flashbulb memory** is an exceptionally clear recollection of an important event. Try asking someone who was alive at the time, "where were you when you first heard about the 9/11 terrorist attacks"? Most likely they can remember where they were and what they were doing. In fact, a Pew Research Center (2011) survey found that for those Americans who were age 8 or older at the time of the event, 97% were able to recall the moment they learned of this event, even a decade after it happened.



Figure 7.4.2: Most people can remember where they were when they first heard about the 9/11 terrorist attacks. This is an example of a flashbulb memory: a record of an atypical and unusual event that has very strong emotional associations. (credit: Michael Foran)

DIG DEEPER: Inaccurate and False Memories

Even flashbulb memories can have decreased accuracy with the passage of time, even with very important events. For example, on at least three occasions, when asked how he heard about the terrorist attacks of 9/11, President George W. Bush responded inaccurately. In January 2002, less than 4 months after the attacks, the then sitting President Bush was asked how he heard about the attacks. He responded:

> "*I was sitting there, and my Chief of Staff—well, first of all, when we walked into the classroom, I had seen this plane fly into the first building. There was a TV set on. And you know, I thought it was pilot error and I was amazed that anybody could make such a terrible mistake*." (Greenberg, 2004, p. 2)

Contrary to what President Bush recalled, no one saw the first plane hit, except people on the ground near the twin towers. The first plane was not videotaped because it was a normal Tuesday morning in New York City, until the first plane hit.

Some people attributed Bush's wrong recall of the event to conspiracy theories. However, there is a much more benign explanation: human memory, even flashbulb memories, can be frail. In fact, memory can be so frail that we can convince a person an event happened to them, even when it did not. In studies, research participants will recall hearing a word, even though they never heard the word. For example, participants were given a list of 15 sleep-related words, but the word "sleep" was not on the list. Participants recalled hearing the word "sleep" even though they did not actually hear it (Roediger & McDermott, 2000). The researchers who discovered this named the theory after themselves and a fellow researcher, calling it the Deese-Roediger-McDermott paradigm.

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7.5: Problems with Memory

Learning Objectives

- Compare and contrast the two types of amnesia
- Discuss the unreliability of eyewitness testimony
- Discuss encoding failure
- Discuss the various memory errors
- Compare and contrast the two types of interference

You may pride yourself on your amazing ability to remember the birthdates and ages of all of your friends and family members, or you may be able recall vivid details of your 5th birthday party at Chuck E. Cheese's. However, all of us have at times felt frustrated, and even embarrassed, when our memories have failed us. There are several reasons why this happens.

Amnesia

Amnesia is the loss of long-term memory that occurs as the result of disease, physical trauma, or psychological trauma. Psychologist Tulving (2002) and his colleagues at the University of Toronto studied K. C. for years. K. C. suffered a traumatic head injury in a motorcycle accident and then had severe amnesia. Tulving writes,

> *"The outstanding fact about K.C.'s mental make-up is his utter inability to remember any events, circumstances, or situations from his own life. His episodic amnesia covers his whole life, from birth to the present. The only exception is the experiences that, at any time, he has had in the last minute or two." (Tulving, 2002, p. 14)*

Anterograde Amnesia

There are two common types of amnesia: anterograde amnesia and retrograde amnesia (Figure). Anterograde amnesia is commonly caused by brain trauma, such as a blow to the head. With **anterograde amnesia**, you cannot remember new information, although you can remember information and events that happened prior to your injury. The hippocampus is usually affected (McLeod, 2011). This suggests that damage to the brain has resulted in the inability to transfer information from short-term to long-term memory; that is, the inability to consolidate memories.

Many people with this form of amnesia are unable to form new episodic or semantic memories, but are still able to form new procedural memories (Bayley & Squire, 2002). This was true of H. M., which was discussed earlier. The brain damage caused by his surgery resulted in anterograde amnesia. H. M. would read the same magazine over and over, having no memory of ever reading it—it was always new to him. He also could not remember people he had met after his surgery. If you were introduced to H. M. and then you left the room for a few minutes, he would not know you upon your return and would introduce himself to you again. However, when presented the same puzzle several days in a row, although he did not remember having seen the puzzle before, his speed at solving it became faster each day (because of relearning) (Corkin, 1965, 1968).



Figure 7.5.1: This diagram illustrates the timeline of retrograde and anterograde amnesia. Memory problems that extend back in time before the injury and prevent retrieval of information previously stored in long-term memory are known as retrograde amnesia. Conversely, memory problems that extend forward in time from the point of injury and prevent the formation of new memories are called anterograde amnesia.

Retrograde Amnesia

Retrograde amnesia is loss of memory for events that occurred prior to the trauma. People with retrograde amnesia cannot remember some or even all of their past. They have difficulty remembering episodic memories. What if you woke up in the hospital one day and there were people surrounding your bed claiming to be your spouse, your children, and your parents? The trouble is you don't recognize any of them. You were in a car accident, suffered a head injury, and now have retrograde amnesia. You don't remember anything about your life prior to waking up in the hospital. This may sound like the stuff of Hollywood movies, and

Hollywood has been fascinated with the amnesia plot for nearly a century, going all the way back to the film *Garden of Lies* from 1915 to more recent movies such as the Jason Bourne trilogy starring Matt Damon. However, for real-life sufferers of retrograde amnesia, like former NFL football player Scott Bolzan, the story is not a Hollywood movie. Bolzan fell, hit his head, and deleted 46 years of his life in an instant. He is now living with one of the most extreme cases of retrograde amnesia on record.

Memory Construction and Reconstruction

The formulation of new memories is sometimes called **construction**, and the process of bringing up old memories is called **reconstruction**. Yet as we retrieve our memories, we also tend to alter and modify them. A memory pulled from long-term storage into short-term memory is flexible. New events can be added and we can change what we think we remember about past events, resulting in inaccuracies and distortions. People may not intend to distort facts, but it can happen in the process of retrieving old memories and combining them with new memories (Roediger and DeSoto, in press).

Suggestibility

When someone witnesses a crime, that person's memory of the details of the crime is very important in catching the suspect. Because memory is so fragile, witnesses can be easily (and often accidentally) misled due to the problem of suggestibility. **Suggestibility** describes the effects of misinformation from external sources that leads to the creation of false memories. In the fall of 2002, a sniper in the DC area shot people at a gas station, leaving Home Depot, and walking down the street. These attacks went on in a variety of places for over three weeks and resulted in the deaths of ten people. During this time, as you can imagine, people were terrified to leave their homes, go shopping, or even walk through their neighborhoods. Police officers and the FBI worked frantically to solve the crimes, and a tip hotline was set up. Law enforcement received over $140,000$ tips, which resulted in approximately $35,000$ possible suspects (Newseum, n.d.).

Most of the tips were dead ends, until a white van was spotted at the site of one of the shootings. The police chief went on national television with a picture of the white van. After the news conference, several other eyewitnesses called to say that they too had seen a white van fleeing from the scene of the shooting. At the time, there were more than 70,000 white vans in the area. Police officers, as well as the general public, focused almost exclusively on white vans because they believed the eyewitnesses. Other tips were ignored. When the suspects were finally caught, they were driving a blue sedan.

As illustrated by this example, we are vulnerable to the power of suggestion, simply based on something we see on the news. Or we can claim to remember something that in fact is only a suggestion someone made. It is the suggestion that is the cause of the false memory.

Eyewitness Misidentification

Even though memory and the process of reconstruction can be fragile, police officers, prosecutors, and the courts often rely on eyewitness identification and testimony in the prosecution of criminals. However, faulty eyewitness identification and testimony can lead to wrongful convictions. See figure below:

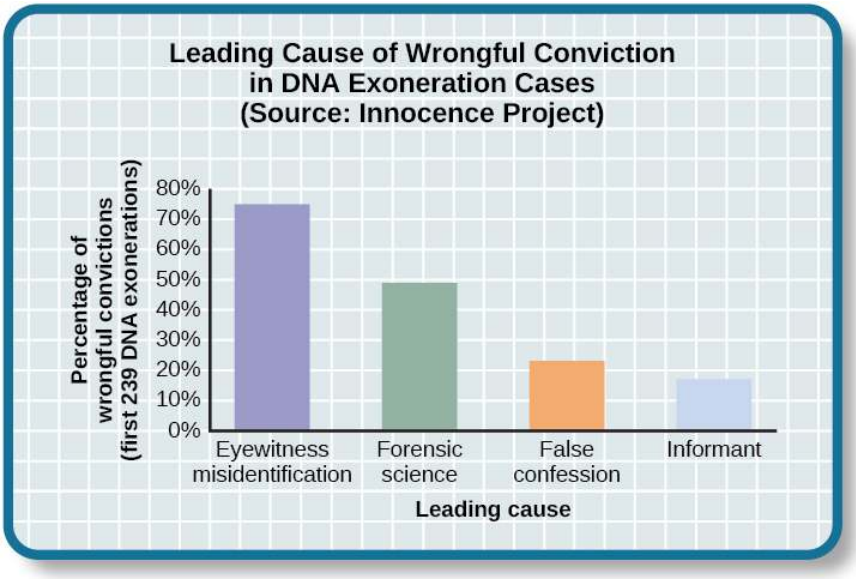


Figure 7.5.2: In studying cases where DNA evidence has exonerated people from crimes, the Innocence Project discovered that eyewitness misidentification is the leading cause of wrongful convictions (Benjamin N. Cardozo School of Law, Yeshiva University, 2009).

How does this happen? In 1984, Jennifer Thompson, then a 22-year-old college student in North Carolina, was brutally raped at knifepoint. As she was being raped, she tried to memorize every detail of her rapist's face and physical characteristics, vowing that if she survived, she would help get him convicted. After the police were contacted, a composite sketch was made of the suspect, and Jennifer was shown six photos. She chose two, one of which was of Ronald Cotton. After looking at the photos for $4-5$ minutes, she said, "Yeah. This is the one," and then she added, "I think this is the guy." When questioned about this by the detective who asked, "You're sure? Positive?" She said that it was him. Then she asked the detective if she did OK, and he reinforced her choice by telling her she did great. These kinds of unintended cues and suggestions by police officers can lead witnesses to identify the wrong suspect. The district attorney was concerned about her lack of certainty the first time, so she viewed a lineup of seven men. She said she was trying to decide between numbers 4 and 5, finally deciding that Cotton, number 5, "Looks most like him." He was 22 years old.

By the time the trial began, Jennifer Thompson had absolutely no doubt that she was raped by Ronald Cotton. She testified at the court hearing, and her testimony was compelling enough that it helped convict him. How did she go from, "I think it's the guy" and it "Looks most like him," to such certainty? Gary Wells and Deah Quinlivan (2009) assert it's suggestive police identification procedures, such as stacking lineups to make the defendant stand out, telling the witness which person to identify, and confirming witnesses choices by telling them "Good choice," or "You picked the guy."

After Cotton was convicted of the rape, he was sent to prison for life plus 50 years. After 4 years in prison, he was able to get a new trial. Jennifer Thompson once again testified against him. This time Ronald Cotton was given two life sentences. After serving 11 years in prison, DNA evidence finally demonstrated that Ronald Cotton did not commit the rape, was innocent, and had served over a decade in prison for a crime he did not commit.

Ronald Cotton's story, unfortunately, is not unique. There are also people who were convicted and placed on death row, who were later exonerated. The Innocence Project is a non-profit group that works to exonerate falsely convicted people, including those convicted by eyewitness testimony. To learn more, you can visit http://www.innocenceproject.org.

DIG DEEPER: Preserving Eyewitness Memory: The Elizabeth Smart Case

Contrast the Cotton case with what happened in the Elizabeth **Smart** case. When Elizabeth was 14 years old and fast asleep in her bed at home, she was abducted at knifepoint. Her nine-year-old sister, Mary Katherine, was sleeping in the same bed and watched, terrified, as her beloved older sister was abducted. Mary Katherine was the sole eyewitness to this crime and was very fearful. In the coming weeks, the Salt Lake City police and the FBI proceeded with caution with Mary Katherine. They did not want to implant any false memories or mislead her in any way. They did not show her police line-ups or push her to do

a composite sketch of the abductor. They knew if they corrupted her memory, Elizabeth might never be found. For several months, there was little or no progress on the case. Then, about **4** months after the kidnapping, Mary Katherine first recalled that she had heard the abductor's voice prior to that night (he had worked one time as a handyman at the family's home) and then she was able to name the person whose voice it was. The family contacted the press and others recognized him—after a total of nine months, the suspect was caught and Elizabeth Smart was returned to her family.

The Misinformation Effect

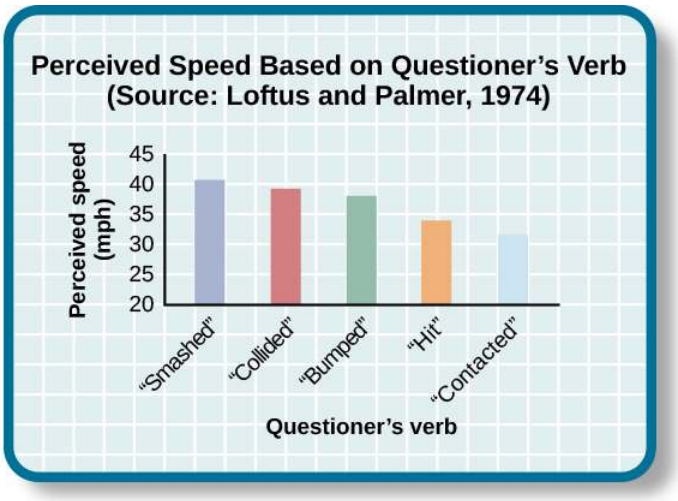
Cognitive psychologist Elizabeth Loftus has conducted extensive research on memory. She has studied false memories as well as recovered memories of childhood sexual abuse. Loftus also developed the **misinformation effect paradigm**, which holds that after exposure to incorrect information, a person may misremember the original event.

According to Loftus, an eyewitness's memory of an event is very flexible due to the misinformation effect. To test this theory, Loftus and John Palmer (1974) asked 45 U.S. college students to estimate the speed of cars using different forms of questions (See figure **7.5.3**). The participants were shown films of car accidents and were asked to play the role of the eyewitness and describe what happened. They were asked, "About how fast were the cars going when they (smashed, collided, bumped, hit, contacted) each other?" The participants estimated the speed of the cars based on the verb used.

Participants who heard the word "smashed" estimated that the cars were traveling at a much higher speed than participants who heard the word "contacted." The implied information about speed, based on the verb they heard, had an effect on the participants' memory of the accident. In a follow-up one week later, participants were asked if they saw any broken glass (none was shown in the accident pictures). Participants who had been in the "smashed" group were more than twice as likely to indicate that they did remember seeing glass. Loftus and Palmer demonstrated that a leading question encouraged them to not only remember the cars were going faster, but to also falsely remember that they saw broken glass.



(a)



(b)

Figure **7.5.3**: When people are asked leading questions about an event, their memory of the event may be altered. (credit a: modification of work by Rob Young)

Controversies over Repressed and Recovered Memories

Other researchers have described how whole events, not just words, can be falsely recalled, even when they did not happen. The idea that memories of traumatic events could be repressed has been a theme in the field of psychology, beginning with Sigmund Freud, and the controversy surrounding the idea continues today.

Recall of false autobiographical memories is called **false memory syndrome**. This syndrome has received a lot of publicity, particularly as it relates to memories of events that do not have independent witnesses—often the only witnesses to the abuse are the perpetrator and the victim (e.g., sexual abuse).

On one side of the debate are those who have recovered memories of childhood abuse years after it occurred. These researchers argue that some children's experiences have been so traumatizing and distressing that they must lock those memories away in order

to lead some semblance of a normal life. They believe that repressed memories can be locked away for decades and later recalled intact through hypnosis and guided imagery techniques (Devilly, 2007).

Research suggests that having no memory of childhood sexual abuse is quite common in adults. For instance, one large-scale study conducted by John Briere and Jon Conte (1993) revealed that 59% of 450 men and women who were receiving treatment for sexual abuse that had occurred before age 18 had forgotten their experiences. Ross Cheit (2007) suggested that repressing these memories created psychological distress in adulthood. The Recovered Memory Project was created so that victims of childhood sexual abuse can recall these memories and allow the healing process to begin (Cheit, 2007; Devilly, 2007).

On the other side, Loftus has challenged the idea that individuals can repress memories of traumatic events from childhood, including sexual abuse, and then recover those memories years later through therapeutic techniques such as hypnosis, guided visualization, and age regression.

Loftus is not saying that childhood sexual abuse doesn't happen, but she does question whether or not those memories are accurate, and she is skeptical of the questioning process used to access these memories, given that even the slightest suggestion from the therapist can lead to misinformation effects. For example, researchers Stephen Ceci and Maggie Brucks (1993, 1995) asked three-year-old children to use an anatomically correct doll to show where their pediatricians had touched them during an exam. Fifty-five percent of the children pointed to the genital/anal area on the dolls, even when they had not received any form of genital exam.

Ever since Loftus published her first studies on the suggestibility of eyewitness testimony in the 1970s, social scientists, police officers, therapists, and legal practitioners have been aware of the flaws in interview practices. Consequently, steps have been taken to decrease suggestibility of witnesses. One way is to modify how witnesses are questioned. When interviewers use neutral and less leading language, children more accurately recall what happened and who was involved (Goodman, 2006; Pipe, 1996; Pipe, Lamb, Orbach, & Esplin, 2004). Another change is in how police lineups are conducted. It's recommended that a blind photo lineup be used. This way the person administering the lineup doesn't know which photo belongs to the suspect, minimizing the possibility of giving leading cues. Additionally, judges in some states now inform jurors about the possibility of misidentification. Judges can also suppress eyewitness testimony if they deem it unreliable.

Forgetting

"*I've a grand memory for forgetting*," quipped Robert Louis Stevenson. **Forgetting** refers to loss of information from long-term memory. We all forget things, like a loved one's birthday, someone's name, or where we put our car keys. As you've come to see, memory is fragile, and forgetting can be frustrating and even embarrassing. But why do we forget? To answer this question, we will look at several perspectives on forgetting.

Encoding Failure

Sometimes memory loss happens before the actual memory process begins, which is encoding failure. We can't remember something if we never stored it in our memory in the first place. This would be like trying to find a book on your e-reader that you never actually purchased and downloaded. Often, in order to remember something, we must pay attention to the details and actively work to process the information (effortful encoding). Lots of times we don't do this. For instance, think of how many times in your life you've seen a penny. Can you accurately recall what the front of a U.S. penny looks like? When researchers Raymond Nickerson and Marilyn Adams (1979) asked this question, they found that most Americans don't know which one it is. The reason is most likely encoding failure. Most of us never encode the details of the penny. We only encode enough information to be able to distinguish it from other coins. If we don't encode the information, then it's not in our long-term memory, so we will not be able to remember it.



(a) (b) (c) (d)

Figure 7.5.4: Can you tell which coin, (a), (b), (c), or (d) is the accurate depiction of a US nickel? The correct answer is (c).

Memory Errors

Psychologist Daniel Schacter (2001), a well-known memory researcher, offers seven ways our memories fail us. He calls them the seven sins of memory and categorizes them into three groups: forgetting, distortion, and intrusion.

Table 7.5.1: Schacter's Seven Sins of Memory

Sin	Type	Description	Example
Transience	Forgetting	Accessibility of memory decreases over time	Forget events that occurred long ago
absentmindedness	Forgetting	Forgetting caused by lapses in attention	Forget where your phone is
Blocking	Forgetting	Accessibility of information is temporarily blocked	Tip of the tongue
Misattribution	Distortion	Source of memory is confused	Recalling a dream memory as a waking memory
Suggestibility	Distortion	False memories	Result from leading questions
Bias	Distortion	Memories distorted by current belief system	Align memories to current beliefs
Persistence	Intrusion	Inability to forget undesirable memories	Traumatic events

Let's look at the first sin of the forgetting errors: **transience**, which means that memories can fade over time. Here's an example of how this happens. Nathan's English teacher has assigned his students to read the novel *To Kill a Mockingbird*. Nathan comes home from school and tells his mom he has to read this book for class. "*Oh, I loved that book!*" she says. Nathan asks her what the book is about, and after some hesitation she says, "*Well . . . I know I read the book in high school, and I remember that one of the main characters is named Scout, and her father is an attorney, but I honestly don't remember anything else.*" Nathan wonders if his mother actually read the book, and his mother is surprised she can't recall the plot. What is going on here is storage decay: unused information tends to fade with the passage of time.

In 1885, German psychologist Hermann **Ebbinghaus** analyzed the process of memorization. First, he memorized lists of nonsense syllables. Then he measured how much he learned (retained) when he attempted to relearn each list. He tested himself over different periods of time from 20 minutes later to 30 days later. The result is his famous forgetting curve (See figure 7.5.5). Due to storage decay, an average person will lose 50% of the memorized information after 20 minutes and 70% of the information after 24 hours (Ebbinghaus, 1885/1964). Your memory for new information decays quickly and then eventually levels out.



Figure **7.5.5**: The Ebbinghaus forgetting curve shows how quickly memory for new information decays.

Are you constantly losing your cell phone? Have you ever driven back home to make sure you turned off the stove? Have you ever walked into a room for something, but forgotten what it was? You probably answered yes to at least one, if not all, of these examples—but don't worry, you are not alone. We are all prone to committing the memory error known as **absentmindedness**. These lapses in memory are caused by breaks in attention or our focus being somewhere else.

Cynthia, a psychologist, recalls a time when she recently committed the memory error of absentmindedness.

> *When I was completing court-ordered psychological evaluations, each time I went to the court, I was issued a temporary identification card with a magnetic strip which would open otherwise locked doors. As you can imagine, in a courtroom, this identification is valuable and important and no one wanted it to be lost or be picked up by a criminal. At the end of the day, I would hand in my temporary identification. One day, when I was almost done with an evaluation, my daughter's day care called and said she was sick and needed to be picked up. It was flu season, I didn't know how sick she was, and I was concerned. I finished up the evaluation in the next ten minutes, packed up my tools, and rushed to drive to my daughter's day care. After I picked up my daughter, I could not remember if I had handed back my identification or if I had left it sitting out on a table. I immediately called the court to check. It turned out that I had handed back my identification. Why could I not remember that? (personal communication, September 5, 2013)*

When have you experienced absentmindedness?

"*I just went and saw this movie called Oblivion, and it had that famous actor in it. Oh, what's his name? He's been in all of those movies, like The Shawshank Redemption and The Dark Knight trilogy. I think he's even won an Oscar. Oh gosh, I can picture his face in my mind, and hear his distinctive voice, but I just can't think of his name! This is going to bug me until I can remember it*!" This particular error can be so frustrating because you have the information right on the tip of your tongue. Have you ever experienced this? If so, you've committed the error known as **blocking**: you can't access stored information. See figure below:



Figure **7.5.6**: Blocking is also known as tip-of-the-tongue (TOT) phenomenon. The memory is right there, but you can't seem to recall it, just like not being able to remember the name of that very famous actor, Morgan Freeman. (credit: modification of work by D. Miller)

Now let's take a look at the three errors of distortion: misattribution, suggestibility, and bias. **Misattribution** happens when you confuse the source of your information. Let's say Alejandro was dating Lucia and they saw the first Hobbit movie together. Then they broke up and Alejandro saw the second Hobbit movie with someone else. Later that year, Alejandro and Lucia get back together. One day, they are discussing how the Hobbit books and movies are different and Alejandro says to Lucia, "*I loved watching the second movie with you and seeing you jump out of your seat during that super scary part.*" When Lucia responded with a puzzled and then angry look, Alejandro realized he'd committed the error of misattribution.

What if someone is a victim of rape shortly after watching a television program? Is it possible that the victim could actually blame the rape on the person she saw on television because of misattribution? This is exactly what happened to Donald Thomson.

> *Australian eyewitness expert Donald Thomson appeared on a live TV discussion about the unreliability of eyewitness memory. He was later arrested, placed in a lineup and identified by a victim as the man who had raped her. The police charged Thomson although the rape had occurred at the time he was on TV. They dismissed his alibi that he was in plain view of a TV audience and in the company of the other discussants, including an assistant commissioner of police. . . . Eventually, the investigators discovered that the rapist had attacked the woman as she was watching TV—the very program on which Thomson had appeared. Authorities eventually cleared Thomson. The woman had confused the rapist's face with the face that she had seen on TV. (Baddeley, 2004, p. 133)*

The second distortion error is suggestibility. Suggestibility is similar to misattribution, since it also involves false memories, but it's different. With misattribution you create the false memory entirely on your own, which is what the victim did in the Donald Thomson case above. With suggestibility, it comes from someone else, such as a therapist or police interviewer asking leading questions of a witness during an interview.

Memories can also be affected by **bias**, which is the final distortion error. Schacter (2001) says that your feelings and view of the world can actually distort your memory of past events. There are several types of bias:

- Stereotypical bias involves racial and gender biases. For example, when Asian American and European American research participants were presented with a list of names, they more frequently incorrectly remembered typical African American names such as Jamal and Tyrone to be associated with the occupation basketball player, and they more frequently incorrectly remembered typical White names such as Greg and Howard to be associated with the occupation of politician (Payne, Jacoby, & Lambert, 2004).

- Egocentric bias involves enhancing our memories of the past (Payne et al., 2004). Did you really score the winning goal in that big soccer match, or did you just assist?
- Hindsight bias happens when we think an outcome was inevitable after the fact. This is the "I knew it all along" phenomenon. The reconstructive nature of memory contributes to hindsight bias (Carli, 1999). We remember untrue events that seem to confirm that we knew the outcome all along.

Have you ever had a song play over and over in your head? How about a memory of a traumatic event, something you really do not want to think about? When you keep remembering something, to the point where you can't "get it out of your head" and it interferes with your ability to concentrate on other things, it is called **persistence**. It's Schacter's seventh and last memory error. It's actually a failure of our memory system because we involuntarily recall unwanted memories, particularly unpleasant ones (See figure 7.5.7). For instance, you witness a horrific car accident on the way to work one morning, and you can't concentrate on work because you keep remembering the scene.



Figure 7.5.7: Many veterans of military conflicts involuntarily recall unwanted, unpleasant memories. (credit: Department of Defense photo by U.S. Air Force Tech. Sgt. Michael R. Holzworth)

Interference

Sometimes information is stored in our memory, but for some reason it is inaccessible. This is known as interference, and there are two types: proactive interference and retroactive interference (See figure 7.5.8). Have you ever gotten a new phone number or moved to a new address, but right after you tell people the old (and wrong) phone number or address? When the new year starts, do you find you accidentally write the previous year? These are examples of **proactive interference**: when old information hinders the recall of newly learned information. **Retroactive interference** happens when information learned more recently hinders the recall of older information. For example, this week you are studying about Freud's Psychoanalytic Theory. Next week you study the humanistic perspective of Maslow and Rogers. Thereafter, you have trouble remembering Freud's Psychosexual Stages of Development because you can only remember Maslow's Hierarchy of Needs.

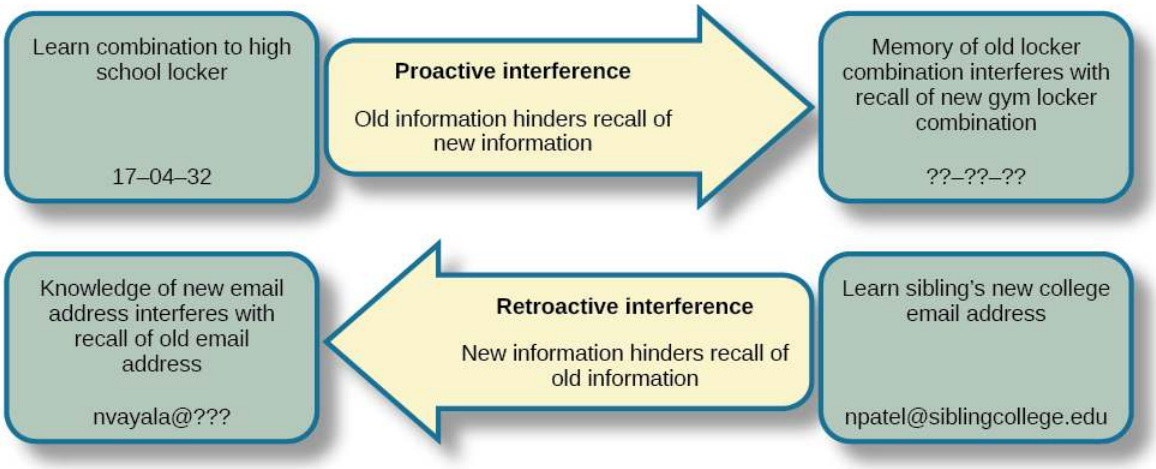


Figure 7.5.8: Sometimes forgetting is caused by a failure to retrieve information. This can be due to interference, either retroactive or proactive.

Summary

All of us at times have felt dismayed, frustrated, and even embarrassed when our memories have failed us. Our memory is flexible and prone to many errors, which is why eyewitness testimony has been found to be largely unreliable. There are several reasons why forgetting occurs. In cases of brain trauma or disease, forgetting may be due to amnesia. Another reason we forget is due to encoding failure. We can't remember something if we never stored it in our memory in the first place. Schacter presents seven memory errors that also contribute to forgetting. Sometimes, information is actually stored in our memory, but we cannot access it due to interference. Proactive interference happens when old information hinders the recall of newly learned information. Retroactive interference happens when information learned more recently hinders the recall of older information.

Glossary

absentmindedness
lapses in memory that are caused by breaks in attention or our focus being somewhere else

amnesia
loss of long-term memory that occurs as the result of disease, physical trauma, or psychological trauma

anterograde amnesia
loss of memory for events that occur after the brain trauma

bias
how feelings and view of the world distort memory of past events

blocking
memory error in which you cannot access stored information

construction
formulation of new memories

false memory syndrome
recall of false autobiographical memories

forgetting
loss of information from long-term memory

misattribution
memory error in which you confuse the source of your information

misinformation effect paradigm
after exposure to incorrect information, a person may misremember the original event

persistence
failure of the memory system that involves the involuntary recall of unwanted memories, particularly unpleasant ones

proactive interference
old information hinders the recall of newly learned information

reconstruction
process of bringing up old memories that might be distorted by new information

retroactive interference
information learned more recently hinders the recall of older information

retrograde amnesia

loss of memory for events that occurred prior to brain trauma

suggestibility
effects of misinformation from external sources that leads to the creation of false memories

transience
memory error in which unused memories fade with the passage of time

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7.6: Ways to Enhance Memory

Learning Objectives

- Recognize and apply memory-enhancing strategies
- Recognize and apply effective study techniques

Most of us suffer from memory failures of one kind or another, and most of us would like to improve our memories so that we don't forget where we put the car keys or, more importantly, the material we need to know for an exam. In this section, we'll look at some ways to help you remember better, and at some strategies for more effective studying.

Memory-Enhancing Strategies

What are some everyday ways we can improve our memory, including recall? To help make sure information goes from short-term memory to long-term memory, you can use **memory-enhancing strategies**. One strategy is **rehearsal**, or the conscious repetition of information to be remembered (Craik & Watkins, 1973). Think about how you learned your multiplication tables as a child. You may recall that $6 \times 6 = 36$, $6 \times 7 = 42$, and $6 \times 8 = 48$. Memorizing these facts is rehearsal.

Another strategy is **chunking**: you organize information into manageable bits or chunks (Bodie, Powers, & Fitch-Hauser, 2006). Chunking is useful when trying to remember information like dates and phone numbers. Instead of trying to remember 5205550467, you remember the number as $520 - 555 - 0467$. So, if you met an interesting person at a party and you wanted to remember his phone number, you would naturally chunk it, and you could repeat the number over and over, which is the rehearsal strategy.

You could also enhance memory by using **elaborative rehearsal**: a technique in which you think about the meaning of the new information and its relation to knowledge already stored in your memory (Tigner, 1999). For example, in this case, you could remember that 520 is an area code for Arizona and the person you met is from Arizona. This would help you better remember the 520 prefix. If the information is retained, it goes into long-term memory.

Mnemonic devices are memory aids that help us organize information for encoding (See figure 7.6.1). They are especially useful when we want to recall larger bits of information such as steps, stages, phases, and parts of a system (Bellezza, 1981). Brian needs to learn the order of the planets in the solar system, but he's having a hard time remembering the correct order. His friend Kelly suggests a mnemonic device that can help him remember. Kelly tells Brian to simply remember the name Mr. VEM J. SUN, and he can easily recall the correct order of the planets: **M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus, and **N**eptune. You might use a mnemonic device to help you remember someone's name, a mathematical formula, or the seven levels of Bloom's taxonomy.

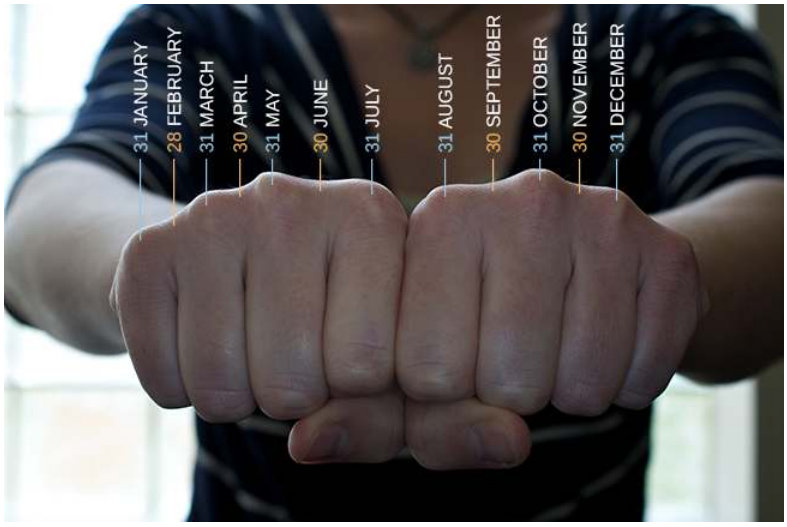


Figure 7.6.1: This is a knuckle mnemonic to help you remember the number of days in each month. Months with 31 days are represented by the protruding knuckles and shorter months fall in the spots between knuckles. (credit: modification of work by Cory Zanker)

If you have ever watched the television show *Modern Family*, you might have seen Phil Dunphy explain how he remembers names:

> *The other day I met this guy named Carl. Now, I might forget that name, but he was wearing a Grateful Dead t-shirt. What's a band like the Grateful Dead? Phish. Where do fish live? The ocean. What else lives in the ocean? Coral. Hello, Co-arl. (Wrubel & Spiller, 2010)*

It seems the more vivid or unusual the mnemonic, the easier it is to remember. The key to using any mnemonic successfully is to find a strategy that works for you.

Some other strategies that are used to improve memory include expressive writing and saying words aloud. Expressive writing helps boost your short-term memory, particularly if you write about a traumatic experience in your life. Masao Yogo and Shuji Fujihara (2008) had participants write for 20-minute intervals several times per month. The participants were instructed to write about a traumatic experience, their best possible future selves, or a trivial topic. The researchers found that this simple writing task increased short-term memory capacity after five weeks, but only for the participants who wrote about traumatic experiences. Psychologists can't explain why this writing task works, but it does.

What if you want to remember items you need to pick up at the store? Simply say them out loud to yourself. A series of studies (MacLeod, Gopie, Hourihan, Neary, & Ozubko, 2010) found that saying a word out loud improves your memory for the word because it increases the word's distinctiveness. Feel silly, saying random grocery items aloud? This technique works equally well if you just mouth the words. Using these techniques increased participants' memory for the words by more than 10%. These techniques can also be used to help you study.

How to Study Effectively

Based on the information presented in this chapter, here are some strategies and suggestions to help you hone your study techniques (See figure 7.6.2). The key with any of these strategies is to figure out what works best for you.



Figure 7.6.2: Memory techniques can be useful when studying for class. (credit: Barry Pousman)

- **Use elaborative rehearsal**: In a famous article, Craik and Lockhart (1972) discussed their belief that information we process more deeply goes into long-term memory. Their theory is called **levels of processing**. If we want to remember a piece of information, we should think about it more deeply and link it to other information and memories to make it more meaningful. For example, if we are trying to remember that the hippocampus is involved with memory processing, we might envision a hippopotamus with excellent memory and then we could better remember the hippocampus.
- **Apply the self-reference effect**: As you go through the process of elaborative rehearsal, it would be even more beneficial to make the material you are trying to memorize personally meaningful to you. In other words, make use of the self-reference effect. Write notes in your own words. Write definitions from the text, and then rewrite them in your own words. Relate the material to something you have already learned for another class, or think how you can apply the concepts to your own life. When you do this, you are building a web of retrieval cues that will help you access the material when you want to remember it.
- **Don't forget the forgetting curve**: As you know, the information you learn drops off rapidly with time. Even if you think you know the material, study it again right before test time to increase the likelihood the information will remain in your memory.

Overlearning can help prevent storage decay.

- **Rehearse, rehearse, rehearse**: Review the material over time, in spaced and organized study sessions. Organize and study your notes, and take practice quizzes/exams. Link the new information to other information you already know well.
- **Be aware of interference**: To reduce the likelihood of interference, study during a quiet time without interruptions or distractions (like television or music).
- **Keep moving**: Of course you already know that exercise is good for your body, but did you also know it's also good for your mind? Research suggests that regular aerobic exercise (anything that gets your heart rate elevated) is beneficial for memory (van Praag, 2008). Aerobic exercise promotes neurogenesis: the growth of new brain cells in the hippocampus, an area of the brain known to play a role in memory and learning.
- **Get enough sleep**: While you are sleeping, your brain is still at work. During sleep the brain organizes and consolidates information to be stored in long-term memory (Abel & Bäuml, 2013).
- **Make use of mnemonic devices**: As you learned earlier in this chapter, mnemonic devices often help us to remember and recall information. There are different types of mnemonic devices, such as the acronym. An acronym is a word formed by the first letter of each of the words you want to remember. For example, even if you live near one, you might have difficulty recalling the names of all five Great Lakes. What if I told you to think of the word Homes? HOMES is an acronym that represents Huron, Ontario, Michigan, Erie, and Superior: the five Great Lakes. Another type of mnemonic device is an acrostic: you make a phrase of all the first letters of the words. For example, if you are taking a math test and you are having difficulty remembering *the order of operations*, recalling the following sentence will help you: "Please Excuse My Dear Aunt Sally," because the order of mathematical operations is Parentheses, Exponents, Multiplication, Division, Addition, Subtraction. There also are jingles, which are rhyming tunes that contain key words related to the concept, such as *i before e, except after c*.

Summary

There are many ways to combat the inevitable failures of our memory system. Some common strategies that can be used in everyday situations include mnemonic devices, rehearsal, self-referencing, and adequate sleep. These same strategies also can help you to study more effectively.

Glossary

chunking
organizing information into manageable bits or chunks

elaborative rehearsal
thinking about the meaning of the new information and its relation to knowledge already stored in your memory

levels of processing
information that is thought of more deeply becomes more meaningful and thus better committed to memory

memory-enhancing strategy
technique to help make sure information goes from short-term memory to long-term memory

mnemonic device
memory aids that help organize information for encoding

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CHAPTER OVERVIEW

8: Thinking and Language

8.1: Cognition and Cognitive Biases
8.2: Communicating With Others- The Development and Use of Language

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8.1: Cognition and Cognitive Biases

Cognition can be defined as the process of acquiring and using knowledge. Although our cognition allows us to attend to, rehearse, and organize information, cognition may also lead to distortions and errors in our judgments and our behaviors. In this section we consider some of the *cognitive biases* that are known to influence humans. Cognitive biases are *errors in memory or judgment that are caused by the inappropriate use of cognitive processes* (Table **8.1.3**). The study of cognitive biases is important both because it relates to the important psychological theme of accuracy versus inaccuracy in perception, and because being aware of the types of errors that we may make can help us avoid them and therefore improve our decision-making skills.

Table **8.1.3**: Cognitive Processes That Pose Threats to Accuracy

Cognitive process	Description	Potential threat to accuracy
Confirmation bias	The tendency to verify and confirm our existing memories rather than to challenge and disconfirm them	Once beliefs become established, they become self-perpetuating and difficult to change.
Overconfidence	When we are more certain that our memories and judgments are accurate than we should be	Eyewitnesses may be very confident that they have accurately identified a suspect, even though their memories are incorrect.
Representativeness heuristic	Tendency to make judgments according to how well the event matches our expectations	After a coin has come up “heads” many times in a row, we may erroneously think that the next flip is more likely to be “tails” (the gambler’s fallacy).
Availability heuristic	Idea that things that come to mind easily are seen as more common	We may overestimate the crime statistics in our own area, because these crimes are so easy to recall.
Cognitive accessibility	Idea that some memories are more highly activated than others	We may think that we contributed more to a project than we really did because it is so easy to remember our own contributions.
Counterfactual thinking	When we “replay” events such that they turn out differently (especially when only minor changes in the events leading up to them make a difference)	We may feel particularly bad about events that might not have occurred if only a small change had occurred before them.

Schematic Processing: Distortions Based on Expectations

The term **schema** refers to a pattern of knowledge in long-term memory that helps us organize information. However, although schemas can improve our memories, they may also lead to cognitive biases. Using schemas may lead us to falsely remember things that never happened to us and to distort or misremember things that did. For one, schemas lead to the **confirmation bias**, which is *the tendency to verify and confirm our existing memories rather than to challenge and disconfirm them*. The confirmation bias occurs because once we have schemas, they influence how we seek out and interpret new information. The confirmation bias leads us to remember information that fits our schemas better than we remember information that disconfirms them (Stangor & McMillan, 1992), a process that makes our stereotypes very difficult to change. And we ask questions in ways that confirm our schemas (Trope & Thompson, 1997). If we think that a person is an extrovert, we might ask her about ways that she likes to have fun, thereby making it more likely that we will confirm our beliefs. In short, once we begin to believe in something—for instance, a stereotype about a group of people—it becomes very difficult to later convince us that these beliefs are not true; the beliefs become self-confirming.

Darley and Gross (1983) demonstrated how schemas about social class could influence memory. In their research they gave participants a picture and some information about a fourth-grade girl named Hannah. To activate a schema about her social class,

Hannah was pictured sitting in front of a nice suburban house for one-half of the participants and pictured in front of an impoverished house in an urban area for the other half. Then the participants watched a video that showed Hannah taking an intelligence test. As the test went on, Hannah got some of the questions right and some of them wrong, but the number of correct and incorrect answers was the same in both conditions. Then the participants were asked to remember how many questions Hannah got right and wrong. Demonstrating that stereotypes had influenced memory, the participants who thought that Hannah had come from an upper-class background remembered that she had gotten more correct answers than those who thought she was from a lower-class background.

Overconfidence

Research reveals a pervasive cognitive bias toward **overconfidence**, which is *the tendency for people to be too certain about their ability to accurately remember events and to make judgments*. David Dunning and his colleagues (Dunning, Griffin, Milojkovic, & Ross, 1990) asked college students to predict how another student would react in various situations. Some participants made predictions about a fellow student whom they had just met and interviewed, and others made predictions about their roommates whom they knew very well. In both cases, participants reported their confidence in each prediction, and accuracy was determined by the responses of the people themselves. The results were clear: Regardless of whether they judged a stranger or a roommate, the participants consistently overestimated the accuracy of their own predictions.

Eyewitnesses to crimes are also frequently overconfident in their memories, and there is only a small correlation between how accurate and how confident an eyewitness is. The witness who claims to be absolutely certain about his or her identification is not much more likely to be accurate than one who appears much less sure, making it almost impossible to determine whether a particular witness is accurate or not (Wells & Olson, 2003).

Heuristic Processing: Availability and Representativeness

Another way that our information processing may be biased occurs when we use heuristics, which are *information-processing strategies that are useful in many cases but may lead to errors when misapplied*. Let's consider two of the most frequently applied (and misapplied) heuristics: the *representativeness heuristic* and the *availability heuristic*.

In many cases we *base our judgments on information that seems to represent, or match, what we expect will happen, while ignoring other potentially more relevant statistical information*. When we do so, we are using the representativeness heuristic. Consider, for instance, the puzzle presented in Table **8.1.4**. Let's say that you went to a hospital, and you checked the records of the babies that were born today. Which pattern of births do you think you are most likely to find?

Table **8.1.4**: The Representativeness Heuristic

List A		List B	
6:31 a.m.	Girl	6:31 a.m.	Boy
8:15 a.m.	Girl	8:15 a.m.	Girl
9:42 a.m.	Girl	9:42 a.m.	Boy
1:13 p.m.	Girl	1:13 p.m.	Girl
3:39 p.m.	Boy	3:39 p.m.	Girl
5:12 p.m.	Boy	5:12 p.m.	Boy
7:42 p.m.	Boy	7:42 p.m.	Girl
11:44 p.m.	Boy	11:44 p.m.	Boy

Using the representativeness heuristic may lead us to incorrectly believe that some patterns of observed events are more likely to have occurred than others. In this case, list B seems more random, and thus is judged as more likely to have occurred, but statistically both lists are equally likely.

Most people think that list B is more likely, probably because list B looks more random, and thus matches (is "representative of") our ideas about randomness. But statisticians know that any pattern of four girls and four boys is mathematically equally likely. The problem is that we have a schema of what randomness should be like, which doesn't always match what is mathematically the case. Similarly, people who see a flipped coin come up "heads" five times in a row will frequently predict, and perhaps even wager money, that "tails" will be next. This behavior is known as the *gambler's fallacy*. But mathematically, the gambler's fallacy is an error: The likelihood of any single coin flip being "tails" is always 50%, regardless of how many times it has come up "heads" in the past.

Our judgments can also be influenced by how easy it is to retrieve a memory. *The tendency to make judgments of the frequency or likelihood that an event occurs on the basis of the ease with which it can be retrieved from memory* is known as the **availability heuristic** (MacLeod & Campbell, 1992; Tversky & Kahneman, 1973). Imagine, for instance, that I asked you to indicate whether there are more words in the English language that begin with the letter "R" or that have the letter "R" as the third letter. You would probably answer this question by trying to think of words that have each of the characteristics, thinking of all the words you know that begin with "R" and all that have "R" in the third position. Because it is much easier to retrieve words by their first letter than by their third, we may incorrectly guess that there are more words that begin with "R," even though there are in fact more words that have "R" as the third letter.

The availability heuristic may also operate on episodic memory. We may think that our friends are nice people, because we see and remember them primarily when they are around us (their friends, who they are, of course, nice to). And the traffic might seem worse in our own neighborhood than we think it is in other places, in part because nearby traffic jams are more easily retrieved than are traffic jams that occur somewhere else.

Cognitive Accessibility

People also vary in the schemas that they find important to use when judging others and when thinking about themselves. **Cognitive accessibility** refers to *the extent to which knowledge is activated in memory, and thus likely to be used in cognition and behavior*. For instance, you probably know a person who is a golf nut (or fanatic of another sport). All he can talk about is golf. For him, we would say that golf is a highly accessible construct. Because he loves golf, it is important to his self-concept, he sets many of his goals in terms of the sport, and he tends to think about things and people in terms of it ("if he plays golf, he must be a good person!"). Other people have highly accessible schemas about environmental issues, eating healthy food, or drinking really good coffee. When schemas are highly accessible, we are likely to use them to make judgments of ourselves and others, and this overuse may inappropriately color our judgments.

Counterfactual Thinking

In addition to influencing our judgments about ourselves and others, the ease with which we can retrieve potential experiences from memory can have an important effect on our own emotions. If we can easily imagine an outcome that is better than what actually happened, then we may experience sadness and disappointment; on the other hand, if we can easily imagine that a result might have been worse than what actually happened, we may be more likely to experience happiness and satisfaction. *The tendency to think about and experience events according to "what might have been"* is known as **counterfactual thinking** (Kahneman & Miller, 1986; Roese, 2005).

Imagine, for instance, that you were participating in an important contest, and you won the silver (second-place) medal. How would you feel? Certainly you would be happy that you won the silver medal, but wouldn't you also be thinking about what might have happened if you had been just a little bit better—you might have won the gold medal! On the other hand, how might you feel if you won the bronze (third-place) medal? If you were thinking about the *counterfactuals* (the "what might have beens") perhaps the idea of not getting any medal at all would have been highly accessible; you'd be happy that you got the medal that you did get, rather than coming in fourth.



Figure 8.1.21 : Counterfactual Thinking. Does the bronze medalist look happier to you than the silver medalist? Medvec, Madey, and Gilovich (1995) found that, on average, bronze medalists were happier. kinnigurl – Winter Olympic Men's Snowboard Cross medalists – CC BY-SA 2.0.

Tom Gilovich and his colleagues (Medvec, Madey, & Gilovich, 1995) investigated this idea by videotaping the responses of athletes who won medals in the 1992 Summer Olympic Games. They videotaped the athletes both as they learned that they had won a silver or a bronze medal and again as they were awarded the medal. Then the researchers showed these videos, without any sound, to raters who did not know which medal which athlete had won. The raters were asked to indicate how they thought the athlete was feeling, using a range of feelings from "agony" to "ecstasy." The results showed that the bronze medalists were, on average, rated as happier than were the silver medalists. In a follow-up study, raters watched interviews with many of these same athletes as they talked about their performance. The raters indicated what we would expect on the basis of counterfactual thinking—the silver medalists talked about their disappointments in having finished second rather than first, whereas the bronze medalists focused on how happy they were to have finished third rather than fourth.

You might have experienced counterfactual thinking in other situations. Once I was driving across country, and my car was having some engine trouble. I really wanted to make it home when I got near the end of my journey; I would have been extremely disappointed if the car broke down only a few miles from my home. Perhaps you have noticed that once you get close to finishing something, you feel like you really need to get it done. Counterfactual thinking has even been observed in juries. Jurors who were asked to award monetary damages to others who had been in an accident offered them substantially more in compensation if they barely avoided injury than they offered if the accident seemed inevitable (Miller, Turnbull, & McFarland, 1988).

Psychology in Everyday Life: Cognitive Biases in the Real World

Perhaps you are thinking that the kinds of errors that we have been talking about don't seem that important. After all, who really cares if we think there are more words that begin with the letter "R" than there actually are, or if bronze medal winners are happier than the silver medalists? These aren't big problems in the overall scheme of things. But it turns out that what seem to be relatively small cognitive biases on the surface can have profound consequences for people.

Why would so many people continue to purchase lottery tickets, buy risky investments in the stock market, or gamble their money in casinos when the likelihood of them ever winning is so low? One possibility is that they are victims of the availability heuristic; they focus their attention on the likelihood of a big win, forgetting that the chance of the event occurring is very low. The belief in astrology, which all scientific evidence suggests is not accurate, is probably driven in part by the availability of the occasions when the predictions are correct. When a horoscope comes true (which will, of course, happen sometimes), the correct prediction remains highly available in memory and may allow people to maintain the overall false belief.

People may also take more care to prepare for unlikely events than for more likely ones, because the unlikely ones are more available. For instance, people may think that they are more likely to die from a terrorist attack or a homicide than they are from diabetes, stroke, or tuberculosis. But the odds are much greater of dying from the latter than the former. And people are frequently more afraid of flying than driving, although the likelihood of dying in a car crash is hundreds of times greater than dying in a plane crash (more than 50,000 people are killed on U.S. highways every year). Because people don't accurately calibrate their behaviors to match the true potential risks (e.g., they drink and drive or don't wear their seatbelts), the individual and societal level costs are often quite large (Slovic, 2000).

Accessibility also colors how we perceive our social worlds, which may have a big influence on our behavior. For instance, people who watch a lot of violent television shows also view the world as more dangerous (Doob & Macdonald, 1979), probably because violence becomes more cognitively accessible for them. We also unfairly overestimate our contribution to joint projects (Ross & Sicoly, 1979), perhaps in part because our own contributions are highly accessible, whereas the contributions of others are much less so.

Even people who should know better, and who *need* to know better, are subject to cognitive biases. Economists, stock traders, managers, lawyers, and even doctors make the same kinds of mistakes in their professional activities that people make in their everyday lives (Gilovich, Griffin, & Kahneman, 2002). Just like us, these people are victims of overconfidence, heuristics, and other biases.

Although cognitive biases are common, they are not impossible to control, and psychologists and other scientists are working to help people make better decisions. One possibility is to provide people with better feedback about their judgments. Weather forecasters, for instance, learn to be quite accurate in their judgments because they have clear feedback about the accuracy of their predictions. Other research has found that accessibility biases can be reduced by leading people to consider multiple alternatives rather than focus only on the most obvious ones, and particularly by leading people to think about opposite possible outcomes than the ones they are expecting (Lilienfeld, Ammirtai, & Landfield, 2009).

References

Brown, D., Scheflin, A. W., & Hammond, D. C. (1998). *Memory, trauma treatment, and the law*. New York, NY: Norton.

Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition, 5*, 73–98.

Ceci, S. J., Huffman, M. L. C., Smith, E., & Loftus, E. F. (1994). Repeatedly thinking about a non-event: Source misattributions among preschoolers. *Consciousness and Cognition: An International Journal*, *3*(3–4), 388–407.

Darley, J. M., & Gross, P. H. (1983). A hypothesis-confirming bias in labeling effects. *Journal of Personality and Social Psychology, 44*, 20–33.

Doob, A. N., & Macdonald, G. E. (1979). Television viewing and fear of victimization: Is the relationship causal? *Journal of Personality and Social Psychology, 37*(2), 170–179.

Duncker, K. (1945). On problem-solving. *Psychological Monographs*, *58*, 5.

Dunning, D., Griffin, D. W., Milojkovic, J. D., & Ross, L. (1990). The overconfidence effect in social prediction. *Journal of Personality and Social Psychology, 58*(4), 568–581.

Erdmann, K., Volbert, R., & Böhm, C. (2004). Children report suggested events even when interviewed in a non-suggestive manner: What are its implications for credibility assessment? *Applied Cognitive Psychology, 18*(5), 589–611.

Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. New York, NY: Cambridge University Press.

Jacoby, L. L., & Rhodes, M. G. (2006). False remembering in the aged. *Current Directions in Psy*

chological Science, 15(2), 49–53.

Kahneman, D., & Miller, D. T. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review, 93*, 136–153.

Lilienfeld, S. O., Ammirati, R., & Landfield, K. (2009). Giving debiasing away: Can psychological research on correcting cognitive errors promote human welfare? *Perspectives on Psychological Science*, *4*(4), 390–398.

Loftus, E. F. (1979). The malleability of human memory. *American Scientist*, *67*(3), 312–320.

Loftus, E. F., & Ketcham, K. (1994). *The myth of repressed memory: False memories and allegations of sexual abuse* (1st ed.). New York, NY: St. Martin's Press.

Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning & Verbal Behavior*, *13*(5), 585–589.

Loftus, E. F., & Pickrell, J. E. (1995). The formation of false memories. *Psychiatric Annals*, *25*(12), 720–725.

Loftus, E. F., Loftus, G. R., & Messo, J. (1987). Some facts about "weapon focus." *Law and Human Behavior*, *11*(1), 55–62.

MacLeod, C., & Campbell, L. (1992). Memory accessibility and probability judgments: An experimental evaluation of the availability heuristic. *Journal of Personality and Social Psychology*, *63*(6), 890–902.

Mazzoni, G. A. L., Loftus, E. F., & Kirsch, I. (2001). Changing beliefs about implausible autobiographical events: A little plausibility goes a long way. *Journal of Experimental Psychology: Applied*, *7*(1), 51–59.

McArthur, L. Z., & Post, D. L. (1977). Figural emphasis and person perception. *Journal of Experimental Social Psychology*, *13*(6), 520–535.

McNally, R. J., Bryant, R. A., & Ehlers, A. (2003). Does early psychological intervention promote recovery from posttraumatic stress? *Psychological Science in the Public Interest*, *4*(2), 45–79.

Medvec, V. H., Madey, S. F., & Gilovich, T. (1995). When less is more: Counterfactual thinking and satisfaction among Olympic medalists. *Journal of Personality & Social Psychology*, *69*(4), 603–610.

Miller, D. T., Turnbull, W., & McFarland, C. (1988). Particularistic and universalistic evaluation in the social comparison process. *Journal of Personality and Social Psychology*, *55*, 908–917.

Pope, H. G., Jr., Poliakoff, M. B., Parker, M. P., Boynes, M., & Hudson, J. I. (2007). Is dissociative amnesia a culture-bound syndrome? Findings from a survey of historical literature. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences*, *37*(2), 225–233.

Pratkanis, A. R., Greenwald, A. G., Leippe, M. R., & Baumgardner, M. H. (1988). In search of reliable persuasion effects: III. The sleeper effect is dead: Long live the sleeper effect. *Journal of Personality and Social Psychology*, *54*(2), 203–218.

Rassin, E., Merckelbach, H., & Spaan, V. (2001). When dreams become a royal road to confusion: Realistic dreams, dissociation, and fantasy proneness. *Journal of Nervous and Mental Disease*, *189*(7), 478–481.

Roese, N. (2005). *If only: How to turn regret into opportunity*. New York, NY: Broadway Books.

Ross, M., & Sicoly, F. (1979). Egocentric biases in availability and attribution. *Journal of Personality and Social Psychology*, *37*(3), 322–336.

Schmolck, H., Buffalo, E. A., & Squire, L. R. (2000). Memory distortions develop over time: Recollections of the O. J. Simpson trial verdict after 15 and 32 months. *Psychological Science*, *11*(1), 39–45.

Slovic, P. (Ed.). (2000). *The perception of risk*. London, England: Earthscan Publications.

Stangor, C., & McMillan, D. (1992). Memory for expectancy-congruent and expectancy-incongruent information: A review of the social and social developmental literatures. *Psychological Bulletin*, *111*(1), 42–61.

Steblay, N., Dysart, J., Fulero, S., & Lindsay, R. C. L. (2001). Eyewitness accuracy rates in sequential and simultaneous lineup presentations: A meta-analytic comparison. *Law and Human Behavior*, *25*(5), 459–473.

Talarico, J. M., & Rubin, D. C. (2003). Confidence, not consistency, characterizes flashbulb memories. *Psychological Science*, *14*(5), 455–461.

Taylor, S. E., & Fiske, S. T. (1978). Salience, attention and attribution: Top of the head phenomena. *Advances in Experimental Social Psychology*, *11*, 249–288.

Trope, Y., & Thompson, E. (1997). Looking for truth in all the wrong places? Asymmetric search of individuating information about stereotyped group members. *Journal of Personality and Social Psychology, 73*, 229–241.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5*, 207–232.

Wason, P. (1960). On the failure to eliminate hypotheses in a conceptual task. *The Quarterly Journal of Experimental Psychology, 12*(3), 129–140.

Wells, G. L., & Olson, E. A. (2003). Eyewitness testimony. *Annual Review of Psychology*, 277–295.

Wells, G. L., Memon, A., & Penrod, S. D. (2006). Eyewitness evidence: Improving its probative value. *Psychological Science in the Public Interest, 7*(2), 45–75.

Wells, G. L., Wright, E. F., & Bradfield, A. L. (1999). Witnesses to crime: Social and cognitive factors governing the validity of people's reports. In R. Roesch, S. D. Hart, & J. R. P. Ogloff (Eds.), *Psychology and law: The state of the discipline* (pp. 53–87). Dordrecht, Netherlands: Kluwer Academic Publishers.

Winograd, E., Peluso, J. P., & Glover, T. A. (1998). Individual differences in susceptibility to memory illusions. *Applied Cognitive Psychology, 12*(Spec. Issue), S5–S27.

Zaragoza, M. S., Belli, R. F., & Payment, K. E. (2007). Misinformation effects and the suggestibility of eyewitness memory. In M. Garry & H. Hayne (Eds.), *Do justice and let the sky fall: Elizabeth Loftus and her contributions to science, law, and academic freedom* (pp. 35–63). Mahwah, NJ: Lawrence Erlbaum Associates.

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8.2: Communicating With Others- The Development and Use of Language

Learning Objectives

1. Review the components and structure of language.
2. Explain the biological underpinnings of language.
3. Outline the theories of language development.

Human language is the most complex behavior on the planet and, at least as far as we know, in the universe. Language involves both the ability to comprehend spoken and written words and to create communication in real time when we speak or write. Most languages are oral, generated through speaking. Speaking involves a variety of complex cognitive, social, and biological processes including operation of the vocal cords, and the coordination of breath with movements of the throat and mouth, and tongue. Other languages are sign languages, in which the communication is expressed by movements of the hands. The most common sign language is American Sign Language (ASL), currently spoken by more than 500,000 people in the United States alone.

Although language is often used for the transmission of information ("turn right at the next light and then go straight," "Place tab A into slot B"), this is only its most mundane function. Language also allows us to access existing knowledge, to draw conclusions, to set and accomplish goals, and to understand and communicate complex social relationships. Language is fundamental to our ability to think, and without it we would be nowhere near as intelligent as we are.

Language can be conceptualized in terms of sounds, meaning, and the environmental factors that help us understand it. *Phonemes* are the elementary sounds of our language, *morphemes* are the smallest units of meaning in a language, *syntax* is the set of grammatical rules that control how words are put together, and *contextual information* is the elements of communication that are not part of the content of language but that help us understand its meaning.

The Components of Language

A phoneme is *the smallest unit of sound that makes a meaningful difference in a language*. The word "bit" has three phonemes, /b/, /i/, and /t/ (in transcription, phonemes are placed between slashes), and the word "pit" also has three: /p/, /i/, and /t/. In spoken languages, phonemes are produced by the positions and movements of the vocal tract, including our lips, teeth, tongue, vocal cords, and throat, whereas in sign languages phonemes are defined by the shapes and movement of the hands.

There are hundreds of unique phonemes that can be made by human speakers, but most languages only use a small subset of the possibilities. English contains about 45 phonemes, whereas other languages have as few as 15 and others more than 60. The Hawaiian language contains only about a dozen phonemes, including 5 vowels (a, e, i, o, and u) and 7 consonants (h, k, l, m, n, p, and w).

In addition to using a different set of phonemes, because the phoneme is actually a category of sounds that are treated alike within the language, speakers of different languages are able to hear the difference only between some phonemes but not others. This is known as the *categorical perception of speech sounds*. English speakers can differentiate the /r/ phoneme from the /l/ phoneme, and thus "rake" and "lake" are heard as different words. In Japanese, however, /r/ and /l/ are the same phoneme, and thus speakers of that language cannot tell the difference between the word "rake" and the word "lake." Try saying the words "cool" and "keep" out loud. Can you hear the difference between the two /k/ sounds? To English speakers they both sound the same, but to speakers of Arabic these represent two different phonemes.

Infants are born able to understand all phonemes, but they lose their ability to do so as they get older; by 10 months of age a child's ability to recognize phonemes becomes very similar to that of the adult speakers of the native language. Phonemes that were initially differentiated come to be treated as equivalent (Werker & Tees, 2002).

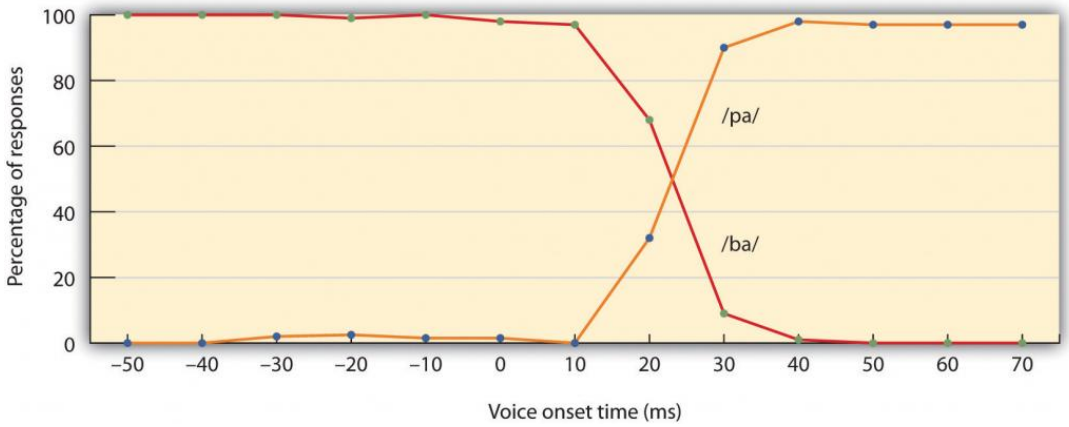


Figure 8.2.11 : When adults hear speech sounds that gradually change from one phoneme to another, they do not hear the continuous change; rather, they hear one sound until they suddenly begin hearing the other. In this case, the change is from /ba/ to /pa/. Adapted from Wood, C. C. (1976). Discriminability, response bias, and phoneme categories in discrimination of voice onset time. *Journal of the Acoustical Society of America, 60* (6), 1381–1389.

Whereas phonemes are the smallest units of sound in language, a morpheme is *a string of one or more phonemes that makes up the smallest units of meaning in a language*. Some morphemes, such as one-letter words like “I” and “a,” are also phonemes, but most morphemes are made up of combinations of phonemes. Some morphemes are prefixes and suffixes used to modify other words. For example, the syllable “re-” as in “rewrite” or “repay” means “to do again,” and the suffix “-est” as in “happiest” or “coolest” means “to the maximum.”

Syntax is *the set of rules of a language by which we construct sentences*. Each language has a different syntax. The syntax of the English language requires that each sentence have a noun and a verb, each of which may be modified by adjectives and adverbs. Some syntaxes make use of the order in which words appear, while others do not. In English, “The man bites the dog” is different from “The dog bites the man.” In German, however, only the article endings before the noun matter. “Der Hund beisst den Mann” means “The dog bites the man” but so does “Den Mann beisst der Hund.”

Words do not possess fixed meanings but change their interpretation as a function of the context in which they are spoken. We use contextual information—*the information surrounding language*—to help us interpret it. Examples of contextual information include the knowledge that we have and that we know that other people have, and nonverbal expressions such as facial expressions, postures, gestures, and tone of voice. Misunderstandings can easily arise if people aren’t attentive to contextual information or if some of it is missing, such as it may be in newspaper headlines or in text messages.

Examples in Which Syntax Is Correct but the Interpretation Can Be Ambiguous

- Grandmother of Eight Makes Hole in One
- Milk Drinkers Turn to Powder
- Farmer Bill Dies in House
- Old School Pillars Are Replaced by Alumni
- Two Convicts Evade Noose, Jury Hung
- Include Your Children When Baking Cookies

The Biology and Development of Language

Anyone who has tried to master a second language as an adult knows the difficulty of language learning. And yet children learn languages easily and naturally. Children who are not exposed to language early in their lives will likely never learn one. Case studies, including Victor the “Wild Child,” who was abandoned as a baby in France and not discovered until he was 12, and Genie, a child whose parents kept her locked in a closet from 18 months until 13 years of age, are (fortunately) two of the only known examples of these deprived children. Both of these children made some progress in socialization after they were rescued, but

neither of them ever developed language (Rymer, 1993). This is also why it is important to determine quickly if a child is deaf and to begin immediately to communicate in sign language. Deaf children who are not exposed to sign language during their early years will likely never learn it (Mayberry, Lock, & Kazmi, 2002).

Research Focus: When Can We Best Learn Language? Testing the Critical Period Hypothesis

For many years psychologists assumed that there was a critical period (*a time in which learning can easily occur*) for language learning, lasting between infancy and puberty, and after which language learning was more difficult or impossible (Lenneberg, 1967; Penfield & Roberts, 1959). But more recent research has provided a different interpretation.

An important study by Jacqueline Johnson and Elissa Newport (1989) using Chinese and Korean speakers who had learned English as a second language provided the first insight. The participants were all adults who had immigrated to the United States between 3 and 39 years of age and who were tested on their English skills by being asked to detect grammatical errors in sentences. Johnson and Newport found that the participants who had begun learning English before they were 7 years old learned it as well as native English speakers but that the ability to learn English dropped off gradually for the participants who had started later. Newport and Johnson also found a correlation between the age of acquisition and the variance in the ultimate learning of the language. While early learners were almost all successful in acquiring their language to a high degree of proficiency, later learners showed much greater individual variation.

Johnson and Newport's finding that children who immigrated before they were 7 years old learned English fluently seemed consistent with the idea of a "critical period" in language learning. But their finding of a gradual decrease in proficiency for those who immigrated between 8 and 39 years of age was not—rather, it suggested that there might not be a single critical period of language learning that ended at puberty, as early theorists had expected, but that language learning at later ages is simply better when it occurs earlier. This idea was reinforced in research by Hakuta, Bialystok, and Wiley (2003), who examined U.S. census records of language learning in millions of Chinese and Spanish speakers living in the United States. The census form asks respondents to describe their own English ability using one of five categories: "not at all," "not well," "well," "very well," and "speak only English." The results of this research dealt another blow to the idea of the critical period, because it showed that regardless of what year was used as a cutoff point for the end of the critical period, there was no evidence for any discontinuity in language-learning potential. Rather, the results (Figure **8.2.12**) showed that the degree of success in second-language acquisition declined steadily throughout the respondent's life span. The difficulty of learning language as one gets older is probably due to the fact that, with age, the brain loses its plasticity—that is, *its ability to develop new neural connections*.

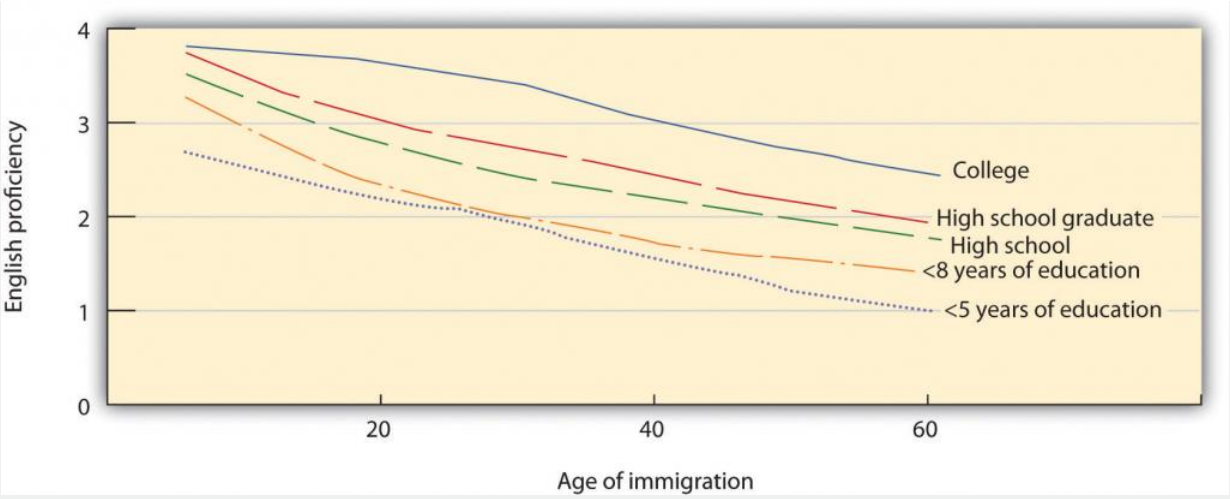


Figure **8.2.12**: English Proficiency in Native Chinese Speakers. Hakuta, Bialystok, and Wiley (2003) found no evidence for critical periods in language learning. Regardless of level of education, self-reported second-language skills decreased consistently across age of immigration. Adapted from Hakuta, K., Bialystok, E., & Wiley, E. (2003). Critical evidence: A test of the critical-period hypothesis for second-language acquisition. *Psychological Science, 14* (1), 31–38.

For the 90% of people who are right-handed, language is stored and controlled by the left cerebral cortex, although for some left-handers this pattern is reversed. These differences can easily be seen in the results of neuroimaging studies that show that listening to and producing language creates greater activity in the left hemisphere than in the right. Broca's area, *an area in front of the left hemisphere near the motor cortex*, is responsible for language production (Figure **8.2.13**). This area was first localized in the 1860s by the French physician Paul Broca, who studied patients with lesions to various parts of the brain. Wernicke's area, *an area of the brain next to the auditory cortex*, is responsible for language comprehension.

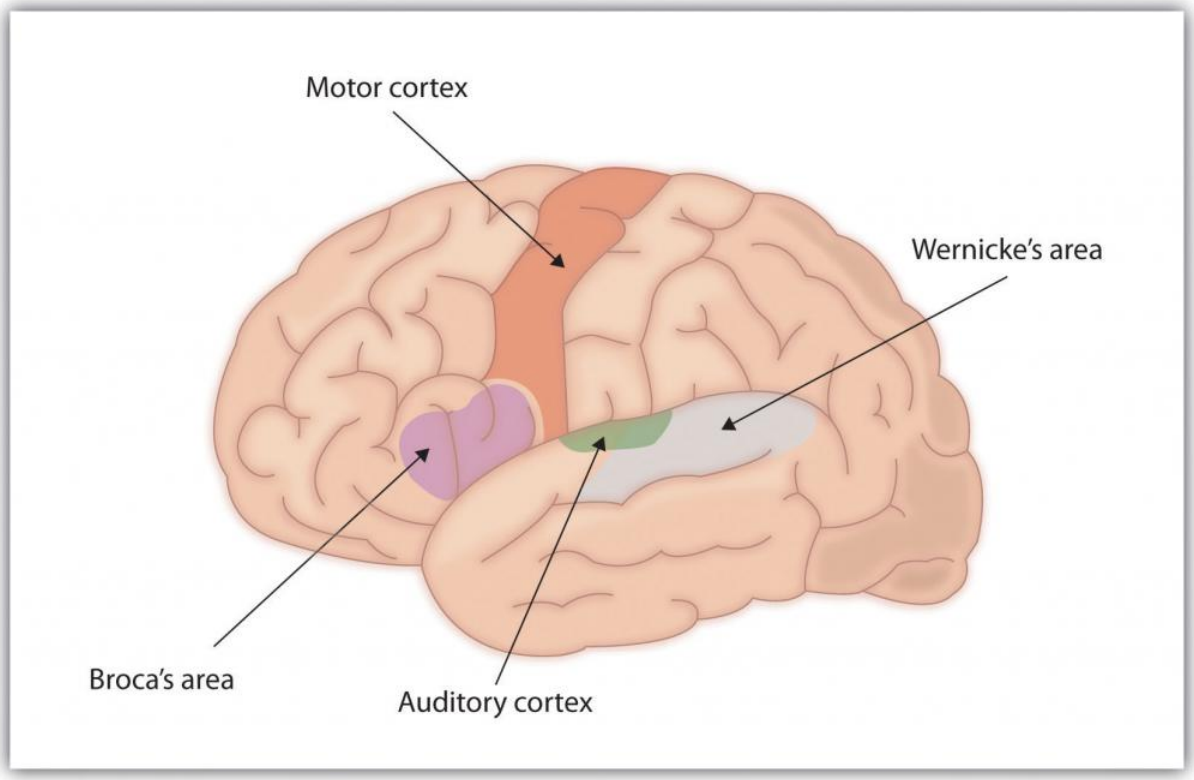


Figure
8.2.13
Drawing of Brain Showing Broca's and Wernicke's Areas. For most people the left hemisphere is specialized for language.
Broca's area
, near the motor cortex, is involved in language production, whereas
Wernicke's area
, near the auditory cortex, is specialized for language comprehension.

Evidence for the importance of Broca's and Wernicke's areas in language is seen in patients who experience aphasia, *a condition in which language functions are severely impaired*. People with Broca's aphasia have difficulty producing speech, whereas people with damage to Wernicke's area can produce speech, but what they say makes no sense and they have trouble understanding language.

Learning Language

Language learning begins even before birth, because the fetus can hear muffled versions of speaking from outside the womb. Moon, Cooper, and Fifer (1993) found that infants only two days old sucked harder on a pacifier when they heard their mothers' native language being spoken than when they heard a foreign language, even when strangers were speaking the languages. Babies are also aware of the patterns of their native language, showing surprise when they hear speech that has a different patterns of phonemes than those they are used to (Saffran, Aslin, & Newport, 2004).

During the first year or so after birth, and long before they speak their first words, infants are already learning language. One aspect of this learning is practice in producing speech. By the time they are 6 to 8 weeks old, babies start making vowel sounds ("ooohh," "aaahh," "goo") as well as a variety of cries and squeals to help them practice.

Beginning Stages of Language Development

1. Babbling and Understanding Words

At about 7 months, infants begin **babbling**, engaging in *intentional vocalizations that lack specific meaning*. Children babble as practice in creating specific sounds, and by the time they are 1 year old, the babbling uses primarily the sounds of the language that

they are learning (de Boysson-Bardies, Sagart, & Durand, 1984). These vocalizations have a conversational tone that sounds meaningful even though it isn't. Babbling also helps children understand the social, communicative function of language. Children who are exposed to sign language babble in sign by making hand movements that represent real language (Petitto & Marentette, 1991).



Figure 8.2.14 : Babies often engage in vocal exchanges to help them practice language. Jonathan Klinger – CC BY-SA 2.0.

At the same time that infants are practicing their speaking skills by babbling, they are also learning to better understand sounds and eventually the words of language. One of the first words that children understand is their own name, usually by about 6 months, followed by commonly used words like "bottle," "mama," and "doggie" by 10 to 12 months (Mandel, Jusczyk, & Pisoni, 1995).

2. One-Word Stage

Infants usually produce their first words at about 1 year of age. It is at this point that the child first understands that words are more than sounds—they refer to particular objects and ideas. Most children's first words are nouns, and early sentences may include only the noun. One-word phrases used by a child to indicate a whole sentence are known as **holophrases**. "Ma" may mean "more milk please" and "da" may mean "look, there's Fido."

3. Two-Word Stage

Eventually the length of the utterances increases to two words ("mo ma" or "da bark") at about 2 years of age. At the two-word stage, children use **telegraphic speech** (so named because like telegraphs of the old days, which charged people by the word to send long-distance messages) children will include only the most important words, usually a noun and a verb in their two-word sentences.

More Advanced Language Development

By the time children are 2 years old, they have a vocabulary of several hundred words, and by kindergarten their vocabularies have increased to several thousand words. By fifth grade most children know about 50,000 words and by the time they are in college, about 200,000.

The early utterances of children contain many errors, for instance, confusing /b/ and /d/, or /c/ and /z/. And the words that children create are often simplified, in part because they are not yet able to make the more complex sounds of the real language (Dobrich & Scarborough, 1992). Children may say "keekee" for kitty, "nana" for banana, and "vesketti" for spaghetti in part because it is easier. Often these early words are accompanied by gestures that may also be easier to produce than the words themselves. Children's pronunciations become increasingly accurate between 1 and 3 years, but some problems may persist until school age.

Most of a child's first words are nouns, and early sentences may include only the noun. "Ma" may mean "more milk please" and "da" may mean "look, there's Fido." Eventually the length of the utterances increases to two words ("mo ma" or "da bark"), and these primitive sentences begin to follow the appropriate syntax of the native language.

Because language involves the active categorization of sounds and words into higher level units, children make some mistakes in interpreting what words mean and how to use them. In particular, they often make **overextensions** of concepts, which means they use a given word in a broader context than appropriate. A child might at first call all adult men "daddy" or all animals "doggie."

Children also use contextual information, particularly the cues that parents provide, to help them learn language. Infants are frequently more attuned to the tone of voice of the person speaking than to the content of the words themselves, and are aware of the target of speech. Werker, Pegg, and McLeod (1994) found that infants listened longer to a woman who was speaking to a baby than to a woman who was speaking to another adult.

Children learn that people are usually referring to things that they are looking at when they are speaking (Baldwin, 1993), and that that the speaker's emotional expressions are related to the content of their speech. Children also use their knowledge of syntax to help them figure out what words mean. If a child hears an adult point to a strange object and say, "this is a dirb," they will infer that a "dirb" is a thing, but if they hear them say, "this is a one of those dirb things" they will infer that it refers to the color or other characteristic of the object. And if they hear the word "dirbing," they will infer that "dirbing" is something that we do (Waxman, 1990).

As children's language development advances, they begins to utter simple sentences and to acquire new vocabulary at a very rapid pace. In addition, children begin to demonstrate a clear understanding of the specific rules that apply to their language(s). Even the mistakes that children sometimes make provide evidence of just how much they understand about those rules. This is sometimes seen in the form of **overgeneralization**. In this context, overgeneralization refers to an extension of a language rule to an exception to the rule. For example, in English, it is usually the case that an "s" is added to the end of a word to indicate plurality. For example, we speak of one dog versus two dogs. Young children will overgeneralize this rule to cases that are exceptions to the "add an s to the end of the word" rule and say things like "those two gooses" or "three mouses." Clearly, the rules of the language are understood, even if the exceptions to the rules are still being learned (Moskowitz, 1978).

How Children Learn Language: Theories of Language Acquisition

Psychological theories of language learning differ in terms of the importance they place on nature versus nurture. Yet it is clear that both matter. Children are not born knowing language; they learn to speak by hearing what happens around them. On the other hand, human brains, unlike those of any other animal, are prewired in a way that leads them, almost effortlessly, to learn language.

Perhaps the most straightforward explanation of language development is that it occurs through principles of learning, including association, reinforcement, and the observation of others (Skinner, 1965). There must be at least some truth to the idea that language is learned, because children learn the language that they hear spoken around them rather than some other language. Also supporting this idea is the gradual improvement of language skills with time. It seems that children modify their language through imitation, reinforcement, and shaping, as would be predicted by learning theories.

But language cannot be entirely learned. For one, children learn words too fast for them to be learned through reinforcement. Between the ages of 18 months and 5 years, children learn up to 10 new words every day (Anglin, 1993). More importantly, language is more *generative* than it is imitative. Generativity refers to *the fact that speakers of a language can compose sentences to represent new ideas that they have never before been exposed to*. Language is not a predefined set of ideas and sentences that we choose when we need them, but rather a system of rules and procedures that allows us to create an infinite number of statements, thoughts, and ideas, including those that have never previously occurred. When a child says that she "swimmed" in the pool, for instance, she is showing generativity. No adult speaker of English would ever say "swimmed," yet it is easily generated from the normal system of producing language.

Other evidence that refutes the idea that all language is learned through experience comes from the observation that children may learn languages better than they ever hear them. Deaf children whose parents do not speak ASL very well nevertheless are able to learn it perfectly on their own, and may even make up their own language if they need to (Goldin-Meadow & Mylander, 1998). A group of deaf children in a school in Nicaragua, whose teachers could not sign, invented a way to communicate through made-up signs (Senghas, Senghas, & Pyers, 2005). The development of this new Nicaraguan Sign Language has continued and changed as new generations of students have come to the school and started using the language. Although the original system was not a real language, it is becoming closer and closer every year, showing the development of a new language in modern times.

The linguist Noam Chomsky is a believer in the nature approach to language, arguing that human brains contain a *language acquisition device* that includes a *universal grammar* that underlies all human language (Chomsky, 1965, 1972). According to this approach, each of the many languages spoken around the world (there are between 6,000 and 8,000) is an individual example of the

same underlying set of procedures that are hardwired into human brains. Chomsky's account proposes that children are born with a knowledge of general rules of syntax that determine how sentences are constructed.

Chomsky differentiates between the deep structure of an idea—*how the idea is represented in the fundamental universal grammar that is common to all languages*, and the surface structure of the idea—*how it is expressed in any one language*. Once we hear or express a thought in surface structure, we generally forget exactly how it happened. At the end of a lecture, you will remember a lot of the deep structure (i.e., the ideas expressed by the instructor), but you cannot reproduce the surface structure (the exact words that the instructor used to communicate the ideas).

Although there is general agreement among psychologists that babies are genetically programmed to learn language, there is still debate about Chomsky's idea that there is a universal grammar that can account for all language learning. Evans and Levinson (2009) surveyed the world's languages and found that none of the presumed underlying features of the language acquisition device were entirely universal. In their search they found languages that did not have noun or verb phrases, that did not have tenses (e.g., past, present, future), and even some that did not have nouns or verbs at all, even though a basic assumption of a universal grammar is that all languages should share these features.

Bilingualism and Cognitive Development

Although it is less common in the United States than in other countries, bilingualism (*the ability to speak two languages*) is becoming more and more frequent in the modern world. Nearly one-half of the world's population, including 18% of U.S. citizens, grows up bilingual.

In recent years many U.S. states have passed laws outlawing bilingual education in schools. These laws are in part based on the idea that students will have a stronger identity with the school, the culture, and the government if they speak only English, and in part based on the idea that speaking two languages may interfere with cognitive development.

Some early psychological research showed that, when compared with monolingual children, bilingual children performed more slowly when processing language, and their verbal scores were lower. But these tests were frequently given in English, even when this was not the child's first language, and the children tested were often of lower socioeconomic status than the monolingual children (Andrews, 1982).

More current research that has controlled for these factors has found that, although bilingual children may in some cases learn language somewhat slower than do monolingual children (Oller & Pearson, 2002), bilingual and monolingual children do not significantly differ in the final depth of language learning, nor do they generally confuse the two languages (Nicoladis & Genesee, 1997). In fact, participants who speak two languages have been found to have better cognitive functioning, cognitive flexibility, and analytic skills in comparison to monolinguals (Bialystok, 2009). Research (Figure **8.2.15**) has also found that learning a second language produces changes in the area of the brain in the left hemisphere that is involved in language, such that this area is denser and contains more neurons (Mechelli et al., 2004). Furthermore, the increased density is stronger in those individuals who are most proficient in their second language and who learned the second language earlier. Thus, rather than slowing language development, learning a second language seems to increase cognitive abilities.

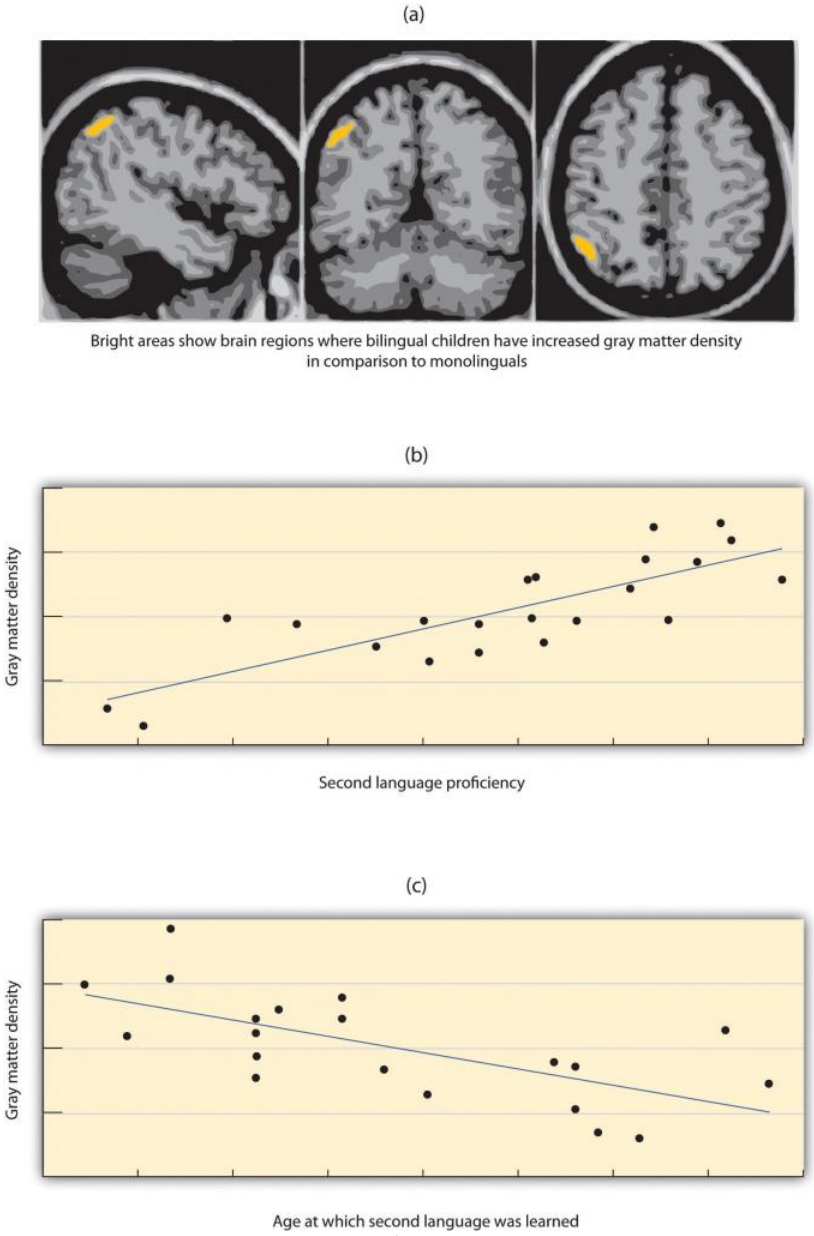


Figure 8.2.15 : Gray Matter in Bilinguals. Andrea Mechelli and her colleagues (2004) found that children who were bilingual had increased gray matter density (i.e., more neurons) in cortical areas related to language in comparison to monolinguals (panel a), that gray matter density correlated positively with second language proficiency (panel b) and that gray matter density correlated negatively with the age at which the second language was learned (panel c). Adapted from Mechelli, A., Crinion, J. T., Noppeney, U., O'Doherty, J., Ashburner, J., Frackowiak, R. S., & Price C. J. (2004). Structural plasticity in the bilingual brain: Proficiency in a second language and age at acquisition affect grey-matter density. *Nature, 431*, 757.

Can Animals Learn Language?

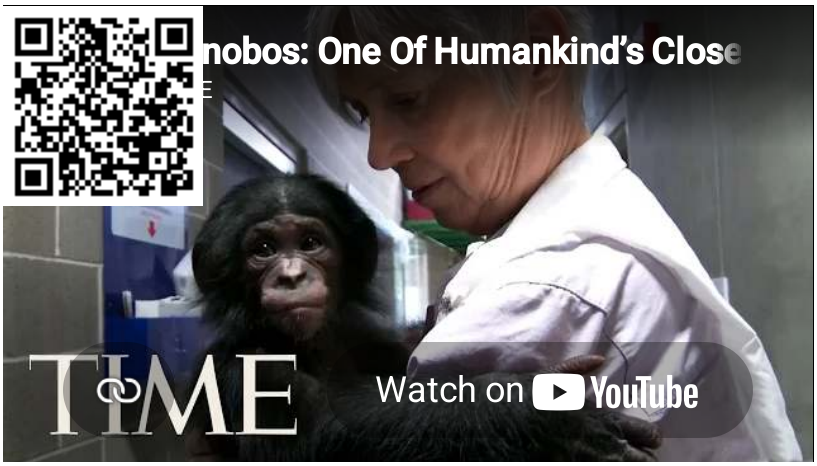
Nonhuman animals have a wide variety of systems of communication. Some species communicate using scents; others use visual displays, such as baring the teeth, puffing up the fur, or flapping the wings; and still others use vocal sounds. Male songbirds, such as canaries and finches, sing songs to attract mates and to protect territory, and chimpanzees use a combination of facial expressions, sounds, and actions, such as slapping the ground, to convey aggression (de Waal, 1989). Honeybees use a "waggle dance" to direct other bees to the location of food sources (von Frisch, 1956). The language of vervet monkeys is relatively

advanced in the sense that they use specific sounds to communicate specific meanings. Vervets make different calls to signify that they have seen either a leopard, a snake, or a hawk (Seyfarth & Cheney, 1997).

Despite their wide abilities to communicate, efforts to teach animals to use language have had only limited success. One of the early efforts was made by Catherine and Keith Hayes, who raised a chimpanzee named Viki in their home along with their own children. But Viki learned little and could never speak (Hayes & Hayes, 1952). Researchers speculated that Viki's difficulties might have been in part because the she could not create the words in her vocal cords, and so subsequent attempts were made to teach primates to speak using sign language or by using boards on which they can point to symbols.

Allen and Beatrix Gardner worked for many years to teach a chimpanzee named Washoe to sign using ASL. Washoe, who lived to be 42 years old, could label up to 250 different objects and make simple requests and comments, such as "please tickle" and "me sorry" (Fouts, 1997). Washoe's adopted daughter Loulis, who was never exposed to human signers, learned more than 70 signs simply by watching her mother sign.

The most proficient nonhuman language speaker is Kanzi, a bonobo who lives at the Language Learning Center at Georgia State University (Savage-Rumbaugh, & Lewin, 1994). As you can see in Note 9.44 "Video Clip: Language Recognition in Bonobos", Kanzi has a propensity for language that is in many ways similar to humans'. He learned faster when he was younger than when he got older, he learns by observation, and he can use symbols to comment on social interactions, rather than simply for food treats. Kanzi can also create elementary syntax and understand relatively complex commands. Kanzi can make tools and can even play Pac-Man.



Video Clip: Language Recognition in Bonobos. The bonobo Kanzi is the most proficient known nonhuman language speaker.
https://youtu.be/RkabybLQYPw

And yet even Kanzi does not have a true language in the same way that humans do. Human babies learn words faster and faster as they get older, but Kanzi does not. Each new word he learns is almost as difficult as the one before. Kanzi usually requires many trials to learn a new sign, whereas human babies can speak words after only one exposure. Kanzi's language is focused primarily on food and pleasure and only rarely on social relationships. Although he can combine words, he generates few new phrases and cannot master syntactic rules beyond the level of about a 2-year-old human child (Greenfield & Savage-Rumbaugh, 1991).

In sum, although many animals communicate, none of them have a true language. With some exceptions, the information that can be communicated in nonhuman species is limited primarily to displays of liking or disliking, and related to basic motivations of aggression and mating. Humans also use this more primitive type of communication, in the form of *nonverbal behaviors* such as eye contact, touch, hand signs, and interpersonal distance, to communicate their like or dislike for others, but they (unlike animals) also supplant this more primitive communication with language. Although other animal brains share similarities to ours, only the human brain is complex enough to create language. What is perhaps most remarkable is that although language never appears in nonhumans, language is universal in humans. All humans, unless they have a profound brain abnormality or are completely isolated from other humans, learn language.

Language and Perception

To this point in the chapter we have considered intelligence and language as if they are separate concepts. But what if language influences our thinking? *The idea that language and its structures influence and limit human thought* is called linguistic relativity.

The most frequently cited example of this possibility was proposed by Benjamin Whorf (1897–1941), an American linguist who was particularly interested in Native American languages. Whorf argued that the Inuit people of Canada (sometimes known as Eskimos) had many words for snow, whereas English speakers have only one, and that this difference influenced how the different cultures perceived snow. Whorf argued that the Inuit perceived and categorized snow in finer details than English speakers possibly could, because the English language constrained perception.

Although the idea of linguistic relativism seemed reasonable, research has suggested that language has less influence on thinking than might be expected. For one, in terms of perceptions of snow, although it is true that the Inuit do make more distinctions among types of snow than do English speakers, the latter also make some distinctions (think “powder,” “slush,” “whiteout,” and so forth). And it is also possible that thinking about snow may influence language, rather than the other way around.

In a more direct test of the possibility that language influences thinking, Eleanor Rosch (1973) compared people from the Dani culture of New Guinea, who have only two terms for color (“dark” and “bright”), with English speakers who use many more terms. Rosch hypothesized that if language constrains perception and categorization, then the Dani should have a harder time distinguishing colors than would English speakers. But her research found that when the Dani were asked to categorize colors using new categories, they did so in almost the same way that English speakers did. Similar results were found by Frank, Everett, Fedorenko, and Gibson (2008), who showed that the Amazonian tribe known as the Pirahã, who have no linguistic method for expressing exact quantities (not even the number “one”), were nevertheless able to perform matches with large numbers without problem.

Although these data led researchers to conclude that the language we use to describe color and number does not influence our underlying understanding of the underlying sensation, another more recent study has questioned this assumption. Roberson, Davies, and Davidoff (2000) conducted another study with Dani participants and found that, at least for some colors, the names that they used to describe colors did influence their perceptions of the colors. Other researchers continue to test the possibility that our language influences our perceptions, and perhaps even our thoughts (Levinson, 1998), and yet the evidence for this possibility is, as of now, mixed.

Key Takeaways

- Language involves both the ability to comprehend spoken and written words and to speak and write. Some languages are sign languages, in which the communication is expressed by movements of the hands.
- Phonemes are the elementary sounds of our language, morphemes are the smallest units of meaningful language, syntax is the grammatical rules that control how words are put together, and contextual information is the elements of communication that help us understand its meaning.
- Recent research suggests that there is not a single critical period of language learning, but that language learning is simply better when it occurs earlier.
- Broca’s area is responsible for language production. Wernicke’s area is responsible for language comprehension.
- Language learning begins even before birth. An infant usually produces his or her first words at about 1 year of age.
- One explanation of language development is that it occurs through principles of learning, including association, reinforcement, and the observation of others.
- Noam Chomsky argues that human brains contain a language acquisition module that includes a universal grammar that underlies all human language. Chomsky differentiates between the deep structure and the surface structure of an idea.
- Although other animals communicate and may be able to express ideas, only the human brain is complex enough to create real language.
- Our language may have some influence on our thinking, but it does not affect our underlying understanding of concepts.

Exercises and Critical Thinking

1. What languages do you speak? Did you ever try to learn a new one? What problems did you have when you did this? Would you consider trying to learn a new language?

2. Some animals, such as Kanzi, display at least some language. Do you think that this means that they are intelligent?

References

Andrews, I. (1982). Bilinguals out of focus: A critical discussion. *International Review of Applied Linguistics in Language Teaching*, *20*(4), 297–305.

Anglin, J. M. (1993). Vocabulary development: A morphological analysis. *Monographs of the Society for Research in Child Development*, *58*(10), v–165.

Baldwin, D. A. (1993). Early referential understanding: Infants' ability to recognize referential acts for what they are. *Developmental Psychology*, *29*(5), 832–843.

Bialystok, E. (2009). Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition*, *12*(1), 3–11.

Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: MIT Press; Chomsky, N. (1972). *Language and mind* (Extended ed.). New York, NY: Harcourt, Brace & Jovanovich.

de Boysson-Bardies, B., Sagart, L., & Durand, C. (1984). Discernible differences in the babbling of infants according to target language. *Journal of Child Language*, *11*(1), 1–15.

De Waal, F. (1989). *Peacemaking among primates*. Cambridge, MA: Harvard University Press.

Dobrich, W., & Scarborough, H. S. (1992). Phonological characteristics of words young children try to say. *Journal of Child Language*, *19*(3), 597–616.

Evans, N., & Levinson, S. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences*, *32*(5), 429–448.

Fouts, R. (1997). *Next of kin: What chimpanzees have taught me about who we are*. New York, NY: William Morrow.

Frank, M. C., Everett, D. L., Fedorenko, E., & Gibson, E. (2008). Number as a cognitive technology: Evidence from Pirahã language and cognition. *Cognition*, *108*(3), 819–824.

Goldin-Meadow, S., & Mylander, C. (1998). Spontaneous sign systems created by deaf children in two cultures. *Nature*, *391*(6664), 279–281.

Greenfield, P. M., & Savage-Rumbaugh, E. S. (1991). Imitation, grammatical development, and the invention of protogrammar by an ape. In N. A. Krasnegor, D. M. Rumbaugh, R. L. Schiefelbusch, & M. Studdert-Kennedy (Eds.), *Biological and behavioral determinants of language development* (pp. 235–258). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hakuta, K., Bialystok, E., & Wiley, E. (2003). Critical evidence: A test of the critical-period hypothesis for second-language acquisition. *Psychological Science*, *14*(1), 31–38.

Hayes, K. J., and Hayes, C. (1952). Imitation in a home-raised chimpanzee. *Journal of Comparative and Physiological Psychology*, *45*, 450–459.

Johnson, J. S., & Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology*, *21*(1), 60–99.

Lenneberg, E. (1967). *Biological foundations of language*. New York, NY: John Wiley & Sons;
Levinson, S. C. (1998). Studying spatial conceptualization across cultures: Anthropology and cognitive science. *Ethos*, *26*(1), 7–24.

Mandel, D. R., Jusczyk, P. W., & Pisoni, D. B. (1995). Infants' recognition of the sound patterns of their own names. *Psychological Science*, *6*(5), 314–317.

Mayberry, R. I., Lock, E., & Kazmi, H. (2002). Development: Linguistic ability and early language exposure. *Nature*, *417*(6884), 38.

Mechelli, A., Crinion, J. T., Noppeney, U., O'Doherty, J., Ashburner, J., Frackowiak, R. S., & Price C. J. (2004). Structural plasticity in the bilingual brain: Proficiency in a second language and age at acquisition affect grey-matter density. *Nature*, *431*, 757.

Moon, C., Cooper, R. P., & Fifer, W. P. (1993). Two-day-olds prefer their native language. *Infant Behavior & Development, 16*(4), 495–500.

Nicoladis, E., & Genesee, F. (1997). Language development in preschool bilingual children. *Journal of Speech-Language Pathology and Audiology, 21*(4), 258–270.

Oller, D. K., & Pearson, B. Z. (2002). Assessing the effects of bilingualism: A background. In D. K. Oller & R. E. Eilers (Eds.), *Language and literacy in bilingual children* (pp. 3–21). Tonawanda, NY: Multilingual Matters.

Penfield, W., & Roberts, L. (1959). *Speech and brain mechanisms*. Princeton, NJ: Princeton University Press.

Petitto, L. A., & Marentette, P. F. (1991). Babbling in the manual mode: Evidence for the ontogeny of language. *Science, 251*(5000), 1493–1496.

Roberson, D., Davies, I., & Davidoff, J. (2000). Color categories are not universal: Replications and new evidence from a stone-age culture. *Journal of Experimental Psychology: General, 129*(3), 369–398.

Rosch, E. H. (1973). Natural categories. *Cognitive Psychology, 4*(3), 328–350.

Rymer, R. (1993). *Genie: An abused child's flight from silence*. New York, NY: HarperCollins.

Saffran, J. R., Aslin, R. N., & Newport, E. L. (2004). *Statistical learning by 8-month-old infants*. New York, NY: Psychology Press.

Savage-Rumbaugh, S., & Lewin, R. (1994). *Kanzi: The ape at the brink of the human mind*. Hoboken, NJ: John Wiley & Sons.

Senghas, R. J., Senghas, A., & Pyers, J. E. (2005). The emergence of Nicaraguan Sign Language: Questions of development, acquisition, and evolution. In S. T. Parker, J. Langer, & C. Milbrath (Eds.), *Biology and knowledge revisited: From neurogenesis to psychogenesis* (pp. 287–306). Mahwah, NJ: Lawrence Erlbaum Associates.

Seyfarth, R. M., & Cheney, D. L. (1997). Behavioral mechanisms underlying vocal communication in nonhuman primates. *Animal Learning & Behavior, 25*(3), 249–267.

Skinner, B. F. (1965). *Science and human behavior.* New York, NY: Free Press.

Von Frisch, K. (1956). *Bees: Their vision, chemical senses, and language*. Ithaca, NY: Cornell University Press.

Waxman, S. R. (1990). Linguistic biases and the establishment of conceptual hierarchies: Evidence from preschool children. *Cognitive Development, 5*(2), 123–150.

Werker, J. F., & Tees, R. C. (2002). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. *Infant Behavior & Development, 25*(1), 121–133.

Werker, J. F., Pegg, J. E., & McLeod, P. J. (1994). A cross-language investigation of infant preference for infant-directed communication. *Infant Behavior & Development, 17*(3), 323–333.

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CHAPTER OVERVIEW

9: Intelligence

9.1: Defining and Measuring Intelligence
9.2: Extremes of Intelligence

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9.1: Defining and Measuring Intelligence

Learning Objectives

1. Define intelligence and list the different types of intelligences psychologists study.
2. Summarize the characteristics of a scientifically valid intelligence test.
3. Outline the biological and environmental determinants of intelligence.

Psychologists have long debated how to best conceptualize and measure intelligence (Sternberg, 2003). These questions include how many types of intelligence there are, the role of nature versus nurture in intelligence, how intelligence is represented in the brain, and the meaning of group differences in intelligence.

General (g) Versus Specific (s) Intelligences

In the early 1900s, the French psychologist Alfred Binet (1857–1914) and his colleague Henri Simon (1872–1961) began working in Paris to develop a measure that would differentiate students who were expected to be better learners from students who were expected to be slower learners. The goal was to help teachers better educate these two groups of students. Binet and Simon developed what most psychologists today regard as the first intelligence test, which consisted of a wide variety of questions that included the ability to name objects, define words, draw pictures, complete sentences, compare items, and construct sentences.

Binet and Simon (Binet, Simon, & Town, 1915; Siegler, 1992) believed that the questions they asked their students, even though they were on the surface dissimilar, all assessed the basic abilities to understand, reason, and make judgments. And it turned out that the correlations among these different types of measures were in fact all positive; students who got one item correct were more likely to also get other items correct, even though the questions themselves were very different.

On the basis of these results, the psychologist Charles Spearman (1863–1945) hypothesized that there must be a single underlying construct that all of these items measure. He called *the construct that the different abilities and skills measured on intelligence tests have in common* the general intelligence factor (g). Virtually all psychologists now believe that there is a generalized intelligence factor, g, that relates to abstract thinking and that includes the abilities to acquire knowledge, to reason abstractly, to adapt to novel situations, and to benefit from instruction and experience (Gottfredson, 1997; Sternberg, 2003). People with higher general intelligence learn faster.

Soon after Binet and Simon introduced their test, the American psychologist Lewis Terman (1877–1956) developed an American version of Binet's test that became known as the *Stanford-Binet Intelligence Test*. The Stanford-Binet is a measure of general intelligence made up of a wide variety of tasks including vocabulary, memory for pictures, naming of familiar objects, repeating sentences, and following commands.

Although there is general agreement among psychologists that g exists, there is also evidence for specific intelligence (s), *a measure of specific skills in narrow domains*. One empirical result in support of the idea of s comes from intelligence tests themselves. Although the different types of questions do correlate with each other, some items correlate more highly with each other than do other items; they form clusters or clumps of intelligences.

One distinction is between *fluid intelligence*, which refers to the capacity to learn new ways of solving problems and performing activities, and *crystallized intelligence*, which refers to the accumulated knowledge of the world we have acquired throughout our lives (Salthouse, 2004). These intelligences must be different because crystallized intelligence increases with age—older adults are as good as or better than young people in solving crossword puzzles—whereas fluid intelligence tends to decrease with age (Horn, Donaldson, & Engstrom, 1981; Salthouse, 2004).

Other researchers have proposed even more types of intelligences. L. L. Thurstone (1938) proposed that there were seven clusters of *primary mental abilities*, made up of word fluency, verbal comprehension, spatial ability, perceptual speed, numerical ability, inductive reasoning, and memory. But even these dimensions tend to be at least somewhat correlated, showing again the importance of g.

One advocate of the idea of multiple intelligences is the psychologist Robert Sternberg. Sternberg has proposed a triarchic (three-part) theory of intelligence that proposes that *people may display more or less analytical intelligence, creative intelligence, and*

practical intelligence. Sternberg (1985, 2003) argued that traditional intelligence tests assess analytical intelligence, the ability to answer problems with a single right answer, but that they do not well assess creativity (the ability to adapt to new situations and create new ideas) or practicality (e.g., the ability to write good memos or to effectively delegate responsibility).

As Sternberg proposed, research has found that creativity is not highly correlated with analytical intelligence (Furnham & Bachtiar, 2008), and exceptionally creative scientists, artists, mathematicians, and engineers do not score higher on intelligence than do their less creative peers (Simonton, 2000). Furthermore, the brain areas that are associated with *convergent thinking*, thinking that is directed toward finding the correct answer to a given problem, are different from those associated with *divergent thinking*, the ability to generate many different ideas for or solutions to a single problem (Tarasova, Volf, & Razoumnikova, 2010). On the other hand, being creative often takes some of the basic abilities measured by g, including the abilities to learn from experience, to remember information, and to think abstractly (Bink & Marsh, 2000).



Figure **9.1.2**: Test your divergent thinking. How many uses for a paper clip can you think of? Dead Hochman – paper clips – CC BY 2.0.

Studies of creative people suggest at least five components that are likely to be important for creativity:

1. *Expertise*. Creative people have carefully studied and know a lot about the topic that they are working in. Creativity comes with a lot of hard work (Ericsson, 1998; Weisberg, 2006).
2. *Imaginative thinking*. Creative people often view a problem in a visual way, allowing them to see it from a new and different point of view.
3. *Risk taking*. Creative people are willing to take on new but potentially risky approaches.
4. *Intrinsic interest*. Creative people tend to work on projects because they love doing them, not because they are paid for them. In fact, research has found that people who are paid to be creative are often less creative than those who are not (Hennessey & Amabile, 2010).
5. *Working in a creative environment*. Creativity is in part a social phenomenon. Simonton (1992) found that the most creative people were supported, aided, and challenged by other people working on similar projects.

The last aspect of the triarchic model, practical intelligence, refers primarily to intelligence that cannot be gained from books or formal learning. Practical intelligence represents a type of “street smarts” or “common sense” that is learned from life experiences. Although a number of tests have been devised to measure practical intelligence (Sternberg, Wagner, & Okagaki, 1993; Wagner & Sternberg, 1985), research has not found much evidence that practical intelligence is distinct from g or that it is predictive of success at any particular tasks (Gottfredson, 2003). Practical intelligence may include, at least in part, certain abilities that help people perform well at specific jobs, and these abilities may not always be highly correlated with general intelligence (Sternberg, Wagner, & Okagaki, 1993). On the other hand, these abilities or skills are very specific to particular occupations and thus do not seem to represent the broader idea of intelligence.

Another champion of the idea of multiple intelligences is the psychologist Howard Gardner (1983, 1999). Gardner argued that it would be evolutionarily functional for different people to have different talents and skills, and proposed that there are eight intelligences that can be differentiated from each other (Table **9.1.1**). Gardner noted that some evidence for multiple intelligences comes from the abilities of *autistic savants*, people who score low on intelligence tests overall but who nevertheless may have exceptional skills in a given domain, such as math, music, art, or in being able to recite statistics in a given sport (Treffert & Wallace, 2004).

Table **9.1.1** Howard Gardner’s Eight Specific Intelligences

Intelligence	Description
Linguistic	The ability to speak and write well
Logico-mathematical	The ability to use logic and mathematical skills to solve problems
Spatial	The ability to think and reason about objects in three dimensions
Musical	The ability to perform and enjoy music
Kinesthetic (body)	The ability to move the body in sports, dance, or other physical activities
Interpersonal	The ability to understand and interact effectively with others
Intrapersonal	The ability to have insight into the self
Naturalistic	The ability to recognize, identify, and understand animals, plants, and other living things

Source: Adapted from Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York, NY: Basic Books.



Figure **9.1.3**: Although intelligence is often conceptualized in a general way (as the g factor), there is a variety of specific skills that can be useful for particular tasks. Nayu Kim – Playing piano – CC BY 2.0; Helgi Halldórsson – Run faster, Jump higher – CC BY-SA 2.0; Thomas Hawk – Bahamian Clown – CC BY-NC 2.0; Sudipta Mallick – painter – CC BY 2.0; Blondinrikard Fröberg – Torsten, math teacher – CC BY 2.0.

The idea of multiple intelligences has been influential in the field of education, and teachers have used these ideas to try to teach differently to different students. For instance, to teach math problems to students who have particularly good kinesthetic intelligence, a teacher might encourage the students to move their bodies or hands according to the numbers. On the other hand, some have argued that these "intelligences" sometimes seem more like "abilities" or "talents" rather than real intelligence. And there is no clear conclusion about how many intelligences there are. Are sense of humor, artistic skills, dramatic skills, and so forth also separate intelligences? Furthermore, and again demonstrating the underlying power of a single intelligence, the many different intelligences are in fact correlated and thus represent, in part, g (Brody, 2003).

Measuring Intelligence: Standardization and the Intelligence Quotient

The goal of most intelligence tests is to measure g, the general intelligence factor. Good intelligence tests are **reliable**, meaning that they are consistent over time, and also demonstrate **construct validity**, meaning that they actually measure intelligence rather than something else. Because intelligence is such an important individual difference dimension, psychologists have invested substantial effort in creating and improving measures of intelligence, and these tests are now the most accurate of all psychological tests. In fact, the ability to accurately assess intelligence is one of the most important contributions of psychology to everyday public life.

Intelligence changes with age. A 3-year-old who could accurately multiply 183 by 39 would certainly be intelligent, but a 25-year-old who could not do so would be seen as unintelligent. Thus understanding intelligence requires that we know the norms or standards in a given population of people at a given age. The **standardization** of a test involves *giving it to a large number of people at different ages and computing the average score on the test at each age level*.

It is important that intelligence tests be standardized on a regular basis, because the overall level of intelligence in a population may change over time. The Flynn effect refers to the *observation that scores on intelligence tests worldwide have increased substantially over the past decades* (Flynn, 1999). Although the increase varies somewhat from country to country, the average increase is about 3 IQ points every 10 years. There are many explanations for the Flynn effect, including better nutrition, increased

access to information, and more familiarity with multiple-choice tests (Neisser, 1998). But whether people are actually getting smarter is debatable (Neisser, 1997).

Once the standardization has been accomplished, we have a picture of the average abilities of people at different ages and can calculate a person's mental age, which is *the age at which a person is performing intellectually*. If we compare the mental age of a person to the person's chronological age, the result is the intelligence quotient (IQ), *a measure of intelligence that is adjusted for age*. A simple way to calculate IQ is by using the following formula:

IQ = mental age ÷ chronological age × 100.

Thus a 10-year-old child who does as well as the average 10-year-old child has an IQ of 100 (10 ÷ 10 × 100), whereas an 8-year-old child who does as well as the average 10-year-old child would have an IQ of 125 (10 ÷ 8 × 100). Most modern intelligence tests are based the relative position of a person's score among people of the same age, rather than on the basis of this formula, but the idea of an intelligence "ratio" or "quotient" provides a good description of the score's meaning.

A number of scales are based on the IQ. The Wechsler Adult lntelligence Scale (WAIS) is *the most widely used intelligence test for adults* (Watkins, Campbell, Nieberding, & Hallmark, 1995). The current version of the WAIS, the WAIS-IV, was standardized on 2,200 people ranging from 16 to 90 years of age. It consists of 15 different tasks, each designed to assess intelligence, including working memory, arithmetic ability, spatial ability, and general knowledge about the world (Figure **9.1.4**). The WAIS-IV yields scores on four domains: verbal, perceptual, working memory, and processing speed. The reliability of the test is high (more than 0.95), and it shows substantial construct validity. The WAIS-IV is correlated highly with other IQ tests such as the Stanford-Binet, as well as with criteria of academic and life success, including college grades, measures of work performance, and occupational level. It also shows significant correlations with measures of everyday functioning among the mentally retarded.

The Wechsler scale has also been adapted for preschool children in the form of the *Wechsler Primary and Preschool Scale of Intelligence (WPPSI-III)* and for older children and adolescents in the form of the *Wechsler Intelligence Scale for Children (WISC-IV)*.

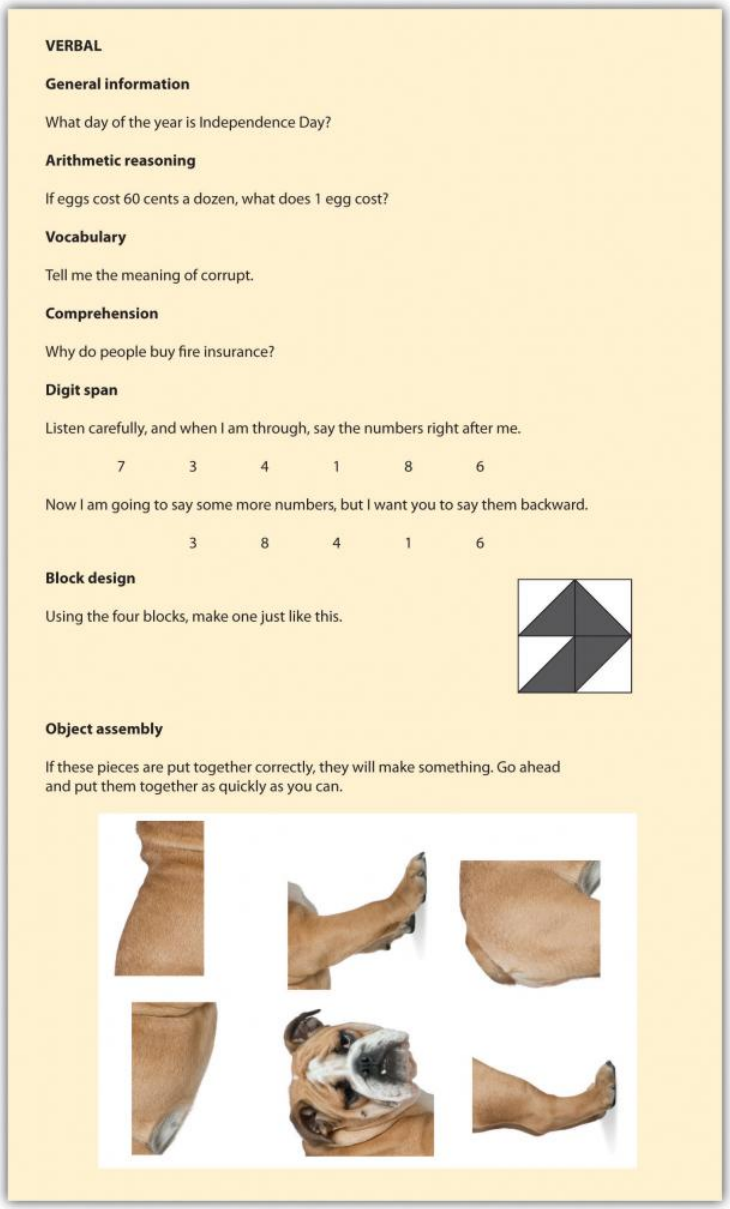


Figure **9.1.4** Sample Items From the Wechsler Adult Intelligence Scale (WAIS). Source: Adapted from Thorndike, R. L., & Hagen, E. P. (1997). Cognitive Abilities Test (Form 5): Research handbook. Chicago, IL: Riverside Publishing.

The intelligence tests that you may be most familiar with are *aptitude tests*, which are designed to measure one's ability to perform a given task, for instance, to do well in college or in postgraduate training. Most U.S. colleges and universities require students to take the Scholastic Assessment Test (SAT) or the American College Test (ACT), and postgraduate schools require the Graduate Record Examination (GRE), Medical College Admissions Test (MCAT), or the Law School Admission Test (LSAT). These tests are useful for selecting students because they predict success in the programs that they are designed for, particularly in the first year of the program (Kuncel, Hezlett, & Ones, 2010). These aptitude tests also measure, in part, intelligence. Frey and Detterman (2004) found that the SAT correlated highly (between about $r = .7$ and $r = .8$) with standard measures of intelligence.

Intelligence tests are also used by industrial and organizational psychologists in the process of *personnel selection*. Personnel selection is *the use of structured tests to select people who are likely to perform well at given jobs* (Schmidt & Hunter, 1998). The psychologists begin by conducting a *job analysis* in which they determine what knowledge, skills, abilities, and personal characteristics (*KSAPs*) are required for a given job. This is normally accomplished by surveying and/or interviewing current workers and their supervisors. Based on the results of the job analysis, the psychologists choose selection methods that are most

likely to be predictive of job performance. Measures include tests of cognitive and physical ability and job knowledge tests, as well as measures of IQ and personality.

The Biology of Intelligence

The brain processes underlying intelligence are not completely understood, but current research has focused on four potential factors: brain size, sensory ability, speed and efficience of neural transmission, and working memory capacity.

There is at least some truth to the idea that smarter people have bigger brains. Studies that have measured brain volume using neuroimaging techniques find that larger brain size is correlated with intelligence (McDaniel, 2005), and intelligence has also been found to be correlated with the number of neurons in the brain and with the thickness of the cortex (Haier, 2004; Shaw et al., 2006). It is important to remember that these correlational findings do not mean that having more brain volume causes higher intelligence. It is possible that growing up in a stimulating environment that rewards thinking and learning may lead to greater brain growth (Garlick, 2003), and it is also possible that a third variable, such as better nutrition, causes both brain volume and intelligence.

Another possibility is that the brains of more intelligent people operate faster or more efficiently than the brains of the less intelligent. Some evidence supporting this idea comes from data showing that people who are more intelligent frequently show less brain activity (suggesting that they need to use less capacity) than those with lower intelligence when they work on a task (Haier, Siegel, Tang, & Abel, 1992). And the brains of more intelligent people also seem to run faster than the brains of the less intelligent. Research has found that the speed with which people can perform simple tasks—such as determining which of two lines is longer or pressing, as quickly as possible, one of eight buttons that is lighted—is predictive of intelligence (Deary, Der, & Ford, 2001). Intelligence scores also correlate at about $r = .5$ with measures of working memory (Ackerman, Beier, & Boyle, 2005), and working memory is now used as a measure of intelligence on many tests.

Although intelligence is not located in a specific part of the brain, it is more prevalent in some brain areas than others. Duncan et al. (2000) administered a variety of intelligence tasks and observed the places in the cortex that were most active. Although different tests created different patterns of activation, as you can see in Figure **9.1.5**, these activated areas were primarily in the outer parts of the cortex, the area of the brain most involved in planning, executive control, and short-term memory.

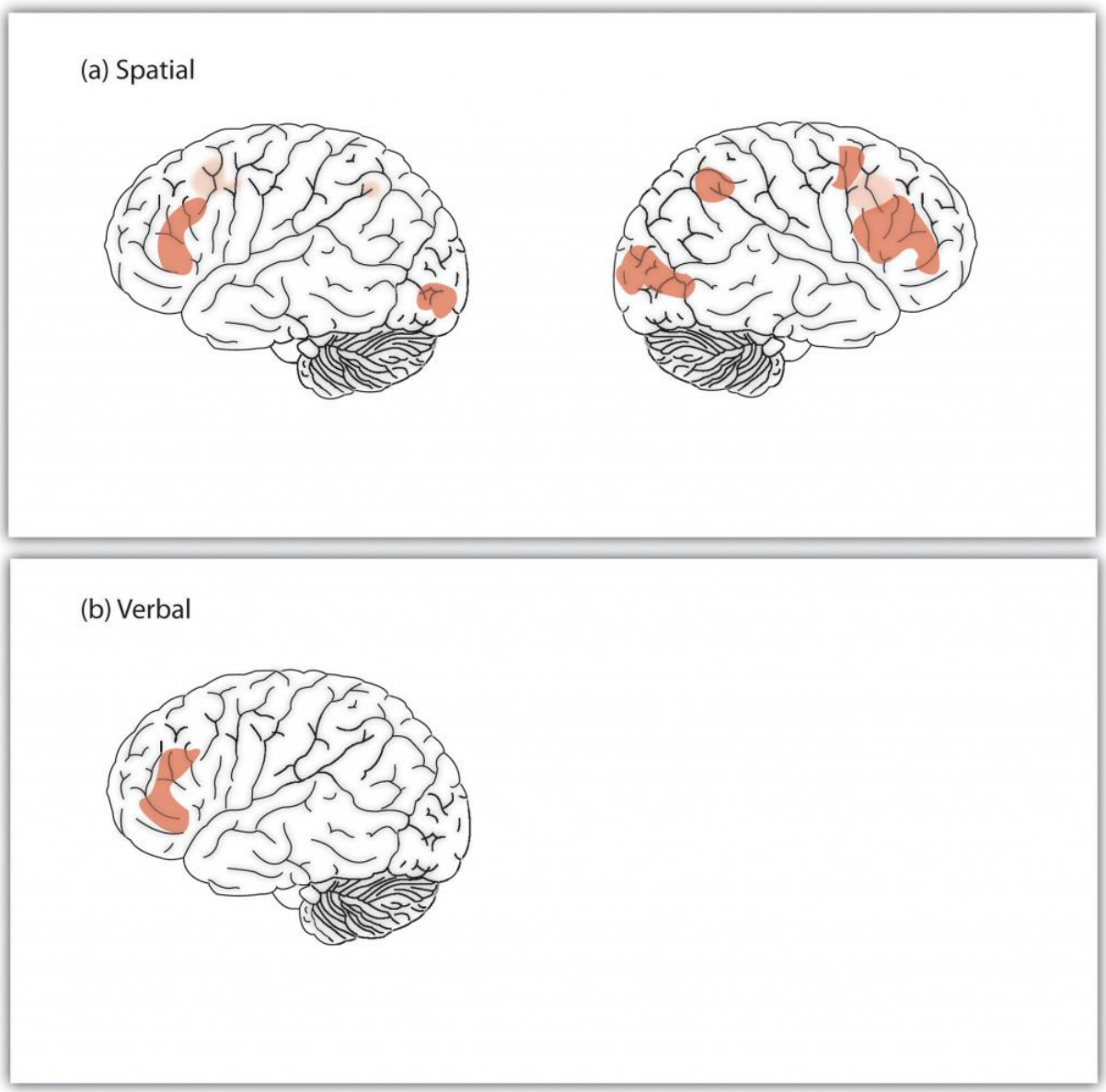


Figure **9.1.5**: Where Is Intelligence? fMRI studies have found that the areas of the brain most related to intelligence are in the outer parts of the cortex. Source: Adapted from Duncan, J., Seitz, R. J., Kolodny, J., Bor, D., Herzog, H., Ahmed, A.,…Emslie, H. (2000). A neural basis for general intelligence. Science, 289(5478), 457–460.

Is Intelligence Nature or Nurture?

Intelligence has both genetic and environmental causes, and these have been systematically studied through a large number of twin and adoption studies (Neisser et al., 1996; Plomin, DeFries, Craig, & McGuffin, 2003). These studies have found that between 40% and 80% of the variability in IQ is due to genetics, meaning that overall genetics plays a bigger role than does environment in creating IQ differences among individuals (Plomin & Spinath, 2004). The IQs of identical twins correlate very highly (r = .86), much higher than do the scores of fraternal twins who are less genetically similar (r = .60). And the correlations between the IQs of parents and their biological children (r = .42) is significantly greater than the correlation between parents and adopted children (r = .19). The role of genetics gets stronger as children get older. The intelligence of very young children (less than 3 years old) does not predict adult intelligence, but by age 7 it does, and IQ scores remain very stable in adulthood (Deary, Whiteman, Starr, Whalley, & Fox, 2004).

But there is also evidence for the role of nurture, indicating that individuals are not born with fixed, unchangeable levels of intelligence. Twins raised together in the same home have more similar IQs than do twins who are raised in different homes, and

fraternal twins have more similar IQs than do nontwin siblings, which is likely due to the fact that they are treated more similarly than are siblings.

The fact that intelligence becomes more stable as we get older provides evidence that early environmental experiences matter more than later ones. Environmental factors also explain a greater proportion of the variance in intelligence for children from lower-class households than they do for children from upper-class households (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003). This is because most upper-class households tend to provide a safe, nutritious, and supporting environment for children, whereas these factors are more variable in lower-class households.

Social and economic deprivation can adversely affect IQ. Children from households in poverty have lower IQs than do children from households with more resources even when other factors such as education, race, and parenting are controlled (Brooks-Gunn & Duncan, 1997). Poverty may lead to diets that are undernourishing or lacking in appropriate vitamins, and poor children may also be more likely to be exposed to toxins such as lead in drinking water, dust, or paint chips (Bellinger & Needleman, 2003). Both of these factors can slow brain development and reduce intelligence.

If impoverished environments can harm intelligence, we might wonder whether enriched environments can improve it. Government-funded after-school programs such as Head Start are designed to help children learn. Research has found that attending such programs may increase intelligence for a short time, but these increases rarely last after the programs end (McLoyd, 1998; Perkins & Grotzer, 1997). But other studies suggest that Head Start and similar programs may improve emotional intelligence and reduce the likelihood that children will drop out of school or be held back a grade (Reynolds, Temple, Robertson, & Mann 2001).

Intelligence is improved by education; the number of years a person has spent in school correlates at about $r = .6$ with IQ (Ceci, 1991). In part this correlation may be due to the fact that people with higher IQ scores enjoy taking classes more than people with low IQ scores, and they thus are more likely to stay in school. But education also has a causal effect on IQ. Comparisons between children who are almost exactly the same age but who just do or just do not make a deadline for entering school in a given school year show that those who enter school a year earlier have higher IQ than those who have to wait until the next year to begin school (Baltes & Reinert, 1969; Ceci & Williams, 1997). Children's IQs tend to drop significantly during summer vacations (Huttenlocher, Levine, & Vevea, 1998), a finding that suggests that a longer school year, as is used in Europe and East Asia, is beneficial.

It is important to remember that the relative roles of nature and nurture can never be completely separated. A child who has higher than average intelligence will be treated differently than a child who has lower than average intelligence, and these differences in behaviors will likely amplify initial differences. This means that modest genetic differences can be multiplied into big differences over time.

Psychology in Everyday Life: Emotional Intelligence

Although most psychologists have considered intelligence a cognitive ability, people also use their emotions to help them solve problems and relate effectively to others. Emotional intelligence refers to *the ability to accurately identify, assess, and understand emotions, as well as to effectively control one's own emotions* (Feldman-Barrett & Salovey, 2002; Mayer, Salovey, & Caruso, 2000).

The idea of emotional intelligence is seen in Howard Gardner's *interpersonal intelligence* (the capacity to understand the emotions, intentions, motivations, and desires of other people) and *intrapersonal intelligence* (the capacity to understand oneself, including one's emotions). Public interest in, and research on, emotional intellgence became widely prevalent following the publication of Daniel Goleman's best-selling book, *Emotional Intelligence: Why It Can Matter More Than IQ* (Goleman, 1998).

There are a variety of measures of emotional intelligence (Mayer, Salovey, & Caruso, 2008; Petrides & Furnham, 2000). One popular measure, the Mayer-Salovey-Caruso Emotional Intelligence Test (http://www.emotionaliq.org), includes items about the ability to understand, experience, and manage emotions, such as these:

- What mood(s) might be helpful to feel when meeting in-laws for the very first time?
- Tom felt anxious and became a bit stressed when he thought about all the work he needed to do. When his supervisor brought him an additional project, he felt ____ (fill in the blank).

- Contempt most closely combines which two emotions?
  1. anger and fear
  2. fear and surprise
  3. disgust and anger
  4. surprise and disgust
- Debbie just came back from vacation. She was feeling peaceful and content. How well would each of the following actions help her preserve her good mood?
  - Action 1: She started to make a list of things at home that she needed to do.
  - Action 2: She began thinking about where and when she would go on her next vacation.
  - Action 3: She decided it was best to ignore the feeling since it wouldn't last anyway.

One problem with emotional intelligence tests is that they often do not show a great deal of reliability or construct validity (Føllesdal & Hagtvet, 2009).Although it has been found that people with higher emotional intelligence are also healthier (Martins, Ramalho, & Morin, 2010), findings are mixed about whether emotional intelligence predicts life success—for instance, job performance (Harms & Credé, 2010). Furthermore, other researchers have questioned the construct validity of the measures, arguing that emotional intelligence really measures knowledge about what emotions are, but not necessarily how to use those emotions (Brody, 2004), and that emotional intelligence is actually a personality trait, a part of g, or a skill that can be applied in some specific work situations—for instance, academic and work situations (Landy, 2005).

Although measures of the ability to understand, experience, and manage emotions may not predict effective behaviors, another important aspect of emotional intelligence—*emotion regulation*—does. Emotion regulation refers to the ability to control and productively use one's emotions. Research has found that people who are better able to override their impulses to seek immediate gratification and who are less impulsive also have higher cognitive and social intelligence. They have better SAT scores, are rated by their friends as more socially adept, and cope with frustration and stress better than those with less skill at emotion regulation (Ayduk et al., 2000; Eigsti et al., 2006; Mischel & Ayduk, 2004).

Because emotional intelligence seems so important, many school systems have designed programs to teach it to their students. However, the effectiveness of these programs has not been rigorously tested, and we do not yet know whether emotional intelligence can be taught, or if learning it would improve the quality of people's lives (Mayer & Cobb, 2000).

Key Takeaways

- Intelligence is the ability to think, to learn from experience, to solve problems, and to adapt to new situations. Intelligence is important because it has an impact on many human behaviors.
- Psychologists believe that there is a construct that accounts for the overall differences in intelligence among people, known as general intelligence (g).
- There is also evidence for specific intelligences (s), measures of specific skills in narrow domains, including creativity and practical intelligence.
- The intelligence quotient (IQ) is a measure of intelligence that is adjusted for age. The Wechsler Adult lntelligence Scale (WAIS) is the most widely used IQ test for adults.
- Brain volume, speed of neural transmission, and working memory capacity are related to IQ.
- Between 40% and 80% of the variability in IQ is due to genetics, meaning that overall genetics plays a bigger role than does environment in creating IQ differences among individuals.
- Intelligence is improved by education and may be hindered by environmental factors such as poverty.
- Emotional intelligence refers to the ability to identify, assess, manage, and control one's emotions. People who are better able to regulate their behaviors and emotions are also more successful in their personal and social encounters.

Exercises and Critical Thinking

1. Consider your own IQ. Are you smarter than the average person? What specific intelligences do you think you excel in?
2. Did your parents try to improve your intelligence? Do you think their efforts were successful?
3. Consider the meaning of the Flynn effect. Do you think people are really getting smarter?

4. Give some examples of how emotional intelligence (or the lack of it) influences your everyday life and the lives of other people you know.

References

Ackerman, P. L., Beier, M. E., & Boyle, M. O. (2005). Working memory and intelligence: The same or different constructs? *Psychological Bulletin, 131*(1), 30–60.

Ayduk, O., Mendoza-Denton, R., Mischel, W., Downey, G., Peake, P. K., & Rodriguez, M. (2000). Regulating the interpersonal self: Strategic self-regulation for coping with rejection sensitivity. *Journal of Personality and Social Psychology, 79*(5), 776–792.

Baltes, P. B., & Reinert, G. (1969). Cohort effects in cognitive development of children as revealed by cross-sectional sequences. *Developmental Psychology, 1*(2), 169–177.

Bellinger, D. C., & Needleman, H. L. (2003). Intellectual impairment and blood lead levels [Letter to the editor]. *The New England Journal of Medicine, 349*(5), 500.

Binet, A., Simon, T., & Town, C. H. (1915). *A method of measuring the development of the intelligence of young children* (3rd ed.) Chicago, IL: Chicago Medical Book.

Bink, M. L., & Marsh, R. L. (2000). Cognitive regularities in creative activity. *Review of General Psychology, 4*(1), 59–78.

Brody, N. (2003). Construct validation of the Sternberg Triarchic abilities test: Comment and reanalysis. *Intelligence, 31*(4), 319–329.

Brody, N. (2004). What cognitive intelligence is and what emotional intelligence is not. *Psychological Inquiry, 15*, 234–238.

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children, 7*(2), 55–71.

Ceci, S. J. (1991). How much does schooling influence general intelligence and its cognitive components? A reassessment of the evidence. *Developmental Psychology, 27*(5), 703–722.

Ceci, S. J., & Williams, W. M. (1997). Schooling, intelligence, and income. *American Psychologist, 52*(10), 1051–1058.

Deary, I. J., Der, G., & Ford, G. (2001). Reaction times and intelligence differences: A population-based cohort study. *Intelligence, 29*(5), 389–399.

Deary, I. J., Whiteman, M. C., Starr, J. M., Whalley, L. J., & Fox, H. C. (2004). The impact of childhood intelligence on later life: Following up the Scottish mental surveys of 1932 and 1947. *Journal of Personality and Social Psychology, 86*(1), 130–147.

Duncan, J., Seitz, R. J., Kolodny, J., Bor, D., Herzog, H., Ahmed, A.,…Emslie, H. (2000). A neural basis for general intelligence. *Science, 289*(5478), 457–460.

Eigsti, I.-M., Zayas, V., Mischel, W., Shoda, Y., Ayduk, O., Dadlani, M. B.,…Casey, B. J. (2006). Predicting cognitive control from preschool to late adolescence and young adulthood. *Psychological Science, 17*(6), 478–484.

Ericsson, K. (1998). The scientific study of expert levels of performance: General implications for optimal learning and creativity. *High Ability Studies, 9*(1), 75–100.

Feldman-Barrett, L., & Salovey, P. (Eds.). (2002). *The wisdom in feeling: Psychological processes in emotional intelligence*. New York, NY: Guilford Press.

Flynn, J. R. (1999). Searching for justice: The discovery of IQ gains over time. *American Psychologist, 54*(1), 5–20.

Føllesdal, H., & Hagtvet, K. A. (2009). Emotional intelligence: The MSCEIT from the perspective of generalizability theory. *Intelligence, 37*(1), 94–105.

Frey, M. C., & Detterman, D. K. (2004). Scholastic assessment or g? The relationship between the scholastic assessment test and general cognitive ability. *Psychological Science, 15*(6), 373–378.

Furnham, A., & Bachtiar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and Individual Differences, 45*(7), 613–617.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books;

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York, NY: Basic Books.

Garlick, D. (2003). Integrating brain science research with intelligence research. *Current Directions in Psychological Science*, *12*(5), 185–189.

Goleman, D. (1998). *Working with emotional intelligence.* New York, NY: Bantam Books.

Gottfredson, L. S. (1997). Mainstream science on intelligence: An editorial with 52 signatories, history and bibliography. *Intelligence*, *24*(1), 13–23.

Gottfredson, L. S. (2003). Dissecting practical intelligence theory: Its claims and evidence. *Intelligence*, *31*(4), 343–397.

Haier, R. J. (2004). Brain imaging studies of personality: The slow revolution. In R. M. Stelmack (Ed.), *On the psychobiology of personality: Essays in honor of Marvin Zuckerman* (pp. 329–340). New York, NY: Elsevier Science;

Haier, R. J., Siegel, B. V., Tang, C., & Abel, L. (1992). Intelligence and changes in regional cerebral glucose metabolic rate following learning. *Intelligence*, *16*(3–4), 415–426.

Harms, P. D., & Credé, M. (2010). Emotional intelligence and transformational and transactional leadership: A meta-analysis. *Journal of Leadership & Organizational Studies*, *17*(1), 5–17.

Hennessey, B. A., & Amabile, T. M. (2010). Creativity. *Annual Review of Psychology*, *61*, 569–598.

Horn, J. L., Donaldson, G., & Engstrom, R. (1981). Apprehension, memory, and fluid intelligence decline in adulthood. *Research on Aging*, *3*(1), 33–84.

Huttenlocher, J., Levine, S., & Vevea, J. (1998). Environmental input and cognitive growth: A study using time-period comparisons. *Child Development*, *69*(4), 1012–1029.

Kuncel, N. R., Hezlett, S. A., & Ones, D. S. (2010). A comprehensive meta-analysis of the predictive validity of the graduate record examinations: Implications for graduate student selection and performance. *Psychological Bulletin*, *127*(1), 162–181.

Landy, F. J. (2005). Some historical and scientific issues related to research on emotional intelligence. *Journal of Organizational Behavior*, *26*, 411–424.

Martins, A., Ramalho, N., & Morin, E. (2010). A comprehensive meta-analysis of the relationship between emotional intelligence and health. *Personality and Individual Differences*, *49*(6), 554–564.

Mayer, J. D., & Cobb, C. D. (2000). Educational policy on emotional intelligence: Does it make sense? *Educational Psychology Review*, *12*(2), 163–183.

Mayer, J. D., Salovey, P., & Caruso, D. (2000). Models of emotional intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 396–420). New York, NY: Cambridge University Press.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2008). Emotional intelligence: New ability or eclectic traits. *American Psychologist*, *63*(6), 503–517.

McDaniel, M. A. (2005). Big-brained people are smarter: A meta-analysis of the relationship between in vivo brain volume and intelligence. *Intelligence*, *33*(4), 337–346.

McLoyd, V. C. (1998). Children in poverty: Development, public policy and practice. In W. Damon, I. E. Sigel, & K. A. Renninger (Eds.), *Handbook of child psychology: Child psychology in practice* (5th ed., Vol. 4, pp. 135–208). Hoboken, NJ: John Wiley & Sons.

Mischel, W., & Ayduk, O. (Eds.). (2004). *Willpower in a cognitive-affective processing system: The dynamics of delay of gratification*. New York, NY: Guilford Press.

Neisser, U. (1997). Rising scores on intelligence tests. *American Scientist*, *85*, 440–447.

Neisser, U. (Ed.). (1998). *The rising curve*. Washington, DC: American Psychological Association.

Neisser, U., Boodoo, G., Bouchard, T. J., Jr., Boykin, A. W., Brody, N., Ceci, S. J.,…Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist*, *51*(2), 77–101.

Perkins, D. N., & Grotzer, T. A. (1997). Teaching intelligence. *American Psychologist*, *52*(10), 1125–1133.

Petrides, K. V., & Furnham, A. (2000). On the dimensional structure of emotional intelligence. *Personality and Individual Differences*, *29*, 313–320.

Plomin, R. (2003). General cognitive ability. In R. Plomin, J. C. DeFries, I. W. Craig, & P. McGuffin (Eds.), *Behavioral genetics in the postgenomic era* (pp. 183–201). Washington, DC: American Psychological Association.

Plomin, R., & Spinath, F. M. (2004). Intelligence: Genetics, genes, and genomics. *Journal of Personality and Social Psychology*, *86*(1), 112–129.

Reynolds, A. J., Temple, J. A., Robertson, D. L., & Mann, E. A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools. *Journal of the American Medical Association*, *285*(18), 2339–2346.

Salthouse, T. A. (2004). What and when of cognitive aging. *Current Directions in Psychological Science*, *13*(4), 140–144.

Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin*, *124*, 262–274.

Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N.,…Giedd, J. (2006). Intellectual ability and cortical development in children and adolescents. *Nature*, *440*(7084), 676–679.

Siegler, R. S. (1992). The other Alfred Binet. *Developmental Psychology*, *28*(2), 179–190.

Simonton, D. K. (1992). The social context of career success and course for 2,026 scientists and inventors. *Personality and Social Psychology Bulletin*, *18*(4), 452–463.

Simonton, D. K. (2000). Creativity: Cognitive, personal, developmental, and social aspects. *American Psychologist*, *55*(1), 151–158.

Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York, NY: Cambridge University Press.

Sternberg, R. J. (2003). Contemporary theories of intelligence. In W. M. Reynolds & G. E. Miller (Eds.), *Handbook of psychology: Educational psychology* (Vol. 7, pp. 23–45). Hoboken, NJ: John Wiley & Sons.

Sternberg, R. J. (2003). Our research program validating the triarchic theory of successful intelligence: Reply to Gottfredson. *Intelligence*, *31*(4), 399–413.

Sternberg, R. J., Wagner, R. K., & Okagaki, L. (1993). Practical intelligence: The nature and role of tacit knowledge in work and at school. In J. M. Puckett & H. W. Reese (Eds.), *Mechanisms of everyday cognition* (pp. 205–227). Hillsdale, NJ: Lawrence Erlbaum Associates.

Tarasova, I. V., Volf, N. V., & Razoumnikova, O. M. (2010). Parameters of cortical interactions in subjects with high and low levels of verbal creativity. *Human Physiology*, *36*(1), 80–85.

Thurstone, L. L. (1938). Primary mental abilities. *Psychometric Monographs*, *No. 1*. Chicago, IL: University of Chicago Press.

Treffert, D. A., & Wallace, G. L. (2004, January 1). Islands of genius. *Scientific American*, 14–23. Retrieved from http://gordonresearch.com/articles_autism/SciAm-Islands_of_Genius.pdf

Turkheimer, E., Haley, A., Waldron, M., D'Onofrio, B., & Gottesman, I. I. (2003). Socioeconomic status modifies heritability of IQ in young children. *Psychological Science*, *14*(6), 623–628.

Wagner, R., & Sternberg, R. (1985). Practical intelligence in real-world pursuits: The role of tacit knowledge. *Journal of Personality and Social Psychology*, *49*(2), 436–458.

Watkins, C. E., Campbell, V. L., Nieberding, R., & Hallmark, R. (1995). Contemporary practice of psychological assessment by clinical psychologists. *Professional Psychology: Research and Practice*, *26*(1), 54–60.

Weisberg, R. (2006). *Creativity: Understanding innovation in problem solving, science, invention, and the arts.* Hoboken, NJ: John Wiley & Sons.

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9.2: Extremes of Intelligence

Learning Objectives

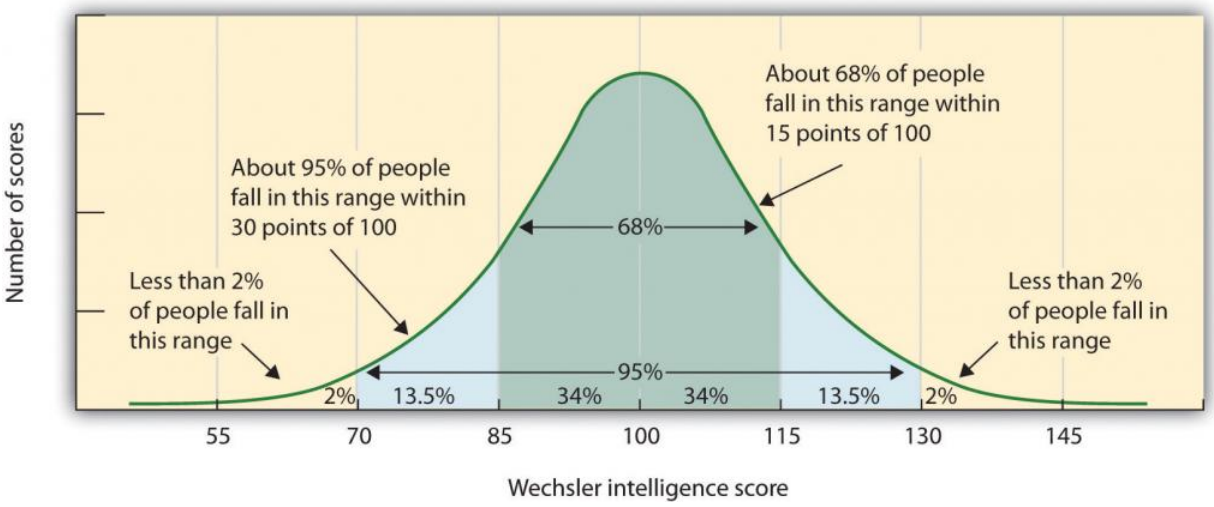
1. Explain how very high and very low intelligence is defined and what it means to have them.

Extremes of Intelligence: Retardation and Giftedness

The results of studies assessing the measurement of intelligence show that IQ is distributed in the population in the form of a normal distribution (or bell curve), which is *the pattern of scores usually observed in a variable that clusters around its average*. In a normal distribution, the bulk of the scores fall toward the middle, with many fewer scores falling at the extremes. The normal distribution of intelligence (Figure **9.2.6**) shows that on IQ tests, as well as on most other measures, the majority of people cluster around the average (in this case, where IQ = 100), and fewer are either very smart or very dull. Because the standard deviation of an IQ test is about 15, this means that about 2% of people score above an IQ of 130 (often considered the threshold for *giftedness*), and about the same percentage score below an IQ of 70 (often being considered the threshold for *mental retardation*).

Although Figure **9.2.6** presents a single distribution, the actual IQ distribution varies by sex such that the distribution for men is more spread out than is the distribution for women. These sex differences mean that about 20% more men than women fall in the extreme (very smart or very dull) ends of the distribution (Johnson, Carothers, & Deary, 2009). Boys are about five times more likely to be diagnosed with the reading disability dyslexia than are girls (Halpern, 1992), and are also more likely to be classified as mentally retarded. But boys are also about 20% more highly represented in the upper end of the IQ distribution.

Figure **9.2.6** Distribution of IQ Scores in the General Population



The normal distribution of IQ scores in the general population shows that most people have about average intelligence, while very few have extremely high or extremely low intelligence.

Extremely Low Intelligence

One end of the distribution of intelligence scores is defined by people with very low IQ. Mental retardation is *a generalized disorder ascribed to people who have an IQ below 70, who have experienced deficits since childhood, and who have trouble with basic life skills, such as dressing and feeding oneself and communicating with others* (Switzky & Greenspan, 2006). About 1% of the United States population, most of them males, fulfill the criteria for mental retardation, but some children who are diagnosed as mentally retarded lose the classification as they get older and better learn to function in society. A particular vulnerability of people with low IQ is that they may be taken advantage of by others, and this is an important aspect of the definition of mental retardation (Greenspan, Loughlin, & Black, 2001).Mental retardation is divided into four categories: mild, moderate, severe, and profound.

Severe and profound mental retardation is usually caused by genetic mutations or accidents during birth, whereas mild forms have both genetic and environmental influences.

One cause of mental retardation is Down syndrome, *a chromosomal disorder leading to mental retardation caused by the presence of all or part of an extra 21st chromosome*. The incidence of Down syndrome is estimated at 1 per 800 to 1,000 births, although its prevalence rises sharply in those born to older mothers. People with Down syndrome typically exhibit a distinctive pattern of physical features, including a flat nose, upwardly slanted eyes, a protruding tongue, and a short neck.

Figure **9.2.7**



About one in every 800 to 1,000 children has Down syndrome.

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Societal attitudes toward individuals with mental retardation have changed over the past decades. We no longer use terms such as "moron," "idiot," or "imbecile" to describe these people, although these were the official psychological terms used to describe degrees of retardation in the past. Laws such as the Americans with Disabilities Act (ADA) have made it illegal to discriminate on the basis of mental and physical disability, and there has been a trend to bring the mentally retarded out of institutions and into our workplaces and schools. In 2002 the U.S. Supreme Court ruled that the execution of people with mental retardation is "cruel and unusual punishment," thereby ending this practice (Atkins v. Virginia, 2002).

Extremely High Intelligence

Having extremely high IQ is clearly less of a problem than having extremely low IQ, but there may also be challenges to being particularly smart. It is often assumed that schoolchildren who are labeled as "gifted" may have adjustment problems that make it more difficult for them to create social relationships. To study gifted children, Lewis Terman and his colleagues (Terman & Oden, 1959) selected about 1,500 high school students who scored in the top 1% on the Stanford-Binet and similar IQ tests (i.e., who had IQs of about 135 or higher), and tracked them for more than seven decades (the children became known as the "termites" and are still being studied today). This study found, first, that these students were not unhealthy or poorly adjusted but rather were above average in physical health and were taller and heavier than individuals in the general population. The students also had above average social relationships—for instance, being less likely to divorce than the average person (Seagoe, 1975).

Terman's study also found that many of these students went on to achieve high levels of education and entered prestigious professions, including medicine, law, and science. Of the sample, 7% earned doctoral degrees, 4% earned medical degrees, and 6% earned law degrees. These numbers are all considerably higher than what would have been expected from a more general population. Another study of young adolescents who had even higher IQs found that these students ended up attending graduate school at a rate more than 50 times higher than that in the general population (Lubinski & Benbow, 2006).

As you might expect based on our discussion of intelligence, kids who are gifted have higher scores on general intelligence (g). But there are also different types of giftedness. Some children are particularly good at math or science, some at automobile repair or carpentry, some at music or art, some at sports or leadership, and so on. There is a lively debate among scholars about whether it is appropriate or beneficial to label some children as "gifted and talented" in school and to provide them with accelerated special classes and other programs that are not available to everyone. Although doing so may help the gifted kids (Colangelo & Assouline, 2009), it also may isolate them from their peers and make such provisions unavailable to those who are not classified as "gifted."

Referernces

Aronson, J., Lustina, M. J., Good, C., Keough, K., & Steele, C. M. (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology, 35*, 29–46.

Atkins v. Virginia, 536 U.S. 304 (2002).

Baral, B. D., & Das, J. P. (2004). Intelligence: What is indigenous to India and what is shared? In R. J. Sternberg (Ed.), *International handbook of intelligence* (pp. 270–301). New York, NY: Cambridge University Press;

Benbow, C. P., & Stanley, J. C. (1983). Sex differences in mathematical reasoning ability: More facts. *Science*, *222*(4627), 1029–1031.

Brody, N. (1992). *Intelligence* (2nd ed.). San Diego, CA: Academic Press.

Brown, R., Croizet, J.-C., Bohner, G., Fournet, M., & Payne, A. (2003). Automatic category activation and social behaviour: The moderating role of prejudiced beliefs. *Social Cognition*, *21*(3), 167–193;

Colangelo, N., & Assouline, S. (2009). Acceleration: Meeting the academic and social needs of students. In T. Balchin, B. Hymer, & D. J. Matthews (Eds.), *The Routledge international companion to gifted education* (pp. 194–202). New York, NY: Routledge.

Croizet, J.-C., & Claire, T. (1998). Extending the concept of stereotype and threat to social class: The intellectual underperformance of students from low socioeconomic backgrounds. *Personality and Social Psychology Bulletin*, *24*(6), 588–594.

Gonzales, P. M., Blanton, H., & Williams, K. J. (2002). The effects of stereotype threat and double-minority status on the test performance of Latino women. *Personality and Social Psychology Bulletin*, *28*(5), 659–670.

Greenspan, S., Loughlin, G., & Black, R. S. (2001). Credulity and gullibility in people with developmental disorders: A framework for future research. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 24, pp. 101–135). San Diego, CA: Academic Press.

Halpern, D. F. (1992). *Sex differences in cognitive abilities* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbache, M. A. (2007). The science of sex differences in science and mathematics. *Psychological Science in the Public Interest*, *8*(1), 1–51.

Hunt, E., & Carlson, J. (2007). Considerations relating to the study of group differences in intelligence. *Perspectives on Psychological Science*, *2*(2), 194–213.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist*, *60*(6), 581–592.
Johns, M., Schmader, T., & Martens, A. (2005). Knowing is half the battle: Teaching stereotype threat as a means of improving women's math performance. *Psychological Science*, *16*(3), 175–179.

Johnson, W., Carothers, A., & Deary, I. J. (2009). A role for the X chromosome in sex differences in variability in general intelligence? *Perspectives on Psychological Science*, *4*(6), 598–611.

Kimura, D., & Hampson, E. (1994). Cognitive pattern in men and women is influenced by fluctuations in sex hormones. *Current Directions in Psychological Science*, *3*(2), 57–61;

Lewontin, R. C., Rose, S. P. R., & Kamin, L. J. (1984). *Not in our genes: Biology, ideology, and human nature* (1st ed.). New York, NY: Pantheon Books.

Lubinski, D., & Benbow, C. P. (2006). Study of mathematically precocious youth after 35 years: Uncovering antecedents for the development of math-science expertise. *Perspectives on Psychological Science*, *1*(4), 316–345.

Lynn, R. (1996). Racial and ethnic differences in intelligence in the United States on the differential ability scale. *Personality and Individual Differences*, *20*(2), 271–273;

Marx, D. M., & Roman, J. S. (2002). Female role models: Protecting women's math test performance. *Personality and Social Psychology Bulletin*, *28*(9), 1183–1193;

McClure, E. B. (2000). A meta-analytic review of sex differences in facial expression processing and their development in infants, children, and adolescents. *Psychological Bulletin*, *126*(3), 424–453.

McIntyre, R. B., Paulson, R. M., & Lord, C. G. (2003). Alleviating women's mathematics stereotype threat through salience of group achievements. *Journal of Experimental Social Psychology*, *39*(1), 83–90.

Neisser, U., Boodoo, G., Bouchard, T. J., Jr., Boykin, A. W., Brody, N., Ceci, S. J.,…Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist, 51*(2), 77–101.

Newcombe, N. S., & Huttenlocher, J. (2006). Development of spatial cognition. In D. Kuhn, R. S. Siegler, W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology: Cognition, perception, and language* (6th ed., Vol. 2, pp. 734–776). Hoboken, NJ: John Wiley & Sons.

Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review, 115*(2), 336–356.

Seagoe, M. V. (1975). *Terman and the gifted*. Los Altos, CA: William Kaufmann.

Selden, S. (1999). *Inheriting shame: The story of eugenics and racism in America*. New York, NY: Teachers College Press.

Spelke, E. S. (2005). Sex differences in intrinsic aptitude for mathematics and science? A critical review. *American Psychologist, 60*(9), 950–958.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual performance of African Americans. *Journal of Personality and Social Psychology, 69*, 797–811.

Sternberg, R. J. (2007). Intelligence and culture. In S. Kitayama & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 547–568). New York, NY: Guilford Press.

Stone, J. (2002). Battling doubt by avoiding practice: The effects of stereotype threat on self-handicapping in White athletes. *Personality and Social Psychology Bulletin, 28*(12), 1667–1678;

Stone, J., Lynch, C. I., Sjomeling, M., & Darley, J. M. (1999). Stereotype threat effects on Black and White athletic performance. *Journal of Personality and Social Psychology, 77*(6), 1213–1227.

Suzuki, L. A., & Valencia, R. R. (1997). Race-ethnicity and measured intelligence: Educational implications. *American Psychologist, 52*(10), 1103–1114.

Switzky, H. N., & Greenspan, S. (2006). *What is mental retardation? Ideas for an evolving disability in the 21st century*. Washington, DC: American Association on Mental Retardation.

Terman, L. M., & Oden, M. H. (1959). *Genetic studies of genius: The gifted group at mid-life* (Vol. 5). Stanford, CA: Stanford University Press.

Vogel, G. (1996). School achievement: Asia and Europe top in world, but reasons are hard to find. *Science, 274*(5291), 1296.

Voyer, D., Voyer, S., & Bryden, M. P. (1995). Magnitude of sex differences in spatial abilities: A meta-analysis and consideration of critical variables. *Psychological Bulletin, 117*(2), 250–270.

Voyer, D., Voyer, S., & Bryden, M. P. (1995). Magnitude of sex differences in spatial abilities: A meta-analysis and consideration of critical variables. *Psychological Bulletin, 117*(2), 250–270.

Walton, G. M., & Cohen, G. L. (2003). Stereotype lift. *Journal of Experimental Social Psychology, 39*(5), 456–467.

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CHAPTER OVERVIEW

10: Motivation and Emotion

10.1: Motivation
10.2: Emotion

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10.1: Motivation

Learning Objectives

- Define intrinsic and extrinsic motivation
- Understand that instincts, drive reduction, self-efficacy, and social motives have all been proposed as theories of motivation
- Explain the basic concepts associated with Maslow's hierarchy of needs

Why do we do the things we do? What motivations underlie our behaviors? **Motivation** describes the wants or needs that direct behavior toward a goal. In addition to biological motives, motivations can be **intrinsic** (arising from internal factors) or **extrinsic** (arising from external factors) (See figure **10.1.1**). Intrinsically motivated behaviors are performed because of the sense of personal satisfaction that they bring, while extrinsically motivated behaviors are performed in order to receive something from others.

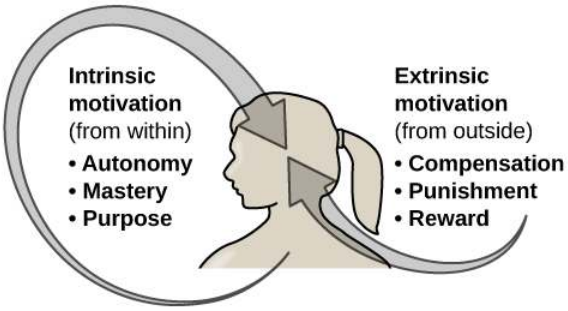


Figure 10.2 Intrinsic motivation comes from within the individual, while extrinsic motivation comes from outside the individual.

Think about why you are currently in college. Are you here because you enjoy learning and want to pursue an education to make yourself a more well-rounded individual? If so, then you are intrinsically motivated. However, if you are here because you want to get a college degree to make yourself more marketable for a high-paying career or to satisfy the demands of your parents, then your motivation is more extrinsic in nature.

In reality, our motivations are often a mix of both intrinsic and extrinsic factors, but the nature of the mix of these factors might change over time (often in ways that seem counter-intuitive). There is an old adage: "Choose a job that you love, and you will never have to work a day in your life," meaning that if you enjoy your occupation, work doesn't seem like . . . well, work. Some research suggests that this isn't necessarily the case (Daniel & Esser, 1980; Deci, 1972; Deci, Koestner, & Ryan, 1999). According to this research, receiving some sort of extrinsic reinforcement (i.e., getting paid) for engaging in behaviors that we enjoy leads to those behaviors being thought of as work no longer providing that same enjoyment. As a result, we might spend less time engaging in these reclassified behaviors in the absence of any extrinsic reinforcement. For example, Odessa loves baking, so in her free time, she bakes for fun. Oftentimes, after stocking shelves at her grocery store job, she often whips up pastries in the evenings because she enjoys baking. When a coworker in the store's bakery department leaves his job, Odessa applies for his position and gets transferred to the bakery department. Although she enjoys what she does in her new job, after a few months, she no longer has much desire to concoct tasty treats in her free time. Baking has become work in a way that changes her motivation to do it (See figure 10.3). What Odessa has experienced is called the overjustification effect—intrinsic motivation is diminished when extrinsic motivation is given. This can lead to extinguishing the intrinsic motivation and creating a dependence on extrinsic rewards for continued performance (Deci et al., 1999).



Figure 10.3 Research suggests that when something we love to do, like icing cakes, becomes our job, our intrinsic and extrinsic motivations to do it may change. (credit: Agustín Ruiz)

Other studies suggest that intrinsic motivation may not be so vulnerable to the effects of extrinsic reinforcements, and in fact, reinforcements such as verbal praise might actually increase intrinsic motivation (Arnold, 1976; Cameron & Pierce, 1994). In that case, Odessa's motivation to bake in her free time might remain high if, for example, customers regularly compliment her baking or cake decorating skills.

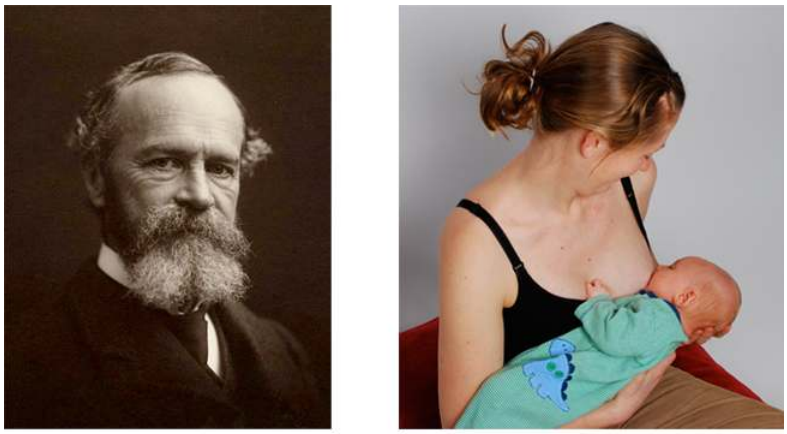
These apparent discrepancies in the researchers' findings may be understood by considering several factors. For one, physical reinforcement (such as money) and verbal reinforcement (such as praise) may affect an individual in very different ways. In fact, tangible rewards (i.e., money) tend to have more negative effects on intrinsic motivation than do intangible rewards (i.e., praise). Furthermore, the expectation of the extrinsic motivator by an individual is crucial: If the person expects to receive an extrinsic reward, then intrinsic motivation for the task tends to be reduced. If, however, there is no such expectation, and the extrinsic motivation is presented as a surprise, then intrinsic motivation for the task tends to persist (Deci et al., 1999).

In addition, culture may influence motivation. For example, in collectivistic cultures, it is common to do things for your family members because the emphasis is on the group and what is best for the entire group, rather than what is best for any one individual (Nisbett, Peng, Choi, & Norenzayan, 2001). This focus on others provides a broader perspective that takes into account both situational and cultural influences on behavior; thus, a more nuanced explanation of the causes of others' behavior becomes more likely. (You will learn more about collectivistic and individualistic cultures when you learn about social psychology.)

In educational settings, students are more likely to experience intrinsic motivation to learn when they feel a sense of belonging and respect in the classroom. This internalization can be enhanced if the evaluative aspects of the classroom are de-emphasized and if students feel that they exercise some control over the learning environment. Furthermore, providing students with activities that are challenging, yet doable, along with a rationale for engaging in various learning activities can enhance intrinsic motivation for those tasks (Niemiec & Ryan, 2009). Consider Hakim, a first-year law student with two courses this semester: Family Law and Criminal Law. The Family Law professor has a rather intimidating classroom: He likes to put students on the spot with tough questions, which often leaves students feeling belittled or embarrassed. Grades are based exclusively on quizzes and exams, and the instructor posts results of each test on the classroom door. In contrast, the Criminal Law professor facilitates classroom discussions and respectful debates in small groups. The majority of the course grade is not exam-based, but centers on a student-designed research project on a crime issue of the student's choice. Research suggests that Hakim will be less intrinsically motivated in his Family Law course, where students are intimidated in the classroom setting, and there is an emphasis on teacher-driven evaluations. Hakim is likely to experience a higher level of intrinsic motivation in his Criminal Law course, where the class setting encourages inclusive collaboration and a respect for ideas, and where students have more influence over their learning activities.

Theories About Motivation

William **James** (1842–1910) was an important contributor to early research into motivation, and he is often referred to as the father of psychology in the United States. James theorized that behavior was driven by a number of instincts, which aid survival (Figure 10.4). From a biological perspective, an **instinct** is a species-specific pattern of behavior that is not learned. There was, however, considerable controversy among James and his contemporaries over the exact definition of instinct. James proposed several dozen special human instincts, but many of his contemporaries had their own lists that differed. A mother's protection of her baby, the urge to lick sugar, and hunting prey were among the human behaviors proposed as true instincts during James's era. This view—that human behavior is driven by instincts—received a fair amount of criticism because of the undeniable role of learning in shaping all sorts of human behavior. In fact, as early as the 1900s, some instinctive behaviors were experimentally demonstrated to result from associative learning (recall when you learned about Watson's conditioning of fear response in "Little Albert") (Faris, 1921).



(a) (b)

Figure 10.4 William James proposed the instinct theory of motivation, asserting that behavior is driven by instincts. (b) In humans, instincts may include behaviors such as an infant's rooting for a nipple and sucking. (credit b: modification of work by "Mothering Touch"/Flickr)

Another early theory of motivation proposed that the maintenance of **homeostasis** is particularly important in directing behavior. You may recall from your earlier reading that homeostasis is the tendency to maintain a balance, or optimal level, within a biological system. In a body system, a control center (which is often part of the brain) receives input from receptors (which are often complexes of neurons). The control center directs effectors (which may be other neurons) to correct any imbalance detected by the control center.

According to the **drive theory** of motivation, deviations from homeostasis create physiological needs. These needs result in psychological drive states that direct behavior to meet the need and, ultimately, bring the system back to homeostasis. For example, if it's been a while since you ate, your blood sugar levels will drop below normal. This low blood sugar will induce a physiological need and a corresponding drive state (i.e., hunger) that will direct you to seek out and consume food (See figure 10.5). Eating will eliminate the hunger, and, ultimately, your blood sugar levels will return to normal. Interestingly, drive theory also emphasizes the role that habits play in the type of behavioral response in which we engage. A **habit** is a pattern of behavior in which we regularly engage. Once we have engaged in a behavior that successfully reduces a drive, we are more likely to engage in that behavior whenever faced with that drive in the future (Graham & Weiner, 1996).



Figure 10.5 Hunger and subsequent eating are the result of complex physiological processes that maintain homeostasis. (credit "left": modification of work by "Gracie and Viv"/Flickr; credit "center": modification of work by Steven Depolo; credit "right": modification of work by Monica Renata)

Extensions of drive theory take into account levels of arousal as potential motivators. The **arousal theory** of motivation asserts that there is an optimal level of arousal that we all try to maintain (See figure 10.6). If we are underaroused, we become bored and will seek out some sort of stimulation. On the other hand, if we are overaroused, we will engage in behaviors to reduce our arousal (Berlyne, 1960). Most students have experienced this need to maintain optimal levels of arousal over the course of their academic career. Think about how much stress students experience toward the end of spring semester. They feel overwhelmed with seemingly endless exams, papers, and major assignments that must be completed on time. They probably yearn for the rest and relaxation that awaits them over the extended summer break. However, once they finish the semester, it doesn't take too long before they begin to feel bored. Generally, by the time the next semester is beginning in the fall, many students are quite happy to return to school. This is an example of how arousal theory works.

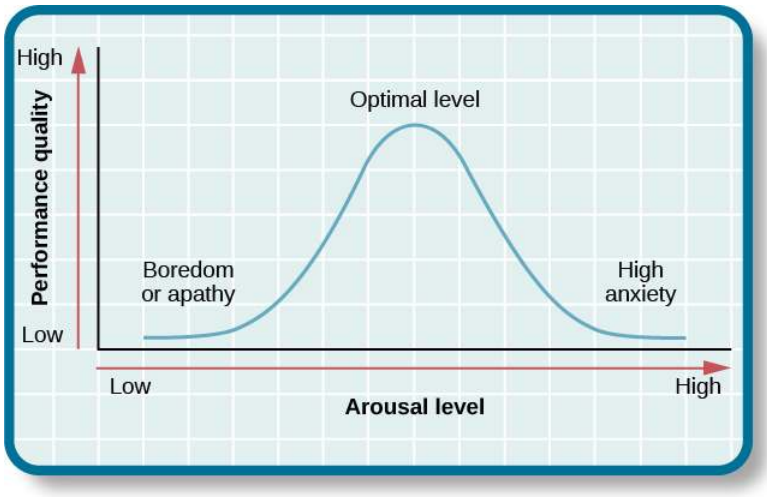


Figure 10.6 The concept of optimal arousal in relation to performance on a task is depicted here. Performance is maximized at the optimal level of arousal, and it tapers off during under- and overarousal.

So what is the optimal level of arousal? What level leads to the best performance? Research shows that moderate arousal is generally best; when arousal is very high or very low, performance tends to suffer (Yerkes & Dodson, 1908). Think of your arousal level regarding taking an exam for this class. If your level is very low, such as boredom and apathy, your performance will likely suffer. Similarly, a very high level, such as extreme anxiety, can be paralyzing and hinder performance. Consider the example of a softball team facing a tournament. They are favored to win their first game by a large margin, so they go into the game with a lower level of arousal and get beat by a less skilled team.

But optimal arousal level is more complex than a simple answer that the middle level is always best. Researchers Robert Yerkes (pronounced "Yerk-EES") and John Dodson discovered that the optimal arousal level depends on the complexity and difficulty of the task to be performed (See figure 10.7). This relationship is known as **Yerkes-Dodson law**, which holds that a simple task is performed best when arousal levels are relatively high and complex tasks are best performed when arousal levels are lower.

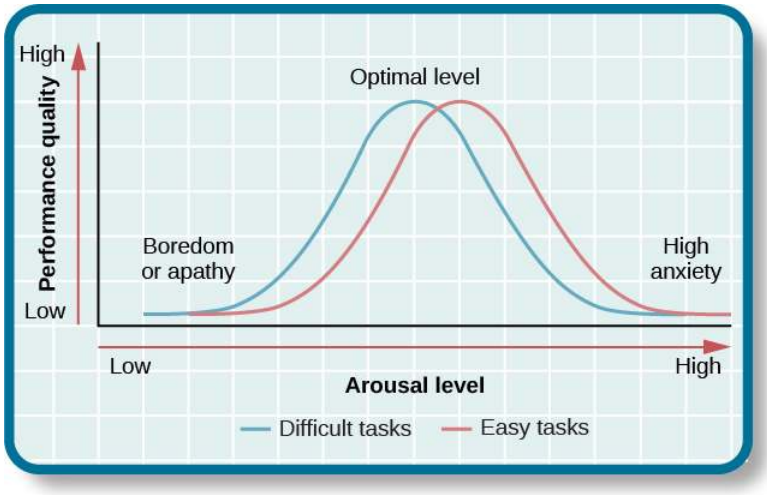


Figure 10.7 Task performance is best when arousal levels are in a middle range, with difficult tasks best performed under lower levels of arousal and simple tasks best performed under higher levels of arousal.

Self-efficacy and Social Motives

Self-efficacy is an individual's belief in her own capability to complete a task, which may include a previous successful completion of the exact task or a similar task. Albert **Bandura** (1994) theorized that an individual's sense of self-efficacy plays a pivotal role in motivating behavior. Bandura argues that motivation derives from expectations that we have about the consequences of our behaviors, and ultimately, it is the appreciation of our capacity to engage in a given behavior that will determine what we do and

the future goals that we set for ourselves. For example, if you have a sincere belief in your ability to achieve at the highest level, you are more likely to take on challenging tasks and to not let setbacks dissuade you from seeing the task through to the end.

A number of theorists have focused their research on understanding social motives (McAdams & Constantian, 1983; McClelland & Liberman, 1949; Murray et al., 1938). Among the motives they describe are needs for achievement, affiliation, and intimacy. It is the need for achievement that drives accomplishment and performance. The need for affiliation encourages positive interactions with others, and the need for intimacy causes us to seek deep, meaningful relationships. Henry Murray et al. (1938) categorized these needs into domains. For example, the need for achievement and recognition falls under the domain of ambition. Dominance and aggression were recognized as needs under the domain of human power, and play was a recognized need in the domain of interpersonal affection.

Maslow's Hierarchy of Needs

While the theories of motivation described earlier relate to basic biological drives, individual characteristics, or social contexts, Abraham **Maslow** (1943) proposed a **hierarchy of needs** that spans the spectrum of motives ranging from the biological to the individual to the social. These needs are often depicted as a pyramid:

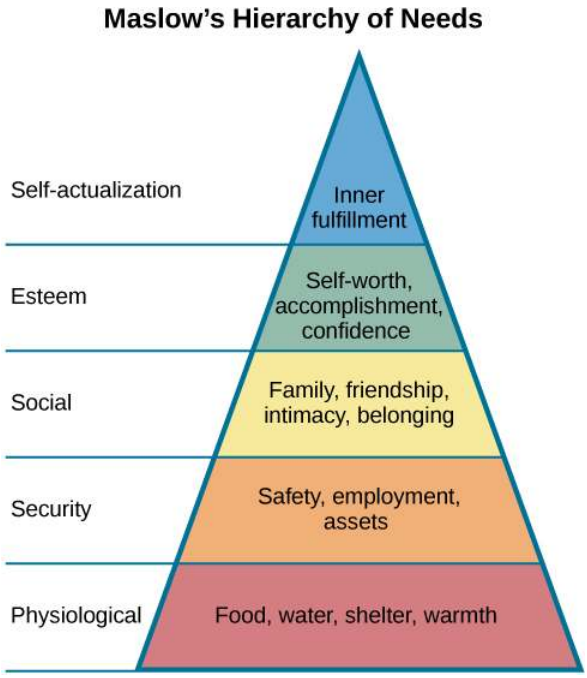


Figure 10.8 Maslow's hierarchy of needs is illustrated here. In some versions of the pyramid, cognitive and aesthetic needs are also included between esteem and self-actualization. Others include another tier at the top of the pyramid for self-transcendence.

At the base of the pyramid are all of the physiological needs that are necessary for survival. These are followed by basic needs for security and safety, the need to be loved and to have a sense of belonging, and the need to have self-worth and confidence. The top tier of the pyramid is self-actualization, which is a need that essentially equates to achieving one's full potential, and it can only be realized when needs lower on the pyramid have been met. To Maslow and humanistic theorists, self-actualization reflects the humanistic emphasis on positive aspects of human nature. Maslow suggested that this is an ongoing, life-long process and that only a small percentage of people actually achieve a self-actualized state (Francis & Kritsonis, 2006; Maslow, 1943).

According to Maslow (1943), one must satisfy lower-level needs before addressing those needs that occur higher in the pyramid. So, for example, if someone is struggling to find enough food to meet his nutritional requirements, it is quite unlikely that he would spend an inordinate amount of time thinking about whether others viewed him as a good person or not. Instead, all of his energies would be geared toward finding something to eat. However, it should be pointed out that Maslow's theory has been criticized for its subjective nature and its inability to account for phenomena that occur in the real world (Leonard, 1982). Other research has more recently addressed that late in life, Maslow proposed a self-transcendence level above self-actualization—to represent striving for meaning and purpose beyond the concerns of oneself (Koltko-Rivera, 2006). For example, people sometimes make self-sacrifices in order to make a political statement or in an attempt to improve the conditions of others. Mohandas K. Gandhi, a world-renowned

advocate for independence through nonviolent protest, on several occasions went on hunger strikes to protest a particular situation. People may starve themselves or otherwise put themselves in danger displaying higher-level motives beyond their own needs.

Link to Learning

Check out this interactive exercise about Maslow's hierarchy of needs to learn more.

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10.2: Emotion

Learning Objectives

- Explain the major theories of emotion
- Describe the role that limbic structures play in emotional processing
- Understand the ubiquitous nature of producing and recognizing emotional expression

As we move through our daily lives, we experience a variety of emotions. Emotions result from the combination of subjective experience, expression, cognitive appraisal, and physiological responses (Levenson, Carstensen, Friesen, & Ekman, 1991). However, as discussed later in the chapter, the exact order in which the components occur is not clear, and some parts may happen at the same time. An emotion often begins with a subjective (individual) experience, which is a stimulus. Often the stimulus is external, but it does not have to be from the outside world. For example, it might be that one thinks about war and becomes sad, even though they never experienced war. Emotional expression refers to the way one displays an emotion and includes nonverbal and verbal behaviors (Gross, 1999). One also performs a cognitive appraisal in which a person tries to determine the way they will be impacted by a situation (Roseman & Smith, 2001). In addition, emotions include physiological responses, such as possible changes in heart rate, sweating, etc. (Soussignan, 2002).

The words emotion and mood are sometimes used interchangeably, but psychologists use these words to refer to two different things. Typically, the word **emotion** indicates a subjective, affective state that is relatively intense and that occurs in response to something we experience (See figure 10.20). Emotions are often thought to be consciously experienced and intentional. **Mood**, on the other hand, refers to a prolonged, less intense, affective state that does not occur in response to something we experience. Mood states may not be consciously recognized and do not carry the intentionality that is associated with emotion (Beedie, Terry, Lane, & Devonport, 2011). Here we will focus on emotion, and you will learn more about mood in the chapter that covers psychological disorders.



(a) (b)

Figure 10.20 Toddlers can cycle through emotions quickly, being (a) extremely happy one moment and (b) extremely sad the next. (credit a: modification of work by Kerry Ceszyk; credit b: modification of work by Kerry Ceszyk)

We can be at the heights of joy or in the depths of despair. We might feel angry when we are betrayed, fear when we are threatened, and surprised when something unexpected happens. This section will outline some of the most well-known theories explaining our emotional experience and provide insight into the biological bases of emotion. This section closes with a discussion of the ubiquitous nature of facial expressions of emotion and our abilities to recognize those expressions in others.

Theories of Emotion

Our emotional states are combinations of physiological arousal, psychological appraisal, and subjective experiences. Together, these are known as the **components of emotion**. These appraisals are informed by our experiences, backgrounds, and cultures. Therefore, different people may have different emotional experiences even when faced with similar circumstances. Over time, several different theories of emotion, shown in figure 10.21, have been proposed to explain how the various components of emotion interact with one another.

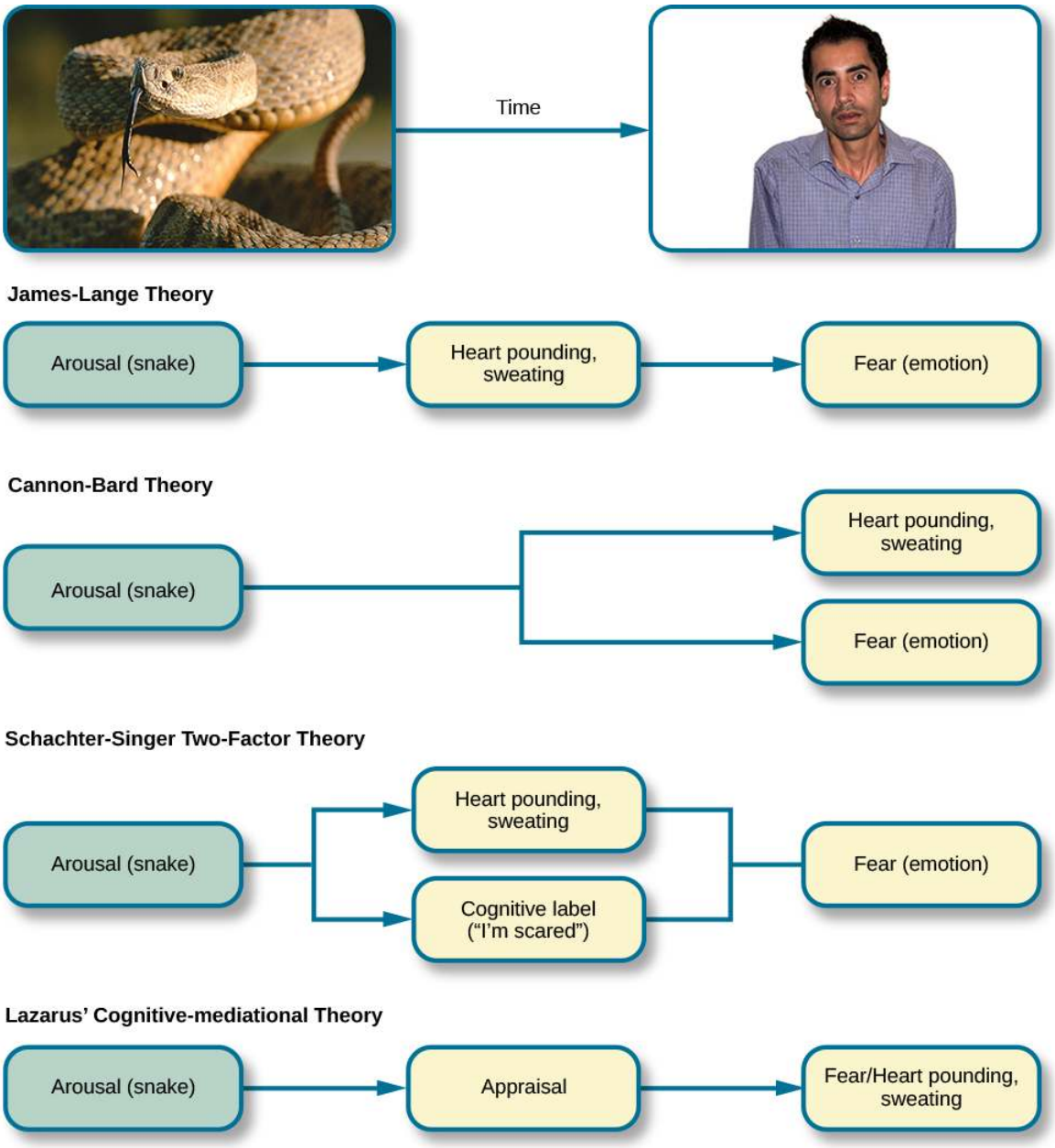


Figure 10.21 This figure illustrates the major assertions of the James-Lange, Cannon-Bard, and Schachter-Singer two-factor theories of emotion. (credit "snake": modification of work by "tableatny"/Flickr; credit "face": modification of work by Cory Zanker)

The **James-Lange theory** of emotion asserts that emotions arise from physiological arousal. Recall what you have learned about the sympathetic nervous system and our fight or flight response when threatened. If you were to encounter some threat in your environment, like a venomous snake in your backyard, your sympathetic nervous system would initiate significant physiological arousal, which would make your heart race and increase your respiration rate. According to the James-Lange theory of emotion, you would only experience a feeling of fear after this physiological arousal had taken place. Furthermore, different arousal patterns would be associated with different feelings.

Other theorists, however, doubted that the physiological arousal that occurs with different types of emotions is distinct enough to result in the wide variety of emotions that we experience. Thus, the **Cannon-Bard theory** of emotion was developed. According to this view, physiological arousal and emotional experience occur simultaneously, yet independently (Lang, 1994). So, when you see the venomous snake, you feel fear at exactly the same time that your body mounts its fight or flight response. This emotional reaction would be separate and independent of the physiological arousal, even though they co-occur.

Does smiling make you happy? Alternatively, does being happy make you smile? The facial feedback hypothesis proposes that your facial expression can actually affect your emotional experience (Adelman & Zajonc, 1989; Boiger & Mesquita, 2012; Buck, 1980; Capella, 1993; Soussignan, 2001). Research investigating the facial feedback hypothesis suggested that suppression of facial expression of emotion lowered the intensity of some emotions experienced by participants (Davis, Senghas, & Ochsner, 2009). Havas, Glenberg, Gutowski, Lucarelli, and Davidson (2010) used Botox injections to paralyze facial muscles and limit facial expressions, including frowning, and they found that depressed people reported less depression after their frowning muscles were paralyzed. Other research found that the intensities of facial expressions affected the emotional reactions (Soussignan, 2002). In other words, if something insignificant occurs and you smile as if you just won lottery, you will actually be happier about the little thing than you would be if you only had a tiny smile. Conversely, if you walk around frowning all the time, it might cause you to have less positive emotions than you would if you had smiled. Interestingly, Soussignan (2002) also reported physiological arousal differences associated with the intensities of one type of smile.

G. Marañon Posadillo was a Spanish physician who studied the psychological effects of adrenaline to create a model for the experience of emotion. Marañon's model preceded Schachter's two-factor or arousal-cognition theory of emotion (Cornelius, 1991). The Schachter-Singer two-factor theory of emotion is another variation on theories of emotions that takes into account both physiological arousal and the emotional experience. According to this theory, emotions are composed of two factors: physiological and cognitive. In other words, physiological arousal is interpreted in context to produce the emotional experience. In revisiting our example involving the venomous snake in your backyard, the two-factor theory maintains that the snake elicits sympathetic nervous system activation that is labeled as fear given the context, and our experience is that of fear. If you had labeled your sympathetic nervous system activation as joy, you would have experienced joy. The Schachter-Singer two-factor theory depends on labeling the physiological experience, which is a type of cognitive appraisal.

Magda Arnold was the first theorist to offer an exploration of the meaning of appraisal, and to present an outline of what the appraisal process might be and how it relates to emotion (Roseman & Smith, 2001). The key idea of appraisal theory is that you have thoughts (a cognitive appraisal) before you experience an emotion, and the emotion you experience depends on the thoughts you had (Frijda, 1988; Lazarus, 1991). If you think something is positive, you will have more positive emotions about it than if your appraisal was negative, and the opposite is true. Appraisal theory explains the way two people can have two completely different emotions regarding the same event. For example, suppose your psychology instructor selected you to lecture on emotion; you might see that as positive, because it represents an opportunity to be the center of attention, and you would experience happiness. However, if you dislike speaking in public, you could have a negative appraisal and experience discomfort.

Schachter and Singer believed that physiological arousal is very similar across the different types of emotions that we experience, and therefore, the cognitive appraisal of the situation is critical to the actual emotion experienced. In fact, it might be possible to misattribute arousal to an emotional experience if the circumstances were right (Schachter & Singer, 1962). They performed a clever experiment to test their idea. A group of men participating in the experiment were randomly assigned to one of several groups. Some of the participants received injections of epinephrine that caused bodily changes that mimicked the fight-or-flight response of the sympathetic nervous system; however, only some of these men were told to expect these reactions as side effects of the injection. The other men that received injections of epinephrine were told either that the injection would have no side effects or that it would result in a side effect unrelated to a sympathetic response, such as itching feet or headache. After receiving these injections, participants waited in a room with someone else they thought was another subject in the research project. In reality, the other person was a confederate (someone working on behalf of) of the researcher. The confederate engaged in scripted displays of euphoric or angry behavior (Schachter & Singer, 1962).

When those participants who were told that they should expect to feel symptoms of physiological arousal were asked about any emotional changes that they had experienced related to either euphoria or anger (depending on the way the confederate behaved), they reported none. However, the men who weren’t expecting physiological arousal as a function of the injection were more likely to report that they experienced euphoria or anger as a function of their assigned confederate’s behavior. While everyone who received an injection of epinephrine experienced the same physiological arousal, only those who were not expecting the arousal used context to interpret the arousal as a change in emotional state (Schachter & Singer, 1962).

Strong emotional responses are associated with strong physiological arousal, which caused some theorists to suggest that the signs of physiological arousal, including increased heart rate, respiration rate, and sweating, might be used to determine whether someone is telling the truth or not. The assumption is that most of us would show signs of physiological arousal if we were being

dishonest with someone. A polygraph, or lie detector test, measures the physiological arousal of an individual responding to a series of questions. Someone trained in reading these tests would look for answers to questions that are associated with increased levels of arousal as potential signs that the respondent may have been dishonest on those answers. While polygraphs are still commonly used, their validity and accuracy are highly questionable because there is no evidence that lying is associated with any particular pattern of physiological arousal (Saxe & Ben-Shakhar, 1999).

The relationship between our experiencing of emotions and our cognitive processing of them, and the order in which these occur, remains a topic of research and debate. Lazarus (1991) developed the cognitive-mediational theory that asserts our emotions are determined by our appraisal of the stimulus. This appraisal mediates between the stimulus and the emotional response, and it is immediate and often unconscious. In contrast to the Schachter-Singer model, the appraisal precedes a cognitive label. You will learn more about Lazarus's appraisal concept when you study stress, health, and lifestyle. However, there are other views of emotions that also emphasize the cognitive processes.

Return to the example of being asked to lecture by your professor. Even if you do not enjoy speaking in public, you probably could manage to do it. You would purposefully control your emotions, which would allow you to speak, but we constantly regulate our emotions, and much of our emotion regulation occurs without us actively thinking about it. Mauss and her colleagues studied automatic emotion regulation (AER), which refers to the non-deliberate control of emotions. It is simply not reacting with your emotions, and AER can affect all aspects of emotional processes. AER can influence the things you attend to, your appraisal, your choice to engage in an emotional experience, and your behaviors after an emotion is experienced (Mauss, Bunge, & Gross, 2007; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). AER is similar to other automatic cognitive processes in which sensations activate knowledge structures that affect functioning. These knowledge structures can include concepts, schemas, or scripts.

The idea of AER is that people develop an automatic process that works like a script or schema, and the process does not require deliberate thought to regulate emotions. AER works like riding a bicycle. Once you develop the process, you just do it without thinking about it. AER can be adaptive or maladaptive and has important health implications (Hopp, Troy, & Mauss, 2011). Adaptive AER leads to better health outcomes than maladaptive AER, primarily due to experiencing or mitigating stressors better than people with maladaptive AERs (Hopp, Troy, & Mauss, 2011). Alternatively, maladaptive AERs may be critical for maintaining some psychological disorders (Hopp, Troy, & Mauss, 2011). Mauss and her colleagues found that strategies could reduce negative emotions, which in turn should increase psychological health (Mauss, Cook, Cheng, & Gross, 2007; Mauss, Cook, & Gross, 2007; Shallcross, Troy, Boland, & Mauss, 2010; Troy, Shallcross, & Mauss, 2013; Troy, Wilhelm, Shallcross, & Mauss, 2010). Mauss has also suggested there are problems with the way emotions are measured, but she believes most of the aspects of emotions that are typically measured are useful (Mauss, et al., 2005; Mauss & Robinson, 2009). However, another way of considering emotions challenges our entire understanding of emotions.

After about three decades of interdisciplinary research, Barrett argued that we do not understand emotions. She proposed that emotions were not built into your brain at birth, but rather they were constructed based on your experiences. Emotions in the constructivist theory are predictions that construct your experience of the world. In chapter 7 you learned that concepts are categories or groupings of linguistic information, images, ideas, or memories, such as life experiences. Barrett extended that to include emotions as concepts that are predictions (Barrett, 2017). Two identical physiological states can result in different emotional states depending on your predictions. For example, your brain predicting a churning stomach in a bakery could lead to you constructing hunger. However, your brain predicting a churning stomach while you were waiting for medical test results could lead your brain to construct worry. Thus, you can construct two different emotions from the same physiological sensations. Rather than emotions being something over which you have no control, you can control and influence your emotions.

Note

Watch this video in which Dr. Barrett explains constructed emotions to learn more.

Two other prominent views arise from the work of Robert Zajonc and Joseph LeDoux. Zajonc asserted that some emotions occur separately from or prior to our cognitive interpretation of them, such as feeling fear in response to an unexpected loud sound (Zajonc, 1998). He also believed in what we might casually refer to as a gut feeling—that we can experience an instantaneous and unexplainable like or dislike for someone or something (Zajonc, 1980). LeDoux also views some emotions as requiring no cognition: some emotions completely bypass contextual interpretation. His research into the neuroscience of emotion has

demonstrated the amygdala's primary role in fear (Cunha, Monfils, & LeDoux, 2010; LeDoux 1996, 2002). A fear stimulus is processed by the brain through one of two paths: from the thalamus (where it is perceived) directly to the amygdala or from the thalamus through the cortex and then to the amygdala. The first path is quick, while the second enables more processing about details of the stimulus. In the following section, we will look more closely at the neuroscience of emotional response.

The Biology of Emotions

Earlier, you learned about the **limbic system**, which is the area of the brain involved in emotion and memory (See figure 10.22). The limbic system includes the hypothalamus, thalamus, amygdala, and the hippocampus. The hypothalamus plays a role in the activation of the sympathetic nervous system that is a part of any given emotional reaction. The thalamus serves as a sensory relay center whose neurons project to both the amygdala and the higher cortical regions for further processing. The amygdala plays a role in processing emotional information and sending that information on to cortical structures (Fossati, 2012).The hippocampus integrates emotional experience with cognition (Femenía, Gómez-Galán, Lindskog, & Magara, 2012).

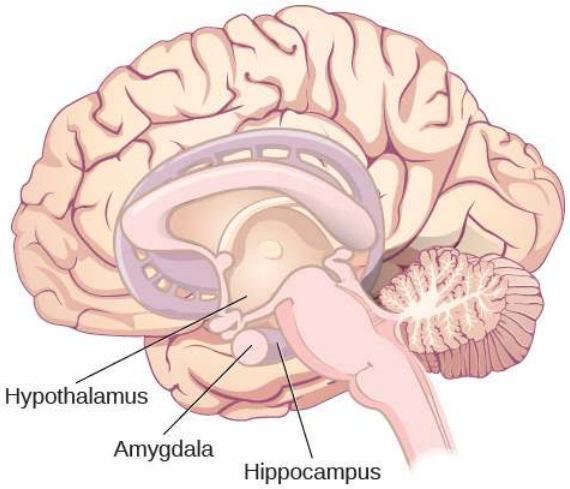


Figure 10.22 The limbic system, which includes the hypothalamus, thalamus, amygdala, and the hippocampus, is involved in mediating emotional response and memory.

Link to Learning

Work through this Open Colleges interactive 3D brain simulator for a refresher on the brain's parts and their functions. To begin, click the "Start Exploring" button. To access the limbic system, click the plus sign in the right-hand menu (set of three tabs).

Amygdala

The **amygdala** has received a great deal of attention from researchers interested in understanding the biological basis for emotions, especially fear and anxiety (Blackford & Pine, 2012; Goosens & Maren, 2002; Maren, Phan, & Liberzon, 2013). The amygdala is composed of various subnuclei, including the basolateral complex and the central nucleus (See figure 10.23). The **basolateral complex** has dense connections with a variety of sensory areas of the brain. It is critical for classical conditioning and for attaching emotional value to learning processes and memory. The **central nucleus** plays a role in attention, and it has connections with the hypothalamus and various brainstem areas to regulate the autonomic nervous and endocrine systems' activity (Pessoa, 2010).

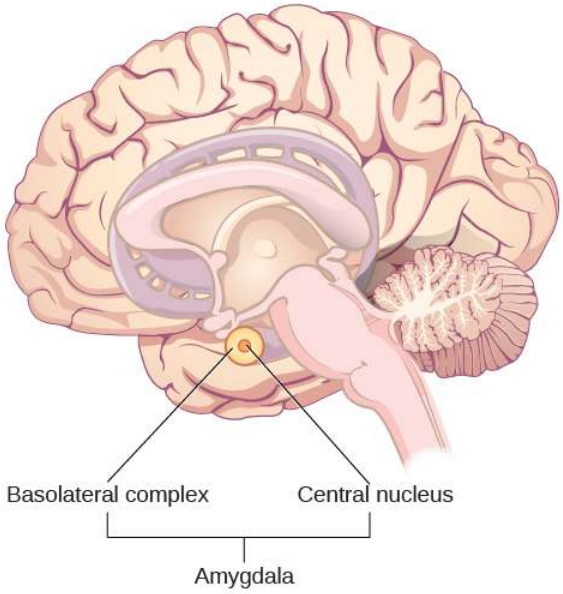


Figure 10.23 The anatomy of the basolateral complex and central nucleus of the amygdala are illustrated in this diagram.

Animal research has demonstrated that there is increased activation of the amygdala in rat pups that have odor cues paired with electrical shock when their mother is absent. This leads to an aversion to the odor cue that suggests the rats learned to fear the odor cue. Interestingly, when the mother was present, the rats actually showed a preference for the odor cue despite its association with an electrical shock. This preference was associated with no increases in amygdala activation. This suggests a differential effect on the amygdala by the *context* (the presence or absence of the mother) determined whether the pups learned to fear the odor or to be attracted to it (Moriceau & Sullivan, 2006).

Raineki, Cortés, Belnoue, and Sullivan (2012) demonstrated that, in rats, negative early life experiences could alter the function of the amygdala and result in adolescent patterns of behavior that mimic human mood disorders. In this study, rat pups received either abusive or normal treatment during postnatal days $8-12$. There were two forms of abusive treatment. The first form of abusive treatment had an insufficient bedding condition. The mother rat had insufficient bedding material in her cage to build a proper nest that resulted in her spending more time away from her pups trying to construct a nest and less times nursing her pups. The second form of abusive treatment had an associative learning task that involved pairing odors and an electrical stimulus in the absence of the mother, as described above. The control group was in a cage with sufficient bedding and was left undisturbed with their mothers during the same time period. The rat pups that experienced abuse were much more likely to exhibit depressive-like symptoms during adolescence when compared to controls. These depressive-like behaviors were associated with increased activation of the amygdala.

Human research also suggests a relationship between the amygdala and psychological disorders of mood or anxiety. Changes in amygdala structure and function have been demonstrated in adolescents who are either at-risk or have been diagnosed with various mood and/or anxiety disorders (Miguel-Hidalgo, 2013; Qin et al., 2013). It has also been suggested that functional differences in the amygdala could serve as a biomarker to differentiate individuals suffering from bipolar disorder from those suffering from major depressive disorder (Fournier, Keener, Almeida, Kronhaus, & Phillips, 2013).

Hippocampus

As mentioned earlier, the **hippocampus** is also involved in emotional processing. Like the amygdala, research has demonstrated that hippocampal structure and function are linked to a variety of mood and anxiety disorders. Individuals suffering from posttraumatic stress disorder (PTSD) show marked reductions in the volume of several parts of the hippocampus, which may result from decreased levels of neurogenesis and dendritic branching (the generation of new neurons and the generation of new dendrites in existing neurons, respectively) (Wang et al., 2010). While it is impossible to make a causal claim with correlational research like this, studies have demonstrated behavioral improvements and hippocampal volume increases following either pharmacological or cognitive-behavioral therapy in individuals suffering from PTSD (Bremner & Vermetten, 2004; Levy-Gigi, Szabó, Kelemen, & Kéri, 2013).

Facial Expression and Recognition of Emotions

Culture can impact the way in which people display emotion. A **cultural display rule** is one of a collection of culturally specific standards that govern the types and frequencies of displays of emotions that are acceptable (Malatesta & Haviland, 1982). Therefore, people from varying cultural backgrounds can have very different cultural display rules of emotion. For example, research has shown that individuals from the United States express negative emotions like fear, anger, and disgust both alone and in the presence of others, while Japanese individuals only do so while alone (Matsumoto, 1990). Furthermore, individuals from cultures that tend to emphasize social cohesion are more likely to engage in suppression of emotional reaction so they can evaluate which response is most appropriate in a given context (Matsumoto, Yoo, & Nakagawa, 2008).

Other distinct cultural characteristics might be involved in emotionality. For instance, there may be gender differences involved in emotional processing. While research into gender differences in emotional display is equivocal, there is some evidence that men and women may differ in regulation of emotions (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008).

Paul Ekman (1972) researched a New Guinea man who was living in a preliterate culture using stone implements, and which was isolated and had never seen any outsiders before. Ekman asked the man to show what his facial expression would be if: (1) friends visited, (2) his child had just died, (3) he was about to fight, (4) he stepped on a smelly dead pig. After Ekman's return from New Guinea, he researched facial expressions for more than four decades. Despite different emotional display rules, our ability to recognize and produce facial expressions of emotion appears to be universal. In fact, even congenitally blind individuals produce the same facial expression of emotions, despite their never having the opportunity to observe these facial displays of emotion in other people. This would seem to suggest that the pattern of activity in facial muscles involved in generating emotional expressions is universal, and indeed, this idea was suggested in the late 19th century in Charles Darwin's book *The Expression of Emotions in Man and Animals* (1872). In fact, there is substantial evidence for seven universal emotions that are each associated with distinct facial expressions. These include: happiness, surprise, sadness, fright, disgust, contempt, and anger (Figure 10.24) (Ekman & Keltner, 1997).

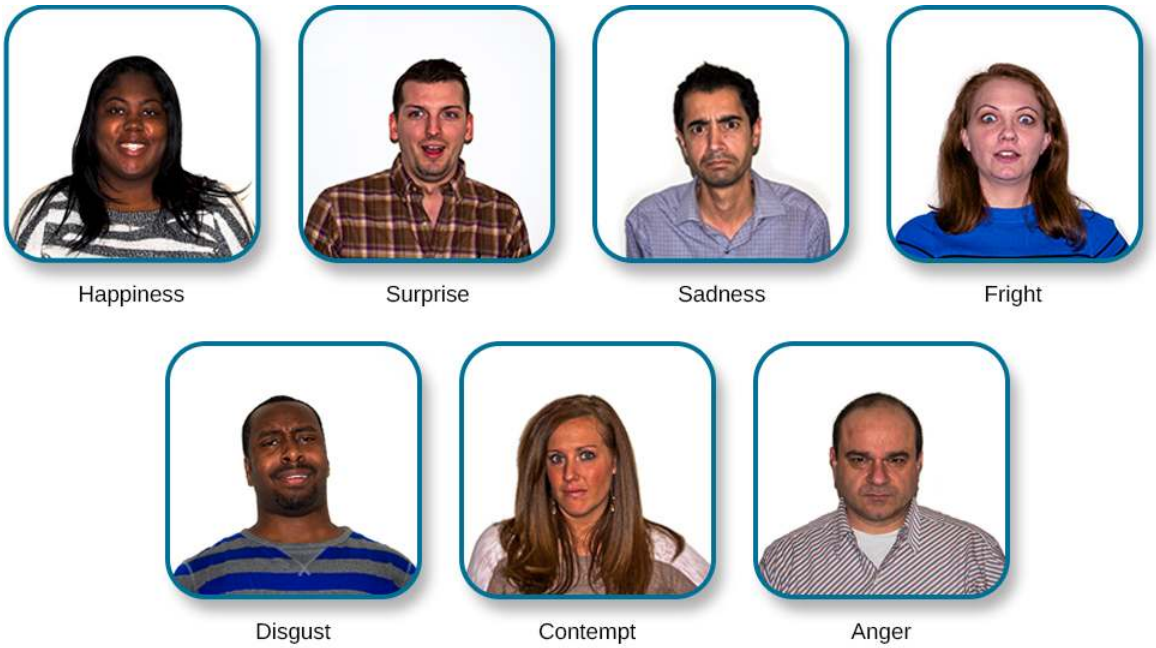


Figure 10.24 The seven universal facial expressions of emotion are shown. (credit: modification of work by Cory Zanker)

Of course, emotion is not only displayed through facial expression. We also use the tone of our voices, various behaviors, and body language to communicate information about our emotional states. **Body language** is the expression of emotion in terms of body position or movement. Research suggests that we are quite sensitive to the emotional information communicated through body language, even if we're not consciously aware of it (de Gelder, 2006; Tamietto et al., 2009).

Link to Learning

Watch this short CNN video about body language in the tense situation of a political debate to learn more. Watch this video to learn how to apply the same concepts to more everyday situations.

CONNECT THE CONCEPTS: Autism Spectrum Disorder and Expression of Emotions

Autism spectrum disorder (ASD) is a set of neurodevelopmental disorders characterized by repetitive behaviors and communication and social problems. Children who have autism spectrum disorders have difficulty recognizing the emotional states of others, and research has shown that this may stem from an inability to distinguish various nonverbal expressions of emotion (i.e., facial expressions) from one another (Hobson, 1986). In addition, there is evidence to suggest that autistic individuals also have difficulty expressing emotion through tone of voice and by producing facial expressions (Macdonald et al., 1989). Difficulties with emotional recognition and expression may contribute to the impaired social interaction and communication that characterize autism; therefore, various therapeutic approaches have been explored to address these difficulties. Various educational curricula, cognitive-behavioral therapies, and pharmacological therapies have shown some promise in helping autistic individuals process emotionally relevant information (Bauminger, 2002; Golan & Baron-Cohen, 2006; Guastella et al., 2010).

Emotion regulation describes how people respond to situations and experiences by modifying their emotional experiences and expressions. Covert emotion regulation strategies are those that occur within the individual, while overt strategies involve others or actions (such as seeking advice or consuming alcohol). Aldao and Dixon (2014) studied the relationship between overt emotional regulation strategies and psychopathology. They researched how 218 undergraduate students reported their use of covert and overt strategies and their reported symptoms associated with selected mental disorders, and found that overt emotional regulation strategies were better predictors of psychopathology than covert strategies. Another study examined the relationship between pregaming (the act of drinking heavily before a social event) and two emotion regulation strategies to understand how these might contribute to alcohol-related problems; results suggested a relationship but a complicated one (Pederson, 2016). Further research is needed in these areas to better understand patterns of adaptive and maladaptive emotion regulation (Aldao & Dixon-Gordon, 2014).

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CHAPTER OVERVIEW

11: Stress, Lifestyle, and Health

Scientific interest in stress, including how we adapt and cope, has been longstanding in psychology; indeed, after nearly a century of research on the topic, much has been learned and many insights have been developed. This chapter examines stress and highlights our current understanding of the phenomenon, including its psychological and physiological natures, its causes and consequences, and the steps we can take to master stress rather than become its victim.

11.1: Introduction

11.2: What Is Stress?

11.3: Stressors

11.4: Stress and Illness

11.5: Regulation of Stress

11.6: The Pursuit of Happiness

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11.1: Introduction

Chapter Outline

14.1 What Is Stress?

14.2 Stressors

14.3 Stress and Illness

14.4 Regulation of Stress

14.5 The Pursuit of Happiness



Figure **11.1.1**: Exams are a stressful, but unavoidable, element of college life. (credit “left”: modification of work by Travis K. Mendoza; credit “center”: modification of work by “albertogp123”/Flickr; credit “right”: modification of work by Jeffrey Pioquinto, SJ)

Few would deny that today’s college students are under a lot of pressure. In addition to many usual stresses and strains incidental to the college experience (e.g., exams, term papers, and the dreaded freshman 15), students today are faced with increased college tuitions, burdensome debt, and difficulty finding employment after graduation. A significant population of non-traditional college students may face additional stressors, such as raising children or holding down a full-time job while working toward a degree.

Of course, life is filled with many additional challenges beyond those incurred in college or the workplace. We might have concerns with financial security, difficulties with friends or neighbors, family responsibilities, and we may not have enough time to do the things we want to do. Even minor hassles—losing things, traffic jams, and loss of internet service—all involve pressure and demands that can make life seem like a struggle and that can compromise our sense of well-being. That is, all can be stressful in some way.

Scientific interest in stress, including how we adapt and cope, has been longstanding in psychology; indeed, after nearly a century of research on the topic, much has been learned and many insights have been developed. This chapter examines stress and highlights our current understanding of the phenomenon, including its psychological and physiological natures, its causes and consequences, and the steps we can take to master stress rather than become its victim.

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11.2: What Is Stress?

Learning Objectives

- Differentiate between stimulus-based and response-based definitions of stress
- Define stress as a process
- Differentiate between good stress and bad stress
- Describe the early contributions of Walter Cannon and Hans Selye to the stress research field
- Understand the physiological basis of stress and describe the general adaptation syndrome

The term "stress" as it relates to the human condition first emerged in scientific literature in the 1930s, but it did not enter the popular vernacular until the 1970s (Lyon, 2012). Today, we often use the term loosely in describing a variety of unpleasant feeling states; for example, we often say we are stressed out when we feel frustrated, angry, conflicted, overwhelmed, or fatigued. Despite the widespread use of the term, stress is a fairly vague concept that is difficult to define with precision.

Researchers have had a difficult time agreeing on an acceptable definition of stress. Some have conceptualized stress as a demanding or threatening event or situation (e.g., a high-stress job, overcrowding, and long commutes to work). Such conceptualizations are known as stimulus-based definitions because they characterize stress as a stimulus that causes certain reactions. Stimulus-based definitions of stress are problematic, however, because they fail to recognize that people differ in how they view and react to challenging life events and situations. For example, a conscientious student who has studied diligently all semester would likely experience less stress during final exams week than would a less responsible, unprepared student.

Others have conceptualized stress in ways that emphasize the physiological responses that occur when faced with demanding or threatening situations (e.g., increased arousal). These conceptualizations are referred to as response-based definitions because they describe stress as a response to environmental conditions. For example, the endocrinologist Hans **Selye**, a famous stress researcher, once defined stress as the “response of the body to any demand, whether it is caused by, or results in, pleasant or unpleasant conditions” (Selye, 1976, p. 74). Selye’s definition of stress is response-based in that it conceptualizes stress chiefly in terms of the body’s physiological reaction to any demand that is placed on it. Neither stimulus-based nor response-based definitions provide a complete definition of stress. Many of the physiological reactions that occur when faced with demanding situations (e.g., accelerated heart rate) can also occur in response to things that most people would not consider to be genuinely stressful, such as receiving unanticipated good news: an unexpected promotion or raise.

A useful way to conceptualize **stress** is to view it as a process whereby an individual perceives and responds to events that he appraises as overwhelming or threatening to his well-being (Lazarus & Folkman, 1984). A critical element of this definition is that it emphasizes the importance of how we appraise—that is, judge—demanding or threatening events (often referred to as **stressors**); these appraisals, in turn, influence our reactions to such events. Two kinds of appraisals of a stressor are especially important in this regard: primary and secondary appraisals. A **primary appraisal** involves judgment about the degree of potential harm or threat to well-being that a stressor might entail. A stressor would likely be appraised as a threat if one anticipates that it could lead to some kind of harm, loss, or other negative consequence; conversely, a stressor would likely be appraised as a challenge if one believes that it carries the potential for gain or personal growth. For example, an employee who is promoted to a leadership position would likely perceive the promotion as a much greater threat if she believed the promotion would lead to excessive work demands than if she viewed it as an opportunity to gain new skills and grow professionally. Similarly, a college student on the cusp of graduation may face the change as a threat or a challenge (See figure 14.2 below).



Figure 14.2 Graduating from college and entering the workforce can be viewed as either a threat (loss of financial support) or a challenge (opportunity for independence and growth). (credit: Timothy Zanker)

The perception of a threat triggers a **secondary appraisal**: judgment of the options available to cope with a stressor, as well as perceptions of how effective such options will be (Lyon, 2012) (See figure 14.3). As you may recall from what you learned about self-efficacy, an individual's belief in his ability to complete a task is important (Bandura, 1994). A threat tends to be viewed as less catastrophic if one believes something can be done about it (Lazarus & Folkman, 1984). Imagine that two middle-aged women, Robin and Maria, perform breast self-examinations one morning and each woman notices a lump on the lower region of her left breast. Although both women view the breast lump as a potential threat (primary appraisal), their secondary appraisals differ considerably. In considering the breast lump, some of the thoughts racing through Robin's mind are, "Oh my God, I could have breast cancer! What if the cancer has spread to the rest of my body and I cannot recover? What if I have to go through chemotherapy? I've heard that experience is awful! What if I have to quit my job? My husband and I won't have enough money to pay the mortgage. Oh, this is just horrible…I can't deal with it!" On the other hand, Maria thinks, "Hmm, this may not be good. Although most times these things turn out to be benign, I need to have it checked out. If it turns out to be breast cancer, there are doctors who can take care of it because the medical technology today is quite advanced. I'll have a lot of different options, and I'll be just fine." Clearly, Robin and Maria have different outlooks on what might turn out to be a very serious situation: Robin seems to think that little could be done about it, whereas Maria believes that, worst case scenario, a number of options that are likely to be effective would be available. As such, Robin would clearly experience greater stress than would Maria.

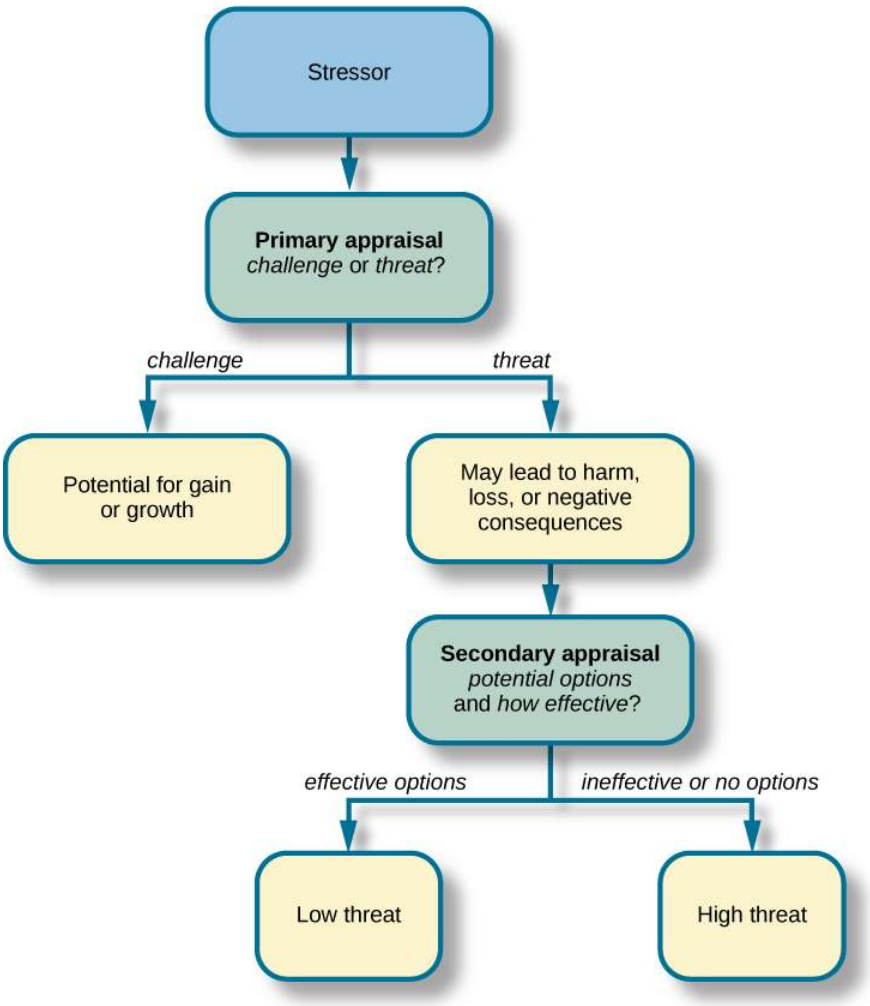


Figure 14.3 When encountering a stressor, a person judges its potential threat (primary appraisal) and then determines if effective options are available to manage the situation. Stress is likely to result if a stressor is perceived as extremely threatening or threatening with few or no effective coping options available.

To be sure, some stressors are inherently more stressful than others in that they are more threatening and leave less potential for variation in cognitive appraisals (e.g., objective threats to one's health or safety). Nevertheless, appraisal will still play a role in augmenting or diminishing our reactions to such events (Everly & Lating, 2002).

If a person appraises an event as harmful and believes that the demands imposed by the event exceed the available resources to manage or adapt to it, the person will subjectively experience a state of stress. In contrast, if one does not appraise the same event as harmful or threatening, she is unlikely to experience stress. According to this definition, environmental events trigger stress reactions by the way they are interpreted and the meanings they are assigned. In short, stress is largely in the eye of the beholder: it's not so much what happens to you as it is how you respond (Selye, 1976).

Good Stress?

Although stress carries a negative connotation, at times it may be of some benefit. Stress can motivate us to do things in our best interests, such as study for exams, visit the doctor regularly, exercise, and perform to the best of our ability at work. Indeed, Selye (1974) pointed out that not all stress is harmful. He argued that stress can sometimes be a positive, motivating force that can improve the quality of our lives. This kind of stress, which Selye called **eustress** (from the Greek *eu* = "good"), is a good kind of stress associated with positive feelings, optimal health, and performance. A moderate amount of stress can be beneficial in challenging situations. For example, athletes may be motivated and energized by pregame stress, and students may experience similar beneficial stress before a major exam. Indeed, research shows that moderate stress can enhance both immediate and delayed recall of educational material. Male participants in one study who memorized a scientific text passage showed improved memory

of the passage immediately after exposure to a mild stressor as well as one day following exposure to the stressor (Hupbach & Fieman, 2012).

Increasing one's level of stress will cause performance to change in a predictable way. As shown in figure 14.4, as stress increases, so do performance and general well-being (eustress); when stress levels reach an optimal level (the highest point of the curve), performance reaches its peak. A person at this stress level is colloquially at the top of his game, meaning he feels fully energized, focused, and can work with minimal effort and maximum efficiency. But when stress exceeds this optimal level, it is no longer a positive force—it becomes excessive and debilitating, or what Selye termed **distress** (from the Latin *dis* = "bad"). People who reach this level of stress feel burned out; they are fatigued, exhausted, and their performance begins to decline. If the stress remains excessive, health may begin to erode as well (Everly & Lating, 2002).

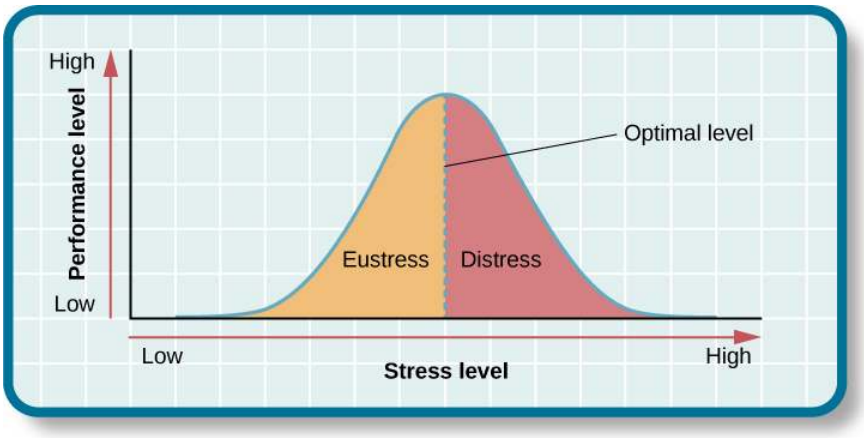


Figure 14.4 As the stress level increases from low to moderate, so does performance (eustress). At the optimal level (the peak of the curve), performance has reached its peak. If stress exceeds the optimal level, it will reach the distress region, where it will become excessive and debilitating, and performance will decline (Everly & Lating, 2002).

The Prevalence of Stress

Stress is everywhere and, as shown in figure 14.5, it has been on the rise over the last several years. Each of us is acquainted with stress—some are more familiar than others. In many ways, stress feels like a load you just can't carry—a feeling you experience when, for example, you have to drive somewhere in a crippling blizzard, when you wake up late the morning of an important job interview, when you run out of money before the next pay period, and before taking an important exam for which you realize you are not fully prepared.

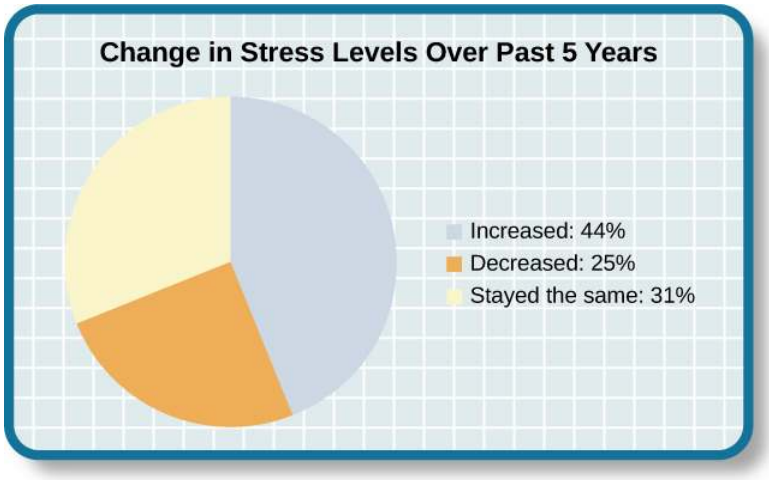


Figure 14.5 Nearly half of U.S. adults indicated that their stress levels have increased over the last five years (Neelakantan, 2013).

Stress is an experience that evokes a variety of responses, including those that are physiological (e.g., accelerated heart rate, headaches, or gastrointestinal problems), cognitive (e.g., difficulty concentrating or making decisions), and behavioral (e.g.,

drinking alcohol, smoking, or taking actions directed at eliminating the cause of the stress). Although stress can be positive at times, it can have deleterious health implications, contributing to the onset and progression of a variety of physical illnesses and diseases (Cohen & Herbert, 1996).

The scientific study of how stress and other psychological factors impact health falls within the realm of **health psychology**, a subfield of psychology devoted to understanding the importance of psychological influences on health, illness, and how people respond when they become ill (Taylor, 1999). Health psychology emerged as a discipline in the 1970s, a time during which there was increasing awareness of the role behavioral and lifestyle factors play in the development of illnesses and diseases (Straub, 2007). In addition to studying the connection between stress and illness, health psychologists investigate issues such as why people make certain lifestyle choices (e.g., smoking or eating unhealthy food despite knowing the potential adverse health implications of such behaviors). Health psychologists also design and investigate the effectiveness of interventions aimed at changing unhealthy behaviors. Perhaps one of the more fundamental tasks of health psychologists is to identify which groups of people are especially at risk for negative health outcomes, based on psychological or behavioral factors. For example, measuring differences in stress levels among demographic groups and how these levels change over time can help identify populations who may have an increased risk for illness or disease.

Figure 14.6 depicts the results of three national surveys in which several thousand individuals from different demographic groups completed a brief stress questionnaire; the surveys were administered in 1983, 2006, and 2009 (Cohen & Janicki-Deverts, 2012). All three surveys demonstrated higher stress in women than in men. Unemployed individuals reported high levels of stress in all three surveys, as did those with less education and income; retired persons reported the lowest stress levels. However, from 2006 to 2009 the greatest increase in stress levels occurred among men, Whites, people aged $45-64$, college graduates, and those with full-time employment. One interpretation of these findings is that concerns surrounding the 2008–2009 economic downturn (e.g., threat of or actual job loss and substantial loss of retirement savings) may have been especially stressful to White, college-educated, employed men with limited time remaining in their working careers.

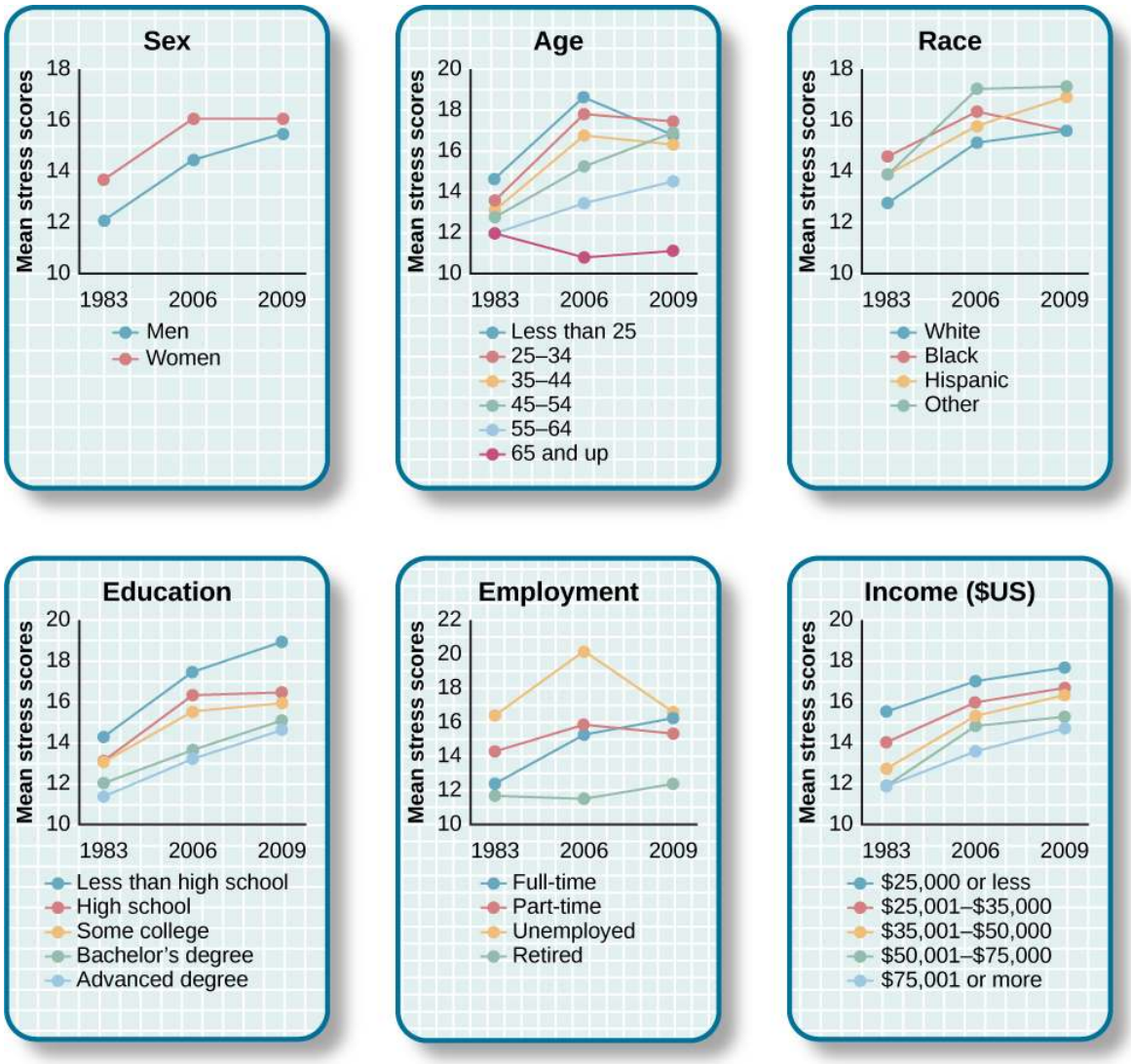


Figure 14.6 The charts above, adapted from Cohen & Janicki-Deverts (2012), depict the mean stress level scores among different demographic groups during the years 1983, 2006, and 2009. Across categories of sex, age, race, education level, employment status, and income, stress levels generally show a marked increase over this quarter-century time span.

Early contributions to the Study of Stress

As previously stated, scientific interest in stress goes back nearly a century. One of the early pioneers in the study of stress was Walter **Cannon**, an eminent American physiologist at Harvard Medical School (See figure 14.7). In the early part of the 20th century, Cannon was the first to identify the body's physiological reactions to stress.

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Figure 14.7 Harvard physiologist Walter Cannon first articulated and named the fight-or-flight response, the nervous system's sympathetic response to a significant stressor.

Cannon and the Fight-or-Flight Response

Imagine that you are hiking in the beautiful mountains of Colorado on a warm and sunny spring day. At one point during your hike, a large, frightening-looking black bear appears from behind a stand of trees and sits about 50 yards from you. The bear notices you, sits up, and begins to lumber in your direction. In addition to thinking, "This is definitely not good," a constellation of physiological reactions begins to take place inside you. Prompted by a deluge of epinephrine (adrenaline) and norepinephrine (noradrenaline) from your adrenal glands, your pupils begin to dilate. Your heart starts to pound and speeds up, you begin to breathe heavily and perspire, you get butterflies in your stomach, and your muscles become tense, preparing you to take some kind of direct action. Cannon proposed that this reaction, which he called the **fight-or-flight response**, occurs when a person experiences very strong emotions—especially those associated with a perceived threat (Cannon, 1932). During the fight-or-flight response, the body is rapidly aroused by activation of both the sympathetic nervous system and the endocrine system (See figure 14.8). This arousal helps prepare the person to either fight or flee from a perceived threat.

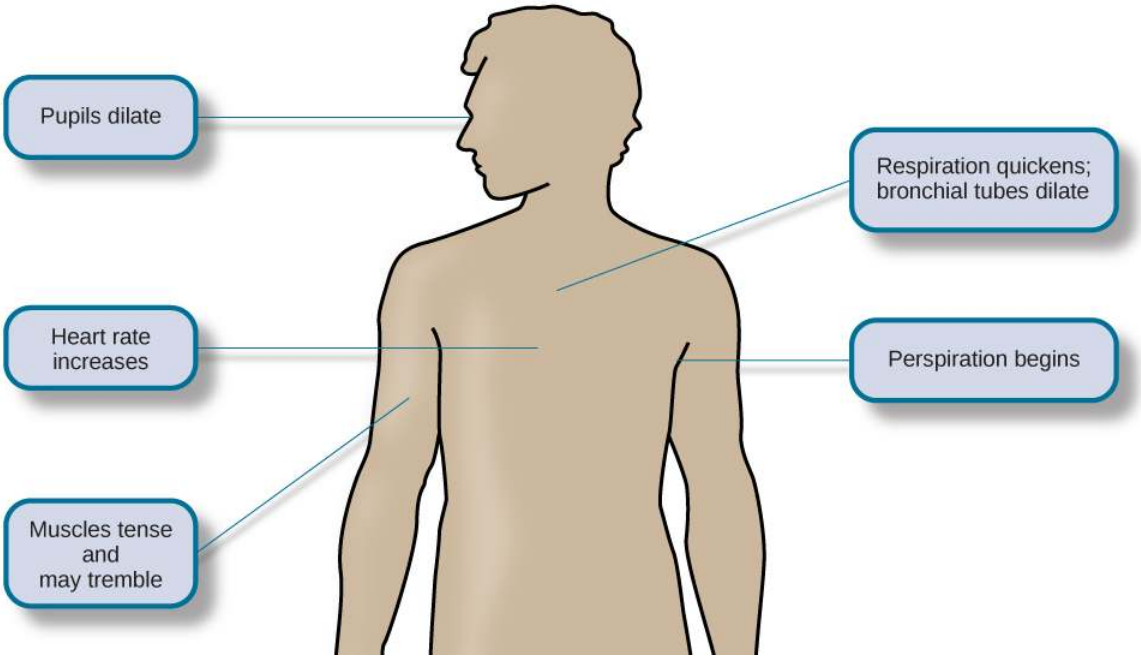


Figure 14.8 Fight or flight is a physiological response to a stressor.

According to Cannon, the fight-or-flight response is a built-in mechanism that assists in maintaining homeostasis—an internal environment in which physiological variables such as blood pressure, respiration, digestion, and temperature are stabilized at levels optimal for survival. Thus, Cannon viewed the fight-or-flight response as adaptive because it enables us to adjust internally and externally to changes in our surroundings, which is helpful in species survival.

Selye and the General Adaptation Syndrome

Another important early contributor to the stress field was Hans **Selye**, mentioned earlier. He would eventually become one of the world's foremost experts in the study of stress (See figure 14.9). As a young assistant in the biochemistry department at McGill University in the 1930s, Selye was engaged in research involving sex hormones in rats. Although he was unable to find an answer for what he was initially researching, he incidentally discovered that when exposed to prolonged negative stimulation (stressors)—such as extreme cold, surgical injury, excessive muscular exercise, and shock—the rats showed signs of adrenal enlargement, thymus and lymph node shrinkage, and stomach ulceration. Selye realized that these responses were triggered by a coordinated series of physiological reactions that unfold over time during continued exposure to a stressor. These physiological reactions were nonspecific, which means that regardless of the type of stressor, the same pattern of reactions would occur. What Selye discovered was the **general adaptation syndrome**, the body's nonspecific physiological response to stress.



Figure 14.9 Hans Selye specialized in research about stress. In 2009, his native Hungary honored his work with this stamp, released in conjunction with the 2nd annual World Conference on Stress.

The general adaptation syndrome, shown in figure 14.10, consists of three stages:

1. alarm reaction
2. stage of resistance
3. stage of exhaustion (Selye, 1936; 1976).

Alarm reaction describes the body's immediate reaction upon facing a threatening situation or emergency, and it is roughly analogous to the fight-or-flight response described by Cannon. During an alarm reaction, you are alerted to a stressor, and your body alarms you with a cascade of physiological reactions that provide you with the energy to manage the situation. A person who wakes up in the middle of the night to discover her house is on fire, for example, is experiencing an alarm reaction.

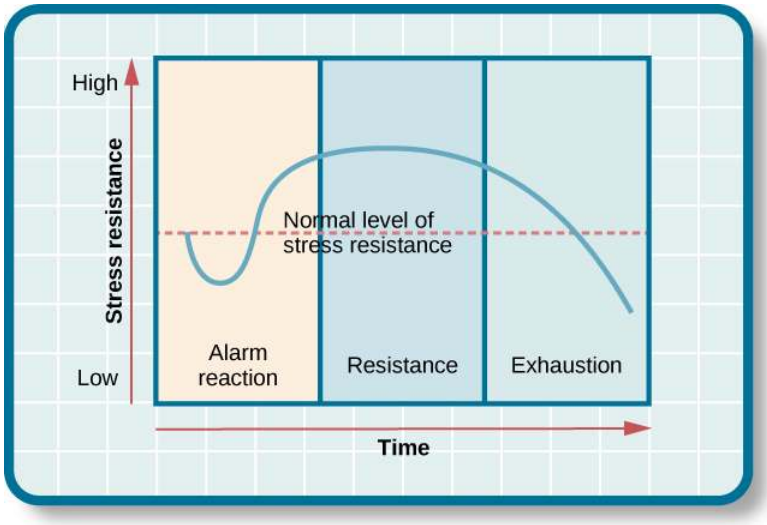


Figure 14.10 The three stages of Selye's general adaptation syndrome are shown in this graph. Prolonged stress ultimately results in exhaustion.

If exposure to a stressor is prolonged, the organism will enter the **stage of resistance**. During this stage, the initial shock of alarm reaction has worn off and the body has adapted to the stressor. Nevertheless, the body also remains on alert and is prepared to respond as it did during the alarm reaction, although with less intensity. For example, suppose a child who went missing is still

missing 72 hours later. Although the parents would obviously remain extremely disturbed, the magnitude of physiological reactions would likely have diminished over the 72 intervening hours due to some adaptation to this event.

If exposure to a stressor continues over a longer period of time, the **stage of exhaustion** ensues. At this stage, the person is no longer able to adapt to the stressor: the body's ability to resist becomes depleted as physical wear takes its toll on the body's tissues and organs. As a result, illness, disease, and other permanent damage to the body—even death—may occur. If a missing child still remained missing after three months, the long-term stress associated with this situation may cause a parent to literally faint with exhaustion at some point or even to develop a serious and irreversible illness.

In short, Selye's general adaptation syndrome suggests that stressors tax the body via a three-phase process—an initial jolt, subsequent readjustment, and a later depletion of all physical resources—that ultimately lays the groundwork for serious health problems and even death. It should be pointed out, however, that this model is a response-based conceptualization of stress, focusing exclusively on the body's physical responses while largely ignoring psychological factors such as appraisal and interpretation of threats. Nevertheless, Selye's model has had an enormous impact on the field of stress because it offers a general explanation for how stress can lead to physical damage and, thus, disease. As we shall discuss later, prolonged or repeated stress has been implicated in development of a number of disorders such as hypertension and coronary artery disease.

The Physiological Basis of Stress

What goes on inside our bodies when we experience stress? The physiological mechanisms of stress are extremely complex, but they generally involve the work of two systems—the **sympathetic nervous system** and the **hypothalamic-pituitary-adrenal (HPA) axis**. When a person first perceives something as stressful (Selye's alarm reaction), the sympathetic nervous system triggers arousal via the release of adrenaline from the adrenal glands. Release of these hormones activates the fight-or-flight responses to stress, such as accelerated heart rate and respiration. At the same time, the HPA axis, which is primarily endocrine in nature, becomes especially active, although it works much more slowly than the sympathetic nervous system. In response to stress, the hypothalamus (one of the limbic structures in the brain) releases corticotrophin-releasing factor, a hormone that causes the pituitary gland to release adrenocorticotropic hormone (ACTH) (See figure 14.11). The ACTH then activates the adrenal glands to secrete a number of hormones into the bloodstream; an important one is cortisol, which can affect virtually every organ within the body. **Cortisol** is commonly known as a stress hormone and helps provide that boost of energy when we first encounter a stressor, preparing us to run away or fight. However, sustained elevated levels of cortisol weaken the immune system.

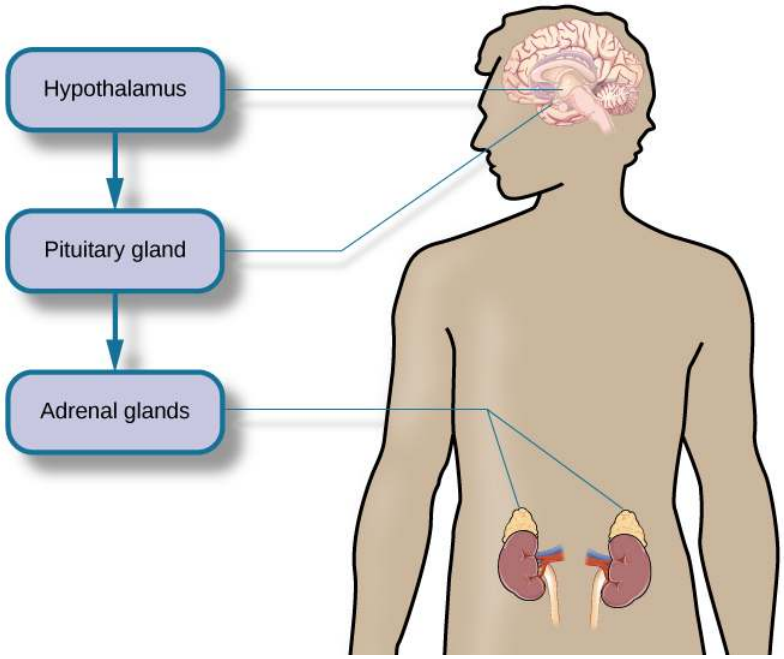


Figure 14.11 This diagram shows the functioning of the hypothalamic-pituitary-adrenal (HPA) axis. The hypothalamus activates the pituitary gland, which in turn activates the adrenal glands, increasing their secretion of cortisol.

In short bursts, this process can have some favorable effects, such as providing extra energy, improving **immune system** functioning temporarily, and decreasing pain sensitivity. However, extended release of cortisol—as would happen with prolonged or chronic stress—often comes at a high price. High levels of cortisol have been shown to produce a number of harmful effects. For example, increases in cortisol can significantly weaken our immune system (Glaser & Kiecolt-Glaser, 2005), and high levels are frequently observed among depressed individuals (Geoffroy, Hertzman, Li, & Power, 2013). In summary, a stressful event causes a variety of physiological reactions that activate the adrenal glands, which in turn release epinephrine, norepinephrine, and cortisol. These hormones affect a number of bodily processes in ways that prepare the stressed person to take direct action, but also in ways that may heighten the potential for illness.

When stress is extreme or chronic, it can have profoundly negative consequences. For example, stress often contributes to the development of certain psychological disorders, including post-traumatic stress disorder, major depressive disorder, and other serious psychiatric conditions. Additionally, we noted earlier that stress is linked to the development and progression of a variety of physical illnesses and diseases. For example, researchers in one study found that people injured during the September 11, 2001, World Trade Center disaster or who developed post-traumatic stress symptoms afterward later suffered significantly elevated rates of heart disease (Jordan, Miller-Archie, Cone, Morabia, & Stellman, 2011). Another investigation yielded that self-reported stress symptoms among aging and retired Finnish food industry workers were associated with morbidity 11 years later. This study also predicted the onset of musculoskeletal, nervous system, and endocrine and metabolic disorders (Salonen, Arola, Nygård, & Huhtala, 2008). Another study reported that male South Korean manufacturing employees who reported high levels of work-related stress were more likely to catch the common cold over the next several months than were those employees who reported lower work-related stress levels (Park et al., 2011). Later, you will explore the mechanisms through which stress can produce physical illness and disease.

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11.3: Stressors

Learning Objectives

- Describe different types of possible stressors
- Explain the importance of life changes as potential stressors
- Describe the Social Readjustment Rating Scale
- Understand the concepts of job strain and job burnout

For an individual to experience **stress**, he must first encounter a potential **stressor**. In general, stressors can be placed into one of two broad categories: chronic and acute. Chronic stressors include events that persist over an extended period of time, such as caring for a parent with dementia, long-term unemployment, or imprisonment. Acute stressors involve brief focal events that sometimes continue to be experienced as overwhelming well after the event has ended, such as falling on an icy sidewalk and breaking your leg (Cohen, Janicki-Deverts, & Miller, 2007). Whether chronic or acute, potential stressors come in many shapes and sizes. They can include major traumatic events, significant life changes, daily hassles, as well as other situations in which a person is regularly exposed to threat, challenge, or danger.

Traumatic Events

Some stressors involve traumatic events or situations in which a person is exposed to actual or threatened death or serious injury. Stressors in this category include exposure to military combat, threatened or actual physical assaults (e.g., physical attacks, sexual assault, robbery, childhood abuse), terrorist attacks, natural disasters (e.g., earthquakes, floods, hurricanes), and automobile accidents. Men, non-Whites, and individuals in lower socioeconomic status (SES) groups report experiencing a greater number of traumatic events than do women, Whites, and individuals in higher SES groups (Hatch & Dohrenwend, 2007). Some individuals who are exposed to stressors of extreme magnitude develop post-traumatic stress disorder (PTSD): a chronic stress reaction characterized by experiences and behaviors that may include intrusive and painful memories of the stressor event, jumpiness, persistent negative emotional states, detachment from others, angry outbursts, and avoidance of reminders of the event (American Psychiatric Association [APA], 2013).

Life Changes

Most stressors that we encounter are not nearly as intense as the ones described above. Many potential stressors we face involve events or situations that require us to make changes in our ongoing lives and require time as we adjust to those changes. Examples include death of a close family member, marriage, divorce, and moving. See figure below:



Figure 14.12 Some fairly typical life events, such as moving, can be significant stressors. Even when the move is intentional and positive, the amount of resulting change in daily life can cause stress. (credit: "Jellaluna"/Flickr)

In the 1960s, psychiatrists Thomas **Holmes** and Richard **Rahe** wanted to examine the link between life stressors and physical illness, based on the hypothesis that life events requiring significant changes in a person's normal life routines are stressful, whether these events are desirable or undesirable. They developed the **Social Readjustment Rating Scale (SRRS)**, consisting of **43** life events that require varying degrees of personal readjustment (Holmes & Rahe, 1967). Many life events that most people would consider pleasant (e.g., holidays, retirement, marriage) are among those listed on the SRRS; these are examples of eustress. Holmes and Rahe also proposed that life events can add up over time, and that experiencing a cluster of stressful events increases one's risk of developing physical illnesses.

In developing their scale, Holmes and Rahe asked 394 participants to provide a numerical estimate for each of the 43 items; each estimate corresponded to how much readjustment participants felt each event would require. These estimates resulted in mean value scores for each event—often called life change units (LCUs) (Rahe, McKeen, & Arthur, 1967). The numerical scores ranged from 11 to 100, representing the perceived magnitude of life change each event entails. Death of a spouse ranked highest on the scale with 100 LCUs, and divorce ranked second highest with 73 LCUs. In addition, personal injury or illness, marriage, and job termination also ranked highly on the scale with 53, 50, and 47 LCUs, respectively. Conversely, change in residence (20 LCUs), change in eating habits (15 LCUs), and vacation (13 LCUs) ranked low on the scale (See Table 14.1 below). Minor violations of the law ranked the lowest with 11 LCUs. To complete the scale, participants checked yes for events experienced within the last 12 months. LCUs for each checked item are totaled for a score quantifying the amount of life change. Agreement on the amount of adjustment required by the various life events on the SRRS is highly consistent, even cross-culturally (Holmes & Masuda, 1974).

Table 14.1 *Some Stressors on the Social Readjustment Rating Scale (Holmes & Rahe, 1967)*

Life event	Life change units
Death of a close family member	63
Personal injury or illness	53
Dismissal from work	47
Change in financial state	38
Change to different line of work	36
Outstanding personal achievement	28
Beginning or ending school	26
Change in living conditions	25
Change in working hours or conditions	20
Change in residence	20
Change in schools	20
Change in social activities	18
Change in sleeping habits	16
Change in eating habits	15
Minor violation of the law	11

Extensive research has demonstrated that accumulating a high number of life change units within a brief period of time (one or two years) is related to a wide range of physical illnesses (even accidents and athletic injuries) and mental health problems (Monat & Lazarus, 1991; Scully, Tosi, & Banning, 2000). In an early demonstration, researchers obtained LCU scores for U.S. and Norwegian Navy personnel who were about to embark on a six-month voyage. A later examination of medical records revealed positive (but small) correlations between LCU scores prior to the voyage and subsequent illness symptoms during the ensuing six-month journey (Rahe, 1974). In addition, people tend to experience more physical symptoms, such as backache, upset stomach, diarrhea, and acne, on specific days in which self-reported LCU values are considerably higher than normal, such as the day of a family member's wedding (Holmes & Holmes, 1970).

The Social Readjustment Rating Scale (SRRS) provides researchers a simple, easy-to-administer way of assessing the amount of stress in people's lives, and it has been used in hundreds of studies (Thoits, 2010). Despite its widespread use, the scale has been subject to criticism. First, many of the items on the SRRS are vague; for example, death of a close friend could involve the death of a long-absent childhood friend that requires little social readjustment (Dohrenwend, 2006). In addition, some have challenged its assumption that undesirable life events are no more stressful than desirable ones (Derogatis & Coons, 1993). However, most of the

available evidence suggests that, at least as far as mental health is concerned, undesirable or negative events are more strongly associated with poor outcomes (such as depression) than are desirable, positive events (Hatch & Dohrenwend, 2007). Perhaps the most serious criticism is that the scale does not take into consideration respondents' appraisals of the life events it contains. As you recall, appraisal of a stressor is a key element in the conceptualization and overall experience of stress. Being fired from work may be devastating to some but a welcome opportunity to obtain a better job for others. The SRRS remains one of the most well-known instruments in the study of stress, and it is a useful tool for identifying potential stress-related health outcomes (Scully et al., 2000).

Link to Learning

Go to this site and complete the SRRS scale to determine the total number of LCUs you have experienced over the last year.

CONNECT THE CONCEPTS: Correlational Research

The Holmes and Rahe Social Readjustment Rating Scale (SRRS) uses the **correlational research** method to identify the connection between stress and health. That is, respondents' LCU scores are correlated with the number or frequency of self-reported symptoms indicating health problems. These correlations are typically positive—as LCU scores increase, the number of symptoms increase. Consider all the thousands of studies that have used this scale to correlate stress and illness symptoms: If you were to assign an average correlation coefficient to this body of research, what would be your best guess? How strong do you think the correlation coefficient would be? Why can't the SRRS show a causal relationship between stress and illness? If it were possible to show causation, do you think stress causes illness or illness causes stress?

Hassles

Potential stressors do not always involve major life events. **Daily hassles**—the minor irritations and annoyances that are part of our everyday lives (e.g., rush hour traffic, lost keys, obnoxious coworkers, inclement weather, arguments with friends or family)—can build on one another and leave us just as stressed as life change events (See figure 14.13) (Kanner, Coyne, Schaefer, & Lazarus, 1981).



(a) (b)

Figure 14.13 Daily commutes, whether (a) on the road or (b) via public transportation, can be hassles that contribute to our feelings of everyday stress. (credit a: modification of work by Jeff Turner; credit b: modification of work by "epSos.de"/Flickr)

Researchers have demonstrated that the frequency of daily hassles is actually a better predictor of both physical and psychological health than are life change units. In a well-known study of San Francisco residents, the frequency of daily hassles was found to be more strongly associated with physical health problems than were life change events (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982). In addition, daily minor hassles, especially interpersonal conflicts, often lead to negative and distressed mood states (Bolger, DeLongis, Kessler, & Schilling, 1989). Cyber hassles that occur on social media may represent a new source of stress. In one investigation, undergraduates who, over a 10-week period, reported greater Facebook-induced stress (e.g., guilt or discomfort over rejecting friend requests and anger or sadness over being unfriended by another) experienced increased rates of upper respiratory infections, especially if they had larger social networks (Campisi et al., 2012). Clearly, daily hassles can add up and take a toll on us both emotionally and physically.

Other Stressors

Stressors can include situations in which one is frequently exposed to challenging and unpleasant events, such as difficult, demanding, or unsafe working conditions. Although most jobs and occupations can at times be demanding, some are clearly more stressful than others (See figure 14.14). For example, most people would likely agree that a firefighter's work is inherently more

stressful than that of a florist. Equally likely, most would agree that jobs containing various unpleasant elements, such as those requiring exposure to loud noise (heavy equipment operator), constant harassment and threats of physical violence (prison guard), perpetual frustration (bus driver in a major city), or those mandating that an employee work alternating day and night shifts (hotel desk clerk), are much more demanding—and thus, more stressful—than those that do not contain such elements. The Table 14.2 below lists several occupations and some of the specific stressors associated with those occupations (Sulsky & Smith, 2005).



(a)



(b)

Figure 14.14 (a) Police officers and (b) firefighters hold high stress occupations. (credit a: modification of work by Australian Civil-Military Centre; credit b: modification of work by Andrew Magill)

Table 14.2 Occupations and Their Related Stressors

Occupation	Stressors Specific to Occupation (Sulsky & Smith, 2005)
Police officer	physical dangers, excessive paperwork, red tape, dealing with court system, coworker and supervisor conflict, lack of support from the public
Firefighter	uncertainty over whether a serious fire or hazard awaits after an alarm
Social worker	little positive feedback from jobs or from the public, unsafe work environments, frustration in dealing with bureaucracy, excessive paperwork, sense of personal responsibility for clients, work overload
Teacher	Excessive paperwork, lack of adequate supplies or facilities, work overload, lack of positive feedback, vandalism, threat of physical violence
Nurse	Work overload, heavy physical work, patient concerns (dealing with death and medical concerns), interpersonal problems with other medical staff (especially physicians)
Emergency medical worker	Unpredictable and extreme nature of the job, inexperience
Air traffic controller	Little control over potential crisis situations and workload, fear of causing an accident, peak traffic situations, general work environment
Clerical and secretarial work	Little control over job mobility, unsupportive supervisors, work overload, lack of perceived control
Managerial work	Work overload, conflict and ambiguity in defining the managerial role, difficult work relationships

Although the specific stressors for these occupations are diverse, they seem to share two common denominators: heavy workload and uncertainty about and lack of control over certain aspects of a job. Both of these factors contribute to **job strain**, a work situation that combines excessive job demands and workload with little discretion in decision making or job control (Karasek & Theorell, 1990). Clearly, many occupations other than the ones listed in Table 14.2 involve at least a moderate amount of job strain

in that they often involve heavy workloads and little job control (e.g., inability to decide when to take breaks). Such jobs are often low-status and include those of factory workers, postal clerks, supermarket cashiers, taxi drivers, and short-order cooks. Job strain can have adverse consequences on both physical and mental health; it has been shown to be associated with increased risk of hypertension (Schnall & Landsbergis, 1994), heart attacks (Theorell et al., 1998), recurrence of heart disease after a first heart attack (Aboa-Éboulé et al., 2007), significant weight loss or gain (Kivimäki et al., 2006), and major depressive disorder (Stansfeld, Shipley, Head, & Fuhrer, 2012). A longitudinal study of over 10,000 British civil servants reported that workers under 50 years old who earlier had reported high job strain were 68% more likely to later develop heart disease than were those workers under 50 years old who reported little job strain (Chandola et al., 2008).

Some people who are exposed to chronically stressful work conditions can experience **job burnout**, which is a general sense of emotional exhaustion and cynicism in relation to one's job (Maslach & Jackson, 1981). Job burnout occurs frequently among those in human service jobs (e.g., social workers, teachers, therapists, and police officers). Job burnout consists of three dimensions. The first dimension is exhaustion—a sense that one's emotional resources are drained or that one is at the end of her rope and has nothing more to give at a psychological level. Second, job burnout is characterized by depersonalization: a sense of emotional detachment between the worker and the recipients of his services, often resulting in callous, cynical, or indifferent attitudes toward these individuals. Third, job burnout is characterized by diminished personal accomplishment, which is the tendency to evaluate one's work negatively by, for example, experiencing dissatisfaction with one's job-related accomplishments or feeling as though one has categorically failed to influence others' lives through one's work.

Job strain appears to be one of the greatest risk factors leading to job burnout, which is most commonly observed in workers who are older (ages $55-64$), unmarried, and whose jobs involve manual labor. Heavy alcohol consumption, physical inactivity, being overweight, and having a physical or lifetime mental disorder are also associated with job burnout (Ahola, et al., 2006). In addition, depression often co-occurs with job burnout. One large-scale study of over $3,000$ Finnish employees reported that half of the participants with severe job burnout had some form of depressive disorder (Ahola et al., 2005). Job burnout is often precipitated by feelings of having invested considerable energy, effort, and time into one's work while receiving little in return (e.g., little respect or support from others or low pay) (Tatris, Peeters, Le Blanc, Schreurs, & Schaufeli, 2001).

As an illustration, consider CharlieAnn, a nursing assistant who worked in a nursing home. CharlieAnn worked long hours for little pay in a difficult facility. Her supervisor was domineering, unpleasant, and unsupportive; he was disrespectful of CharlieAnn's personal time, frequently informing her at the last minute she must work several additional hours after her shift ended or that she must report to work on weekends. CharlieAnn had very little autonomy at her job. She had little say in her day-to-day duties and how to perform them, and she was not permitted to take breaks unless her supervisor explicitly told her that she could. CharlieAnn did not feel as though her hard work was appreciated, either by supervisory staff or by the residents of the home. She was very unhappy over her low pay, and she felt that many of the residents treated her disrespectfully.

After several years, CharlieAnn began to hate her job. She dreaded going to work in the morning, and she gradually developed a callous, hostile attitude toward many of the residents. Eventually, she began to feel as though she could no longer help the nursing home residents. CharlieAnn's absenteeism from work increased, and one day she decided that she had had enough and quit. She now has a job in sales, vowing never to work in nursing again.

Link to Learning

Watch this clip from the 1999 comedy *Office Space* for a humorous illustration of lack of supervisory support in which a sympathetic character's insufferable boss makes a last-minute demand that he "go ahead and come in" to the office on both Saturday and Sunday.

Finally, our close relationships with friends and family—particularly the negative aspects of these relationships—can be a potent source of stress. Negative aspects of close relationships can include adverse exchanges and conflicts, lack of emotional support or confiding, and lack of reciprocity. All of these can be overwhelming, threatening to the relationship, and thus stressful. Such stressors can take a toll both emotionally and physically. A longitudinal investigation of over $9,000$ British civil servants found that those who at one point had reported the highest levels of negative interactions in their closest relationship were 34% more likely to experience serious heart problems (fatal or nonfatal heart attacks) over a $13-15$ year period, compared to those who experienced the lowest levels of negative interaction (De Vogli, Chandola & Marmot, 2007).

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11.4: Stress and Illness

Learning Objectives

- Explain the nature of psychophysiological disorders
- Describe the immune system and how stress impacts its functioning
- Describe how stress and emotional factors can lead to the development and exacerbation of cardiovascular disorders, asthma, and tension headaches

In this section, we will discuss **stress** and illness. As stress researcher Robert Sapolsky (1998) describes,

> *"stress-related disease emerges, predominantly, out of the fact that we so often activate a physiological system that has evolved for responding to acute physical emergencies, but we turn it on for months on end, worrying about mortgages, relationships, and promotions". (p. 6)*

The stress response, as noted earlier, consists of a coordinated but complex system of physiological reactions that are called upon as needed. These reactions are beneficial at times because they prepare us to deal with potentially dangerous or threatening situations (for example, recall our old friend, the fearsome bear on the trail). However, health is affected when physiological reactions are sustained, as can happen in response to ongoing stress.

Psychophysiological Disorders

If the reactions that compose the stress response are chronic or if they frequently exceed normal ranges, they can lead to cumulative wear and tear on the body, in much the same way that running your air conditioner on full blast all summer will eventually cause wear and tear on it. For example, the high blood pressure that a person under considerable job strain experiences might eventually take a toll on his heart and set the stage for a heart attack or heart failure. Also, someone exposed to high levels of the stress hormone cortisol might become vulnerable to infection or disease because of weakened immune system functioning (McEwen, 1998).

Link to learning

Neuroscientists Robert Sapolsky and Carol Shively have conducted extensive research on stress in non-human primates for over 30 years. Both have shown that position in the social hierarchy predicts stress, mental health status, and disease. Their research sheds light on how stress may lead to negative health outcomes for stigmatized or ostracized people. Here are two videos featuring Dr. Sapolsky: one is regarding killer stress and the other is an excellent in-depth documentary from *National Geographic*.

Physical disorders or diseases whose symptoms are brought about or worsened by stress and emotional factors are called **psychophysiological disorders**. The physical symptoms of psychophysiological disorders are real and they can be produced or exacerbated by psychological factors (hence the *psycho* and *physiological* in psychophysiological). A list of frequently encountered psychophysiological disorders is provided in the Table 14.3 below:

Table ***14.3*** Types of Psychophysiological Disorders (adapted from Everly & Lating, 2002)

Type of Psychophysiological Disorder	Examples
Cardiovascular	hypertension, coronary heart disease
Gastrointestinal	irritable bowel syndrome
Respiratory	asthma, allergy
Musculoskeletal	low back pain, tension headaches
Skin	acne, eczema, psoriasis

Friedman and Booth-Kewley (1987) statistically reviewed 101 studies to examine the link between personality and illness. They proposed the existence of disease-prone personality characteristics, including depression, anger/hostility, and anxiety. Indeed, a study of over 61,000 Norwegians identified depression as a risk factor for all major disease-related causes of death (Mykletun et al., 2007). In addition, neuroticism—a personality trait that reflects how anxious, moody, and sad one is—has been identified as a risk factor for chronic health problems and mortality (Ploubidis & Grundy, 2009).

Below, we discuss two kinds of psychophysiological disorders about which a great deal is known: cardiovascular disorders and asthma. First, however, it is necessary to turn our attention to a discussion of the immune system—one of the major pathways through which stress and emotional factors can lead to illness and disease.

Everyday Connection: Social States, Stress, and Health Care

Psychologists have long been aware that social status (e.g., wealth, privilege) is intimately tied to stress, health, and well-being. Some factors that contribute to high stress and poor health among people with lower social status include lack of control and predictability (e.g., greater unemployment) and resource inequality (e.g., less access to health care and other community resources) (Marmot & Sapolsky, 2014).

In the United States, resource inequalities tied to social status often create race and gender differences in health care. For example, African American women have the highest rates of emergency room visits and unmet health care needs compared to any other group, and this disparity increased significantly from 2006 to 2014 (Manuel, 2018). Lesbian, gay, bisexual, and transgender youth often experience poor quality of care as a result of stigma, lack of understanding, and insensitivity among health care professionals (Hafeez, Zeshan, Tahir, Jahan, & Naveed, 2017). One goal of the U.S. government's Healthy People 2020 initiative is to eliminate gender and race disparities in health care. Their interactive dataset provides an updated snapshot of health disparities: https://www.healthypeople.gov/2020/d...sparities-data.

Stress and the Immune System

In a sense, the **immune system** is the body's surveillance system. It consists of a variety of structures, cells, and mechanisms that serve to protect the body from invading toxins and microorganisms that can harm or damage the body's tissues and organs. When the immune system is working as it should, it keeps us healthy and disease free by eliminating bacteria, viruses, and other foreign substances that have entered the body (Everly & Lating, 2002).

Immune System Errors

Sometimes, the immune system will function erroneously. For example, sometimes it can go awry by mistaking your body's own healthy cells for invaders and repeatedly attacking them. When this happens, the person is said to have an autoimmune disease, which can affect almost any part of the body. How an autoimmune disease affects a person depends on what part of the body is targeted. For instance, rheumatoid arthritis, an autoimmune disease that affects the joints, results in joint pain, stiffness, and loss of function. Systemic lupus erythematosus, an autoimmune disease that affects the skin, can result in rashes and swelling of the skin. Grave's disease, an autoimmune disease that affects the thyroid gland, can result in fatigue, weight gain, and muscle aches (National Institute of Arthritis and Musculoskeletal and Skin Diseases [NIAMS], 2012).

In addition, the immune system may sometimes break down and be unable to do its job. This situation is referred to as **immunosuppression**, the decreased effectiveness of the immune system. When people experience immunosuppression, they become susceptible to any number of infections, illness, and diseases. For example, acquired immune deficiency syndrome (AIDS) is a serious and lethal disease that is caused by human immunodeficiency virus (HIV), which greatly weakens the immune system by infecting and destroying antibody-producing cells, thus rendering a person vulnerable to any of a number of opportunistic infections (Powell, 1996).

Stressors and Immune Function

The question of whether stress and negative emotional states can influence immune function has captivated researchers for over three decades, and discoveries made over that time have dramatically changed the face of health psychology (Kiecolt-Glaser, 2009). **Psychoneuroimmunology** is the field that studies how psychological factors such as stress influence the immune system and immune functioning. The term psychoneuroimmunology was first coined in 1981, when it appeared as the title of a book that

reviewed available evidence for associations between the brain, endocrine system, and immune system (Zacharie, 2009). To a large extent, this field evolved from the discovery that there is a connection between the central nervous system and the immune system.

Some of the most compelling evidence for a connection between the brain and the immune system comes from studies in which researchers demonstrated that immune responses in animals could be classically conditioned (Everly & Lating, 2002). For example, Ader and Cohen (1975) paired flavored water (the conditioned stimulus) with the presentation of an immunosuppressive drug (the unconditioned stimulus), causing sickness (an unconditioned response). Not surprisingly, rats exposed to this pairing developed a conditioned aversion to the flavored water. However, the taste of the water itself later produced immunosuppression (a conditioned response), indicating that the immune system itself had been conditioned. Many subsequent studies over the years have further demonstrated that immune responses can be classically conditioned in both animals and humans (Ader & Cohen, 2001). Thus, if classical conditioning can alter immunity, other psychological factors should be capable of altering it as well.

Hundreds of studies involving tens of thousands of participants have tested many kinds of brief and chronic stressors and their effect on the immune system (e.g., public speaking, medical school examinations, unemployment, marital discord, divorce, death of spouse, burnout and job strain, caring for a relative with Alzheimer's disease, and exposure to the harsh climate of Antarctica). It has been repeatedly demonstrated that many kinds of stressors are associated with poor or weakened immune functioning (Glaser & Kiecolt-Glaser, 2005; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Segerstrom & Miller, 2004).

When evaluating these findings, it is important to remember that there is a tangible physiological connection between the brain and the immune system. For example, the sympathetic nervous system innervates immune organs such as the thymus, bone marrow, spleen, and even lymph nodes (Maier, Watkins, & Fleshner, 1994). Also, we noted earlier that stress hormones released during hypothalamic-pituitary-adrenal (HPA) axis activation can adversely impact immune function. One way they do this is by inhibiting the production of **lymphocytes**, white blood cells that circulate in the body's fluids that are important in the immune response (Everly & Lating, 2002).

Some of the more dramatic examples demonstrating the link between stress and impaired immune function involve studies in which volunteers were exposed to viruses. The rationale behind this research is that because stress weakens the immune system, people with high stress levels should be more likely to develop an illness compared to those under little stress. In one memorable experiment using this method, researchers interviewed 276 healthy volunteers about recent stressful experiences (Cohen et al., 1998). Following the interview, these participants were given nasal drops containing the cold virus (in case you are wondering why anybody would ever want to participate in a study in which they are subjected to such treatment, the participants were paid $800 for their trouble). When examined later, participants who reported experiencing chronic stressors for more than one month—especially enduring difficulties involving work or relationships—were considerably more likely to have developed colds than were participants who reported no chronic stressors (See figure below).

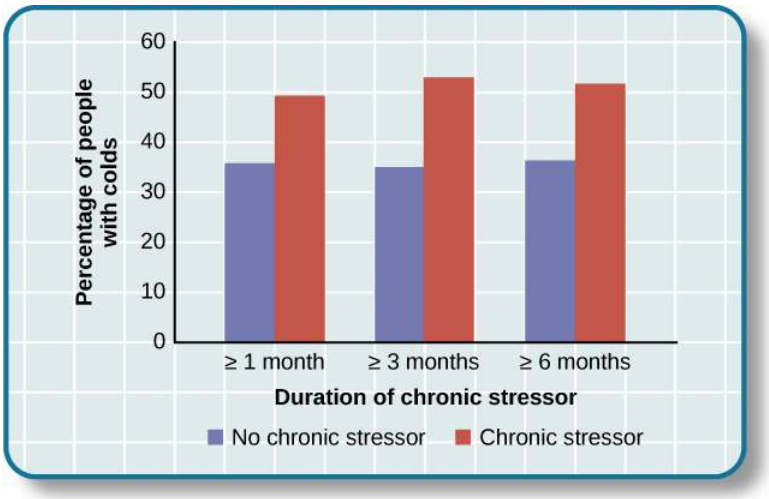


Figure 14.15 This graph shows the percentages of participants who developed colds (after receiving the cold virus) after reporting having experienced chronic stressors lasting at least one month, three months, and six months (adapted from Cohen et al., 1998).

In another study, older volunteers were given an influenza virus vaccination. Compared to controls, those who were caring for a spouse with Alzheimer's disease (and thus were under chronic stress) showed poorer antibody response following the vaccination

(Kiecolt-Glaser, Glaser, Gravenstein, Malarkey, & Sheridan, 1996).

Other studies have demonstrated that stress slows down wound healing by impairing immune responses important to wound repair (Glaser & Kiecolt-Glaser, 2005). In one study, for example, skin blisters were induced on the forearm. Subjects who reported higher levels of stress produced lower levels of immune proteins necessary for wound healing (Glaser et al., 1999). Stress, then, is not so much the sword that kills the knight, so to speak; rather, it's the sword that breaks the knight's shield, and your immune system is that shield.

DIG DEEPER: Stress and Aging: A Tale of Telomeres

Have you ever wondered why people who are stressed often seem to have a haggard look about them? A pioneering study from 2004 suggests that the reason is because stress can actually accelerate the cell biology of aging.

Stress, it seems, can shorten telomeres, which are segments of DNA that protect the ends of chromosomes. Shortened telomeres can inhibit or block cell division, which includes growth and proliferation of new cells, thereby leading to more rapid aging (Sapolsky, 2004). In the study, researchers compared **telomere** lengths in the white blood cells in mothers of chronically ill children to those of mothers of healthy children (Epel et al., 2004). Mothers of chronically ill children would be expected to experience more stress than would mothers of healthy children. The longer a mother had spent caring for her ill child, the shorter her telomeres (the correlation between years of caregiving and telomere length was $r = -0.40$). In addition, higher levels of perceived stress were negatively correlated with telomere size ($r = -0.31$). These researchers also found that the average telomere length of the most stressed mothers, compared to the least stressed, was similar to what you would find in people who were $9 - 17$ years older than they were on average.

Numerous other studies since have continued to find associations between stress and eroded telomeres (Blackburn & Epel, 2012). Some studies have even demonstrated that stress can begin to erode telomeres in childhood and perhaps even before children are born. For example, childhood exposure to violence (e.g., maternal domestic violence, bullying victimization, and physical maltreatment) was found in one study to accelerate telomere erosion from ages 5 to 10 (Shalev et al., 2013). Another study reported that young adults whose mothers had experienced severe stress during their pregnancy had shorter telomeres than did those whose mothers had stress-free and uneventful pregnancies (Entringer et al., 2011). Further, the corrosive effects of childhood stress on telomeres can extend into young adulthood. In an investigation of over $4,000$ U.K. women ages $41 - 80$, adverse experiences during childhood (e.g., physical abuse, being sent away from home, and parent divorce) were associated with shortened telomere length (Surtees et al., 2010), and telomere size decreased as the amount of experienced adversity increased (See figure 14.16 below).

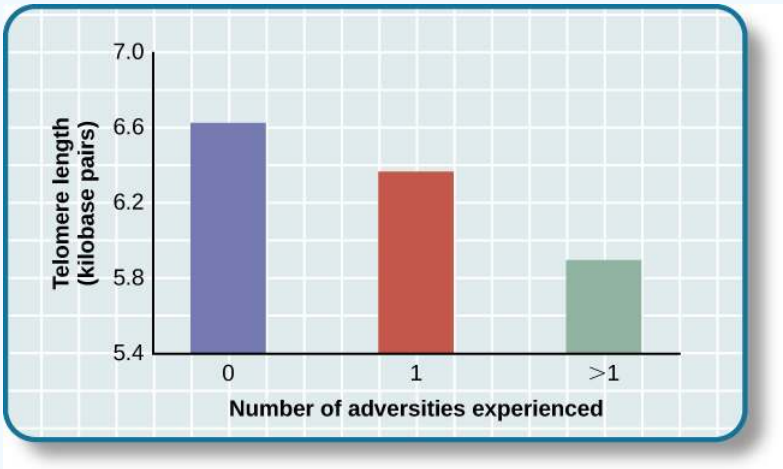


Figure 14.16 Telomeres are shorter in adults who experienced more trauma as children (adapted from Blackburn & Epel, 2012).

Efforts to dissect the precise cellular and physiological mechanisms linking short telomeres to stress and disease are currently underway. For the time being, telomeres provide us with yet another reminder that stress, especially during early life, can be just as harmful to our health as smoking or fast food (Blackburn & Epel, 2012).

Cardiovascular Disorders

The cardiovascular system is composed of the heart and blood circulation system. For many years, disorders that involve the cardiovascular system—known as **cardiovascular disorders**—have been a major focal point in the study of psychophysiological disorders because of the cardiovascular system's centrality in the stress response (Everly & Lating, 2002). **Heart disease** is one such condition. Each year, heart disease causes approximately one in three deaths in the United States, and it is the leading cause of death in the developed world (Centers for Disease Control and Prevention [CDC], 2011; Shapiro, 2005).

The symptoms of heart disease vary somewhat depending on the specific kind of heart disease one has, but they generally involve angina—chest pains or discomfort that occur when the heart does not receive enough blood (Office on Women's Health, 2009). The pain often feels like the chest is being pressed or squeezed; burning sensations in the chest and shortness of breath are also commonly reported. Such pain and discomfort can spread to the arms, neck, jaws, stomach (as nausea), and back (American Heart Association [AHA], 2012a) (See figure 14.17 below).

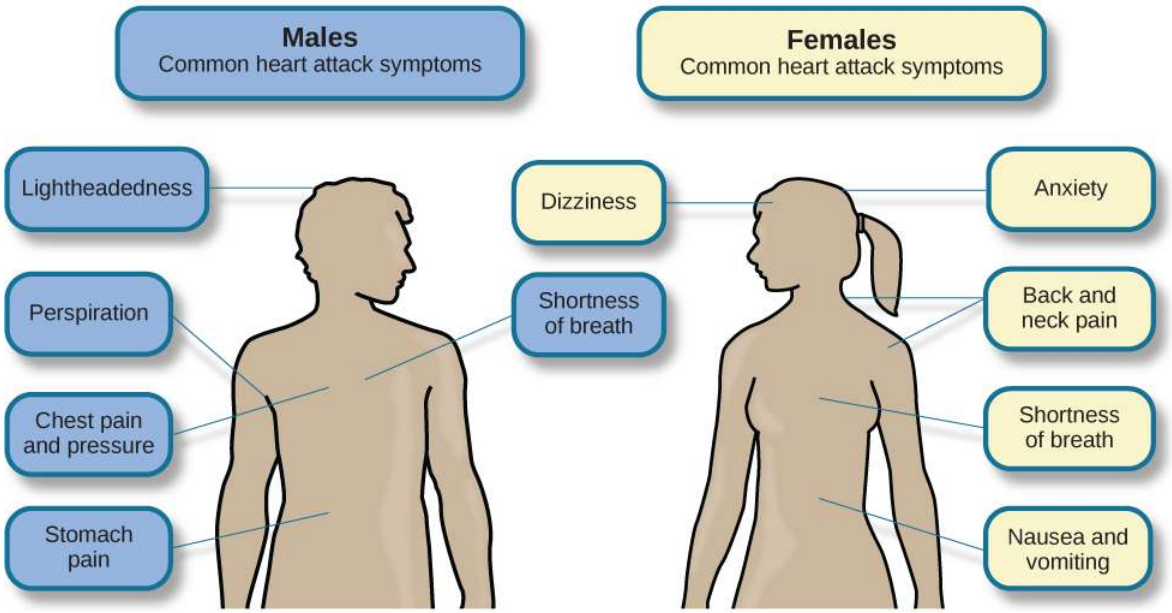


Figure 14.17 Males and females often experience different symptoms of a heart attack.

A major risk factor for heart disease is **hypertension**, which is high blood pressure. Hypertension forces a person's heart to pump harder, thus putting more physical strain on the heart. If left unchecked, hypertension can lead to a heart attack, stroke, or heart failure; it can also lead to kidney failure and blindness. Hypertension is a serious cardiovascular disorder, and it is sometimes called the silent killer because it has no symptoms—one who has high blood pressure may not even be aware of it (AHA, 2012b).

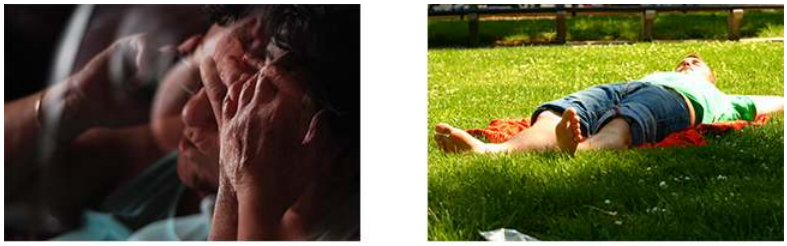
Many risk factors contributing to cardiovascular disorders have been identified. These risk factors include social determinants such as aging, income, education, and employment status, as well as behavioral risk factors that include unhealthy diet, tobacco use, physical inactivity, and excessive alcohol consumption; obesity and diabetes are additional risk factors (World Health Organization [WHO], 2013).

Over the past few decades, there has been much greater recognition and awareness of the importance of stress and other psychological factors in cardiovascular health (Nusair, Al-dadah, & Kumar, 2012). Indeed, exposure to stressors of many kinds has also been linked to cardiovascular problems; in the case of hypertension, some of these stressors include job strain (Trudel, Brisson, & Milot, 2010), natural disasters (Saito, Kim, Maekawa, Ikeda, & Yokoyama, 1997), marital conflict (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007), and exposure to high traffic noise levels at one's home (de Kluizenaar, Gansevoort, Miedema, & de Jong, 2007). Perceived discrimination appears to be associated with hypertension among African Americans (Sims et al., 2012). In addition, laboratory-based stress tasks, such as performing mental arithmetic under time pressure, immersing one's hand into ice water (known as the cold pressor test), mirror tracing, and public speaking have all been shown to elevate blood pressure (Phillips, 2011).

Are you Type A or Type B?

Sometimes research ideas and theories emerge from seemingly trivial observations. In the 1950s, cardiologist Meyer Friedman was looking over his waiting room furniture, which consisted of upholstered chairs with armrests. Friedman decided to have these chairs reupholstered. When the man doing the reupholstering came to the office to do the work, he commented on how the chairs were worn in a unique manner—the front edges of the cushions were worn down, as were the front tips of the arm rests. It seemed like the cardiology patients were tapping or squeezing the front of the armrests, as well as literally sitting on the edge of their seats (Friedman & Rosenman, 1974). Were cardiology patients somehow different than other types of patients? If so, how?

After researching this matter, Friedman and his colleague, Ray Rosenman, came to understand that people who are prone to heart disease tend to think, feel, and act differently than those who are not. These individuals tend to be intensively driven workaholics who are preoccupied with deadlines and always seem to be in a rush. According to Friedman and Rosenman, these individuals exhibit **Type A** behavior pattern; those who are more relaxed and laid-back were characterized as **Type B** (See figure 14.18). In a sample of Type As and Type Bs, Friedman and Rosenman were startled to discover that heart disease was over seven times more frequent among the Type As than the Type Bs (Friedman & Rosenman, 1959).



(a) (b)

Figure 14.18 (a) Type A individuals are characterized as intensely driven, (b) while Type B people are characterized as laid-back and relaxed. (credit a: modification of work by Greg Hernandez; credit b: modification of work by Elvert Barnes)

The major components of the Type A pattern include an aggressive and chronic struggle to achieve more and more in less and less time (Friedman & Rosenman, 1974). Specific characteristics of the Type A pattern include an excessive competitive drive, chronic sense of time urgency, impatience, and hostility toward others (particularly those who get in the person's way).

An example of a person who exhibits Type A behavior pattern is Jeffrey. Even as a child, Jeffrey was intense and driven. He excelled at school, was captain of the swim team, and graduated with honors from an Ivy League college. Jeffrey never seems able to relax; he is always working on something, even on the weekends. However, Jeffrey always seems to feel as though there are not enough hours in the day to accomplish all he feels he should. He volunteers to take on extra tasks at work and often brings his work home with him; he often goes to bed angry late at night because he feels that he has not done enough. Jeffrey is quick tempered with his coworkers; he often becomes noticeably agitated when dealing with those coworkers he feels work too slowly or whose work does not meet his standards. He typically reacts with hostility when interrupted at work. He has experienced problems in his marriage over his lack of time spent with family. When caught in traffic during his commute to and from work, Jeffrey incessantly pounds on his horn and swears loudly at other drivers. When Jeffrey was 52, he suffered his first heart attack.

By the 1970s, a majority of practicing cardiologists believed that Type A behavior pattern was a significant risk factor for heart disease (Friedman, 1977). Indeed, a number of early longitudinal investigations demonstrated a link between Type A behavior pattern and later development of heart disease (Rosenman et al., 1975; Haynes, Feinleib, & Kannel, 1980).

Subsequent research examining the association between Type A and heart disease, however, failed to replicate these earlier findings (Glassman, 2007; Myrtek, 2001). Because Type A theory did not pan out as well as they had hoped, researchers shifted their attention toward determining if any of the specific elements of Type A predict heart disease.

Extensive research clearly suggests that the anger/hostility dimension of Type A behavior pattern may be one of the most important factors in the development of heart disease. This relationship was initially described in the Haynes et al. (1980) study mentioned above: Suppressed hostility was found to substantially elevate the risk of heart disease for both men and women. Also, one investigation followed over $1,000$ male medical students from 32 to 48 years. At the beginning of the study, these men completed a questionnaire assessing how they react to pressure; some indicated that they respond with high levels of **anger**, whereas others indicated that they respond with less anger. Decades later, researchers found that those who earlier had indicated the highest levels

of anger were over 6 times more likely than those who indicated less anger to have had a heart attack by age 55, and they were 3.5 times more likely to have experienced heart disease by the same age (Chang, Ford, Meoni, Wang, & Klag, 2002). From a health standpoint, it clearly does not pay to be an angry young person.

After reviewing and statistically summarizing 35 studies from 1983 to 2006, Chida and Steptoe (2009) concluded that the bulk of the evidence suggests that anger and hostility constitute serious long-term risk factors for adverse cardiovascular outcomes among both healthy individuals and those already suffering from heart disease. One reason angry and hostile moods might contribute to cardiovascular diseases is that such moods can create social strain, mainly in the form of antagonistic social encounters with others. This strain could then lay the foundation for disease-promoting cardiovascular responses among hostile individuals (Vella, Kamarck, Flory, & Manuck, 2012). In this transactional model, hostility and social strain form a cycle (See figure below).

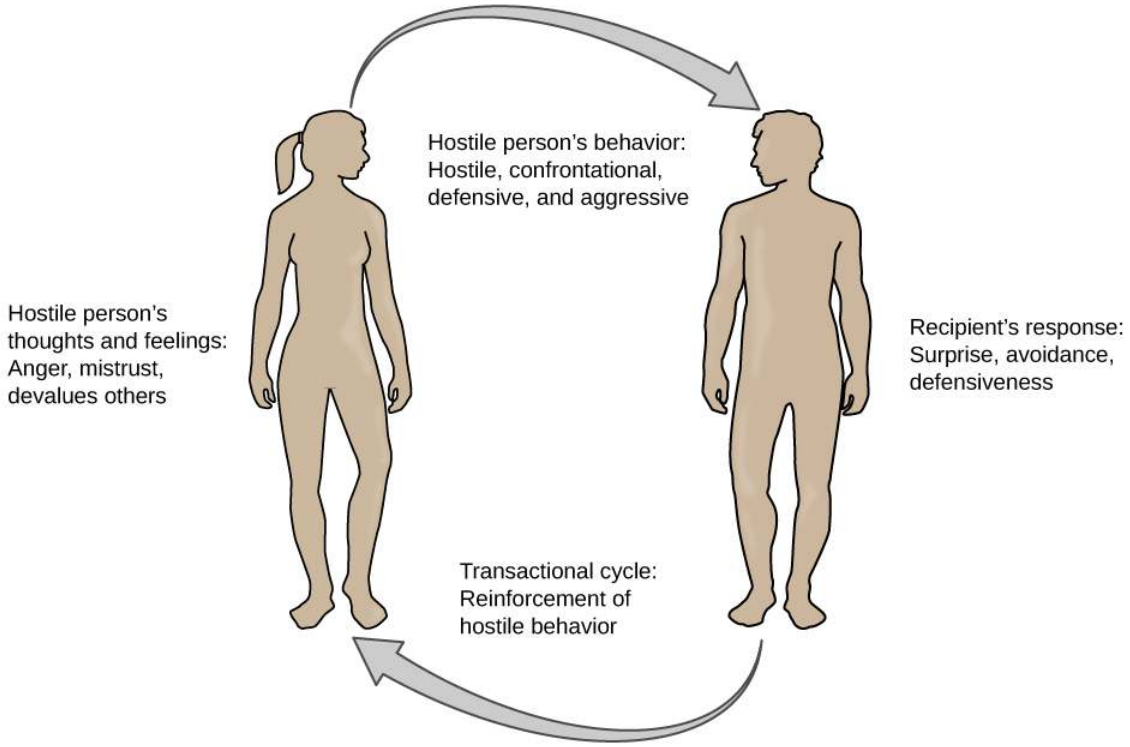


Figure 14.19 According to the transactional model of hostility for predicting social interactions (Vella et al., 2012), the thoughts and feelings of a hostile person promote antagonistic behavior toward others, which in turn reinforces complimentary reactions from others, thereby intensifying ones' hostile disposition and intensifying the cyclical nature of this relationship.

For example, suppose Kaitlin has a hostile disposition; she has a cynical, distrustful attitude toward others and often thinks that other people are out to get her. She is very defensive around people, even those she has known for years, and she is always looking for signs that others are either disrespecting or belittling her. In the shower each morning before work, she often mentally rehearses what she would say to someone who said or did something that angered her, such as making a political statement that was counter to her own ideology. As Kaitlin goes through these mental rehearsals, she often grins and thinks about the retaliation on anyone who will irk her that day.

Socially, she is confrontational and tends to use a harsh tone with people, which often leads to very disagreeable and sometimes argumentative social interactions. As you might imagine, Kaitlin is not especially popular with others, including coworkers, neighbors, and even members of her own family. They either avoid her at all costs or snap back at her, which causes Kaitlin to become even more cynical and distrustful of others, making her disposition even more hostile. Kaitlin's hostility—through her own doing—has created an antagonistic environment that cyclically causes her to become even more hostile and angry, thereby potentially setting the stage for cardiovascular problems.

In addition to anger and hostility, a number of other negative emotional states have been linked with heart disease, including negative affectivity and depression (Suls & Bunde, 2005). **Negative affectivity** is a tendency to experience distressed emotional states involving anger, contempt, disgust, guilt, fear, and nervousness (Watson, Clark, & Tellegen, 1988). It has been linked with

the development of both hypertension and heart disease. For example, over 3,000 initially healthy participants in one study were tracked longitudinally, up to 22 years. Those with higher levels of negative affectivity at the time the study began were substantially more likely to develop and be treated for hypertension during the ensuing years than were those with lower levels of negative affectivity (Jonas & Lando, 2000). In addition, a study of over 10,000 middle-aged London-based civil servants who were followed an average of 12.5 years revealed that those who earlier had scored in the upper third on a test of negative affectivity were 32% more likely to have experienced heart disease, heart attack, or angina over a period of years than were those who scored in the lowest third (Nabi, Kivimaki, De Vogli, Marmot, & Singh-Manoux, 2008). Hence, negative affectivity appears to be a potentially vital risk factor for the development of cardiovascular disorders.

Depression and the Heart

For centuries, poets and folklore have asserted that there is a connection between moods and the heart (Glassman & Shapiro, 1998). You are no doubt familiar with the notion of a broken heart following a disappointing or depressing event and have encountered that notion in songs, films, and literature.

Perhaps the first to recognize the link between **depression** and **heart disease** was Benjamin Malzberg (1937), who found that the death rate among institutionalized patients with melancholia (an archaic term for depression) was six times higher than that of the population. A classic study in the late 1970s looked at over 8,000 manic-depressive persons in Denmark, finding a nearly 50% increase in deaths from heart disease among these patients compared with the general Danish population (Weeke, 1979). By the early 1990s, evidence began to accumulate showing that depressed individuals who were followed for long periods of time were at increased risk for heart disease and cardiac death (Glassman, 2007). In one investigation of over 700 Denmark residents, those with the highest depression scores were 71% more likely to have experienced a heart attack than were those with lower depression scores (Barefoot & Schroll, 1996). Figure 14.20 illustrates the gradation in risk of heart attacks for both men and women.

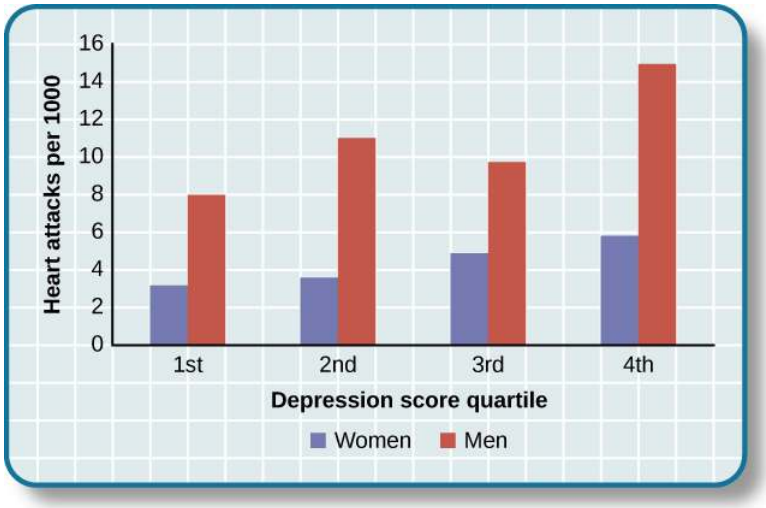


Figure 14.20 This graph shows the incidence of heart attacks among men and women by depression score quartile (adapted from Barefoot & Schroll, 1996).

After more than two decades of research, it is now clear that a relationship exists: Patients with heart disease have more depression than the general population, and people with depression are more likely to eventually develop heart disease and experience higher mortality than those who do not have depression (Hare, Toukhsati, Johansson, & Jaarsma, 2013); the more severe the depression, the higher the risk (Glassman, 2007). Consider the following:

- In one study, death rates from cardiovascular problems was substantially higher in depressed people; depressed men were 50% more likely to have died from cardiovascular problems, and depressed women were 70% more likely (Ösby, Brandt, Correia, Ekbom, & Sparén, 2001).
- A statistical review of 10 longitudinal studies involving initially healthy individuals revealed that those with elevated depressive symptoms have, on average, a 64% greater risk of developing heart disease than do those with fewer symptoms (Wulsin & Singal, 2003).

- A study of over $63,000$ registered nurses found that those with more depressed symptoms when the study began were 49% more likely to experience fatal heart disease over a 12-year period (Whang et al., 2009).

The American Heart Association, fully aware of the established importance of depression in cardiovascular diseases, several years ago recommended routine depression screening for all heart disease patients (Lichtman et al., 2008). Recently, they have recommended including depression as a risk factor for heart disease patients (AHA, 2014).

Although the exact mechanisms through which depression might produce heart problems have not been fully clarified, a recent investigation examining this connection in early life has shed some light. In an ongoing study of childhood depression, adolescents who had been diagnosed with depression as children were more likely to be obese, smoke, and be physically inactive than were those who had not received this diagnosis (Rottenberg et al., 2014). One implication of this study is that depression, especially if it occurs early in life, may increase the likelihood of living an unhealthy lifestyle, thereby predisposing people to an unfavorable cardiovascular disease risk profile.

It is important to point out that depression may be just one piece of the emotional puzzle in elevating the risk for heart disease, and that chronically experiencing several negative emotional states may be especially important. A longitudinal investigation of Vietnam War veterans found that depression, anxiety, hostility, and trait anger each independently predicted the onset of heart disease (Boyle, Michalek, & Suarez, 2006). However, when each of these negative psychological attributes was combined into a single variable, this new variable (which researchers called psychological risk factor) predicted heart disease more strongly than any of the individual variables. Thus, rather than examining the predictive power of isolated psychological risk factors, it seems crucial for future researchers to examine the effects of combined and more general negative emotional and psychological traits in the development of cardiovascular illnesses.

Asthma

Asthma is a chronic and serious disease in which the airways of the respiratory system become obstructed, leading to great difficulty expelling air from the lungs. The airway obstruction is caused by inflammation of the airways (leading to thickening of the airway walls) and a tightening of the muscles around them, resulting in a narrowing of the airways (See figure 14.21) (American Lung Association, 2010). Because airways become obstructed, a person with asthma will sometimes have great difficulty breathing and will experience repeated episodes of wheezing, chest tightness, shortness of breath, and coughing, the latter occurring mostly during the morning and night (CDC, 2006).

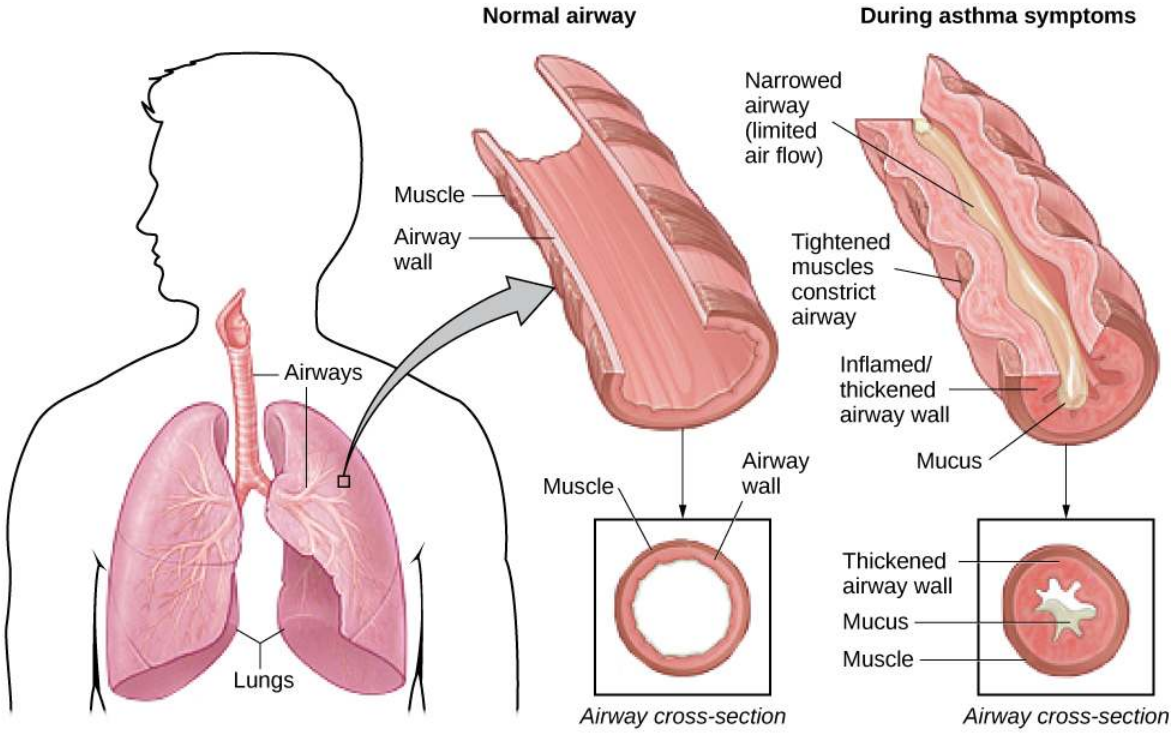


Figure 14.21 In asthma, the airways become inflamed and narrowed.

According to the Centers for Disease Control and Prevention (CDC), around 4,000 people die each year from asthma-related causes, and asthma is a contributing factor to another 7,000 deaths each year (CDC, 2013a). The CDC has revealed that asthma affects 18.7 million U.S. adults and is more common among people with lower education and income levels (CDC, 2013b). Especially concerning is that asthma is on the rise, with rates of asthma increasing 157% between 2000 and 2010 (CDC, 2013b).

Asthma attacks are acute episodes in which an asthma sufferer experiences the full range of symptoms. Asthma exacerbation is often triggered by environmental factors, such as air pollution, allergens (e.g., pollen, mold, and pet hairs), cigarette smoke, airway infections, cold air or a sudden change in temperature, and exercise (CDC, 2013b).

Psychological factors appear to play an important role in asthma (Wright, Rodriguez, & Cohen, 1998), although some believe that psychological factors serve as potential triggers in only a subset of asthma patients (Ritz, Steptoe, Bobb, Harris, & Edwards, 2006). Many studies over the years have demonstrated that some people with asthma will experience asthma-like symptoms if they expect to experience such symptoms, such as when breathing an inert substance that they (falsely) believe will lead to airway obstruction (Sodergren & Hyland, 1999). As stress and emotions directly affect immune and respiratory functions, psychological factors likely serve as one of the most common triggers of asthma exacerbation (Trueba & Ritz, 2013).

People with asthma tend to report and display a high level of negative emotions such as anxiety, and asthma attacks have been linked to periods of high emotionality (Lehrer, Isenberg, & Hochron, 1993). In addition, high levels of emotional distress during both laboratory tasks and daily life have been found to negatively affect airway function and can produce asthma-like symptoms in people with asthma (von Leupoldt, Ehnes, & Dahme, 2006). In one investigation, 20 adults with asthma wore preprogrammed wristwatches that signaled them to breathe into a portable device that measures airway function. Results showed that higher levels of negative emotions and stress were associated with increased airway obstruction and self-reported asthma symptoms (Smyth, Soefer, Hurewitz, Kliment, & Stone, 1999). In addition, D'Amato, Liccardi, Cecchi, Pellegrino, & D'Amato (2010) described a case study of an 18-year-old man with asthma whose girlfriend had broken up with him, leaving him in a depressed state. She had also unfriended him on Facebook , while friending other young males. Eventually, the young man was able to "friend" her once again and could monitor her activity through Facebook. Subsequently, he would experience asthma symptoms whenever he logged on and accessed her profile. When he later resigned not to use Facebook any longer, the asthma attacks stopped. This case suggests that the use of Facebook and other forms of social media may represent a new source of stress—it may be a triggering factor for asthma attacks, especially in depressed asthmatic individuals.

Exposure to stressful experiences, particularly those that involve parental or interpersonal conflicts, has been linked to the development of asthma throughout the lifespan. A longitudinal study of 145 children found that parenting difficulties during the first year of life increased the chances that the child developed asthma by 107% (Klinnert et al., 2001). In addition, a cross-sectional study of over 10,000 Finnish college students found that high rates of parent or personal conflicts (e.g., parental divorce, separation from spouse, or severe conflicts in other long-term relationships) increased the risk of asthma onset (Kilpeläinen, Koskenvuo, Helenius, & Terho, 2002). Further, a study of over 4,000 middle-aged men who were interviewed in the early 1990s and again a decade later found that breaking off an important life partnership (e.g., divorce or breaking off relationship from parents) increased the risk of developing asthma by 124% over the time of the study (Loerbroks, Apfelbacher, Thayer, Debling, & Stürmer, 2009).

Tension Headaches

A headache is a continuous pain anywhere in the head and neck region. Migraine headaches are a type of headache thought to be caused by blood vessel swelling and increased blood flow (McIntosh, 2013). Migraines are characterized by severe pain on one or both sides of the head, an upset stomach, and disturbed vision. They are more frequently experienced by women than by men (American Academy of Neurology, 2014). Tension headaches are triggered by tightening/tensing of facial and neck muscles; they are the most commonly experienced kind of headache, accounting for about 42% of all headaches worldwide (Stovner et al., 2007). In the United States, well over one-third of the population experiences tension headaches each year, and $2-3\%$ of the population suffers from chronic tension headaches (Schwartz, Stewart, Simon, & Lipton, 1998).

A number of factors can contribute to tension headaches, including sleep deprivation, skipping meals, eye strain, overexertion, muscular tension caused by poor posture, and stress (MedicineNet, 2013). Although there is uncertainty regarding the exact mechanisms through which stress can produce tension headaches, stress has been demonstrated to increase sensitivity to pain (Caceres & Burns, 1997; Logan et al., 2001). In general, tension headache sufferers, compared to non-sufferers, have a lower threshold for and greater sensitivity to pain (Ukestad & Wittrock, 1996), and they report greater levels of subjective stress when

faced with a stressor (Myers, Wittrock, & Foreman, 1998). Thus, stress may contribute to tension headaches by increasing pain sensitivity in already-sensitive pain pathways in tension headache sufferers (Cathcart, Petkov, & Pritchard, 2008).

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11.5: Regulation of Stress

Learning Objectives

- Define coping and differentiate between problem-focused and emotion-focused coping
- Describe the importance of perceived control in our reactions to stress
- Explain how social support is vital in health and longevity

As we learned in the previous section, **stress**—especially if it is chronic—takes a toll on our bodies and can have enormously negative health implications. When we experience events in our lives that we appraise as stressful, it is essential that we use effective coping strategies to manage our stress. **Coping** refers to mental and behavioral efforts that we use to deal with problems relating to stress, including its presumed cause and the unpleasant feelings and emotions it produces.

Coping Styles

Lazarus and Folkman (1984) distinguished two fundamental kinds of coping: problem-focused coping and emotion-focused coping. In problem-focused coping, one attempts to manage or alter the problem that is causing one to experience stress (i.e., the stressor). Problem-focused coping strategies are similar to strategies used in everyday problem-solving: they typically involve identifying the problem, considering possible solutions, weighing the costs and benefits of these solutions, and then selecting an alternative (Lazarus & Folkman, 1984). As an example, suppose Bradford receives a midterm notice that he is failing statistics class. If Bradford adopts a **problem-focused coping** approach to managing his stress, he would be proactive in trying to alleviate the source of the stress. He might contact his professor to discuss what must be done to raise his grade, he might also decide to set aside two hours daily to study statistics assignments, and he may seek tutoring assistance. A problem-focused approach to managing stress means we actively try to do things to address the problem.

Emotion-focused coping, in contrast, consists of efforts to change or reduce the negative emotions associated with stress. These efforts may include avoiding, minimizing, or distancing oneself from the problem, or positive comparisons with others ("I'm not as bad off as she is"), or seeking something positive in a negative event ("Now that I've been fired, I can sleep in for a few days"). In some cases, **emotion-focused coping** strategies involve reappraisal, whereby the stressor is construed differently (and somewhat self-deceptively) without changing its objective level of threat (Lazarus & Folkman, 1984). For example, a person sentenced to federal prison who thinks, "This will give me a great chance to network with others," is using reappraisal. If Bradford adopted an emotion-focused approach to managing his midterm deficiency stress, he might watch a comedy movie, play video games, or spend hours on Twitter to take his mind off the situation. In a certain sense, emotion-focused coping can be thought of as treating the symptoms rather than the actual cause.

While many stressors elicit both kinds of coping strategies, problem-focused coping is more likely to occur when encountering stressors we perceive as controllable, while emotion-focused coping is more likely to predominate when faced with stressors that we believe we are powerless to change (Folkman & Lazarus, 1980). Clearly, emotion-focused coping is more effective in dealing with uncontrollable stressors. For example, if at midnight you are stressing over a 40-page paper due in the morning that you have not yet started, you are probably better off recognizing the hopelessness of the situation and doing something to take your mind off it; taking a problem-focused approach by trying to accomplish this task would only lead to frustration, anxiety, and even more stress.

Fortunately, most stressors we encounter can be modified and are, to varying degrees, controllable. A person who cannot stand her job can quit and look for work elsewhere; a middle-aged divorcee can find another potential partner; the freshman who fails an exam can study harder next time, and a breast lump does not necessarily mean that one is fated to die of breast cancer.

Control and Stress

The desire and ability to predict events, make decisions, and affect outcomes—that is, to enact control in our lives—is a basic tenet of human behavior (Everly & Lating, 2002). Albert Bandura (1997) stated that "the intensity and chronicity of human stress is governed largely by perceived control over the demands of one's life" (p. 262). As cogently described in his statement, our reaction to potential stressors depends to a large extent on how much control we feel we have over such things. **Perceived control** is our beliefs about our personal capacity to exert influence over and shape outcomes, and it has major implications for our health and

happiness (Infurna & Gerstorf, 2014). Extensive research has demonstrated that perceptions of personal control are associated with a variety of favorable outcomes, such as better physical and mental health and greater psychological well-being (Diehl & Hay, 2010). Greater personal control is also associated with lower reactivity to stressors in daily life. For example, researchers in one investigation found that higher levels of perceived control at one point in time were later associated with lower emotional and physical reactivity to interpersonal stressors (Neupert, Almeida, & Charles, 2007). Further, a daily diary study with **34** older widows found that their stress and anxiety levels were significantly reduced on days during which the widows felt greater perceived control (Ong, Bergeman, & Bisconti, 2005).

DIG DEEPER: Learned Helplessness

When we lack a sense of control over the events in our lives, particularly when those events are threatening, harmful, or noxious, the psychological consequences can be profound. In one of the better illustrations of this concept, psychologist Martin Seligman conducted a series of classic experiments in the 1960s (Seligman & Maier, 1967) in which dogs were placed in a chamber where they received electric shocks from which they could not escape. Later, when these dogs were given the opportunity to escape the shocks by jumping across a partition, most failed to even try; they seemed to just give up and passively accept any shocks the experimenters chose to administer. In comparison, dogs who were previously allowed to escape the shocks tended to jump the partition and escape the pain (See figure 14.22 below).



Figure 14.22 *Seligman's learned helplessness experiments with dogs used an apparatus that measured when the animals would move from a floor delivering shocks to one without.*

Seligman believed that the dogs who failed to try to escape the later shocks were demonstrating **learned helplessness**: They had acquired a belief that they were powerless to do anything about the noxious stimulation they were receiving. Seligman also believed that the passivity and lack of initiative these dogs demonstrated was similar to that observed in human depression. Therefore, Seligman speculated that acquiring a sense of learned helplessness might be an important cause of depression in humans: Humans who experience negative life events that they believe they are unable to control may become helpless. As a result, they give up trying to control or change the situation and some may become depressed and show lack of initiative in future situations in which they can control the outcomes (Seligman, Maier, & Geer, 1968).

Seligman and colleagues later reformulated the original learned helplessness model of depression (Abramson, Seligman, & Teasdale, 1978). In their reformulation, they emphasized attributions (i.e., a mental explanation for why something occurred) that lead to the perception that one lacks control over negative outcomes are important in fostering a sense of learned helplessness. For example, suppose a coworker shows up late to work; your belief as to what caused the coworker's tardiness would be an attribution (e.g., too much traffic, slept too late, or just doesn't care about being on time).

The reformulated version of Seligman's study holds that the attributions made for negative life events contribute to depression. Consider the example of a student who performs poorly on a midterm exam. This model suggests that the student will make three kinds of attributions for this outcome: internal vs. external (believing the outcome was caused by his own personal inadequacies or by environmental factors), stable vs. unstable (believing the cause can be changed or is permanent), and global vs. specific (believing the outcome is a sign of inadequacy in most everything versus just this area). Assume that the student makes an internal ("I'm just not smart"), stable ("Nothing can be done to change the fact that I'm not smart") and global ("This is another example of how lousy I am at everything") attribution for the poor performance. The reformulated theory predicts that the student would perceive a lack of control over this stressful event and thus be especially prone to developing depression. Indeed, research has demonstrated that people who have a tendency to make internal, global, and stable attributions for bad outcomes tend to develop symptoms of depression when faced with negative life experiences (Peterson & Seligman, 1984).

Seligman's learned helplessness model has emerged over the years as a leading theoretical explanation for the onset of major depressive disorder. When you study psychological disorders, you will learn more about the latest reformulation of this model —now called hopelessness theory.

People who report higher levels of perceived control view their health as controllable, thereby making it more likely that they will better manage their health and engage in behaviors conducive to good health (Bandura, 2004). Not surprisingly, greater perceived control has been linked to lower risk of physical health problems, including declines in physical functioning (Infurna, Gerstorf, Ram, Schupp, & Wagner, 2011), heart attacks (Rosengren et al., 2004), and both cardiovascular disease incidence (Stürmer, Hasselbach, & Amelang, 2006) and mortality from cardiac disease (Surtees et al., 2010). In addition, longitudinal studies of British civil servants have found that those in low-status jobs (e.g., clerical and office support staff) in which the degree of control over the job is minimal are considerably more likely to develop heart disease than those with high-status jobs or considerable control over their jobs (Marmot, Bosma, Hemingway, & Stansfeld, 1997).

The link between perceived control and health may provide an explanation for the frequently observed relationship between social class and health outcomes (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012). In general, research has found that more affluent individuals experience better health mainly because they tend to believe that they can personally control and manage their reactions to life's stressors (Johnson & Krueger, 2006). Perhaps buoyed by the perceived level of control, individuals of higher social class may be prone to overestimating the degree of influence they have over particular outcomes. For example, those of higher social class tend to believe that their votes have greater sway on election outcomes than do those of lower social class, which may explain higher rates of voting in more affluent communities (Krosnick, 1990). Other research has found that a sense of perceived control can protect less affluent individuals from poorer health, depression, and reduced life-satisfaction—all of which tend to accompany lower social standing (Lachman & Weaver, 1998).

Taken together, findings from these and many other studies clearly suggest that perceptions of control and coping abilities are important in managing and coping with the stressors we encounter throughout life.

Social Support

The need to form and maintain strong, stable relationships with others is a powerful, pervasive, and fundamental human motive (Baumeister & Leary, 1995). Building strong interpersonal relationships with others helps us establish a network of close, caring individuals who can provide social support in times of distress, sorrow, and fear. **Social support** can be thought of as the soothing impact of friends, family, and acquaintances (Baron & Kerr, 2003). Social support can take many forms, including advice, guidance, encouragement, acceptance, emotional comfort, and tangible assistance (such as financial help). Thus, other people can be very comforting to us when we are faced with a wide range of life stressors, and they can be extremely helpful in our efforts to manage these challenges. Even in nonhuman animals, species mates can offer social support during times of stress. For example, elephants seem to be able to sense when other elephants are stressed and will often comfort them with physical contact—such as a trunk touch—or an empathetic vocal response (Krumboltz, 2014).

Scientific interest in the importance of social support first emerged in the 1970s when health researchers developed an interest in the health consequences of being socially integrated (Stroebe & Stroebe, 1996). Interest was further fueled by longitudinal studies showing that social connectedness reduced mortality. In one classic study, nearly $7,000$ Alameda County, California, residents were followed over 9 years. Those who had previously indicated that they lacked social and community ties were more likely to die

during the follow-up period than those with more extensive social networks. Compared to those with the most social contacts, isolated men and women were, respectively, 2.3 and 2.8 times more likely to die. These trends persisted even after controlling for a variety of health-related variables, such as smoking, alcohol consumption, self-reported health at the beginning of the study, and physical activity (Berkman & Syme, 1979).

Since the time of that study, social support has emerged as one of the well-documented psychosocial factors affecting health outcomes (Uchino, 2009). A statistical review of 148 studies conducted between 1982 and 2007 involving over 300,000 participants concluded that individuals with stronger social relationships have a 50% greater likelihood of survival compared to those with weak or insufficient social relationships (Holt-Lunstad, Smith, & Layton, 2010). According to the researchers, the magnitude of the effect of social support observed in this study is comparable with quitting smoking and exceeded many well-known risk factors for mortality, such as obesity and physical inactivity (See figure 14.23).



(a) (b)

Figure 14.23 Close relationships with others, whether (a) a group of friends or (b) a family circle, provide more than happiness and fulfillment—they can help foster good health. (credit a: modification of work by Nattachai Noogure; credit b: modification of work by Christian Haugen)

A number of large-scale studies have found that individuals with low levels of social support are at greater risk of mortality, especially from cardiovascular disorders (Brummett et al., 2001). Further, higher levels of social supported have been linked to better survival rates following breast cancer (Falagas et al., 2007) and infectious diseases, especially HIV infection (Lee & Rotheram-Borus, 2001). In fact, a person with high levels of social support is less likely to contract a common cold. In one study, 334 participants completed questionnaires assessing their sociability; these individuals were subsequently exposed to a virus that causes a common cold and monitored for several weeks to see who became ill. Results showed that increased sociability was linearly associated with a decreased probability of developing a cold (Cohen, Doyle, Turner, Alper, & Skoner, 2003).

For many of us, friends are a vital source of social support. But what if you found yourself in a situation in which you lacked friends or companions? For example, suppose a popular high school student attends a far-away college, does not know anyone, and has trouble making friends and meaningful connections with others during the first semester. What can be done? If real life social support is lacking, access to distant friends via social media may help compensate. In a study of college freshmen, those with few face-to-face friends on campus but who communicated electronically with distant friends were less distressed that those who did not (Raney & Troop-Gordon, 2012). Also, for some people, our families—especially our parents—are a major source of social support.

Social support appears to work by boosting the immune system, especially among people who are experiencing stress (Uchino, Vaughn, Carlisle, & Birmingham, 2012). In a pioneering study, spouses of cancer patients who reported high levels of social support showed indications of better immune functioning on two out of three immune functioning measures, compared to spouses who were below the median on reported social support (Baron, Cutrona, Hicklin, Russell, & Lubaroff, 1990). Studies of other populations have produced similar results, including those of spousal caregivers of dementia sufferers, medical students, elderly adults, and cancer patients (Cohen & Herbert, 1996; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002).

In addition, social support has been shown to reduce blood pressure for people performing stressful tasks, such as giving a speech or performing mental arithmetic (Lepore, 1998). In these kinds of studies, participants are usually asked to perform a stressful task either alone, with a stranger present (who may be either supportive or unsupportive), or with a friend present. Those tested with a friend present generally exhibit lower blood pressure than those tested alone or with a stranger (Fontana, Diegnan, Villeneuve, & Lepore, 1999). In one study, 112 female participants who performed stressful mental arithmetic exhibited lower blood pressure when they received support from a friend rather than a stranger, but only if the friend was a male (Phillips, Gallagher, & Carroll,

2009). Although these findings are somewhat difficult to interpret, the authors mention that it is possible that females feel less supported and more evaluated by other females, particularly females whose opinions they value.

Taken together, the findings above suggest one of the reasons social support is connected to favorable health outcomes is because it has several beneficial physiological effects in stressful situations. However, it is also important to consider the possibility that social support may lead to better health behaviors, such as a healthy diet, exercising, smoking cessation, and cooperation with medical regimens (Uchino, 2009).

DIG DEEPER: Stress and Discrimination

Being the recipient of prejudice and discrimination is associated with a number of negative outcomes. Many studies have shown how discrimination is a significant stressor for marginalized groups (Pascoe & Smart Richman, 2009). Discrimination negatively impacts both physical and mental health for individuals in stigmatized groups. As you'll learn when you study social psychology, various social identities (such as gender, age, religion, sexuality, ethnicity) often lead people to simultaneously be exposed to multiple forms of discrimination, which can have even stronger negative effects on mental and physical health (Vines, Ward, Cordoba, & Black, 2017). For example, the amplified levels of discrimination faced by Latinx transgender women may have related effects, leading to high stress levels and poor mental and physical health outcomes.

Perceived control and the general adaptation syndrome help explain the process by which discrimination affects mental and physical health. Discrimination can be conceptualized as an uncontrollable, persistent, and unpredictable stressor. When a discriminatory event occurs, the target of the event initially experiences an acute stress response (alarm stage). This acute reaction alone does not typically have a great impact on health. However, discrimination tends to be a chronic stressor. As people in marginalized groups experience repeated discrimination, they develop a heightened reactivity as their bodies prepare to act quickly (resistance stage). This long-term accumulation of stress responses can eventually lead to increases in negative emotion and wear on physical health (exhaustion stage). This explains why a history of perceived discrimination is associated with a host of mental and physical health problems including depression, cardiovascular disease, and cancer (Pascoe & Smart Richman, 2009).

Protecting stigmatized groups from the negative impact of discrimination-induced stress may involve reducing the incidence of discriminatory behaviors in conjunction with protective strategies that reduce the impact of discriminatory events when they occur. Civil rights legislation has protected some stigmatized groups by making discrimination a prosecutable offense in many social contexts. However, some groups (e.g., transgender people) often lack important legal recourse when discrimination occurs. Moreover, most modern discrimination comes in subtle forms that fall below the radar of the law. For example, discrimination may be experienced as selective inhospitality toward people of specific races or ethnicities, but little is done in response since it would be easy to attribute the behavior to other causes. Although some cultural changes are increasingly helping people to recognize and control subtle discrimination, such shifts may take a long time.

Similar to other stressors, buffers like social support and healthy coping strategies appear to be effective in lowering the impact of perceived discrimination. For example, one study (Ajrouch, Reisine, Lim, Sohn, & Ismail, 2010) showed that discrimination predicted high psychological distress among African American mothers living in Detroit. However, the women who had readily available emotional support from friends and family experienced less distress than those with fewer social resources. While coping strategies and social support may buffer the effects of discrimination, they fail to erase all of the negative impacts. Vigilant antidiscrimination efforts, including the development of legal protections for vulnerable groups, are needed to reduce discrimination, stress, and the resulting physical and mental health effects.

Exercise

Beyond having a sense of control and establishing social support networks, there are numerous other means by which we can manage stress (See figure 14.24). A common technique people use to combat stress is **exercise** (Salmon, 2001). It is well-established that exercise, both of long (aerobic) and short (anaerobic) duration, is beneficial for both physical and mental health (Everly & Lating, 2002). There is considerable evidence that physically fit individuals are more resistant to the adverse effects of stress and recover more quickly from stress than less physically fit individuals (Cotton, 1990). In a study of more than 500 Swiss

police officers and emergency service personnel, increased physical fitness was associated with reduced stress, and regular exercise was reported to protect against stress-related health problems (Gerber, Kellman, Hartman, & Pühse, 2010).



(a) (b) (c)

Figure 14.24 Stress reduction techniques may include (a) exercise, (b) meditation and relaxation, or (c) biofeedback. (credit a: modification of work by “UNE Photos”/Flickr; credit b: modification of work by Caleb Roenigk; credit c: modification of work by Dr. Carmen Russoniello)

One reason exercise may be beneficial is because it might buffer some of the deleterious physiological mechanisms of stress. One study found rats that exercised for six weeks showed a decrease in hypothalamic-pituitary-adrenal responsiveness to mild stressors (Campeau et al., 2010). In high-stress humans, exercise has been shown to prevent telomere shortening, which may explain the common observation of a youthful appearance among those who exercise regularly (Puterman et al., 2010). Further, exercise in later adulthood appears to minimize the detrimental effects of stress on the hippocampus and memory (Head, Singh, & Bugg, 2012). Among cancer survivors, exercise has been shown to reduce anxiety (Speck, Courneya, Masse, Duval, & Schmitz, 2010) and depressive symptoms (Craft, VanIterson, Helenowski, Rademaker, & Courneya, 2012). Clearly, exercise is a highly effective tool for regulating stress.

Meditation

Meditation refers to *techniques in which the individual focuses on something specific, such as an object, a word, or one’s breathing, with the goal of ignoring external distractions, focusing on one’s internal state, and achieving a state of relaxation and well-being*. Followers of various Eastern religions (Hinduism, Buddhism, and Taoism) use meditation to achieve a higher spiritual state, and popular forms of meditation in the West, such as yoga, Zen, and Transcendental Meditation, have originated from these practices. Many meditative techniques are very simple. You simply need to sit in a comfortable position with your eyes closed and practise deep breathing. You might want to try it out for yourself - there are many online videos that will guide you through a 5-10 minute meditation.

Brain imaging studies have indicated that meditation is not only relaxing but can also induce an altered state of consciousness (Figure 7.30). Cahn and Polich (2006) found that experienced meditators in a meditative state had more prominent alpha and theta waves, and other studies have shown declines in heart rate, skin conductance, oxygen consumption, and carbon dioxide elimination during meditation (Dillbeck, Cavanaugh, Glenn, & Orme-Johnson, 1987; Fenwick, 1987). These studies suggest that the action of the sympathetic division of the autonomic nervous system (ANS) is suppressed during meditation, creating a more relaxed physiological state as the meditator moves into deeper states of relaxation and consciousness.



Figure 7.30 Meditation Exercise. Research has found that regular meditation has positive physiological and psychological effects.

Research has found that regular meditation can mediate the effects of stress and depression, and promote well-being (Grossman, Niemann, Schmidt, & Walach, 2004; Reibel, Greeson, Brainard, & Rosenzweig, 2001; Salmon et al., 2004). Meditation has also been shown to assist in controlling blood pressure (Barnes, Treiber, & Davis, 2001; Walton et al., 2004). A study by Lyubimov (1992) showed that during meditation, a larger area of the brain was responsive to sensory stimuli, suggesting that there is greater coordination between the two brain hemispheres as a result of meditation. Lutz, Greischar, Rawlings, Ricard,and Davidson (2004) demonstrated that those who meditate regularly (as opposed to those who do not) tend to utilize a greater part of their brain and that their gamma waves are faster and more powerful. And a study of Tibetan Buddhist monks who meditate daily found that several areas of the brain can be permanently altered by the long-term practice of meditation (Lutz et al. 2004).

It is possible that the positive effects of meditation could also be found by using other methods of relaxation. Although advocates of meditation claim that meditation enables people to attain a higher and purer consciousness, perhaps any kind of activity that calms and relaxes the mind, such as working on crossword puzzles, watching television or movies, or engaging in other enjoyed behaviours, might be equally effective in creating positive outcomes. Regardless of the debate, the fact remains that meditation is, at the very least, a worthwhile relaxation strategy.

References

Barnes, V. A., Treiber, F., & Davis, H. (2001). Impact of Transcendental Meditation® on cardiovascular function at rest and during acute stress in adolescents with high normal blood pressure. *Journal of Psychosomatic Research, 51*(4), 597–605.

Bood, S. Å., Sundequist, U., Kjellgren, A., Nordström, G., & Norlander, T. (2007). Effects of flotation rest (restricted environmental stimulation technique) on stress related muscle pain: Are 33 flotation sessions more effective than 12 sessions? *Social Behavior and Personality, 35*(2), 143–156.

Cahn, B., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin, 132*, 180–211.

Fenwick, P. (1987). Meditation and the EEG. The psychology of meditation. In M.A. West (Ed.), *The psychology of meditation* (pp. 104–117). New York, NY: Clarendon Press/Oxford University Press.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research. 57*(1), 35–43.

Kjellgren, A., Sundequist, U., Norlander, T., & Archer, T. (2001). Effects of flotation-REST on muscle tension pain. *Pain Research & Management, 6*(4), 181–189.

Reibel, D. K., Greeson, J. M., Brainard, G. C., & Rosenzweig, S. (2001). Mindfulness-based stress reduction and health-related quality of life in a heterogeneous patient population. *General Hospital Psychiatry, 23*(4), 183–192.

Salmon, P., Sephton, S., Weissbecker, I., Hoover, K., Ulmer, C., & Studts, J. L. (2004). Mindfulness meditation in clinical practice. *Cognitive and Behavioral Practice, 11*(4), 434–446.

Suedfeld, P. (1990b). Restricted environmental stimulation techniques in health enhancement and disease prevention. In K. D. Craig & S. M. Weiss (Eds.), *Health enhancement, disease prevention, and early intervention: Biobehavioral perspectives* (pp. 206–230). New York, NY: Springer Publishing.

Wallbaum, A. B., Rzewnicki, R., Steele, H., & Suedfeld, P. (1991). Progressive muscle relaxation and restricted environmental stimulation therapy for chronic tension headache: A pilot study. *International Journal of Psychosomatics. 38*(1–4), 33–39.

Walton, K. G., Fields, J. Z., Levitsky, D. K., Harris, D. A., Pugh, N. D., & Schneider, R. H. (2004). Lowering cortisol and CVD risk in postmenopausal women: A pilot study using the Transcendental Meditation program. In R. Yehuda & B. McEwen (Eds.), *Biobehavioral stress response: Protective and damaging effects (Annals of the New York Academy of Sciences)* (Vol. 1032, pp. 211–215). New York, NY: New York Academy of Sciences.

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11.6: The Pursuit of Happiness

Learning Objectives

- Define and discuss happiness, including its determinants
- Describe the field of positive psychology and identify the kinds of problems it addresses
- Explain the meaning of positive affect and discuss its importance in health outcomes
- Describe the concept of flow and its relationship to happiness and fulfillment

Although the study of **stress** and how it affects us physically and psychologically is fascinating, it is—admittedly—somewhat of a grim topic. Psychology is also interested in the study of a more upbeat and encouraging approach to human affairs—the quest for happiness.

Happiness

America's founders declared that its citizens have an unalienable right to pursue happiness. But what is happiness? When asked to define the term, people emphasize different aspects of this elusive state. Indeed, happiness is somewhat ambiguous and can be defined from different perspectives (Martin, 2012). Some people, especially those who are highly committed to their religious faith, view happiness in ways that emphasize virtuosity, reverence, and enlightened spirituality. Others see happiness as primarily contentment—the inner peace and joy that come from deep satisfaction with one's surroundings, relationships with others, accomplishments, and oneself. Still others view happiness mainly as pleasurable engagement with their personal environment—having a career and hobbies that are engaging, meaningful, rewarding, and exciting. These differences, of course, are merely differences in emphasis. Most people would probably agree that each of these views, in some respects, captures the essence of happiness.

Elements of Happiness

Some psychologists have suggested that happiness consists of three distinct elements: the pleasant life, the good life, and the meaningful life, as shown in figure 14.25 (Seligman, 2002; Seligman, Steen, Park, & Peterson, 2005). The pleasant life is realized through the attainment of day-to-day pleasures that add fun, joy, and excitement to our lives. For example, evening walks along the beach and a fulfilling sex life can enhance our daily pleasure and contribute to the pleasant life. The good life is achieved through identifying our unique skills and abilities and engaging these talents to enrich our lives; those who achieve the good life often find themselves absorbed in their work or their recreational pursuits. The meaningful life involves a deep sense of fulfillment that comes from using our talents in the service of the greater good: in ways that benefit the lives of others or that make the world a better place. In general, the happiest people tend to be those who pursue the full life—they orient their pursuits toward all three elements (Seligman et al., 2005).

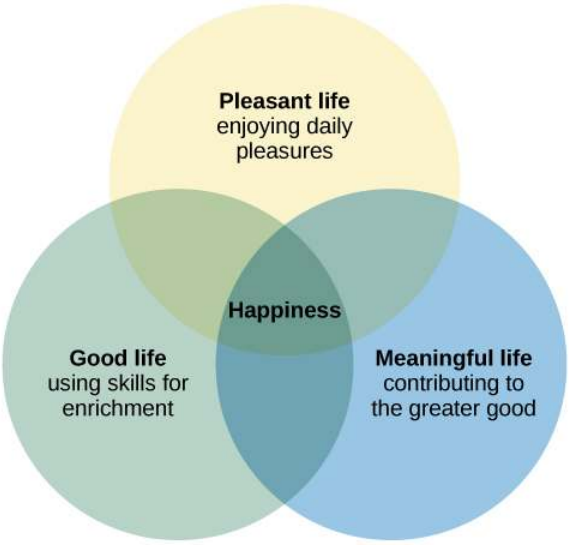


Figure 14.25 Happiness is an enduring state of well-being involving satisfaction in the pleasant, good, and meaningful aspects of life.

For practical purposes, a precise definition of **happiness** might incorporate each of these elements: an enduring state of mind consisting of joy, contentment, and other positive emotions, plus the sense that one's life has meaning and value (Lyubomirsky, 2001). The definition implies that happiness is a long-term state—what is often characterized as subjective well-being—rather than merely a transient positive mood we all experience from time to time. It is this enduring happiness that has captured the interests of psychologists and other social scientists.

The study of happiness has grown dramatically in the last three decades (Diener, 2013). One of the most basic questions that happiness investigators routinely examine is this: How happy are people in general? The average person in the world tends to be relatively happy and tends to indicate experiencing more positive feelings than negative feelings (Diener, Ng, Harter, & Arora, 2010). When asked to evaluate their current lives on a scale ranging from 0 to 10 (with 0 representing "worst possible life" and 10 representing "best possible life"), people in more than 150 countries surveyed from 2010–2012 reported an average score of 5.2. People who live in North America, Australia, and New Zealand reported the highest average score at 7.1, whereas those living Sub-Saharan Africa reported the lowest average score at 4.6 (Helliwell, Layard, & Sachs, 2013). Worldwide, the five happiest countries are Denmark, Norway, Switzerland, the Netherlands, and Sweden; the United States is ranked 17th happiest (See fig. 14.26) (Helliwell et al., 2013).



(a) (b)

Figure 14.26 (a) Surveys of residents in over 150 countries indicate that Denmark has the happiest citizens in the world. (b) Americans ranked the United States as the 17th happiest country in which to live. (credit a: modification of work by "JamesZ_Flickr"/Flickr; credit b: modification of work by Ryan Swindell)

Several years ago, a Gallup survey of more than $1,000$ U.S. adults found that 52% reported that they were "very happy." In addition, more than 8 in 10 indicated that they were "very satisfied" with their lives (Carroll, 2007). However, a recent poll of $2,345$ U.S. adults surprisingly revealed that only one-third reported they are "very happy." The poll also revealed that the happiness levels of certain groups, including minorities, recent college graduates, and the disabled, have trended downward in recent years (Gregoire, 2013). Although it is difficult to explain this apparent decline in happiness, it may be connected to the challenging economic

conditions the United States has endured over the last several years. Of course, this presumption would imply that happiness is closely tied to one's finances. But, is it? This question brings us to the next important issue: What factors influence happiness?

Factors Connected to Happiness

What really makes people happy? What factors contribute to sustained joy and contentment? Is it money, attractiveness, material possessions, a rewarding occupation, a satisfying relationship? Extensive research over the years has examined this question. One finding is that age is related to happiness: Life satisfaction usually increases the older people get, but there do not appear to be gender differences in happiness (Diener, Suh, Lucas, & Smith, 1999). Although it is important to point out that much of this work has been correlational, many of the key findings (some of which may surprise you) are summarized below.

Family and other social relationships appear to be key factors correlated with happiness. Studies show that married people report being happier than those who are single, divorced, or widowed (Diener et al., 1999). Happy individuals also report that their marriages are fulfilling (Lyubomirsky, King, & Diener, 2005). In fact, some have suggested that satisfaction with marriage and family life is the strongest predictor of happiness (Myers, 2000). Happy people tend to have more friends, more high-quality social relationships, and stronger social support networks than less happy people (Lyubomirsky et al., 2005). Happy people also have a high frequency of contact with friends (Pinquart & Sörensen, 2000).

Can money buy happiness? In general, extensive research suggests that the answer is yes, but with several caveats. While a nation's per capita gross domestic product (GDP) is associated with happiness levels (Helliwell et al., 2013), changes in GDP (which is a less certain index of household income) bear little relationship to changes in happiness (Diener, Tay, & Oishi, 2013). On the whole, residents of affluent countries tend to be happier than residents of poor countries; within countries, wealthy individuals are happier than poor individuals, but the association is much weaker (Diener & Biswas-Diener, 2002). To the extent that it leads to increases in purchasing power, increases in income are associated with increases in happiness (Diener, Oishi, & Ryan, 2013). However, income within societies appears to correlate with happiness only up to a point. In a study of over $450,000$ U.S. residents surveyed by the Gallup Organization, Kahneman and Deaton (2010) found that well-being rises with annual income, but only up to $\$75,000$. The average increase in reported well-being for people with incomes greater than $\$75,000$ was null. As implausible as these findings might seem—after all, higher incomes would enable people to indulge in Hawaiian vacations, prime seats as sporting events, expensive automobiles, and expansive new homes—higher incomes may impair people's ability to savor and enjoy the small pleasures of life (Kahneman, 2011). Indeed, researchers in one study found that participants exposed to a subliminal reminder of wealth spent less time savoring a chocolate candy bar and exhibited less enjoyment of this experience than did participants who were not reminded of wealth (Quoidbach, Dunn, Petrides, & Mikolajczak, 2010).

What about education and employment? Happy people, compared to those who are less happy, are more likely to graduate from college and secure more meaningful and engaging jobs. Once they obtain a job, they are also more likely to succeed (Lyubomirsky et al., 2005). While education shows a positive (but weak) correlation with happiness, intelligence is not appreciably related to happiness (Diener et al., 1999).

Does religiosity correlate with happiness? In general, the answer is yes (Hackney & Sanders, 2003). However, the relationship between religiosity and happiness depends on societal circumstances. Nations and states with more difficult living conditions (e.g., widespread hunger and low life expectancy) tend to be more highly religious than societies with more favorable living conditions. Among those who live in nations with difficult living conditions, religiosity is associated with greater well-being; in nations with more favorable living conditions, religious and nonreligious individuals report similar levels of well-being (Diener, Tay, & Myers, 2011).

Clearly the living conditions of one's nation can influence factors related to happiness. What about the influence of one's culture? To the extent that people possess characteristics that are highly valued by their culture, they tend to be happier (Diener, 2012). For example, self-esteem is a stronger predictor of life satisfaction in individualistic cultures than in collectivistic cultures (Diener, Diener, & Diener, 1995), and extraverted people tend to be happier in extraverted cultures than in introverted cultures (Fulmer et al., 2010).

So we've identified many factors that exhibit some correlation to happiness. What factors don't show a correlation? Researchers have studied both parenthood and physical attractiveness as potential contributors to happiness. Although people tend to believe that parenthood is central to a meaningful and fulfilling life, aggregate findings from a range of countries indicate that people who do not have children are generally happier than those who do (Hansen, 2012). And although one's perceived level of attractiveness

seems to predict happiness, a person's objective physical attractiveness is only weakly correlated with her happiness (Diener, Wolsic, & Fujita, 1995).

Life Events and Happiness

An important point should be considered regarding happiness. People are often poor at affective forecasting: predicting the intensity and duration of their future emotions (Wilson & Gilbert, 2003). In one study, nearly all newlywed spouses predicted their marital satisfaction would remain stable or improve over the following four years; despite this high level of initial optimism, their marital satisfaction actually declined during this period (Lavner, Karner, & Bradbury, 2013). In addition, we are often incorrect when estimating how our long-term happiness would change for the better or worse in response to certain life events. For example, it is easy for many of us to imagine how euphoric we would feel if we won the lottery, were asked on a date by an attractive celebrity, or were offered our dream job. It is also easy to understand how long-suffering fans of the Chicago Cubs baseball team, which, until 2016 had not won a World Series championship since 1908, thought they would feel permanently elated if their team would finally win another World Series. Likewise, it easy to predict that we would feel permanently miserable if we suffered a crippling accident or if a romantic relationship ended.

However, something similar to sensory adaptation often occurs when people experience emotional reactions to life events. In much the same way our senses adapt to changes in stimulation (e.g., our eyes adapting to bright light after walking out of the darkness of a movie theater into the bright afternoon sun), we eventually experience **adaptation** to changing emotional circumstances in our lives (Brickman & Campbell, 1971; Helson, 1964). When an event that provokes positive or negative emotions occurs, at first we tend to experience its emotional impact at full intensity. We feel a burst of pleasure following such things as a marriage proposal, birth of a child, acceptance to law school, an inheritance, and the like; as you might imagine, lottery winners experience a surge of happiness after hitting the jackpot (Lutter, 2007). Likewise, we experience a surge of misery following widowhood, a divorce, or a layoff from work. In the long run, however, we eventually adjust to the emotional new normal; the emotional impact of the event tends to erode, and we eventually revert to our original baseline happiness levels. Thus, what was at first a thrilling lottery windfall or World Series championship eventually loses its luster and becomes the status quo (See figure 14.27). Indeed, dramatic life events have much less long-lasting impact on happiness than might be expected (Brickman, Coats, & Janoff-Bulman, 1978).



(a) (b)

Figure 14.27 (a) Long-suffering Chicago Cub fans no doubt felt elated in 2016 when their team won a World Series championship, a feat that had not been accomplished by that franchise in over a century. (b) In ways that are similar, those who play the lottery rightfully think that choosing the correct numbers and winning millions would lead to a surge in happiness. However, the initial burst of elation following such elusive events would most likely erode with time. (credit a: modification of work by Phil Roeder; credit b: modification of work by Robert S. Donovan)

Recently, some have raised questions concerning the extent to which important life events can permanently alter people's happiness set points (Diener, Lucas, & Scollon, 2006). Evidence from a number of investigations suggests that, in some circumstances, happiness levels do not revert to their original positions. For example, although people generally tend to adapt to marriage so that it no longer makes them happier or unhappier than before, they often do not fully adapt to unemployment or severe disabilities (Diener, 2012). Figure 14.28, which is based on longitudinal data from a sample of over $3,000$ German respondents, shows life satisfaction scores several years before, during, and after various life events, and it illustrates how people adapt (or fail to adapt) to these events. German respondents did not get lasting emotional boosts from marriage; instead, they reported brief increases in happiness, followed by quick adaptation. In contrast, widows and those who had been laid off experienced sizeable decreases in happiness that appeared to result in long-term changes in life satisfaction (Diener et al., 2006). Further, longitudinal data from the

same sample showed that happiness levels changed significantly over time for nearly a quarter of respondents, with 9% showing major changes (Fujita & Diener, 2005). Thus, long-term happiness levels can and do change for some people.

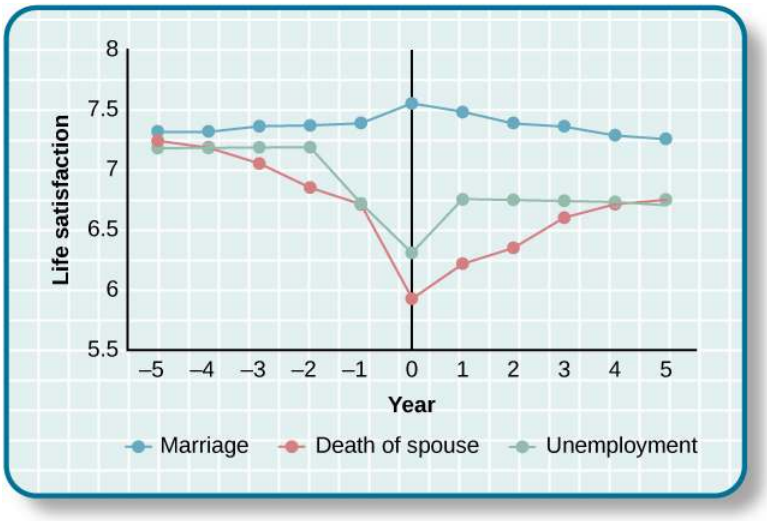


Figure 14.28 This graphs shows life satisfaction scores several years before and after three significant life events (0 represents the year the event happened) (Diener et al., 2006).

Increasing Happiness

Some recent findings about happiness provide an optimistic picture, suggesting that real changes in happiness are possible. For example, thoughtfully developed well-being interventions designed to augment people's baseline levels of happiness may increase happiness in ways that are permanent and long-lasting, not just temporary. These changes in happiness may be targeted at individual, organizational, and societal levels (Diener et al., 2006). Researchers in one study found that a series of happiness interventions involving such exercises as writing down three good things that occurred each day led to increases in happiness that lasted over six months (Seligman et al., 2005).

Measuring **happiness** and well-being at the societal level over time may assist policy makers in determining if people are generally happy or miserable, as well as when and why they might feel the way they do. Studies show that average national happiness scores (over time and across countries) relate strongly to six key variables: per capita gross domestic product (GDP, which reflects a nation's economic standard of living), social support, freedom to make important life choices, healthy life expectancy, freedom from perceived corruption in government and business, and generosity (Helliwell et al., 2013). Investigating why people are happy or unhappy might help policymakers develop programs that increase happiness and well-being within a society (Diener et al., 2006). Resolutions about contemporary political and social issues that are frequent topics of debate—such as poverty, taxation, affordable health care and housing, clean air and water, and income inequality—might be best considered with people's happiness in mind.

Positive Psychology

In 1998, **Seligman** (the same person who conducted the learned helplessness experiments mentioned earlier), who was then president of the American Psychological Association, urged psychologists to focus more on understanding how to build human strength and psychological well-being. In deliberately setting out to create a new direction and new orientation for psychology, Seligman helped establish a growing movement and field of research called positive psychology (Compton, 2005). In a very general sense, **positive psychology** can be thought of as the science of happiness; it is an area of study that seeks to identify and promote those qualities that lead to greater fulfillment in our lives. This field looks at people's strengths and what helps individuals to lead happy, contented lives, and it moves away from focusing on people's pathology, faults, and problems. According to Seligman and Csikszentmihalyi (2000), positive psychology,

> *"at the subjective level is about valued subjective experiences: well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and… happiness (in the present). At the individual level, it is about positive individual traits:*

the capacity for love and vocation, courage, interpersonal skill, aesthetic sensibility, perseverance, forgiveness, originality, future mindedness, spirituality, high talent, and wisdom." (p. 5)

Some of the topics studied by positive psychologists include altruism and empathy, creativity, forgiveness and compassion, the importance of positive emotions, enhancement of immune system functioning, savoring the fleeting moments of life, and strengthening virtues as a way to increase authentic happiness (Compton, 2005). Recent efforts in the field of positive psychology have focused on extending its principles toward peace and well-being at the level of the global community. In a war-torn world in which conflict, hatred, and distrust are common, such an extended "positive peace psychology" could have important implications for understanding how to overcome oppression and work toward global peace (Cohrs, Christie, White, & Das, 2013).

DIG DEEPER: The Center for Investigating Healthy Minds

On the campus of the University of Wisconsin–Madison, the Center for Investigating Healthy Minds at the Waisman Center conducts rigorous scientific research on healthy aspects of the mind, such as kindness, forgiveness, compassion, and mindfulness. Established in 2008 and led by renowned neuroscientist Dr. Richard J. Davidson, the Center examines a wide range of ideas, including such things as a kindness curriculum in schools, neural correlates of prosocial behavior, psychological effects of Tai Chi training, digital games to foster prosocial behavior in children, and the effectiveness of yoga and breathing exercises in reducing symptoms of post-traumatic stress disorder.

According to its website, the Center was founded after Dr. Davidson was challenged by His Holiness, the 14th Dalai Lama, "to apply the rigors of science to study positive qualities of mind" (Center for Investigating Health Minds, 2013). The Center continues to conduct scientific research with the aim of developing mental health training approaches that help people to live happier, healthier lives).

Positive Affect and Optimism

Taking a cue from positive psychology, extensive research over the last $10-15$ years has examined the importance of positive psychological attributes in physical well-being. Qualities that help promote psychological well-being (e.g., having meaning and purpose in life, a sense of autonomy, positive emotions, and satisfaction with life) are linked with a range of favorable health outcomes (especially improved cardiovascular health) mainly through their relationships with biological functions and health behaviors (such as diet, physical activity, and sleep quality) (Boehm & Kubzansky, 2012). The quality that has received attention is **positive affect**, which refers to pleasurable engagement with the environment, such as happiness, joy, enthusiasm, alertness, and excitement (Watson, Clark, & Tellegen, 1988). The characteristics of positive affect, as with negative affect (discussed earlier), can be brief, long-lasting, or trait-like (Pressman & Cohen, 2005). Independent of age, gender, and income, positive affect is associated with greater social connectedness, emotional and practical support, adaptive coping efforts, and lower depression; it is also associated with longevity and favorable physiological functioning (Steptoe, O'Donnell, Marmot, & Wardle, 2008).

Positive affect also serves as a protective factor against heart disease. In a 10-year study of Nova Scotians, the rate of heart disease was 22% lower for each one-point increase on the measure of positive affect, from 1 (no positive affect expressed) to 5 (extreme positive affect) (Davidson, Mostofsky, & Whang, 2010). In terms of our health, the expression, "don't worry, be happy" is helpful advice indeed. There has also been much work suggesting that **optimism**—the general tendency to look on the bright side of things—is also a significant predictor of positive health outcomes.

Although positive affect and optimism are related in some ways, they are not the same (Pressman & Cohen, 2005). Whereas positive affect is mostly concerned with positive feeling states, optimism has been regarded as a generalized tendency to expect that good things will happen (Chang, 2001). It has also been conceptualized as a tendency to view life's stressors and difficulties as temporary and external to oneself (Peterson & Steen, 2002). Numerous studies over the years have consistently shown that optimism is linked to longevity, healthier behaviors, fewer postsurgical complications, better immune functioning among men with prostate cancer, and better treatment adherence (Rasmussen & Wallio, 2008). Further, optimistic people report fewer physical symptoms, less pain, better physical functioning, and are less likely to be rehospitalized following heart surgery (Rasmussen, Scheier, & Greenhouse, 2009).

Flow

Another factor that seems to be important in fostering a deep sense of well-being is the ability to derive flow from the things we do in life. **Flow** is described as a particular experience that is so engaging and engrossing that it becomes worth doing for its own sake (Csikszentmihalyi, 1997). It is usually related to creative endeavors and leisure activities, but it can also be experienced by workers who like their jobs or students who love studying (Csikszentmihalyi, 1999). Many of us instantly recognize the notion of flow. In fact, the term derived from respondents' spontaneous use of the term when asked to describe how it felt when what they were doing was going well. When people experience flow, they become involved in an activity to the point where they feel they lose themselves in the activity. They effortlessly maintain their concentration and focus, they feel as though they have complete control of their actions, and time seems to pass more quickly than usual (Csikszentmihalyi, 1997). Flow is considered a pleasurable experience, and it typically occurs when people are engaged in challenging activities that require skills and knowledge they know they possess. For example, people would be more likely report flow experiences in relation to their work or hobbies than in relation to eating. When asked the question, "Do you ever get involved in something so deeply that nothing else seems to matter, and you lose track of time?" about 20% of Americans and Europeans report having these flow-like experiences regularly (Csikszentmihalyi, 1997).

Although wealth and material possessions are nice to have, the notion of flow suggests that neither are prerequisites for a happy and fulfilling life. Finding an activity that you are truly enthusiastic about, something so absorbing that doing it is reward itself (whether it be playing tennis, studying Arabic, writing children's novels, or cooking lavish meals) is perhaps the real key. According to Csikszentmihalyi (1999), creating conditions that make flow experiences possible should be a top social and political priority. How might this goal be achieved? How might flow be promoted in school systems? In the workplace? What potential benefits might be accrued from such efforts?

In an ideal world, scientific research endeavors should inform us on how to bring about a better world for all people. The field of positive psychology promises to be instrumental in helping us understand what truly builds hope, optimism, happiness, healthy relationships, flow, and genuine personal fulfillment.

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CHAPTER OVERVIEW

12: Social Psychology

12.1: What Is Social Psychology?

12.2: Conformity, Compliance, and Obedience

12.3: Prejudice and Discrimination

12.4: Relationships

12.5: The Psychology of Groups

12.6: Latané And Darley's Model Of Helping

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12.1: What Is Social Psychology?

Social psychology examines how people affect one another, and it looks at the power of the situation. Social psychologists assert that an individual's thoughts, feelings, and behaviors are very much influenced by social situations. Essentially, people will change their behavior to align with the social situation at hand. If we are in a new situation or are unsure how to behave, we will take our cues from other individuals.

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12.2: Conformity, Compliance, and Obedience

Learning Objectives

- Explain the Asch effect
- Define conformity and types of social influence
- Describe Stanley Milgram's experiment and its implications

In this section, we discuss additional ways in which people influence others. The topics of conformity, social influence, obedience, and group processes demonstrate the power of the social situation to change our thoughts, feelings, and behaviors. We begin this section with a discussion of a famous social psychology experiment that demonstrated how susceptible humans are to outside social pressures.

Conformity

Solomon **Asch** conducted several experiments in the 1950s to determine how people are affected by the thoughts and behaviors of other people. In one study, a group of participants was shown a series of printed line segments of different lengths: a, b, and c (See figure 12.17). Participants were then shown a fourth line segment: x. They were asked to identify which line segment from the first group (a, b, or c) most closely resembled the fourth line segment in length.

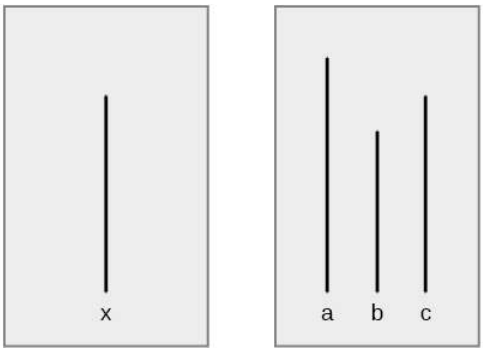


Figure 12.17 These line segments illustrate the judgment task in Asch's conformity study. Which line on the right—a, b, or c—is the same length as line x on the left?

Each group of participants had only one true, naïve subject. The remaining members of the group were confederates of the researcher. A **confederate** is a person who is aware of the experiment and works for the researcher. Confederates are used to manipulate social situations as part of the research design, and the true, naïve participants believe that confederates are, like them, uninformed participants in the experiment. In Asch's study, the confederates identified a line segment that was obviously shorter than the target line—a wrong answer. The naïve participant then had to identify aloud the line segment that best matched the target line segment.

How often do you think the true participant aligned with the confederates' response? That is, how often do you think the group influenced the participant, and the participant gave the wrong answer? Asch (1955) found that 76% of participants conformed to group pressure at least once by indicating the incorrect line. **Conformity** is the change in a person's behavior to go along with the group, even if he does not agree with the group. Why would people give the wrong answer? What factors would increase or decrease someone giving in or conforming to group pressure?

The **Asch effect** is the influence of the group majority on an individual's judgment.

What factors make a person more likely to yield to group pressure? Research shows that the size of the majority, the presence of another dissenter, and the public or relatively private nature of responses are key influences on conformity.

- The size of the majority: The greater the number of people in the majority, the more likely an individual will conform. There is, however, an upper limit: a point where adding more members does not increase conformity. In Asch's study, conformity increased with the number of people in the majority—up to seven individuals. At numbers beyond seven, conformity leveled off and decreased slightly (Asch, 1955).

- The presence of another dissenter: If there is at least one dissenter, conformity rates drop to near zero (Asch, 1955).
- The public or private nature of the responses: When responses are made publicly (in front of others), conformity is more likely; however, when responses are made privately (e.g., writing down the response), conformity is less likely (Deutsch & Gerard, 1955).

The finding that conformity is more likely to occur when responses are public than when they are private is the reason government elections require voting in secret, so we are not coerced by others (See figure 12.18). The **Asch effect** can be easily seen in children when they have to publicly vote for something. For example, if the teacher asks whether the children would rather have extra recess, no homework, or candy, once a few children vote, the rest will comply and go with the majority. In a different classroom, the majority might vote differently, and most of the children would comply with that majority. When someone's vote changes if it is made in public versus private, this is known as compliance. **Compliance** can be a form of conformity. Compliance is going along with a request or demand, even if you do not agree with the request. In Asch's studies, the participants complied by giving the wrong answers, but privately did not accept that the obvious wrong answers were correct.



Figure 12.18 Voting for government officials in the United States is private to reduce the pressure of conformity. (credit: Nicole Klauss)

Now that you have learned about the Asch line experiments, why do you think the participants conformed? The correct answer to the line segment question was obvious, and it was an easy task. Researchers have categorized the motivation to conform into two types: normative social influence and informational social influence (Deutsch & Gerard, 1955).

In **normative social influence**, people conform to the group norm to fit in, to feel good, and to be accepted by the group. However, with **informational social influence**, people conform because they believe the group is competent and has the correct information, particularly when the task or situation is ambiguous. What type of social influence was operating in the Asch conformity studies? Since the line judgment task was unambiguous, participants did not need to rely on the group for information. Instead, participants complied to fit in and avoid ridicule, an instance of normative social influence.

An example of informational social influence may be what to do in an emergency situation. Imagine that you are in a movie theater watching a film and what seems to be smoke comes in the theater from under the emergency exit door. You are not certain that it is smoke—it might be a special effect for the movie, such as a fog machine. When you are uncertain you will tend to look at the behavior of others in the theater. If other people show concern and get up to leave, you are likely to do the same. However, if others seem unconcerned, you are likely to stay put and continue watching the movie (See figure 12.19).



(a) (b)

Figure 12.19 People in crowds tend to take cues from others and act accordingly. (a) An audience is listening to a lecture and people are relatively quiet, still, and attentive to the speaker on the stage. (b) An audience is at a rock concert where people are dancing, singing, and possibly engaging in activities like crowd surfing. (credit a: modification of work by Matt Brown; credit b: modification of work by Christian Holmér)

How would you have behaved if you were a participant in Asch's study? Many students say they would not conform, that the study is outdated, and that people nowadays are more independent. To some extent this may be true. Research suggests that overall rates of conformity may have reduced since the time of Asch's research. Furthermore, efforts to replicate Asch's study have made it clear that many factors determine how likely it is that someone will demonstrate conformity to the group. These factors include the participant's age, gender, and socio-cultural background (Bond & Smith, 1996; Larsen, 1990; Walker & Andrade, 1996).

Link to Learning

Watch this video of a replication of the Asch experiment(opens in new window) to learn more.

Stanley Milgram's Experiment

Conformity is one effect of the influence of others on our thoughts, feelings, and behaviors. Another form of social influence is obedience to authority. **Obedience** is the change of an individual's behavior to comply with a demand by an authority figure. People often comply with the request because they are concerned about a consequence if they do not comply. To demonstrate this phenomenon, we review another classic social psychology experiment.

Stanley **Milgram** was a social psychology professor at Yale who was influenced by the trial of Adolf Eichmann, a Nazi war criminal. Eichmann's defense for the atrocities he committed was that he was "just following orders." Milgram (1963) wanted to test the validity of this defense, so he designed an experiment and initially recruited 40 men for his experiment. The volunteer participants were led to believe that they were participating in a study to improve learning and memory. The participants were told that they were to teach other students (learners) correct answers to a series of test items. The participants were shown how to use a device that they were told delivered electric shocks of different intensities to the learners. The participants were told to shock the learners if they gave a wrong answer to a test item—that the shock would help them to learn. The participants gave (or believed they gave) the learners shocks, which increased in 15-volt increments, all the way up to 450 volts. The participants did not know that the learners were confederates and that the confederates did not actually receive shocks.

In response to a string of incorrect answers from the learners, the participants obediently and repeatedly shocked them. The confederate learners cried out for help, begged the participant teachers to stop, and even complained of heart trouble. Yet, when the researcher told the participant-teachers to continue the shock, 65% of the participants continued the shock to the maximum voltage and to the point that the learner became unresponsive (See figure 12.20). What makes someone obey authority to the point of potentially causing serious harm to another person?

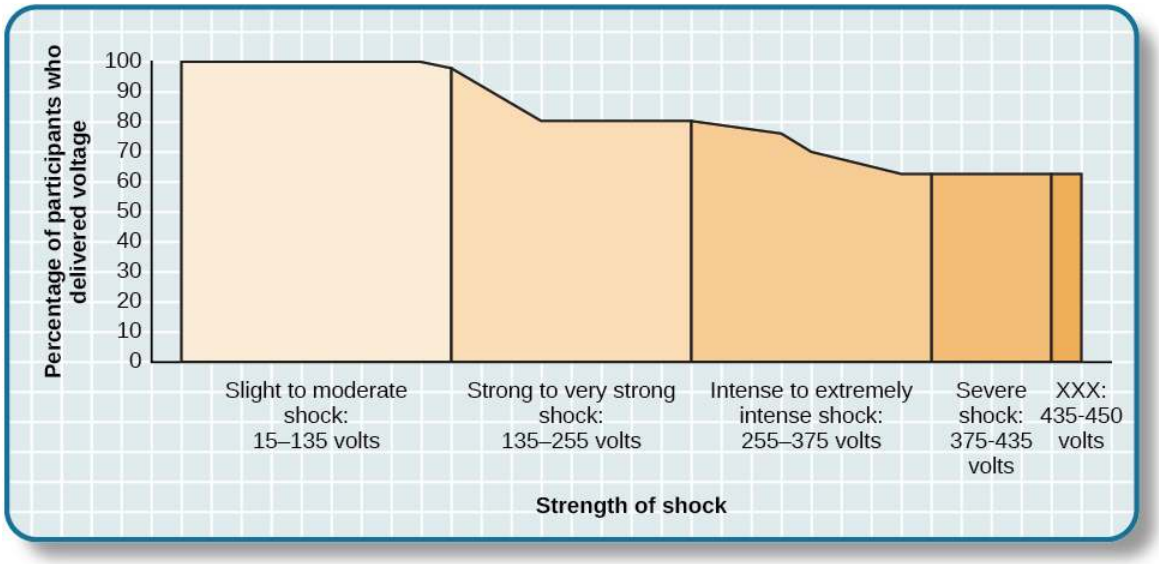


Figure 12.20 The Milgram experiment showed the surprising degree to which people obey authority. Two out of three (65%) participants continued to administer shocks to an unresponsive learner.

Several variations of the original **Milgram** experiment were conducted to test the boundaries of obedience. When certain features of the situation were changed, participants were less likely to continue to deliver shocks (Milgram, 1965). For example, when the setting of the experiment was moved to an office building, the percentage of participants who delivered the highest shock dropped to 48%. When the learner was in the same room as the teacher, the highest shock rate dropped to 40%. When the teachers' and learners' hands were touching, the highest shock rate dropped to 30%. When the researcher gave the orders by phone, the rate dropped to 23%. These variations show that when the humanity of the person being shocked was increased, obedience decreased. Similarly, when the authority of the experimenter decreased, so did obedience.

This case is still very applicable today. What does a person do if an authority figure orders something done? What if the person believes it is incorrect, or worse, unethical? In a study by Martin and Bull (2008), midwives privately filled out a questionnaire regarding best practices and expectations in delivering a baby. Then, a more senior midwife and supervisor asked the junior midwives to do something they had previously stated they were opposed to. Most of the junior midwives were obedient to authority, going against their own beliefs.

The Table 12.2 below summarizes the types of social influence you have learned about in this chapter.

Table 12.2 Types of Social Influence

Type of Social Influence	Description
Conformity	Changing your behavior to go along with the group even if you do not agree with the group
Compliance	Going along with a request or demand
Normative social influence	Conformity to a group norm to fit in, feel good, and be accepted by the group
Informational social influence	Conformity to a group norm prompted by the belief that the group is competent and has the correct information
Obedience	Changing your behavior to please an authority figure or to avoid aversive consequences

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12.3: Prejudice and Discrimination

Learning Objectives

- Define and distinguish among prejudice, stereotypes, and discrimination
- Provide examples of prejudice, stereotypes, and discrimination
- Explain why prejudice and discrimination exist

Human conflict can result in crime, war, and mass murder, such as genocide. Prejudice and discrimination often are root causes of human conflict, which explains how strangers come to hate one another to the extreme of causing others harm. Prejudice and discrimination affect everyone. In this section we will examine the definitions of prejudice and discrimination, examples of these concepts, and causes of these biases.



(a) (b) (c)

Figure 12.21 Prejudice and discrimination occur across the globe. (a) A 1939 sign in German-occupied Poland warns "No Entrance for Poles!" (b) An African-American male drinks from a designated "colored" water fountain in Oklahoma in 1939 during the era of racial segregation as a practice of discrimination. (c) A member of the Westboro Baptist Church, widely identified as a hate group, engages in discrimination based on religion and sexual orientation. (credit b: modification of work by United States Farm Security Administration; credit c: modification of work by "JCWilmore"/Wikimedia Commons)

Understanding Prejudice, Stereotyping, and Discrimination

As we discussed in the opening story of Trayvon Martin, humans are very diverse and although we share many similarities, we also have many differences. The social groups we belong to help form our identities (Tajfel, 1974). These differences may be difficult for some people to reconcile, which may lead to prejudice toward people who are different. **Prejudice** is a negative attitude and feeling toward an individual based solely on one's membership in a particular social group (Allport, 1954; Brown, 2010). Prejudice is common against people who are members of an unfamiliar cultural group. Thus, certain types of education, contact, interactions, and building relationships with members of different cultural groups can reduce the tendency toward prejudice. In fact, simply imagining interacting with members of different cultural groups might affect prejudice. Indeed, when experimental participants were asked to imagine themselves positively interacting with someone from a different group, this led to an increased positive attitude toward the other group and an increase in positive traits associated with the other group. Furthermore, imagined social interaction can reduce anxiety associated with inter-group interactions (Crisp & Turner, 2009). What are some examples of social groups that you belong to that contribute to your identity? Social groups can include gender, race, ethnicity, nationality, social class, religion, sexual orientation, profession, and many more. And, as is true for social roles, you can simultaneously be a member of more than one social group. An example of prejudice is having a negative attitude toward people who are not born in the United States. Although people holding this prejudiced attitude do not know all people who were not born in the United States, they dislike them due to their status as foreigners.

Can you think of a prejudiced attitude you have held toward a group of people? How did your prejudice develop? Prejudice often begins in the form of a **stereotype**—that is, a specific belief or assumption about individuals based solely on their membership in a group, regardless of their individual characteristics. Stereotypes become overgeneralized and applied to all members of a group. For example, someone holding prejudiced attitudes toward older adults, may believe that older adults are slow and incompetent (Cuddy, Norton, & Fiske, 2005; Nelson, 2004). We cannot possibly know each individual person of advanced age to know that all older adults are slow and incompetent. Therefore, this negative belief is overgeneralized to all members of the group, even though many of the individual group members may in fact be spry and intelligent.

Another example of a well-known stereotype involves beliefs about racial differences among athletes. As Hodge, Burden, Robinson, and Bennett (2008) point out, Black male athletes are often believed to be more athletic, yet less intelligent, than their White male counterparts. These beliefs persist despite a number of high profile examples to the contrary. Sadly, such beliefs often influence how these athletes are treated by others and how they view themselves and their own capabilities. Whether or not you agree with a stereotype, stereotypes are generally well-known within in a given culture (Devine, 1989).

Sometimes people will act on their prejudiced attitudes toward a group of people, and this behavior is known as discrimination. **Discrimination** is negative action toward an individual as a result of one's membership in a particular group (Allport, 1954; Dovidio & Gaertner, 2004). As a result of holding negative beliefs (stereotypes) and negative attitudes (prejudice) about a particular group, people often treat the target of prejudice poorly, such as excluding older adults from their circle of friends. The Table 12.3 below summarizes the characteristics of stereotypes, prejudice, and discrimination. Have you ever been the target of discrimination? If so, how did this negative treatment make you feel?

Table 12.3 Connecting Stereotypes, Prejudice, and Discrimination

Item	Function	Connection	Example
Stereotype	Cognitive; thoughts about people	Overgeneralized beliefs about people may lead to prejudice.	"Yankees fans are arrogant and obnoxious."
Prejudice	Affective; feelings about people, both positive and negative	Feelings may influence treatment of others, leading to discrimination.	"I hate Yankees fans; they make me angry."
Discrimination	Behavior; positive or negative treatment of others	Holding stereotypes and harboring prejudice may lead to excluding, avoiding, and biased treatment of group members.	"I would never hire nor become friends with a person if I knew he or she were a Yankees fan."

So far, we've discussed stereotypes, prejudice, and discrimination as negative thoughts, feelings, and behaviors because these are typically the most problematic. However, it is important to also point out that people can hold positive thoughts, feelings, and behaviors toward individuals based on group membership; for example, they would show preferential treatment for people who are like themselves—that is, who share the same gender, race, or favorite sports team.

Link to Learning

Watch this video of a social experiment conducted in a park(opens in new window) that demonstrates the concepts of prejudice, stereotypes, and discrimination. In the video, three people try to steal a bike out in the open. The race and gender of the thief is varied: a White male teenager, a Black male teenager, and a White female. Does anyone try to stop them? The treatment of the teenagers in the video demonstrates the concept of racism.

IN-Groups and OUT-Groups

As discussed previously in this section, we all belong to a gender, race, age, and social economic group. These groups provide a powerful source of our identity and self-esteem (Tajfel & Turner, 1979). These groups serve as our in-groups. An **in-group** is a group that we identify with or see ourselves as belonging to. A group that we don't belong to, or an **out-group**, is a group that we view as fundamentally different from us. For example, if you are a woman, your gender in-group includes all women, and your gender out-group includes all men (See figure 12.23). People often view gender groups as being fundamentally different from each other in personality traits, characteristics, social roles, and interests. Because we often feel a strong sense of belonging and emotional connection to our in-groups, we develop in-group bias: a preference for our own group over other groups. This **in-group bias** can result in prejudice and discrimination because the out-group is perceived as different and is less preferred than our in-group.



Figure 12.23 These children are very young, but they are already aware of their gender in-group and out-group. (credit: modification of work by Simone Ramella)

Despite the group dynamics that seem only to push groups toward conflict, there are forces that promote reconciliation between groups: the expression of empathy, of acknowledgment of past suffering on both sides, and the halt of destructive behaviors.

One function of prejudice is to help us feel good about ourselves and maintain a positive self-concept. This need to feel good about ourselves extends to our in-groups: We want to feel good and protect our in-groups. We seek to resolve threats individually and at the in-group level. This often happens by blaming an out-group for the problem. **Scapegoating** is the act of blaming an out-group when the in-group experiences frustration or is blocked from obtaining a goal (Allport, 1954).

Why Does Prejudice Continue to Exist and Can It Be Reduced?

Prejudice and discrimination persist in society due to social learning and conformity to social norms. Children learn prejudiced attitudes and beliefs from society: their parents, teachers, friends, the media, and other sources of socialization, such as Facebook (O'Keeffe & Clarke-Pearson, 2011). If certain types of prejudice and discrimination are acceptable in a society, there may be normative pressures to conform and share those prejudiced beliefs, attitudes, and behaviors. For example, public and private schools are still somewhat segregated by social class. Historically, only children from wealthy families could afford to attend private schools, whereas children from middle- and low-income families typically attended public schools. If a child from a low-income family received a merit scholarship to attend a private school, how might the child be treated by classmates? Can you recall a time when you held prejudiced attitudes or beliefs or acted in a discriminatory manner because your group of friends expected you to?

In addition, we use our stereotypes and prejudices in part because they are easy; if we can quickly size up people on the basis of their physical appearance, that can save us a lot of time and effort. We may be evolutionarily disposed to stereotyping. Because our primitive ancestors needed to accurately separate members of their own kin group from those of others, categorizing people into "us" (the *ingroup*) and "them" (the *outgroup*) was useful and even necessary (Neuberg, Kenrick, & Schaller, 2010). And *the positive emotions that we experience as a result of our group memberships*—known as social identity—can be an important and positive part of our everyday experiences (Hogg, 2003). We may gain social identity as members of our university, our sports teams, our religious and racial groups, and many other groups.



Figure : Social identity is the positive emotions that we experience as a member of an important social group. Caitlin Regan – Who is number 14? – CC BY 2.0

But the fact that we *may* use our stereotypes does not mean that we *should* use them. Stereotypes, prejudice, and discrimination, whether they are consciously or unconsciously applied, make it difficult for some people to effectively contribute to society and may create both mental and physical health problems for them (Swim & Stangor, 1998). In some cases getting beyond our prejudices is required by law, as detailed in the U.S. Civil Rights Act of 1964, the Equal Opportunity Employment Act of 1972, and the Fair Housing Act of 1978.

There are individual differences in prejudice, such that some people are more likely to try to control and confront their stereotypes and prejudices whereas others apply them more freely (Czopp, Monteith, & Mark, 2006; Plant & Devine, 1998). For instance, some people believe in group hierarchies—that some groups are naturally better than others—whereas other people are more egalitarian and hold fewer prejudices (Sidanius & Pratto, 1999; Stangor & Leary, 2006).

Social psychologists believe that we should work to get past our prejudices. The tendency to hold stereotypes and prejudices and to act on them can be reduced, for instance, through positive interactions and friendships with members of other groups, through practice in avoiding using them, and through education (Hewstone, 1996).

References

Hewstone, M. (1996). Contact and categorization: Social psychological interventions to change intergroup relations. In C. N. Macrae, C. Stangor, & M. Hewstone (Eds.), *Stereotypes and stereotyping* (pp. 323–368). New York, NY: Guilford Press.

Hogg, M. A. (2003). Social identity. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (pp. 462–479). New York, NY: Guilford Press.

Neuberg, S. L., Kenrick, D. T., & Schaller, M. (2010). Evolutionary social psychology. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (5th ed., Vol. 2, pp. 761–796). Hoboken, NJ: John Wiley & Sons.

Sidanius, J., & Pratto, F. (1999). *Social dominance: An intergroup theory of social hierarchy and oppression*. New York, NY: Cambridge University Press.

Stangor, C., & Leary, S. (2006). Intergroup beliefs: Investigations from the social side. *Advances in Experimental Social Psychology, 38*, 243–283.

Swim, J. T., & Stangor, C. (1998). *Prejudice: The target's perspective*. Santa Barbara, CA: Academic Press.

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12.4: Relationships

Learning Objectives

- Describe conditions that influence the formation of relationships
- Identify what attracts people to each other
- Describe the triangular theory of love
- Explain social exchange theory in relationships

You've learned about many of the negative behaviors of social psychology, but the field also studies many positive social interactions and behaviors. What makes people like each other? With whom are we friends? Whom do we date? Researchers have documented several features of the situation that influence whether we form relationships with others. There are also universal traits that humans find attractive in others. In this section we discuss conditions that make forming relationships more likely, what we look for in friendships and romantic relationships, the different types of love, and a theory explaining how our relationships are formed, maintained, and terminated.

Forming Relationships

What do you think is the single most influential factor in determining with whom you become friends and whom you form romantic relationships? You might be surprised to learn that the answer is simple: the people with whom you have the most contact. This most important factor is proximity. You are more likely to be friends with people you have regular contact with. For example, there are decades of research that shows that you are more likely to become friends with people who live in your dorm, your apartment building, or your immediate neighborhood than with people who live farther away (Festinger, Schachler, & Back, 1950). It is simply easier to form relationships with people you see often because you have the opportunity to get to know them.

Similarity is another factor that influences who we form relationships with. We are more likely to become friends or lovers with someone who is similar to us in background, attitudes, and lifestyle. In fact, there is no evidence that opposites attract. Rather, we are attracted to people who are most like us (See figure 12.27) (McPherson, Smith-Lovin, & Cook, 2001). Why do you think we are attracted to people who are similar to us? Sharing things in common will certainly make it easy to get along with others and form connections. When you and another person share similar music taste, hobbies, food preferences, and so on, deciding what to do with your time together might be easy. **Homophily** is the tendency for people to form social networks, including friendships, marriage, business relationships, and many other types of relationships, with others who are similar (McPherson et al., 2001).



Figure 12.27 People tend to be attracted to similar people. Many couples share a cultural background. This can be quite obvious in a ceremony such as a wedding, and more subtle (but no less significant) in the day-to-day workings of a relationship. (credit: modification of work by Shiraz Chanawala)

But, homophily limits our exposure to diversity (McPherson et al., 2001). By forming relationships only with people who are similar to us, we will have homogenous groups and will not be exposed to different points of view. In other words, because we are likely to spend time with those who are most like ourselves, we will have limited exposure to those who are different than ourselves, including people of different races, ethnicities, social-economic status, and life situations.

Once we form relationships with people, we desire reciprocity. **Reciprocity** is the give and take in relationships. We contribute to relationships, but we expect to receive benefits as well. That is, we want our relationships to be a two way street. We are more likely to like and engage with people who like us back. Self-disclosure is part of the two way street. **Self-disclosure** is the sharing of personal information (Laurenceau, Barrett, & Pietromonaco, 1998). We form more intimate connections with people with whom we disclose important information about ourselves. Indeed, self-disclosure is a characteristic of healthy intimate relationships, as long as the information disclosed is consistent with our own views (Cozby, 1973).

Attraction

We have discussed how proximity and similarity lead to the formation of relationships, and that reciprocity and self-disclosure are important for relationship maintenance. But, what features of a person do we find attractive? We don't form relationships with everyone that lives or works near us, so how is it that we decide which specific individuals we will select as friends and lovers?

Researchers have documented several characteristics in men and women that humans find attractive. First we look for friends and lovers who are physically attractive. People differ in what they consider attractive, and attractiveness is culturally influenced. Research, however, suggests that some universally attractive features in women include large eyes, high cheekbones, a narrow jaw line, a slender build (Buss, 1989), and a lower waist-to-hip ratio (Singh, 1993). For men, attractive traits include being tall, having broad shoulders, and a narrow waist (Buss, 1989). Both men and women with high levels of facial and body symmetry are generally considered more attractive than asymmetric individuals (Fink, Neave, Manning, & Grammer, 2006; Penton-Voak et al., 2001; Rikowski & Grammer, 1999). Social traits that people find attractive in potential female mates include warmth, affection, and social skills; in males, the attractive traits include achievement, leadership qualities, and job skills (Regan & Berscheid, 1997). Although humans want mates who are physically attractive, this does not mean that we look for the most attractive person possible. In fact, this observation has led some to propose what is known as the matching hypothesis which asserts that people tend to pick someone they view as their equal in physical attractiveness and social desirability (Taylor, Fiore, Mendelsohn, & Cheshire, 2011). For example, you and most people you know likely would say that a very attractive movie star is out of your league. So, even if you had proximity to that person, you likely would not ask them out on a date because you believe you likely would be rejected. People weigh a potential partner's attractiveness against the likelihood of success with that person. If you think you are particularly unattractive (even if you are not), you likely will seek partners that are fairly unattractive (that is, unattractive in physical appearance or in behavior).

Sternberg's Triangular Theory of Love

We typically love the people with whom we form relationships, but the type of love we have for our family, friends, and lovers differs. Robert Sternberg (1986) proposed that there are three components of love: intimacy, passion, and commitment. These three components form a triangle that defines multiple types of love: this is known as Sternberg's **triangular theory of love** (See figure 12.28). Intimacy is the sharing of details and intimate thoughts and emotions. Passion is the physical attraction—the flame in the fire. Commitment is standing by the person—the "in sickness and health" part of the relationship.

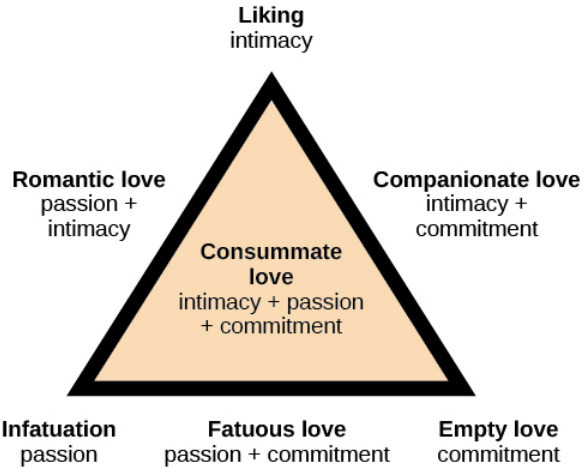


Figure 12.28 According to Sternberg's triangular theory of love, seven types of love can be described from combinations of three components: intimacy, passion, and commitment. (credit: modification of work by "Lnesa"/Wikimedia Commons)

Sternberg (1986) states that a healthy relationship will have all three components of love—intimacy, passion, and commitment—which is described as **consummate love** (See figure 12.29). However, different aspects of love might be more prevalent at different life stages. Other forms of love include liking, which is defined as having intimacy but no passion or commitment. Infatuation is the presence of passion without intimacy or commitment. Empty love is having commitment without intimacy or passion. **Companionate love**, which is characteristic of close friendships and family relationships, consists of intimacy and commitment but no passion. **Romantic love** is defined by having passion and intimacy, but no commitment. Finally, fatuous love is defined by having passion and commitment, but no intimacy, such as a long term sexual love affair. Can you describe other examples of relationships that fit these different types of love?



Figure 12.29 According to Sternberg, consummate love describes a healthy relationship containing intimacy, passion, and commitment. (credit: Kerry Ceszyk)

Social Exchange Theory

We have discussed why we form relationships, what attracts us to others, and different types of love. But what determines whether we are satisfied with and stay in a relationship? One theory that provides an explanation is social exchange theory. According to **social exchange theory**, we act as naïve economists in keeping a tally of the ratio of costs and benefits of forming and maintaining a relationship with others (See figure below) (Rusbult & Van Lange, 2003).

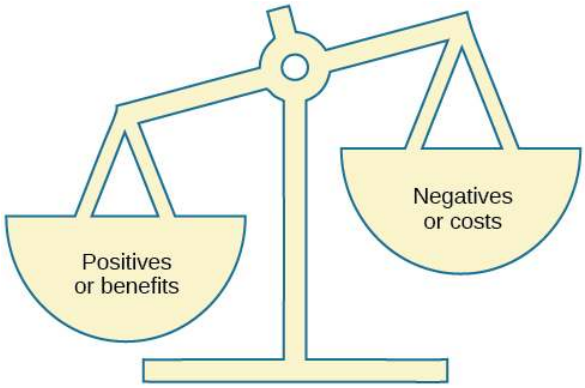


Figure 12.30 Acting like naïve economists, people may keep track of the costs and benefits of maintaining a relationship. Typically, only those relationships in which the benefits outweigh the costs will be maintained.

People are motivated to maximize the benefits of social exchanges, or relationships, and minimize the costs. People prefer to have more benefits than costs, or to have nearly equal costs and benefits, but most people are dissatisfied if their social exchanges create

more costs than benefits. Let’s discuss an example. If you have ever decided to commit to a romantic relationship, you probably considered the advantages and disadvantages of your decision. What are the benefits of being in a committed romantic relationship? You may have considered having companionship, intimacy, and passion, but also being comfortable with a person you know well. What are the costs of being in a committed romantic relationship? You may think that over time boredom from being with only one person may set in; moreover, it may be expensive to share activities such as attending movies and going to dinner. However, the benefits of dating your romantic partner presumably outweigh the costs, or you wouldn’t continue the relationship.

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12.5: The Psychology of Groups

By Donelson R. Forsyth

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learning objectives

- Review the evidence that suggests humans have a fundamental need to belong to groups.
- Compare the sociometer model of self-esteem to a more traditional view of self-esteem.

The Psychology of Groups



How many groups are you a part of on a daily basis? Whether it's family, class, work, social, sports, church or other areas, we typically spend a good deal of our time and attention each day interacting with others in groups. [Image: CC0 Public Domain, goo.gl/m25gce]

Psychologists study groups because nearly all human activities—working, learning, worshiping, relaxing, playing, and even sleeping—occur in groups. The lone individual who is cut off from all groups is a rarity. Most of us live out our lives in groups, and these groups have a profound impact on our thoughts, feelings, and actions. Many psychologists focus their attention on single individuals, but social psychologists expand their analysis to include groups, organizations, communities, and even cultures.

The Psychological Significance of Groups

Many people loudly proclaim their autonomy and independence. Like Ralph Waldo Emerson, they avow, "I must be myself. I will not hide my tastes or aversions . . . . I will seek my own" (1903/2004, p. 127). Even though people are capable of living separate and apart from others, they join with others because groups meet their psychological and social needs.



The need to belong is a strong psychological motivation. [Image: CC0 Public Domain, goo.gl/m25gce]

Across individuals, societies, and even eras, humans consistently seek inclusion over exclusion, membership over isolation, and acceptance over rejection. As Roy Baumeister and Mark Leary conclude, humans have a *need to belong*: "a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and impactful interpersonal relationships" (1995, p. 497). And most of us satisfy this need by joining groups. When surveyed, 87.3% of Americans reported that they lived with other people, including family members, partners, and roommates (Davis & Smith, 2007). The majority, ranging from 50% to 80%, reported regularly doing things in groups, such as attending a sports event together, visiting one another for the evening, sharing a meal together, or going out as a group to see a movie (Putnam, 2000).

People respond negatively when their need to belong is unfulfilled. For example, college students often feel homesick and lonely when they first start college, but not if they belong to a cohesive, socially satisfying group (Buote et al., 2007). People who are accepted members of a group tend to feel happier and more satisfied. But should they be rejected by a group, they feel unhappy, helpless, and depressed. Studies of **ostracism**—the deliberate exclusion from groups—indicate this experience is highly stressful and can lead to depression, confused thinking, and even aggression (Williams, 2007). When researchers used a functional magnetic resonance imaging scanner to track neural responses to exclusion, they found that people who were left out of a group activity displayed heightened cortical activity in two specific areas of the brain—the dorsal anterior cingulate cortex and the anterior insula. These areas of the brain are associated with the experience of physical pain sensations (Eisenberger, Lieberman, & Williams, 2003). It hurts, quite literally, to be left out of a group.

Affiliation in Groups

Groups not only satisfy the need to belong, they also provide members with information, assistance, and social support. Leon Festinger's theory of **social comparison** (1950, 1954) suggested that in many cases people join with others to evaluate the accuracy of their personal beliefs and attitudes. Stanley Schachter (1959) explored this process by putting individuals in ambiguous, stressful situations and asking them if they wished to wait alone or with others. He found that people *affiliate* in such situations—they seek the company of others.

Although any kind of companionship is appreciated, we prefer those who provide us with reassurance and support as well as accurate information. In some cases, we also prefer to join with others who are even worse off than we are. Imagine, for example, how you would respond when the teacher hands back the test and yours is marked 85%. Do you want to affiliate with a friend who got a 95% or a friend who got a 78%? To maintain a sense of self-worth, people seek out and compare themselves to the less fortunate. This process is known as *downward social comparison*.

Identity and Membership

Groups are not only founts of information during times of ambiguity, they also help us answer the existentially significant question, "Who am I?" Common sense tells us that our sense of self is our private definition of who we are, a kind of archival record of our experiences, qualities, and capabilities. Yet, the self also includes all those qualities that spring from memberships in groups. People are defined not only by their traits, preferences, interests, likes, and dislikes, but also by their friendships, social roles, family connections, and group memberships. The self is not just a "me," but also a "we."

Even demographic qualities such as sex or age can influence us if we categorize ourselves based on these qualities. **Social identity theory**, for example, assumes that we don't just classify *other* people into such social categories as man, woman, Anglo, elderly, or college student, but we also categorize ourselves. Moreover, if we strongly identify with these categories, then we will ascribe the characteristics of the typical member of these groups to ourselves, and so stereotype ourselves. If, for example, we believe that college students are intellectual, then we will assume we, too, are intellectual if we identify with that group (Hogg, 2001).

Groups also provide a variety of means for maintaining and enhancing a sense of self-worth, as our assessment of the quality of groups we belong to influences our **collective self-esteem** (Crocker & Luhtanen, 1990). If our self-esteem is shaken by a personal setback, we can focus on our group's success and prestige. In addition, by comparing our group to other groups, we frequently discover that we are members of the better group, and so can take pride in our superiority. By denigrating other groups, we elevate both our personal and our collective self-esteem (Crocker & Major, 1989).

Mark Leary's **sociometer model** goes so far as to suggest that "self-esteem is part of a sociometer that monitors peoples' relational value in other people's eyes" (2007, p. 328). He maintains self-esteem is not just an index of one's sense of personal value, but also an indicator of acceptance into groups. Like a gauge that indicates how much fuel is left in the tank, a dip in self-esteem indicates exclusion from our group is likely. Disquieting feelings of self-worth, then, prompt us to search for and correct characteristics and qualities that put us at risk of social exclusion. Self-esteem is not just high self-regard, but the self-approbation that we feel when included in groups (Leary & Baumeister, 2000).

Evolutionary Advantages of Group Living

Groups may be humans' most useful invention, for they provide us with the means to reach goals that would elude us if we remained alone. Individuals in groups can secure advantages and avoid disadvantages that would plague the lone individuals. In his theory of social integration, Moreland concludes that groups tend to form whenever "people become dependent on one another for the satisfaction of their needs" (1987, p. 104). The advantages of group life may be so great that humans are biologically prepared to seek membership and avoid isolation. From an evolutionary psychology perspective, because groups have increased humans' overall fitness for countless generations, individuals who carried genes that promoted solitude-seeking were less likely to survive and procreate compared to those with genes that prompted them to join groups (Darwin, 1859/1963). This process of natural selection culminated in the creation of a modern human who seeks out membership in groups instinctively, for most of us are descendants of "joiners" rather than "loners."

References

- Allport, F. H. (1924). *Social psychology*. Boston: Houghton Mifflin.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497–529.
- Blascovich, J., Mendes, W. B., Hunter, S. B., & Salomon, K. (1999). Social "facilitation" as challenge and threat. *Journal of Personality and Social Psychology, 77*, 68–77.
- Bond, C. F., Atoum, A. O., & VanLeeuwen, M. D. (1996). Social impairment of complex learning in the wake of public embarrassment. *Basic and Applied Social Psychology, 18*, 31–44.

- Buote, V. M., Pancer, S. M., Pratt, M. W., Adams, G., Birnie-Lefcovitch, S., Polivy, J., & Wintre, M. G. (2007). The importance of friends: Friendship and adjustment among 1st-year university students. *Journal of Adolescent Research, 22(6)*, 665–689.
- Crocker, J., & Luhtanen, R. (1990). Collective self-esteem and ingroup bias. *Journal of Personality and Social Psychology, 58*, 60–67.
- Crocker, J., & Major, B. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review, 96*, 608–630.
- Darwin, C. (1859/1963). *The origin of species*. New York: Washington Square Press.
- Dashiell, J. F. (1930). An experimental analysis of some group effects. *Journal of Abnormal and Social Psychology, 25*, 190–199.
- Davis, J. A., & Smith, T. W. (2007). *General social surveys (1972–2006)*. [machine-readable data file]. Chicago: National Opinion Research Center & Storrs, CT: The Roper Center for Public Opinion Research. Retrieved from http://www.norc.uchicago.edu
- Diehl, M., & Stroebe, W. (1987). Productivity loss in brainstorming groups: Toward the solution of a riddle. *Journal of Personality and Social Psychology, 53*, 497–509.
- Dion, K. L. (2000). Group cohesion: From “field of forces” to multidimensional construct. *Group Dynamics: Theory, Research, and Practice, 4*, 7–26.
- Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science, 302*, 290–292.
- Emerson, R. W. (2004). *Essays and poems by Ralph Waldo Emerson*. New York: Barnes & Noble. (originally published 1903).
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117–140.
- Festinger, L. (1950). Informal social communication. *Psychological Review, 57*, 271–282.
- George, J. M. (1992). Extrinsic and intrinsic origins of perceived social loafing in organizations. *Academy of Management Journal, 35*, 191–202.
- Harkins, S. G. (2006). Mere effort as the mediator of the evaluation-performance relationship. *Journal of Personality and Social Psychology, 91(3)*, 436–455.
- Hogg, M. A. (2001). Social categorization, depersonalization, and group behavior. In M. A. Hogg & R. S. Tindale (Eds.), *Blackwell handbook of social psychology: Group processes* (pp. 56–85). Malden, MA: Blackwell.
- Huguet, P., Galvaing, M. P., Monteil, J. M., & Dumas, F. (1999). Social presence effects in the Stroop task: Further evidence for an attentional view of social facilitation. *Journal of Personality and Social Psychology, 77*, 1011–1025.
- Janis, I. L. (1982). *Groupthink: Psychological studies of policy decisions and fiascos* (2nd ed.). Boston: Houghton Mifflin.
- Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*, 681–706.
- Latané, B. (1981). The psychology of social impact. *American Psychologist, 36*, 343–356.
- Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology, 37*, 822–832.
- Leary, M. R. (2007). Motivational and emotional aspects of the self. *Annual Review of Psychology, 58*, 317–344.
- Leary, M. R. & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. *Advances in Experimental Social Psychology, 32*, 1–62.
- Littlepage, G. E. (1991). Effects of group size and task characteristics on group performance: A test of Steiner’s model. *Personality and Social Psychology Bulletin, 17*, 449–456.
- Moreland, R. L. (1987). The formation of small groups. *Review of Personality and Social Psychology, 8*, 80–110.
- Moreland, R. L., & Levine, J. M. (1982). Socialization in small groups: Temporal changes in individual-group relations. *Advances in Experimental Social Psychology, 15*, 137–192.
- Moscovici, S., & Zavalloni, M. (1969). The group as a polarizer of attitudes. *Journal of Personality and Social Psychology, 12*, 125–135.
- Mullen, B., & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological Bulletin, 115*, 210–227.
- Mullen, B., Driskell, J. E., & Salas, E. (1998). Meta-analysis and the study of group dynamics. *Group Dynamics: Theory, Research, and Practice, 2*, 213–229.
- Myers, D. G., & Bishop, G. D. (1970). Discussion effects on racial attitudes. *Science, 169*, 778–789.

- Myers, D. G., & Lamm, H. (1976). The group polarization phenomenon. *Psychological Bulletin*, *83*, 602–627.
- Neu, W. A. (2012). Unintended cognitive, affective, and behavioral consequences of group assignments. *Journal of Marketing Education*, *34*(1), 67–81.
- Paulus, P. B., & Brown, V. R. (2007). Toward more creative and innovative group idea generation: A cognitive-social-motivational perspective of brainstorming. *Social and Personality Psychology Compass*, *1*, 248–265.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Salas, E., Rosen, M. A., Burke, C. S., & Goodwin, G. F. (2009). The wisdom of collectives in organizations: An update of the teamwork competencies. In E. Salas, G. F. Goodwin, & C. S. Burke (Eds.), *Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches* (pp. 39–79). New York: Routledge/Taylor & Francis Group.
- Schachter, S. (1959). *The psychology of affiliation*. Stanford, CA: Stanford University Press.
- Seashore, S. E. (1954). *Group cohesiveness in the industrial work group*. Ann Arbor, MI: Institute for Social Research.
- Stasser, G., & Titus, W. (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology*, *53*, 81–93.
- Steiner, I. D. (1972). *Group process and productivity*. New York: Academic Press.
- Stroebe, W. (2012). The truth about Triplett (1898), but nobody seems to care. *Perspectives on Psychological Science*, *7*(1), 54–57.
- Strube, M. J. (2005). What did Triplett really find? A contemporary analysis of the first experiment in social psychology. *American Journal of Psychology*, *118*, 271–286.
- Tindale, R. S., Stawiski, S., & Jacobs, E. (2008). Shared cognition and group learning. In V. I. Sessa & M. London (Eds.), *Work group learning: Understanding, improving and assessing how groups learn in organizations* (pp. 73–90). New York: Taylor & Francis Group.
- Triplett, N. (1898). The dynamogenic factors in pacemaking and competition. *American Journal of Psychology*, *9*, 507–533.
- Tuckman, B. W. (1965). Developmental sequences in small groups. *Psychological Bulletin*, *63*, 384–399.
- Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small group development revisited. *Group and Organizational Studies*, *2*, 419–427.
- Williams, K. D. (2007). Ostracism. *Annual Review of Psychology*, *58*, 425–452.
- Zajonc, R. B. (1965). Social facilitation. *Science*, *149*, 269–274.

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12.6: Latané And Darley's Model Of Helping

Although emotional responses such as guilt, personal distress, and empathy are important determinants of altruism, it is the social situation itself—the people around us when we are deciding whether or not to help—that has perhaps the most important influence on whether and when we help.

Consider the unusual case of the killing of 28-year- old Katherine “Kitty” Genovese in New York City at about 3:00 a.m. on March 13, 1964. Her attacker, Winston Moseley, stabbed and sexually assaulted her within a few yards of her apartment building in the borough of Queens. During the struggle with her assailant, Kitty screamed, “Oh my God! He stabbed me! Please help me!” But no one responded. The struggle continued; Kitty broke free from Moseley, but he caught her again, stabbed her several more times, and eventually killed her.

The murder of Kitty Genovese shocked the nation, in large part because of the (often inaccurate) reporting of it. Stories about the killing, in the *New York Times* and other papers, indicated that as many as 38 people had overheard the struggle and killing, that none of them had bothered to intervene, and that only one person had even called the police, long after Genovese was dead.

Although these stories about the lack of concern by people in New York City proved to be false (Manning et al., 2007), they nevertheless led many people to think about the variables that might lead people to help or, alternatively, to be insensitive to the needs of others. Was this an instance of the uncaring and selfish nature of human beings? Or was there something about this particular social situation that was critical? It turns out, contrary to your expectations I would imagine, that having many people around during an emergency can in fact be the opposite of helpful—it can reduce the likelihood that anyone at all will help.

Two social psychologists, Bibb Latané and John Darley, found themselves particularly interested in, and concerned about, the Kitty Genovese case. As they thought about the stories that they had read about it, they considered the nature of emergency situations such as this one. They realized that emergencies are unusual and that people frequently do not really know what to do when they encounter one. Furthermore, emergencies are potentially dangerous to the helper, and it is therefore probably pretty amazing that anyone helps at all.

To better understand the processes of helping in an emergency, Latané and Darley developed a model of helping that took into consideration the important role of the social situation. Their model, which is shown in Figure **12.6.1**, has been extensively tested in many studies, and there is substantial support for it.

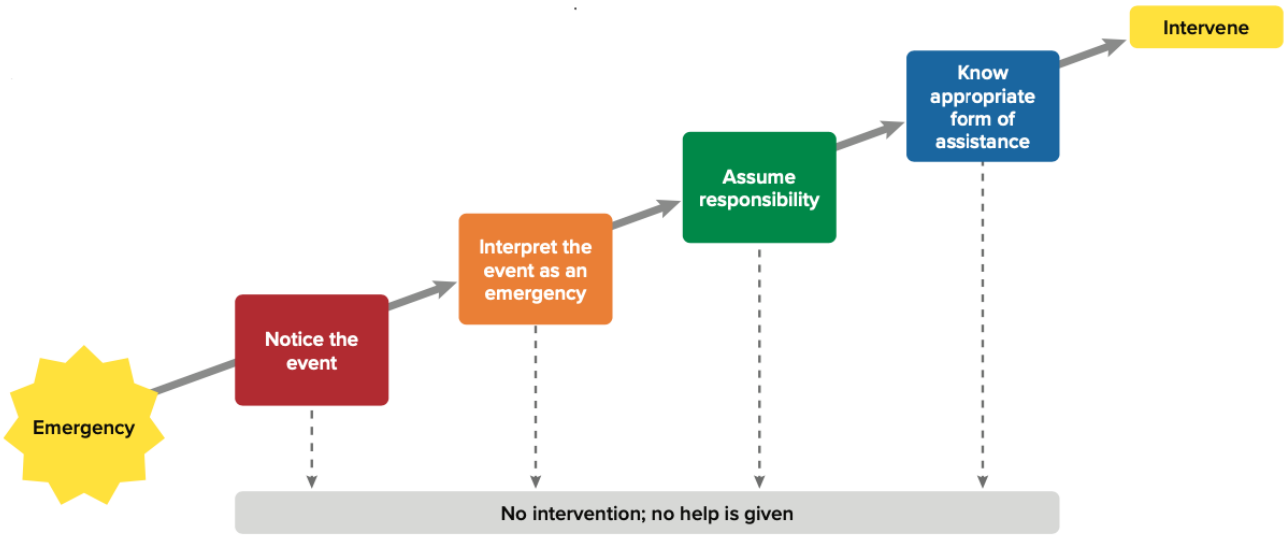


Figure **12.6.1**: latané and Darley’s stages of helping. [This work, “Stages of Helping,” is licensed under CC BY-NC-SA 4.0 by Judy Schmitt. It is a derivative of “Latané and Darley’s Stages of Helping” by University of Minnesota, which is licensed under CC BY-NC-SA 4.0.]

Noticing

Latané and Darley thought the first thing that had to happen in order for people to help is that they had to notice the emergency. This seems pretty obvious, but it turns out that the social situation has a big impact on noticing an emergency. Consider, for instance, people who live in a large city such as New York City, Bangkok, or Beijing. These cities are big, noisy, and crowded—it seems like there are a million things going at once. How could people living in such a city even notice, let alone respond to, the needs of all the people around them? They are simply too overloaded by the stimuli in the city (Milgram, 1970).

Many studies have found that people who live in smaller and less dense rural towns are more likely to help than those who live in large, crowded, urban cities (Amato, 1983; Levine et al., 1994). Although there are a lot of reasons for such differences, just noticing the emergency is critical. When there are more people around, it is less likely that people notice the needs of others.

You may have had an experience that demonstrates the influence of the social situation on noticing. Imagine that you have lived with a family or a roommate for a while, but one night you find yourself alone in your house or apartment because your housemates are staying somewhere else that night. If you are like me, I bet you find yourself hearing sounds that you never heard before—and they might make you pretty nervous. Of course the sounds have always been there, but when other people are around you, you are simply less alert to them. The presence of others can divert our attention from the environment—it's as if we are unconsciously, and probably quite mistakenly, counting on the others to take care of things for us.

Latané and Darley (1968) wondered if they could examine this phenomenon experimentally. To do so, they simply asked their research participants to complete a questionnaire in a small room. Some of the participants completed the questionnaire alone, while others completed the questionnaire in small groups in which two other participants were also working on questionnaires.

A few minutes after the participants had begun the questionnaires, the experimenters started to release some white smoke into the room through a vent in the wall while they watched through a one-way mirror. The smoke got thicker as time went on, until it filled the room. The experimenters timed how long it took before the first person in the room looked up and noticed the smoke. The people who were working alone noticed the smoke in about 5 seconds, and within 4 minutes most of the participants who were working alone had taken some action. But what about the participants working in groups of three? Although we would certainly expect that having more people around would increase the likelihood that someone would notice the smoke, on aver- age, the first person in the group conditions did not notice the smoke until over 20 seconds had elapsed. And although 75% of the participants who were working alone reported the smoke within 4 minutes, the smoke was reported in only 12% of the three-person groups by that time. In fact, in only three of the eight three-person groups did anyone report the smoke at all, even after it had entirely filled the room!

Interpreting

Even if we notice an emergency, we might not interpret it as one. The problem is that events are frequently ambiguous, and we must interpret them to understand what they really mean. Furthermore, we often don't see the whole event unfolding, so it is difficult to get a good handle on it. Is a man holding an iPod and running away from a group of pursuers a criminal who needs to be apprehended, or is this just a harmless prank? Were the cries of Kitty Genovese really calls for help, or were they simply an argument with a boyfriend? It's hard for us to tell when we haven't seen the whole event (Piliavin et al., 1976). Moreover, because emergencies are rare and because we generally tend to assume that events are benign, we may be likely to treat ambiguous cases as not being emergencies.

The problem is compounded when others are present because when we are unsure how to interpret events we normally look to others to help us understand them (this is informational social influence). However, the people we are looking toward for understanding are themselves unsure how to interpret the situation, and they are looking to us for information at the same time we are looking to them.

When we look to others for information we may assume that they know something we do not know. This is often a mistake, because all the people in the situation are doing the same thing. None of us really know what to think, but at the same time we assume that the others do know. **Pluralistic ignorance** occurs when people think others in their environment have information they do not have and when they base their judgments on what they think the others are thinking.

Pluralistic ignorance seems to have been occurring in Latané and Darley's studies, because even when the smoke became really heavy in the room, many people in the group conditions did not react to it. Rather, they looked at each other, and because nobody

else in the room seemed very concerned, they each assumed that the others thought that every- thing was all right. You can see the problem—each bystander thinks that other people aren't acting because they don't see an emergency. Of course, everyone is confused, but believing that the others know something that they don't, each observer concludes that help is not required.

Pluralistic ignorance is not restricted to emergency situations (Miller et al., 1988; Suls & Green, 2003). Maybe you have had the following experience: You are in one of your classes and the instructor has just finished a complicated explanation. He is unsure whether the students are up to speed and asks, "Are there any questions?" All the class members are of course completely confused, but when they look at each other, nobody raises a hand in response. So everybody in the class (including the instructor) assumes that everyone under- stands the topic perfectly. This is pluralistic ignorance at its worst—we are all assuming that others know something that we don't, and so we don't act. The moral to instructors in this situation is clear: Wait until at least one student asks a question. The moral for students is also clear: Ask your question! Don't think that you will look stupid for doing so—the other students will probably thank you.

Taking Responsibility

Even if we have noticed the emergency and interpret it as being one, this does not necessarily mean that we will come to the rescue of the other person. We still need to decide that it is our responsibility to do something. The problem is that when we see others around, it is easy to assume that they are going to do something and that we don't need to do anything. **Diffusion of responsibility** occurs when we assume that others will take action and therefore we do not take action ourselves. The irony of course is that people are more likely to help when they are the only ones in the situation than they are when there are others around.

Darley and Latané (1968) had study participants work on a communication task in which they were sharing ideas about how to best adjust to college life with other people in different rooms using an intercom. According to random assignment to conditions, each participant believed that he or she was communicating with either one, two, or five other people, who were in either one, two, or five other rooms. Each participant had an initial chance to give his opinions over the inter- com, and on the first round one of the other people (actually a confederate of the experimenter) indicated that he had an "epileptic-like" condition that had made the adjustment process very difficult for him. After a few minutes, the subject heard the experimental confederate say,

> I-er-um-I think I-I need-er-if-if could-er-er-somebody er-er-er- er-er-er-er give me a liltle-er-give me a little help here because-er- I-er-I'm-er-er having a-a-a real problcm-er-right now and I-er-if somebody could help me out it would-it would-er-er s-s-sure be-sure be good . . . because there-er-er-a cause I-er-I-uh-I've got a-a one of the-er-sei er-er-things coming on and-and-and I could really-er-use some help so if somebody would-er-give me a little h-help-uh-er-er-er-er-er c-could somebody-er-er-help- er-uh-uh-uh (choking sounds). . . . I'm gonna die-er-er-I'm . . . gonna die-er-help-er-er-seizure-er- (chokes, then quiet). (Dar- ley & Latané, 1968, p. 379)

As you can see in Table **12.6.1**, the participants who thought that they were the only ones who knew about the emergency (because they were only working with one other person) left the room quickly to try to get help. In the larger groups, how- ever, participants were less likely to intervene and slower to respond when they did. Only 31% of the participants in the largest groups responded by the end of the 6-minute session.

Table **12.6.1**: Effects of Group Size on likelihood and Speed of Helping
Source: Darley and Latané (1968).

Group Size	Average Helping (%)	Average Time to Help (in seconds)
2 (participant and victim)	85	52
3 (participant, victim, and 1 other)	62	93
6 (participant, victim, and 4 others)	31	166

You can see that the social situation has a powerful influence on helping. We simply don't help as much when other people are with us.

Perhaps you have noticed diffusion of responsibility if you have participated in an Internet users group where people asked questions of the other users. Did you find that it was easier to get help if you directed your request to a smaller set of users than when you directed it to a larger number of people? Consider the following: In 1998, Larry Froistad, a 29-year-old computer

programmer, sent the following message to the members of an Internet self-help group that had about 200 members. “Amanda I murdered because her mother stood between us . . . when she was asleep, I got wickedly drunk, set the house on fire, went to bed, listened to her scream twice, climbed out the window and set about putting on a show of shock and surprise.” Despite this clear online confession to a murder, only three of the 200 newsgroup members reported the confession to the authorities (Markey, 2000).

To study the possibility that this lack of response was due to the presence of others, the researchers (Markey, 2000) con- ducted a field study in which they observed about 5,000 participants in about 400 different chat groups. The experimenters sent a message to the group, from either a male (JakeHarmen) or female (SuzyHarmen) screen name. Help was sought by either asking all the participants in the chat group, “Can any- one tell me how to look at someone’s profile?” or by randomly selecting one participant and asking “[name of selected participant], can you tell me how to look at someone’s profile?” The experimenters recorded the number of people present in the chat room, which ranged from 2 to 19, and then waited to see how long it took before a response was given.

It turned out that the gender of the person requesting help made no difference, but that addressing to a single per- son did. Assistance was received more quickly when help was asked for by specifying a participant’s name (in only about 37 seconds) than when no name was specified (51 seconds). Furthermore, a correlational analysis found that when help was requested without specifying a participant’s name, there was a significant negative correlation between the number of people currently logged on in the group and the time it took to respond to the request.

Garcia et al. (2002) found that the presence of others can promote diffusion of responsibility even if those other people are only imagined. In these studies, the researchers had participants read one of three possible scenarios that manipulated whether participants thought about dining out with 10 friends at a restaurant (*group condition*) or whether they thought about dining at a restaurant with only one other friend (*one-person condition*). Participants in the group condition were asked to “Imagine you won a dinner for yourself and 10 of your friends at your favorite restaurant.” Participants in the one-person condition were asked to “Imagine you won a dinner for yourself and a friend at your favorite restaurant.”

After reading one of the scenarios, the participants were then asked to help with another experiment supposedly being conducted in another room. Specifically, they were asked: “How much time are you willing to spend on this other experiment?” At this point, participants checked off one of the following minute intervals: *0 minutes*, *2 minutes*, *5 minutes*, *10 minutes*, *15 minutes*, *20 minutes*, *25 minutes*, and *30 minutes*.

As you can see in Figure **12.6.2**, simply imagining that they were in a group or alone had a significant effect on helping, such that those who imagined being with only one other per- son volunteered to help for more minutes than did those who imagined being in a larger group.

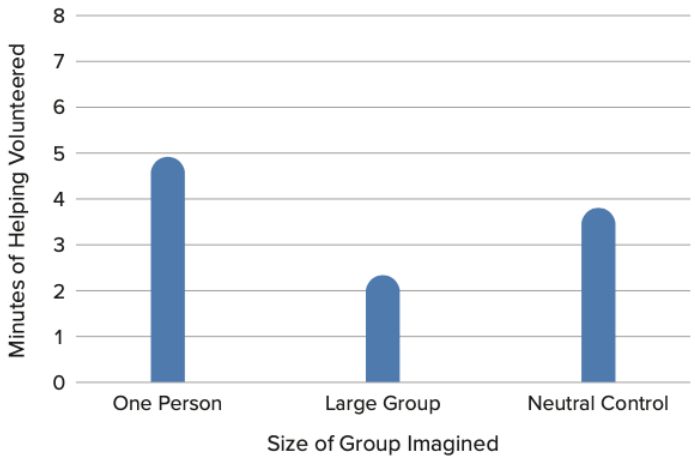


Figure **12.6.2**: Helping as a function of imagined social context. Garcia et al. (2002) found that the presence of others reduced helping, even when those others were only imagined. [This work, “Helping and Imagined Social Context,” is licensed under CC BY-NC-SA 4.0 by Judy Schmitt. It is a derivative of “Helping as a Function of Imagined Social Context” by University of Minnesota, which is licensed under CC BY-NC-SA 4.0.]

Implementing Action

The fourth step in the helping model is knowing how to help. Of course, for many of us the ways to best help another person in an emergency are not that clear; we are not professionals and we have little training in how to help in emergencies. People who do have training in how to act in emergencies are more likely to help, whereas the rest of us just don't know what to do and therefore may simply walk by. On the other hand, today most people have cell phones, and we can do a lot with a quick call. In fact, a phone call made in time might have saved Kitty Genovese's life. The moral: You might not know exactly what to do, but you may well be able to contact someone else who does.

Latané and Darley's decision model of bystander intervention has represented an important theoretical framework for helping us understand the role of situational variables on helping. Whether or not we help depends on the outcomes of a series of decisions that involve noticing the event, interpreting the situation as one requiring assistance, deciding to take personal responsibility, and deciding how to help.

Fischer et al. (2011) analyzed data from over 105 studies using over 7,500 participants who had been observed helping (or not helping) in situations in which they were alone or with others. The researchers found significant support for the idea that people helped more when fewer others were present.

And, supporting the important role of interpretation, they also found that the differences were smaller when the need for helping was clear and dangerous and thus required little interpretation. They also found that there were at least some situations (such as when bystanders were able to help provide needed physical assistance) in which having other people around increased helping.

Although the Latané and Darley model was initially developed to understand how people respond in emergencies requiring immediate assistance, aspects of the model have been successfully applied to many other situations, ranging from preventing someone from driving drunk to making a decision about whether to donate a kidney to a relative (Schroeder et al., 1995).

REFERENCES

Amato, P. R. (1983). The helpfulness of urbanites and small town dwellers: A test between two broad theoretical positions. *Australian Journal of Psychology, 35*(2), 233–243. doi.org/10.1080/ 00049538308255068

Darley, J. M., & Latané, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology, 8*(4, Pt. 1), 377–383. https://doi.org/10.1037/h0025589

Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., & Kainbacher, M. (2011). The bystander-effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin, 137*(4), 517–537. https://doi.org/10.1037/a0023304

Garcia, S. M., Weaver, K., Moskowitz, G. B., & Darley, J. M. (2002). Crowded minds: The implicit bystander effect. *Journal of Personality and Social Psychology, 83*(4), 843–853. doi.org/10.1037/ 0022-3514.83.4.843

Latané, B., & Darley, J. M. (1968). Group inhibition of bystander intervention in emergencies. *Journal of Personality and Social Psychology, 10*(3), 215–221. https://doi.org/10.1037/h0026570

Levine, R. V., Martinez, T. S., Brase, G., & Sorenson, K. (1994). Helping in 36 U.S. cities. *Journal of Personality and Social Psychology, 67*(1), 69–82. https://doi.org/10.1037/0022-3514.67.1.69

Amato, P. R. (1983). The helpfulness of urbanites and small town dwellers: A test between two broad theoretical positions. *Australian Journal of Psychology, 35*(2), 233–243. doi.org/10.1080/ 00049538308255068

Darley, J. M., & Latané, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology, 8*(4, Pt. 1), 377–383. https://doi.org/10.1037/h0025589

Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., & Kainbacher, M. (2011). The bystander-effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin, 137*(4), 517–537. https://doi.org/10.1037/a0023304

Garcia, S. M., Weaver, K., Moskowitz, G. B., & Darley, J. M. (2002). Crowded minds: The implicit bystander effect. *Journal of Personality and Social Psychology, 83*(4), 843–853. doi.org/10.1037/ 0022-3514.83.4.843

Latané, B., & Darley, J. M. (1968). Group inhibition of bystander intervention in emergencies. *Journal of Personality and Social Psychology*, *10*(3), 215–221. https://doi.org/10.1037/h0026570

Levine, R. V., Martinez, T. S., Brase, G., & Sorenson, K. (1994). Helping in 36 U.S. cities. *Journal of Personality and Social Psychology*, *67*(1), 69–82. https://doi.org/10.1037/0022-3514.67.1.69

Manning, R., Levine, M., & Collins, A. (2007). The Kitty Genovese murder and the social psychology of helping: The parable of the 38 witnesses. *American Psychologist*, *62*(6), 555–562. https://doi.org/ 10.1037/0003-066X.62.6.555

Markey, P. M. (2000). Bystander intervention in computer-mediated communication. *Computers in Human Behavior*, *16*(2), 183–188. https://doi.org/10.1016/S0747-5632(99)00056-4

Milgram, S. (1970). The experience of living in cities. *Science*, *167*(3924), 1461–1468. https://doi.org/10.1126/science.167.3924.1461

Miller, D. T., Turnbull, W., & McFarland, C. (1988). Particularistic and universalistic evaluation in the social comparison process. *Journal of Personality and Social Psychology*, *55*, 908–917. doi. org/10.1037/0022-3514.55.6.908

Piliavin, J. A., Piliavin, I. M., & Broll, L. (1976). Time of arrival at an emergency and likelihood of helping. *Personality and Social Psychology Bulletin*, *2*(3), 273–276. doi.org/10.1177/ 014616727600200314

Schroeder, D. A., Penner, L. A., Dovidio, J. F., & Piliavin, J. A. (1995). *The psychology of helping and altruism: Problems and puzzles*. McGraw-Hill.

Suls, J., & Green, P. (2003). Pluralistic ignorance and college student perceptions of gender-specific alcohol norms. *Health Psychology*, *22*(5), 479–486. https://doi.org/10.1037/0278-6133.22.5.479

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CHAPTER OVERVIEW

13: Personality

13.1: What Is Personality?

13.2: Freud and the Psychodynamic Perspective

13.3: Strengths, Mixed Support, and Limitations of Freud's Psychodynamic Perspective

13.4: Humanistic Approaches

13.5: Biological Approaches

13.6: Trait Theorists

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13.1: What Is Personality?

Learning Objectives

- Define personality
- Describe early theories about personality development

Personality refers to the long-standing traits and patterns that propel individuals to consistently think, feel, and behave in specific ways. Our personality is what makes us unique individuals. Each person has an idiosyncratic pattern of enduring, long-term characteristics and a manner in which he or she interacts with other individuals and the world around them. Our personalities are thought to be long term, stable, and not easily changed. The word *personality* comes from the Latin word *persona*. In the ancient world, a persona was a mask worn by an actor. While we tend to think of a mask as being worn to conceal one's identity, the theatrical mask was originally used to either represent or project a specific personality trait of a character (See figure below).

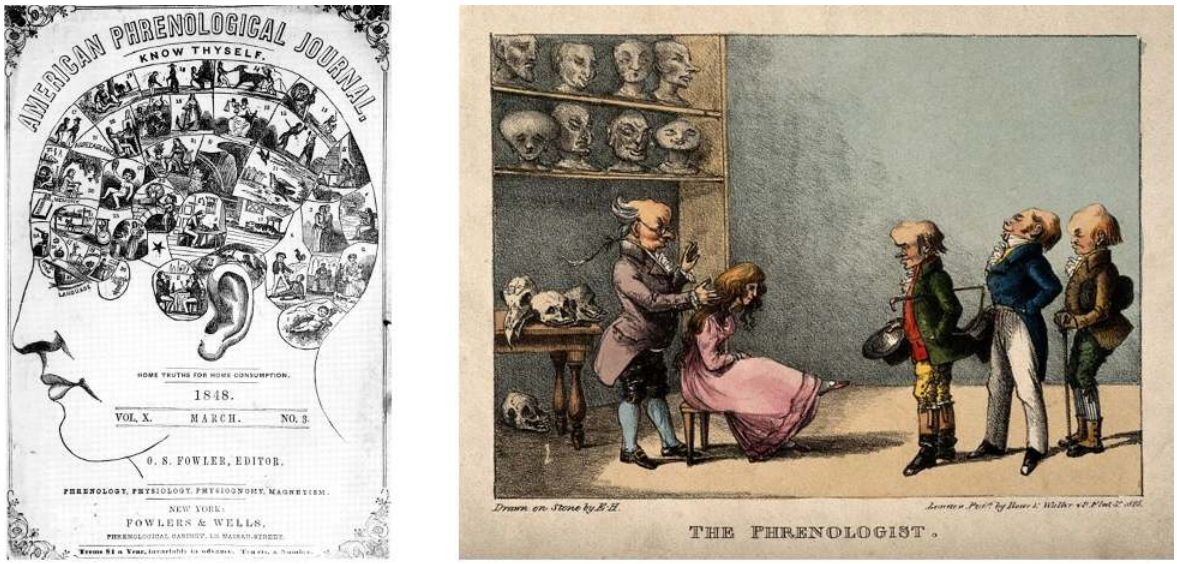


Figure 11.2 Happy, sad, impatient, shy, fearful, curious, helpful. What characteristics describe your personality?

Historical Perspectives

The concept of personality has been studied for at least $2,000$ years, beginning with Hippocrates in 370 BCE (Fazeli, 2012). Hippocrates theorized that personality traits and human behaviors are based on four separate temperaments associated with four fluids ("humors") of the body: choleric temperament (yellow bile from the liver), melancholic temperament (black bile from the kidneys), sanguine temperament (red blood from the heart), and phlegmatic temperament (white phlegm from the lungs) (Clark & Watson, 2008; Eysenck & Eysenck, 1985; Lecci & Magnavita, 2013; Noga, 2007). Centuries later, the influential Greek physician and philosopher **Galen** built on Hippocrates's theory, suggesting that both diseases and personality differences could be explained by imbalances in the humors and that each person exhibits one of the four temperaments. For example, the choleric person is passionate, ambitious, and bold; the melancholic person is reserved, anxious, and unhappy; the sanguine person is joyful, eager, and optimistic; and the phlegmatic person is calm, reliable, and thoughtful (Clark & Watson, 2008; Stelmack & Stalikas, 1991). Galen's theory was prevalent for over 1,000 years and continued to be popular through the Middle Ages.

In 1780, Franz Gall, a German physician, proposed that the distances between bumps on the skull reveal a person's personality traits, character, and mental abilities (See figure 11.3). According to Gall, measuring these distances revealed the sizes of the brain areas underneath, providing information that could be used to determine whether a person was friendly, prideful, murderous, kind, good with languages, and so on. Initially, phrenology was very popular; however, it was soon discredited for lack of empirical support and has long been relegated to the status of pseudoscience (Fancher, 1979).



(a) (b)

Figure 11.3 The pseudoscience of measuring the areas of a person's skull is known as phrenology. (a) Gall developed a chart that depicted which areas of the skull corresponded to particular personality traits or characteristics (Hothersall, 1995). (b) An 1825 lithograph depicts Gall examining the skull of a young woman. (credit b: modification of work by Wellcome Library, London)

In the centuries after Galen, other researchers contributed to the development of his four primary temperament types, most prominently Immanuel Kant (in the 18th century) and psychologist Wilhelm **Wundt** (in the 19th century) (Eysenck, 2009; Stelmack & Stalikas, 1991; Wundt, 1874/1886) (See figure 11.4). Kant agreed with Galen that everyone could be sorted into one of the four temperaments and that there was no overlap between the four categories (Eysenck, 2009). He developed a list of traits that could be used to describe the personality of a person from each of the four temperaments. However, Wundt suggested that a better description of personality could be achieved using two major axes: emotional/nonemotional and changeable/unchangeable. The first axis separated strong from weak emotions (the melancholic and choleric temperaments from the phlegmatic and sanguine). The second axis divided the changeable temperaments (choleric and sanguine) from the unchangeable ones (melancholic and phlegmatic) (Eysenck, 2009).

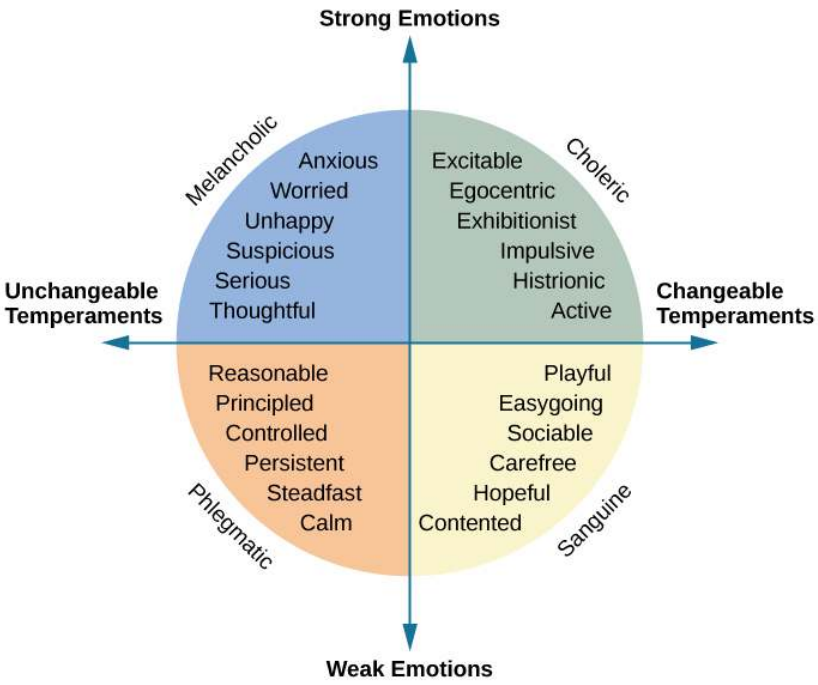


Figure 11.4 Developed from Galen's theory of the four temperaments, Kant proposed trait words to describe each temperament. Wundt later suggested the arrangement of the traits on two major axes.

Sigmund Freud's psychodynamic perspective of personality was the first comprehensive theory of personality, explaining a wide variety of both normal and abnormal behaviors. According to Freud, unconscious drives influenced by sex and aggression, along with childhood sexuality, are the forces that influence our personality. **Freud** attracted many followers who modified his ideas to create new theories about personality. These theorists, referred to as neo-Freudians, generally agreed with Freud that childhood experiences matter, but they reduced the emphasis on sex and focused more on the social environment and effects of culture on personality. The perspective of personality proposed by Freud and his followers was the dominant theory of personality for the first half of the 20th century.

Other major theories then emerged, including the learning, humanistic, biological, evolutionary, trait, and cultural perspectives. In this chapter, we will explore these various perspectives on personality in depth.

Link to Learning

View this video of an overview of some of the psychological perspectives on personality to learn more.

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13.2: Freud and the Psychodynamic Perspective

Learning Objectives

- Describe the assumptions of the psychodynamic perspective on personality development
- Define and describe the nature and function of the id, ego, and superego
- Define and describe the defense mechanisms
- Define and describe the psychosexual stages of personality development

Sigmund **Freud** (1856–1939) is probably the most controversial and misunderstood psychological theorist. When reading Freud's theories, it is important to remember that he was a medical doctor, not a psychologist. There was no such thing as a degree in psychology at the time that he received his education, which can help us understand some of the controversy over his theories today. However, Freud was the first to systematically study and theorize the workings of the unconscious mind in the manner that we associate with modern psychology.

In the early years of his career, Freud worked with Josef Breuer, a Viennese physician. During this time, Freud became intrigued by the story of one of Breuer's patients, Bertha Pappenheim, who was referred to by the pseudonym Anna O. (Launer, 2005). Anna O. had been caring for her dying father when she began to experience symptoms such as partial paralysis, headaches, blurred vision, amnesia, and hallucinations (Launer, 2005). In Freud's day, these symptoms were commonly referred to as hysteria. Anna O. turned to Breuer for help. He spent 2 years (1880–1882) treating Anna O. and discovered that allowing her to talk about her experiences seemed to bring some relief of her symptoms. Anna O. called his treatment the "talking cure" (Launer, 2005). Despite the fact the Freud never met Anna O., her story served as the basis for the 1895 book, *Studies on Hysteria*, which he co-authored with Breuer. Based on Breuer's description of Anna O.'s treatment, Freud concluded that hysteria was the result of sexual abuse in childhood and that these traumatic experiences had been hidden from consciousness. Breuer disagreed with Freud, which soon ended their work together. However, Freud continued to work to refine talk therapy and build his theory on personality.

Levels of Consciousness

To explain the concept of conscious versus unconscious experience, Freud compared the mind to an iceberg (See figure 11.5). He said that only about one-tenth of our mind is **conscious**, and the rest of our mind is **unconscious**. Our unconscious refers to that mental activity of which we are unaware and are unable to access (Freud, 1923). According to Freud, unacceptable urges and desires are kept in our unconscious through a process called repression. For example, we sometimes say things that we don't intend to say by unintentionally substituting another word for the one we meant. You've probably heard of a Freudian slip, the term used to describe this. Freud suggested that slips of the tongue are actually sexual or aggressive urges, accidentally slipping out of our unconscious. Speech errors such as this are quite common. Seeing them as a reflection of unconscious desires, linguists today have found that slips of the tongue tend to occur when we are tired, nervous, or not at our optimal level of cognitive functioning (Motley, 2002).

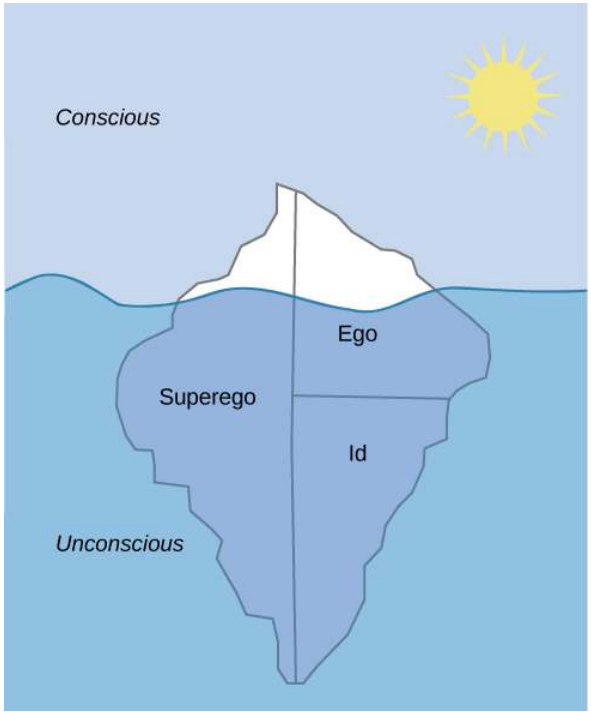


Figure 11.5 Freud believed that we are only aware of a small amount of our mind's activities and that most of it remains hidden from us in our unconscious. The information in our unconscious affects our behavior, although we are unaware of it.

According to Freud, our personality develops from a conflict between two forces: our biological aggressive and pleasure-seeking drives versus our internal (socialized) control over these drives. Our personality is the result of our efforts to balance these two competing forces. Freud suggested that we can understand this by imagining three interacting systems within our minds. He called them the id, ego, and superego. See figure below:

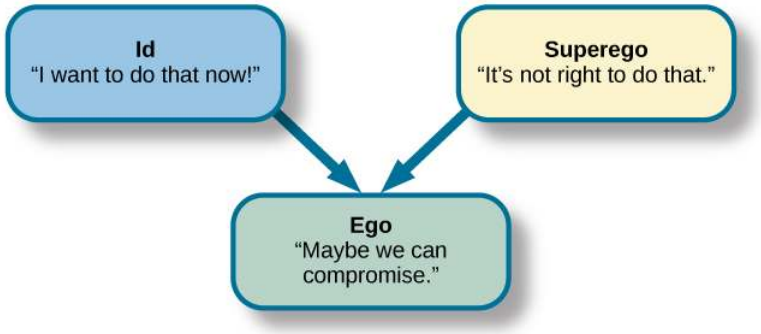


Figure 11.6 The job of the ego, or self, is to balance the aggressive/pleasure-seeking drives of the id with the moral control of the superego.

The unconscious **id** contains our most primitive drives or urges, and is present from birth. It directs impulses for hunger, thirst, and sex. Freud believed that the id operates on what he called the "pleasure principle," in which the id seeks immediate gratification. Through social interactions with parents and others in a child's environment, the ego and superego develop to help control the id. The **superego** develops as a child interacts with others, learning the social rules for right and wrong. The superego acts as our conscience; it is our moral compass that tells us how we should behave. It strives for perfection and judges our behavior, leading to feelings of pride or—when we fall short of the ideal—feelings of guilt. In contrast to the instinctual id and the rule-based superego, the **ego** is the rational part of our personality. It's what Freud considered to be the self, and it is the part of our personality that is seen by others. Its job is to balance the demands of the id and superego in the context of reality; thus, it operates on what Freud called the "reality principle." The ego helps the id satisfy its desires in a realistic way.

The id and superego are in constant conflict, because the id wants instant gratification regardless of the consequences, but the superego tells us that we must behave in socially acceptable ways. Thus, the ego's job is to find the middle ground. It helps satisfy

the id's desires in a rational way that will not lead us to feelings of guilt. According to Freud, a person who has a strong ego, which can balance the demands of the id and the superego, has a healthy personality. Freud maintained that imbalances in the system can lead to **neurosis** (a tendency to experience negative emotions), anxiety disorders, or unhealthy behaviors. For example, a person who is dominated by their id might be narcissistic and impulsive. A person with a dominant superego might be controlled by feelings of guilt and deny themselves even socially acceptable pleasures; conversely, if the superego is weak or absent, a person might become a psychopath. An overly dominant superego might be seen in an over-controlled individual whose rational grasp on reality is so strong that they are unaware of their emotional needs, or, in a neurotic who is overly defensive (overusing ego defense mechanisms).

Defense Mechanisms

Freud believed that feelings of anxiety result from the ego's inability to mediate the conflict between the id and superego. When this happens, Freud believed that the ego seeks to restore balance through various protective measures known as defense mechanisms (See figure 11.7). When certain events, feelings, or yearnings cause an individual anxiety, the individual wishes to reduce that anxiety. To do that, the individual's unconscious mind uses ego **defense mechanisms**, unconscious protective behaviors that aim to reduce anxiety. The ego, usually conscious, resorts to unconscious strivings to protect the ego from being overwhelmed by anxiety. When we use defense mechanisms, we are unaware that we are using them. Further, they operate in various ways that distort reality. According to Freud, we all use ego defense mechanisms.

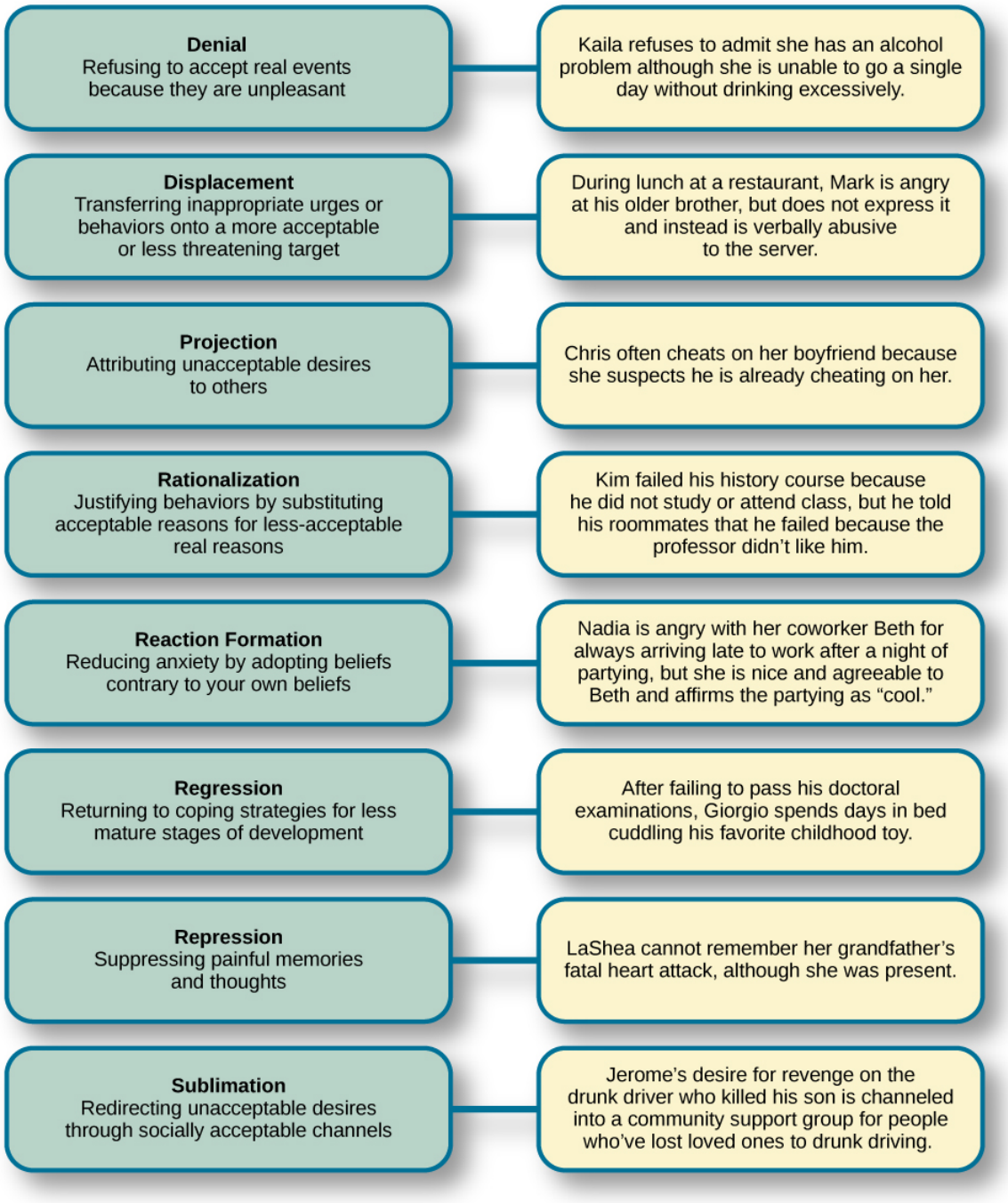


Figure 11.7 Defense mechanisms are unconscious protective behaviors that work to reduce anxiety.

While everyone uses defense mechanisms, Freud believed that overuse of them may be problematic. For example, let's say Joe Smith is a high school football player. Deep down, Joe feels sexually attracted to males. His conscious belief is that being gay is immoral and that if he were gay, his family would disown him and he would be ostracized by his peers. Therefore, there is a conflict between his conscious beliefs (being gay is wrong and will result in being ostracized) and his unconscious urges (attraction to males). The idea that he might be gay causes Joe to have feelings of anxiety. How can he decrease his anxiety? Joe may find himself acting very "macho," making gay jokes, and picking on a school peer who is gay. This way, Joe's unconscious impulses are further submerged.

There are several different types of defense mechanisms. For instance, in repression, anxiety-causing memories from consciousness are blocked. As an analogy, let's say your car is making a strange noise, but because you do not have the money to get it fixed, you

just turn up the radio so that you no longer hear the strange noise. Eventually you forget about it. Similarly, in the human psyche, if a memory is too overwhelming to deal with, it might be **repressed** and thus removed from conscious awareness (Freud, 1920). This repressed memory might cause symptoms in other areas.

Another defense mechanism is **reaction formation**, in which someone expresses feelings, thoughts, and behaviors opposite to their inclinations. In the above example, Joe made fun of a homosexual peer while himself being attracted to males. In **regression**, an individual acts much younger than their age. For example, a four-year-old child who resents the arrival of a newborn sibling may act like a baby and revert to drinking out of a bottle. In **projection**, a person refuses to acknowledge her own unconscious feelings and instead sees those feelings in someone else. Other defense mechanisms include **rationalization**, **displacement**, and **sublimation**.

Link to Learning

Watch this video of Freud's defense mechanisms to review.

Stages of Psychosexual Development

Freud believed that personality develops during early childhood: Childhood experiences shape our personalities as well as our behavior as adults. He asserted that we develop via a series of stages during childhood. Each of us must pass through these childhood stages, and if we do not have the proper nurturing and parenting during a stage, we will be stuck, or fixated, in that stage, even as adults.

In each **psychosexual stage of development**, the child's pleasure-seeking urges, coming from the id, are focused on a different area of the body, called an erogenous zone. The stages are oral, anal, phallic, latency, and genital (Table 11.1).

Freud's psychosexual development theory is quite controversial. To understand the origins of the theory, it is helpful to be familiar with the political, social, and cultural influences of Freud's day in Vienna at the turn of the 20th century. During this era, a climate of sexual repression, combined with limited understanding and education surrounding human sexuality, heavily influenced Freud's perspective. Given that sex was a taboo topic, Freud assumed that negative emotional states (neuroses) stemmed from suppression of unconscious sexual and aggressive urges. For Freud, his own recollections and interpretations of patients' experiences and dreams were sufficient proof that psychosexual stages were universal events in early childhood.

Table 11.1 Freud's Stages of Psychosexual Development

Stage	Age (years)	Erogenous Zone	Major Conflict	Adult Fixation Example
Oral	0–1	Mouth	Weaning off breast or bottle	Smoking, overeating
Anal	1–3	Anus	Toilet training	Neatness, messiness
Phallic	3–6	Genitals	Oedipus/Electra complex	Vanity, overambition
Latency	6–12	None	None	None
Genital	12+	Genitals	None	None

Oral Stage

In the **oral stage** (birth to **1** year), pleasure is focused on the mouth. Eating and the pleasure derived from sucking (nipples, pacifiers, and thumbs) play a large part in a baby's first year of life. At around **1** year of age, babies are weaned from the bottle or breast, and this process can create conflict if not handled properly by caregivers. According to Freud, an adult who smokes, drinks, overeats, or bites her nails is fixated in the oral stage of her psychosexual development; she may have been weaned too early or too late, resulting in these fixation tendencies, all of which seek to ease anxiety.

Anal Stage

After passing through the oral stage, children enter what Freud termed the **anal stage** (**1 – 3** years). In this stage, children experience pleasure in their bowel and bladder movements, so it makes sense that the conflict in this stage is over toilet training. Freud suggested that success at the anal stage depended on how parents handled toilet training. Parents who offer praise and rewards encourage positive results and can help children feel competent. Parents who are harsh in toilet training can cause a child to become fixated at the anal stage, leading to the development of an anal-retentive personality. The anal-retentive personality is stingy and stubborn, has a compulsive need for order and neatness, and might be considered a perfectionist. If parents are too lenient in toilet training, the child might also become fixated and display an anal-expulsive personality. The anal-expulsive personality is messy, careless, disorganized, and prone to emotional outbursts.

Phallic Stage

Freud's third stage of psychosexual development is the **phallic stage** (**3 – 6** years), corresponding to the age when children become aware of their bodies and recognize the differences between boys and girls. The erogenous zone in this stage is the genitals. Conflict arises when the child feels a desire for the opposite-sex parent, and jealousy and hatred toward the same-sex parent. For boys, this is called the Oedipus complex, involving a boy's desire for his mother and his urge to replace his father who is seen as a rival for the mother's attention. At the same time, the boy is afraid his father will punish him for his feelings, so he experiences *castration anxiety*. The Oedipus complex is successfully resolved when the boy begins to identify with his father as an indirect way to have the mother. Failure to resolve the Oedipus complex may result in fixation and development of a personality that might be described as vain and overly ambitious.

Girls experience a comparable conflict in the phallic stage—the Electra complex. The Electra complex, while often attributed to Freud, was actually proposed by Freud's protégé, Carl Jung (Jung & Kerenyi, 1963). A girl desires the attention of her father and wishes to take her mother's place. Jung also said that girls are angry with the mother for not providing them with a penis—hence the term *penis envy*. While Freud initially embraced the Electra complex as a parallel to the Oedipus complex, he later rejected it, yet it remains as a cornerstone of Freudian theory, thanks in part to academics in the field (Freud, 1931/1968; Scott, 2005).

Latency Period

Following the phallic stage of psychosexual development is a period known as the **latency period** (**6** years to puberty). This period is not considered a stage, because sexual feelings are dormant as children focus on other pursuits, such as school, friendships, hobbies, and sports. Children generally engage in activities with peers of the same sex, which serves to consolidate a child's gender-role identity.

Genital Stage

The final stage is the **genital stage** (from puberty on). In this stage, there is a sexual reawakening as the incestuous urges resurface. The young person redirects these urges to other, more socially acceptable partners (who often resemble the other-sex parent). People in this stage have mature sexual interests, which for Freud meant a strong desire for the opposite sex. Individuals who successfully completed the previous stages, reaching the genital stage with no fixations, are said to be well-balanced, healthy adults.

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13.3: Strengths, Mixed Support, and Limitations of Freud's Psychodynamic Perspective

Strengths

Freud has probably exerted a greater impact on the public's understanding of personality than any other thinker, and he has also in large part defined the field of psychology. Psychologists today continue to believe that our childhood experiences and unconscious motivations shape our personalities and our attachments with others. In addition, Freud's important idea that expressing or talking through one's difficulties can be psychologically helpful has been supported in current research (Baddeley & Pennebaker, 2009) and has become a mainstay of psychological therapy.

Mixed Support

In terms of the important role of the unconscious, Freud seems to have been at least in part correct. More and more research demonstrates that a large part of everyday behavior is driven by processes that are outside our conscious awareness (Kihlstrom, 1987). And yet, although our unconscious motivations influence every aspect of our learning and behavior Freud probably overestimated the extent to which these unconscious motivations are primarily sexual and aggressive.

Freud's idea of defense mechanisms has also met with mixed support from modern research. For example, studies have failed to yield evidence for the existence of repression. People who are exposed to traumatic experiences in war have been found to remember their traumas only too well (Kihlstrom, 1997). Although we may attempt to push information that is anxiety-arousing into our unconscious, this often has the ironic effect of making us think about the information even more strongly than if we hadn't tried to repress it (Newman, Duff, & Baumeister, 1997). On the other hand, research has found support for at least two of Freud's defense mechanisms: projection and reaction formation.

Limitations

Freud's theory has rightfully been criticized as unscientific and untestable. A particular problem for testing Freudian theories is that almost anything that conflicts with a prediction based in Freudian theory can be explained away in terms of the use of a defense mechanism. A man who expresses a lot of anger toward his father may be seen via Freudian theory to be experiencing the Oedipus complex, which includes conflict with the father. But a man who expresses no anger at all toward the father also may be seen as experiencing the Oedipus complex by repressing the anger. Because Freud hypothesized that either was possible, but did not specify when repression would or would not occur, the theory is difficult to falsify.

In addition, Freud's psychosexual stages and the idea that children are sexually attracted to their parents have largely been dismissed by modern psychology researchers and practitioners.

Conclusion

Taken together, it is fair to say that Freudian theory, like most psychological theories, was not entirely correct and that it has had to be modified over time as the results of new studies have become available. But the fundamental ideas about personality that Freud proposed, as well as the use of talk therapy as an essential component of therapy, are nevertheless still a major part of psychology and are used by clinical psychologists every day.

References

Baddeley, J. L., & Pennebaker, J. W. (2009). Expressive writing. In W. T. O'Donohue & J. E. Fisher (Eds.), *General principles and empirically supported techniques of cognitive behavior therapy* (pp. 295–299). Hoboken, NJ: John Wiley & Sons.

Crews, F. C. (1998). *Unauthorized Freud: Doubters confront a legend*. New York, NY: Viking Press.

Dolnick, E. (1998). *Madness on the couch: Blaming the victim in the heyday of psychoanalysis.* New York, NY: Simon & Schuster.

Fisher, S., & Greenberg, R. P. (1996). *Freud scientifically reappraised: Testing the theories and therapy*. Oxford, England: John Wiley & Sons.

Freud, S. (1923/1949). *The ego and the id*. London, England: Hogarth Press. (Original work published 1923)

Higgins, E. T., Bond, R. N., Klein, R., & Strauman, T. (1986). Self-discrepancies and emotional vulnerability: How magnitude, accessibility, and type of discrepancy influence affect. *Journal of Personality and Social Psychology, 51*(1), 5–15.

Kihlstrom, J. F. (1987). The cognitive unconscious. *Science*, *237*(4821), 1445–1452.

Kihlstrom, J. F. (1997). Memory, abuse, and science. *American Psychologist*, *52*(9), 994–995.

Maslow, Abraham (1970). *Motivation and personality* (2nd ed.). New York, NY: Harper.

McGregor, H. A., Lieberman, J. D., Greenberg, J., Solomon, S., Arndt, J., Simon, L.,…Pyszczynski, T. (1998). Terror management and aggression: Evidence that mortality salience motivates aggression against worldview-threatening others. *Journal of Personality and Social Psychology, 74*(3), 590–605.

Newman, L. S., Duff, K. J., & Baumeister, R. F. (1997). A new look at defensive projection: Thought suppression, accessibility, and biased person perception. *Journal of Personality and Social Psychology, 72*(5), 980–1001.

Prochaska, J. O., & Norcross, J. C. (2007). *Systems of psychotherapy: A transtheoretical analysis* (6th ed.). Pacific Grove, CA: Brooks/Cole; Yalom, I. (1995). Introduction. In C. Rogers, *A way of being*. (1980). New York, NY: Houghton Mifflin.

Roudinesco, E. (2003). *Why psychoanalysis?* New York, NY: Columbia University Press.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*(1), 5–14.

Strauman, T. J., & Higgins, E. T. (1988). Self-discrepancies as predictors of vulnerability to distinct syndromes of chronic emotional distress. *Journal of Personality, 56*(4), 685–707.

Taylor, E. (2009). *The mystery of personality: A history of psychodynamic theories*. New York, NY: Springer Science + Business Media.

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13.4: Humanistic Approaches

Learning Objectives

- Discuss the contributions of Abraham Maslow and Carl Rogers to personality development

Humanism is sometimes viewed as a reaction to the pessimistic determinism of psychoanalysis, with its emphasis on psychological disturbance. Humanism argues that Freud's theory did not recognize the depth and meaning of human experience, or the innate capacity for self-directed change and transforming personal experiences. This perspective focuses on how healthy people develop. One pioneering humanist, Abraham Maslow, studied people who he considered to be healthy, creative, and productive, including Albert Einstein, Eleanor Roosevelt, Thomas Jefferson, Abraham Lincoln, and others. Maslow (1950, 1970) found that such people share similar characteristics, such as being open, creative, loving, spontaneous, compassionate, concerned for others, and accepting of themselves. When you studied motivation, you learned about one of the best-known humanistic theories, Maslow's hierarchy of needs theory, in which Maslow proposes that human beings have certain needs in common and that these needs must be met in a certain order. The highest need is the need for self-actualization, which is the achievement of our fullest potential.

Another humanistic theorist was Carl Rogers. One of Rogers's main ideas about personality regards **self-concept**, our thoughts and feelings about ourselves. How would you respond to the question, "Who am I?" Your answer can show how you see yourself. If your response is primarily positive, then you tend to feel good about who you are, and you see the world as a safe and positive place. If your response is mainly negative, then you may feel unhappy with who you are. Rogers further divided the self into two categories: the ideal self and the real self. The **ideal self** is the person that you would like to be; the **real self** is the person you actually are. Rogers focused on the idea that we need to achieve consistency between these two selves. We experience **congruence** when our thoughts about our real self and ideal self are very similar—in other words, when our self-concept is accurate**.** High congruence leads to a greater sense of self-worth and a healthy, productive life. Parents can help their children achieve this by giving them unconditional positive regard, or unconditional love. According to Rogers (1980), "As persons are accepted and prized, they tend to develop a more caring attitude towards themselves" (p. 116). Conversely, when there is a great discrepancy between our ideal and actual selves, we experience a state Rogers called **incongruence**, which can lead to maladjustment. Both Rogers's and Maslow's theories focus on individual choices and do not believe that biology is deterministic.

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13.5: Biological Approaches

Learning Objectives

- Discuss the findings of the Minnesota Study of Twins Reared Apart as they relate to personality and genetics
- Discuss temperament and describe the three infant temperaments identified by Thomas and Chess
- Discuss the evolutionary perspective on personality development

How much of our personality is in-born and biological, and how much is influenced by the environment and culture we are raised in? Psychologists who favor the biological approach believe that inherited predispositions as well as physiological processes can be used to explain differences in our personalities (Burger, 2008).

Evolutionary psychology relative to personality development looks at personality traits that are universal, as well as differences across individuals. In this view, adaptive differences have evolved and then provide a survival and reproductive advantage. Individual differences are important from an evolutionary viewpoint for several reasons. Certain individual differences, and the heritability of these characteristics, have been well documented. David Buss has identified several theories to explore this relationship between personality traits and evolution, such as life-history theory, which looks at how people expend their time and energy (such as on bodily growth and maintenance, reproduction, or parenting). Another example is costly signaling theory, which examines the honesty and deception in the signals people send one another about their quality as a mate or friend (Buss, 2009).

In the field of behavioral genetics, the **Minnesota Study of Twins Reared Apart**—a well-known study of the genetic basis for personality—conducted research with twins from 1979 to 1999. In studying 350 pairs of twins, including pairs of identical and fraternal twins reared together and apart, researchers found that identical twins, whether raised together or apart, have very similar personalities (Bouchard, 1994; Bouchard, Lykken, McGue, Segal, & Tellegen, 1990; Segal, 2012). These findings suggest the heritability of some personality traits. **Heritability** refers to the proportion of difference among people that is attributed to genetics. Some of the traits that the study reported as having more than a 0.50 heritability ratio include leadership, obedience to authority, a sense of well-being, alienation, resistance to stress, and fearfulness. The implication is that some aspects of our personalities are largely controlled by genetics; however, it's important to point out that traits are not determined by a single gene, but by a combination of many genes, as well as by epigenetic factors that control whether the genes are expressed.

Other research that has examined the link between personality and other factors has identified and studied Type A and Type B personalities, which you will learn more about in the chapter on Stress, Health, and Lifestyle.

Link to Learning

Watch this video about genetic makeup's influence on personality to learn more.

Temperament

Most contemporary psychologists believe temperament has a biological basis due to its appearance very early in our lives (Rothbart, 2011). As you learned when you studied lifespan development, Thomas and Chess (1977) found that babies could be categorized into one of three temperaments: easy, difficult, or slow to warm up. However, environmental factors (family interactions, for example) and maturation can affect the ways in which children's personalities are expressed (Carter et al., 2008).

Research suggests that there are two dimensions of our temperament that are important parts of our adult personality—reactivity and self-regulation (Rothbart, Ahadi, & Evans, 2000). Reactivity refers to how we respond to new or challenging environmental stimuli; self-regulation refers to our ability to control that response (Rothbart & Derryberry, 1981; Rothbart, Sheese, Rueda, & Posner, 2011). For example, one person may immediately respond to new stimuli with a high level of anxiety, while another barely notices it.

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13.6: Trait Theorists

Learning Objectives

- Discuss early trait theories of Cattell and Eysenck
- Discuss the Big Five factors and describe someone who is high and low on each of the five traits

Trait theorists believe personality can characterized in terms of **traits**, which are *relatively enduring characteristics that influence our behavior across many situations*. Personality traits such as introversion, friendliness, conscientiousness, honesty, and helpfulness are important because they help explain consistencies in behavior. The most popular way of measuring traits is by administering personality tests on which people self-report about their own characteristics. Psychologists have investigated hundreds of traits using the self-report approach, and this research has found many personality traits that have important implications for behavior.

As with intelligence tests, the utility of self-report measures of personality depends on their *reliability* and *construct validity*. Some popular measures of personality are not useful because they are unreliable or invalid. Perhaps you have heard of a personality test known as the **Myers-Briggs Type Indicator (MBTI)**. If so, you are not alone, because the MBTI is the most widely administered personality test in the world, given millions of times a year to employees in thousands of companies. The MBTI categorizes people into one of four categories on each of four dimensions: *introversion* versus *extraversion*, *sensing* versus *intuiting*, *thinking* versus *feeling*, and *judging* versus *perceiving*.

Although completing the MBTI can be useful for helping people think about individual differences in personality, and for "breaking the ice" at meetings, the measure itself is not psychologically useful because it is not reliable or valid. People's classifications change over time, and scores on the MBTI do not relate to other measures of personality or to behavior (Hunsley, Lee, & Wood, 2003). Measures such as the MBTI remind us that it is important to scientifically and empirically test the effectiveness of personality tests by assessing their stability over time and their ability to predict behavior.

Early trait theorists tried to describe all human personality traits. For example, one trait theorist, Gordon Allport (Allport & Odbert, 1936), found $4,500$ words in the English language that could describe people. He organized these personality traits into three categories: cardinal traits, central traits, and secondary traits. A cardinal trait is one that dominates your entire personality, and hence your life—such as Ebenezer Scrooge's greed and Mother Theresa's altruism. Cardinal traits are not very common: Few people have personalities dominated by a single trait. Instead, our personalities typically are composed of multiple traits. Central traits are those that make up our personalities (such as loyal, kind, agreeable, friendly, sneaky, wild, and grouchy). Secondary traits are those that are not quite as obvious or as consistent as central traits. They are present under specific circumstances and include preferences and attitudes. For example, one person gets angry when people try to tickle him; another can only sleep on the left side of the bed; and yet another always orders her salad dressing on the side. And you—although not normally an anxious person—feel nervous before making a speech in front of your English class.

In an effort to make the list of traits more manageable, Raymond Cattell (1946, 1957) narrowed down the list to about 171 traits. However, saying that a trait is either present or absent does not accurately reflect a person's uniqueness, because all of our personalities are actually made up of the same traits; we differ only in the degree to which each trait is expressed. Cattell (1957) identified 16 factors or dimensions of personality: warmth, reasoning, emotional stability, dominance, liveliness, rule-consciousness, social boldness, sensitivity, vigilance, abstractedness, privateness, apprehension, openness to change, self-reliance, perfectionism, and tension. See Table 11.5 below. He developed a personality assessment based on these 16 factors, called the 16PF. Instead of a trait being present or absent, each dimension is scored over a continuum, from high to low. For example, your level of warmth describes how warm, caring, and nice to others you are. If you score low on this index, you tend to be more distant and cold. A high score on this index signifies you are supportive and comforting.

Table 11.5 Personality Factors Measured by the 16PF Questionnaire

Factor	Low Score	High Score
Warmth	Reserved, detached	Outgoing, supportive
Intellect	Concrete thinker	Analytical
Emotional stability	Moody, irritable	Stable, calm
Aggressiveness	Docile, submissive	Controlling, dominant
Liveliness	Somber, prudent	Adventurous, spontaneous
Dutifulness	Unreliable	Conscientious
Social assertiveness	Shy, restrained	Uninhibited, bold
Sensitivity	Tough-minded	Sensitive, caring
Paranoia	Trusting	Suspicious
Abstractness	Conventional	Imaginative
Introversion	Open, straightforward	Private, shrewd
Anxiety	Confident	Apprehensive
Openmindedness	Closeminded, traditional	Curious, experimental
Independence	Outgoing, social	Self-sufficient
Perfectionism	Disorganized, casual	Organized, precise
Tension	Relaxed	Stressed

Link to Learning

Take this assessment based on Cattell's 16PF questionnaire(opens in new window) to see which personality traits dominate your personality.

Psychologists Hans and Sybil **Eysenck** were personality theorists (See figure 11.12) who focused on **temperament**, the inborn, genetically based personality differences that you studied earlier in the chapter. They believed personality is largely governed by biology. The Eysencks (Eysenck, 1990, 1992; Eysenck & Eysenck, 1963) viewed people as having two specific personality dimensions: extroversion/introversion and neuroticism/stability.



Figure 11.12 Hans and Sybil Eysenck believed that our personality traits are influenced by our genetic inheritance. (credit: "Sirswindon"/Wikimedia Commons)

According to their theory, people high on the trait of extroversion are sociable and outgoing, and readily connect with others, whereas people high on the trait of introversion have a higher need to be alone, engage in solitary behaviors, and limit their interactions with others. In the neuroticism/stability dimension, people high on neuroticism tend to be anxious; they tend to have an overactive sympathetic nervous system and, even with low stress, their bodies and emotional state tend to go into a flight-or-fight reaction. In contrast, people high on stability tend to need more stimulation to activate their flight-or-fight reaction and are considered more emotionally stable. Based on these two dimensions, the Eysencks' theory divides people into four quadrants. These quadrants are sometimes compared with the four temperaments described by the Greeks: melancholic, choleric, phlegmatic, and sanguine. See figure 11.13 below:

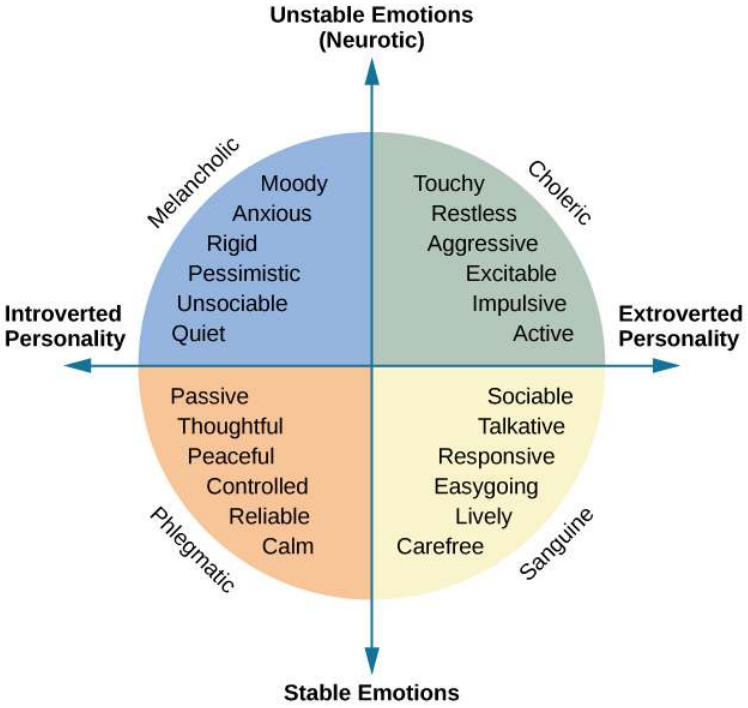


Figure 11.13 The Eysencks described two factors to account for variations in our personalities: extroversion/introversion and emotional stability/instability.

Later, the Eysencks added a third dimension: psychoticism versus superego control (Eysenck, Eysenck & Barrett, 1985). In this dimension, people who are high on psychoticism tend to be independent thinkers, cold, nonconformists, impulsive, antisocial, and

hostile, whereas people who are high on superego control tend to have high impulse control—they are more altruistic, empathetic, cooperative, and conventional (Eysenck, Eysenck & Barrett, 1985).

While Cattell's **16** factors may be too broad, the Eysenck's two-factor system has been criticized for being too narrow. Another personality theory, called the **Five Factor Model**, effectively hits a middle ground, with its five factors referred to as the Big Five personality traits. It is the most popular theory in personality psychology today and the most accurate approximation of the basic trait dimensions (Funder, 2001). The five traits are openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism (See figure 11.14). A helpful way to remember the traits is by using the mnemonic OCEAN.

In the Five Factor Model, each person has each trait, but they occur along a spectrum. Openness to experience is characterized by imagination, feelings, actions, and ideas. People who score high on this trait tend to be curious and have a wide range of interests. Conscientiousness is characterized by competence, self-discipline, thoughtfulness, and achievement-striving (goal-directed behavior). People who score high on this trait are hardworking and dependable. Numerous studies have found a positive correlation between conscientiousness and academic success (Akomolafe, 2013; Chamorro-Premuzic & Furnham, 2008; Conrad & Patry, 2012; Noftle & Robins, 2007; Wagerman & Funder, 2007). Extroversion is characterized by sociability, assertiveness, excitement-seeking, and emotional expression. People who score high on this trait are usually described as outgoing and warm. Not surprisingly, people who score high on both extroversion and openness are more likely to participate in adventure and risky sports due to their curious and excitement-seeking nature (Tok, 2011). The fourth trait is agreeableness, which is the tendency to be pleasant, cooperative, trustworthy, and good-natured. People who score low on agreeableness tend to be described as rude and uncooperative, yet one recent study reported that men who scored low on this trait actually earned more money than men who were considered more agreeable (Judge, Livingston, & Hurst, 2012). The last of the Big Five traits is neuroticism, which is the tendency to experience negative emotions. People high on neuroticism tend to experience emotional instability and are characterized as angry, impulsive, and hostile. Watson and Clark (1984) found that people reporting high levels of neuroticism also tend to report feeling anxious and unhappy. In contrast, people who score low in neuroticism tend to be calm and even-tempered.

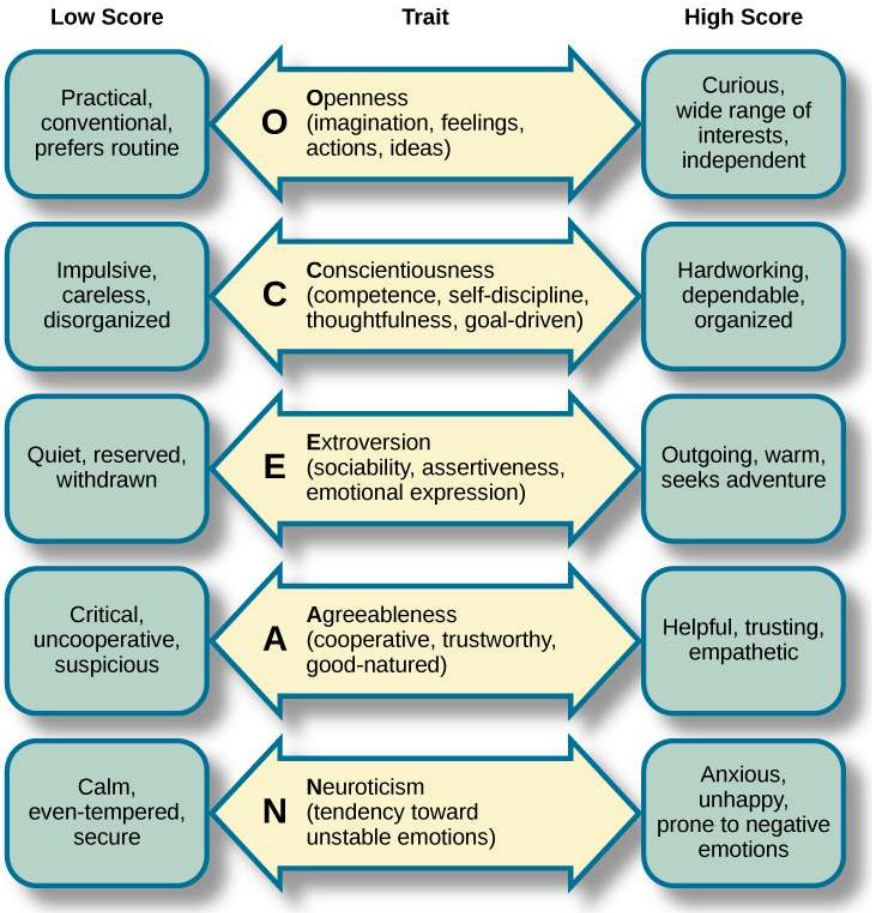


Figure 11.14 In the Five Factor Model, each person has five traits, each scored on a continuum from high to low. In the center column, notice that the first letter of each trait spells the mnemonic OCEAN.

The Big Five personality factors each represent a range between two extremes. In reality, most of us tend to lie somewhere midway along the continuum of each factor, rather than at polar ends. It's important to note that the Big Five traits are relatively stable over our lifespan, with some tendency for the traits to increase or decrease slightly. Researchers have found that conscientiousness increases through young adulthood into middle age, as we become better able to manage our personal relationships and careers (Donnellan & Lucas, 2008). Agreeableness also increases with age, peaking between 50 to 70 years (Terracciano, McCrae, Brant, & Costa, 2005). Neuroticism and extroversion tend to decline slightly with age (Donnellan & Lucas; Terracciano et al.). Additionally, The Big Five traits have been shown to exist across ethnicities, cultures, and ages, and may have substantial biological and genetic components (Jang, Livesley, & Vernon, 1996; Jang et al., 2006; McCrae & Costa, 1997; Schmitt et al., 2007).

Another model of personality traits is the HEXACO model. HEXACO is an acronym for six broad traits: honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience (Anglim & O'Connor, 2018). Table 11.6 provides a brief overview of each trait.

Table 11.6 The HEXACO Traits

HEXACO Traits

Trait	Example Aspects of Trait
(H) Honesty-humility	Sincerity, modesty, faithfulness
(E) Emotionality	Sentimentality, anxiety, sensitivity
(X) Extraversion	Sociability, talkativeness, boldness
(A) Agreeableness	Patience, tolerance, gentleness
(C) Conscientiousness	Organization, thoroughness, precision
(O) Openness	Creativity, inquisitiveness, innovativeness

Link to Learning

Take the Big Five Personality test(opens in new window) to find out about your personality and where you fall on the Big Five factors.

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CHAPTER OVERVIEW

14: Defining Psychological Disorders

14.1: Psychological Disorder- What Makes a Behavior “Abnormal”?

14.2: Anxiety and Dissociative Disorders- Fearing the World Around Us

14.3: Mood Disorders- Emotions as Illness

14.4: Schizophrenia- The Edge of Reality and Consciousness

14.5: Personality Disorders

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14.1: Psychological Disorder- What Makes a Behavior “Abnormal”?

Learning Objectives

1. Define “psychological disorder” and summarize the general causes of disorder.
2. Explain why it is so difficult to define disorder, and how the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is used to make diagnoses.
3. Describe the stigma of psychological disorders and their impact on those who suffer from them.

The focus of the next two chapters is to many people the heart of psychology. This emphasis on **abnormal psychology**—*the application of psychological science to understanding and treating mental disorders*—is appropriate, as more psychologists are involved in the diagnosis and treatment of psychological disorder than in any other endeavor, and these are probably the most important tasks psychologists face. About 1 in every 4 Americans (or over 78 million people) are affected by a psychological disorder during any one year (Kessler, Chiu, Demler, & Walters, 2005), and at least a half billion people are affected worldwide. The impact of mental illness is particularly strong on people who are poorer, of lower socioeconomic class, and from disadvantaged ethnic groups.

People with psychological disorders are often stigmatized by the people around them, resulting in shame and embarrassment, as well as prejudice and discrimination against them. Thus the understanding and treatment of psychological disorder has broad implications for the everyday life of many people. Table **14.1.1** shows the **prevalence** (i.e., *the frequency of occurrence of a given condition in a population at a given time*) of some of the major psychological disorders in the United States.

Table **14.1.1**: One-Year Prevalence Rates for Psychological Disorders in the United States, 2001–2003

Disease	Percentage affected	Number affected
Any mental disorder	26.2	81,744,000
Any anxiety disorder	18.1	56,472,000
Specific phobia	8.7	27,144,000
Social phobia	6.8	21,216,000
Agoraphobia	0.8	2,496,000
Generalized anxiety disorder	3.1	9,672,000
Panic disorder	2.7	8,424,000
Obsessive-compulsive disorder	1.0	3,120,000
Posttraumatic stress disorder	3.5	10,920,000
Any mood disorder	9.5	29,640,000
Major depressive disorder	6.7	20,904,000
Bipolar disorder	2.6	8,112,000
Schizophrenia	1.0	3,120,000
Personality disorders		
Antisocial personality disorder	1.5	4,680,000
Borderline personality disorder	1.5	4,680,000
Anorexia nervosa	0.1	312,000
Any substance abuse disorder	3.8	11,856,000
Alcohol use disorder	4.4	13,728,000
Drug use disorder	1.8	5,616,000
All cancers*	5.4	16,848,000
Diabetes*	10.7	33,348,000

* These nonpsychological conditions are included for comparison. Sources: Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 617–627; Narrow, W. E., Rae, D. S., Robins, L. N., & Regier, D. A. (2002). Revised prevalence based estimates of mental disorders in the United States: Using a clinical significance criterion to reconcile 2 surveys' estimates. *Archives of General Psychiatry, 59*(2), 115–123.

In this chapter our focus is on the disorders themselves. We will review the major psychological disorders and consider their causes and their impact on the people who suffer from them. Then in the next chapter, "Treating Psychological Disorders," we will turn to consider the treatment of these disorders through psychotherapy and drug therapy.

Defining Disorder

A **psychological disorder** is *an ongoing dysfunctional pattern of thought, emotion, and behavior that causes significant distress, and that is considered deviant in that person's culture or society* (Butcher, Mineka, & Hooley, 2007). Psychological disorders have much in common with other medical disorders. They are out of the patient's control, they may in some cases be treated by drugs, and their treatment is often covered by medical insurance. Like medical problems, psychological disorders have both biological

(nature) as well as environmental (nurture) influences. These causal influences are reflected in the bio-psycho-social model of illness (Engel, 1977).

The **bio-psycho-social model of illness** is *a way of understanding disorder that assumes that disorder is caused by biological, psychological, and social factors* (Figure 14.1.1). The *biological component* of the bio-psycho-social model refers to the influences on disorder that come from the functioning of the individual's body. Particularly important are genetic characteristics that make some people more vulnerable to a disorder than others and the influence of neurotransmitters. The *psychological component* of the bio-psycho-social model refers to the influences that come from the individual, such as patterns of negative thinking and stress responses. The *social component* of the bio-psycho-social model refers to the influences on disorder due to social and cultural factors such as socioeconomic status, homelessness, abuse, and discrimination.

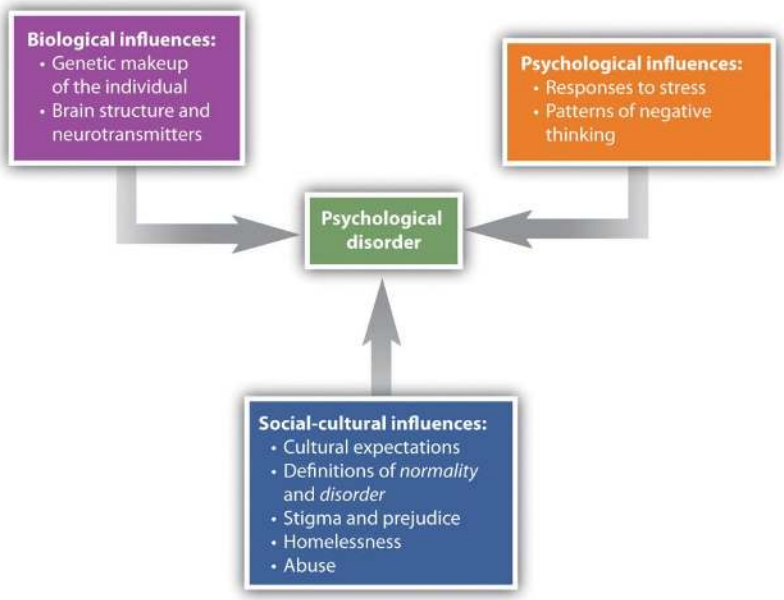


Figure 14.1.1: The Bio-Psycho-Social Model. The bio-psycho-social model of disorder proposes that disorders are caused by biological, psychological, and social-cultural factors.

To consider one example, the psychological disorder of schizophrenia has a biological cause because it is known that there are patterns of genes that make a person vulnerable to the disorder (Gejman, Sanders, & Duan, 2010). But whether or not the person with a biological vulnerability experiences the disorder depends in large part on psychological factors such as how the individual responds to the stress he experiences, as well as social factors such as whether or not he is exposed to stressful environments in adolescence and whether or not he has support from people who care about him (Sawa & Snyder, 2002; Walker, Kestler, Bollini, & Hochman, 2004). Similarly, mood and anxiety disorders are caused in part by genetic factors such as hormones and neurotransmitters, in part by the individual's particular thought patterns, and in part by the ways that other people in the social environment treat the person with the disorder. We will use the bio-psycho-social model as a framework for considering the causes and treatments of disorder.

Although they share many characteristics with them, psychological disorders are nevertheless different from medical conditions in important ways. For one, diagnosis of psychological disorders can be more difficult. Although a medical doctor can see cancer in the lungs using an MRI scan or see blocked arteries in the heart using cardiac catheterization, there is no corresponding test for psychological disorder. Current research is beginning to provide more evidence about the role of brain structures in psychological disorder, but for now the brains of people with severe mental disturbances often look identical to those of people without such disturbances.

Because there are no clear biological diagnoses, psychological disorders are instead diagnosed on the basis of clinical observations of the behaviors that the individual engages in. These observations find that emotional states and behaviors operate on a continuum, ranging from more "normal" and "accepted" to more "deviant," "abnormal," and "unaccepted." The behaviors that are associated with disorder are in many cases the same behaviors we that engage in our "normal" everyday life. Washing one's hands is a normal healthy activity, but it can be overdone by those with an *obsessive-compulsive disorder (OCD)*. It is not unusual to worry about and

try to improve one's body image, but Robert's struggle with his personal appearance, as discussed at the beginning of this chapter, was clearly unusual, unhealthy, and distressing to him.



Figure **14.1.2**: How Thin Is Too Thin? This dancer needs to be thin for her career, but when does her dieting turn into a psychological disorder? Psychologists believe this happens when the behavior becomes *distressing* and *dysfunctional* to the person. Jean-François Chénier – Trust – CC BY-NC 2.0.

Whether a given behavior is considered a psychological disorder is determined not only by whether a behavior is *unusual* (e.g., whether it is "mild" anxiety versus "extreme" anxiety) but also by whether a behavior is maladaptive—that is, the extent to which it causes *distress* (e.g., pain and suffering) and *dysfunction* (impairment in one or more important areas of functioning) to the individual (American Psychiatric Association, 2000)[1]. An intense fear of spiders, for example, would not be considered a psychological disorder unless it has a significant negative impact on the sufferer's life, for instance by causing him or her to be unable to step outside the house. The focus on distress and dysfunction means that behaviors that are simply unusual (such as some political, religious, or sexual practices) are not classified as disorders.

Put your psychology hat on for a moment and consider the behaviors of the people listed in Table **14.1.2**. For each, indicate whether you think the behavior is or is not a psychological disorder. If you're not sure, what other information would you need to know to be more certain of your diagnosis?

Table **14.1.2**: Diagnosing Disorder

Yes	No	Need more information	Description
			Jackie frequently talks to herself while she is working out her math homework. Her roommate sometimes hears her and wonders if she is OK.
			Charlie believes that the noises made by cars and planes going by outside his house have secret meanings. He is convinced that he was involved in the start of a nuclear war and that the only way for him to survive is to find the answer to a difficult riddle.
			Harriet gets very depressed during the winter months when the light is low. She sometimes stays in her pajamas for the whole weekend, eating chocolate and watching TV.
			Frank seems to be afraid of a lot of things. He worries about driving on the highway and about severe weather that may come through his neighborhood. But mostly he fears mice, checking under his bed frequently to see if any are present.
			A worshipper speaking in "tongues" at an Evangelical church views himself as "filled" with the Holy Spirit and is considered blessed with the gift to speak the "language of angels."

A trained clinical psychologist would have checked off "need more information" for each of the examples in Table **14.1.2** because although the behaviors may seem unusual, there is no clear evidence that they are distressing or dysfunctional for the person. Talking to ourselves out loud is unusual and can be a symptom of schizophrenia, but just because we do it once in a while does not mean that there is anything wrong with us. It is natural to be depressed, particularly in the long winter nights, but how severe should this depression be, and how long should it last? If the negative feelings last for an extended time and begin to lead the person to miss work or classes, then they may become symptoms of a mood disorder. It is normal to worry about things, but when does worry turn into a debilitating anxiety disorder? And what about thoughts that seem to be irrational, such as being able to "speak the language of angels"? Are they indicators of a severe psychological disorder, or part of a normal religious experience? Again, the answer lies in the extent to which they are (or are not) interfering with the individual's functioning in society.

Another difficulty in diagnosing psychological disorders is that they frequently occur together. For instance, people diagnosed with anxiety disorders also often have mood disorders (Hunt, Slade, & Andrews, 2004), and people diagnosed with one personality disorder frequently suffer from other personality disorders as well. **Comorbidity** *occurs when people who suffer from one disorder*

also suffer at the same time from other disorders. Because many psychological disorders are comorbid, most severe mental disorders are concentrated in a small group of people (about 6% of the population) who have more than three of them (Kessler, Chiu, Demler, & Walters, 2005).

Psychology in Everyday Life: Combating the Stigma of Abnormal Behavior

Every culture and society has its own views on what constitutes abnormal behavior and what causes it (Brothwell, 1981). The Old Testament Book of Samuel tells us that as a consequence of his sins, God sent King Saul an evil spirit to torment him (1 Samuel 16:14). Ancient Hindu tradition attributed psychological disorder to sorcery and witchcraft. During the Middle Ages it was believed that mental illness occurred when the body was infected by evil spirits, particularly the devil. Remedies included whipping, bloodletting, purges, and trepanation (cutting a hole in the skull) to release the demons.

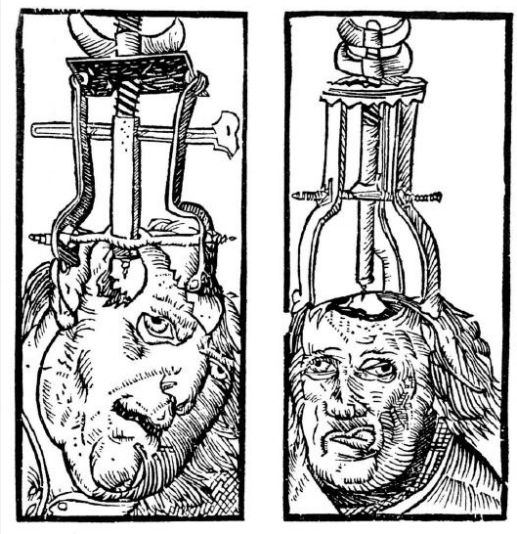


Figure **14.1.3**: Trepanation (drilling holes in the skull) has been used since prehistoric times in attempts to cure epilepsy, schizophrenia, and other psychological disorders. Peter Treveris – Wikimedia Commons – public domain.

Until the 18th century, the most common treatment for the mentally ill was to incarcerate them in asylums or "madhouses." During the 18th century, however, some reformers began to oppose this brutal treatment of the mentally ill, arguing that mental illness was a medical problem that had nothing to do with evil spirits or demons. In France, one of the key reformers was Philippe Pinel (1745–1826), who believed that mental illness was caused by a combination of physical and psychological stressors, exacerbated by inhumane conditions. Pinel advocated the introduction of exercise, fresh air, and daylight for the inmates, as well as treating them gently and talking with them. In America, the reformers Benjamin Rush (1745–1813) and Dorothea Dix (1802–1887) were instrumental in creating mental hospitals that treated patients humanely and attempted to cure them if possible. These reformers saw mental illness as an underlying psychological disorder, which was diagnosed according to its symptoms and which could be cured through treatment.

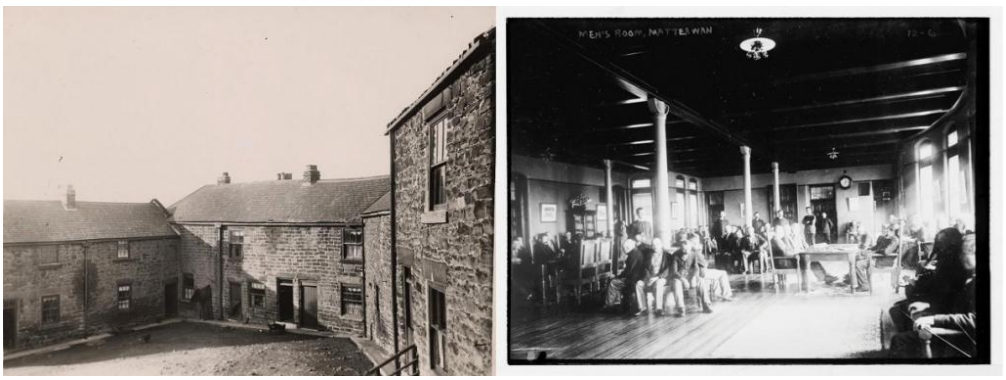


Figure **14.1.4**: Until the early 1900s people with mental disorders were often imprisoned in asylums such as these. U.S. Library of Congress – Wikimedia Commons – public domain.

Despite the progress made since the 1800s in public attitudes about those who suffer from psychological disorders, people, including police, coworkers, and even friends and family members, still stigmatize people with psychological disorders. A **stigma** refers to *a disgrace or defect that indicates that person belongs to a culturally devalued social group*. In some cases the stigma of mental illness is accompanied by the use of disrespectful and dehumanizing labels, including names such as “crazy,” “nuts,” “mental,” “schizo,” and “retard.”

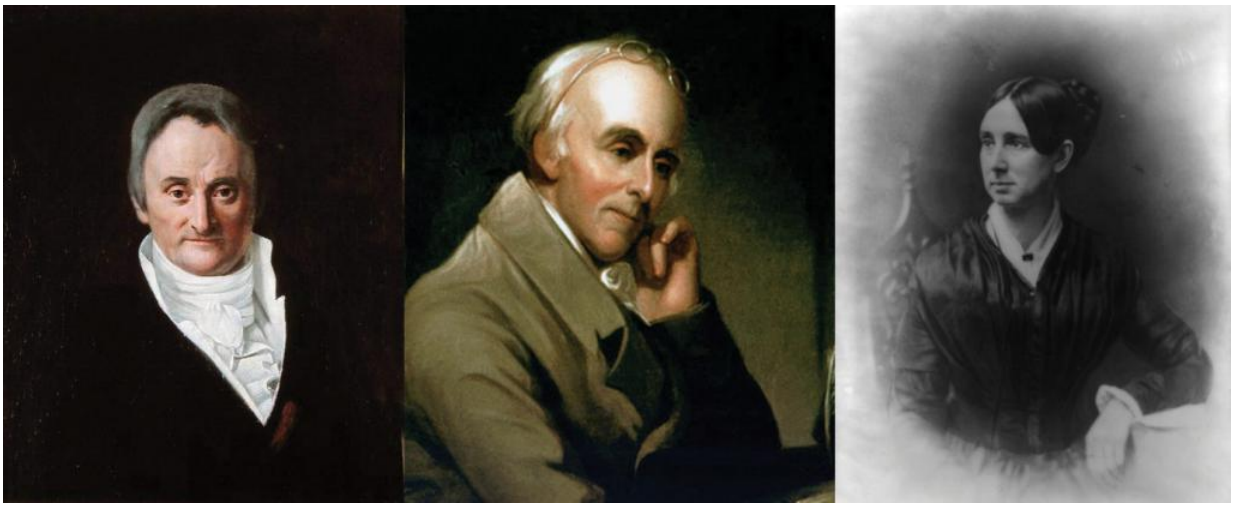


Figure **14.1.5**: The reformers Philippe Pinel, Benjamin Rush, and Dorothea Dix fought the often brutal treatment of the mentally ill and were instrumental in changing perceptions and treatment of them. Anna Mérimée – Pinel – public domain; Charles Wilson Peale – Rush – public domain; U.S. Library of Congress – Dix – public domain.

The stigma of mental disorder affects people while they are ill, while they are healing, and even after they have healed (Schefer, 2003). On a community level, stigma can affect the kinds of services social service agencies give to people with mental illness, and the treatment provided to them and their families by schools, workplaces, places of worship, and health-care providers. Stigma about mental illness also leads to employment discrimination, despite the fact that with appropriate support, even people with severe psychological disorders are able to hold a job (Boardman, Grove, Perkins, & Shepherd, 2003; Leff & Warner, 2006; Ozawa & Yaeda, 2007; Pulido, Diaz, & Ramirez, 2004).

The mass media has a significant influence on society’s attitude toward mental illness (Francis, Pirkis, Dunt, & Blood, 2001). While media portrayal of mental illness is often sympathetic, negative stereotypes still remain in newspapers, magazines, film, and television. (See the following video for an example.)



Television advertisements may perpetuate negative stereotypes about the mentally ill. Burger King recently ran an ad called "The King's Gone Crazy," in which the company's mascot runs around an office complex carrying out acts of violence and wreaking havoc. https://youtu.be/xYA7AnVwejo

The most significant problem of the stigmatization of those with psychological disorder is that it slows their recovery. People with mental problems internalize societal attitudes about mental illness, often becoming so embarrassed or ashamed that they conceal their difficulties and fail to seek treatment. Stigma leads to lowered self-esteem, increased isolation, and hopelessness, and it may negatively influence the individual's family and professional life (Hayward & Bright, 1997).

Despite all of these challenges, however, many people overcome psychological disorders and go on to lead productive lives. It is up to all of us who are informed about the causes of psychological disorder and the impact of these conditions on people to understand, first, that mental illness is not a "fault" any more than is cancer. People do not choose to have a mental illness. Second, we must all work to help overcome the stigma associated with disorder. Organizations such as the National Alliance on Mental Illness (NAMI; n.d.)[2], for example, work to reduce the negative impact of stigma through education, community action, individual support, and other techniques.

Diagnosing Disorder: The *DSM*

Psychologists have developed criteria that help them determine whether behavior should be considered a psychological disorder and which of the many disorders particular behaviors indicate. These criteria are laid out in a 1,000-page manual known as the **Diagnostic and Statistical Manual of Mental Disorders (DSM)**, *a document that provides a common language and standard criteria for the classification of mental disorders* (American Psychiatric Association, 2000). The *DSM* is used by therapists, researchers, drug companies, health insurance companies, and policymakers in the United States to determine what services are appropriately provided for treating patients with given symptoms.

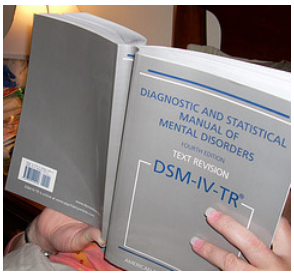


Figure **14.1.6**: The *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) is used to classify psychological disorders in the United States. Richard Masoner / Cyclelicious – Light bedtime reading – CC BY-SA 2.0.

The first edition of the *DSM* was published in 1952 on the basis of census data and psychiatric hospital statistics. Since then, the *DSM* has been revised five times. The last major revision was the fourth edition (*DSM-IV*), published in 1994, and an update of that document was produced in 2000 (*DSM-IV-TR*). The fifth edition (*DSM-5*) is the most recent edition and was published in 2013. The *DSM-IV-TR* was designed in conjunction with the World Health Organization's 10th version of the *International Classification of Diseases* (*ICD-10*), which is used as a guide for mental disorders in Europe and other parts of the world.

The *DSM* does not attempt to specify the exact symptoms that are required for a diagnosis. Rather, the *DSM* uses categories, and patients whose symptoms are similar to the description of the category are said to have that disorder. The *DSM* frequently uses qualifiers to indicate different levels of severity within a category. For instance, the disorder of mental retardation can be classified as mild, moderate, or severe.

Each revision of the *DSM* takes into consideration new knowledge as well as changes in cultural norms about disorder. Homosexuality, for example, was listed as a mental disorder in the *DSM* until 1973, when it was removed in response to advocacy by politically active gay rights groups and changing social norms. The current version of the *DSM* lists about 400 disorders.

Although the *DSM* has been criticized regarding the nature of its categorization system (and it is frequently revised to attempt to address these criticisms), for the fact that it tends to classify more behaviors as disorders with every revision (even "academic problems" are now listed as a potential psychological disorder), and for the fact that it is primarily focused on Western illness, it is nevertheless a comprehensive, practical, and necessary tool that provides a common language to describe disorder. Most U.S. insurance companies will not pay for therapy unless the patient has a *DSM* diagnosis. The *DSM* approach allows a systematic

assessment of the patient, taking into account the mental disorder in question, the patient's medical condition, psychological and cultural factors, and the way the patient functions in everyday life.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (2nd ed.). New York, NY: Guilford Press.

Boardman, J., Grove, B., Perkins, R., & Shepherd, G. (2003). Work and employment for people with psychiatric disabilities. *British Journal of Psychiatry, 182*(6), 467–468. doi:10.1192/bjp.182.6.467.

Braun, J., Kahn, R., Froehlich, T., Auinger, P., & Lanphear, B. (2006). Exposures to environmental toxicants and attention-deficit/hyperactivity disorder in U.S. children. *Environmental Health Perspectives*, *114*(12), 1904–1909.

Brothwell, D. (1981). *Digging up bones: The excavation, treatment, and study of human skeletal remains*. Ithaca, NY: Cornell University Press.

Burt, S. A., Krueger, R. F., McGue, M., & Iacono, W. G. (2001). Sources of covariation among attention-deficit/hyperactivity disorder, oppositional defiant disorder, and conduct disorder: The importance of shared environment. *Journal of Abnormal Psychology, 110*(4), 516–525.

Butcher, J., Mineka, S., & Hooley, J. (2007). *Abnormal psychology and modern life* (13th ed.). Boston, MA: Allyn & Bacon.

Engel, G. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129. doi:10.1126/science.847460

Francis, C., Pirkis, J., Dunt, D., & Blood, R. (2001). *Mental health and illness in the media: A review of the literature*. Canberra, Australia: Commonwealth Department of Health & Aged Care.

Freitag C. M. (2007). The genetics of autistic disorders and its clinical relevance: A review of the literature. *Molecular Psychiatry, 12*(1), 2–22.

Gejman, P., Sanders, A., & Duan, J. (2010). The role of genetics in the etiology of schizophrenia. *Psychiatric Clinics of North America, 33*(1), 35–66. doi:10.1016/j.psc.2009.12.003

Hayward, P., & Bright, J. (1997). Stigma and mental illness: A review and critique. *Journal of Mental Health, 6*(4), 345–354.

Hunt, C., Slade, T., & Andrews, G. (2004). Generalized anxiety disorder and major depressive disorder comorbidity in the National Survey of Mental Health and Well Being. *Depression and Anxiety, 20*, 23–31.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 617–627.

Kogan, M., Blumberg, S., Schieve, L., Boyle, C., Perrin, J., Ghandour, R.,…van Dyck, P. (2009). Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics*, *124*(5), 1395–1403. doi:10.1542/peds.2009-1522

Leff, J., & Warner, R. (2006). *Social inclusion of people with mental illness*. New York, NY: Cambridge University Press.

Linnet K., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen T., Rodriguez, A.,…Jarvelin, M. (2003). Maternal lifestyle factors in pregnancy risk of attention-deficit/hyperactivity disorder and associated behaviors: Review of the current evidence. *American Journal of Psychiatry, 160*(6), 1028–1040.

McCann, D., Barrett, A., Cooper, A., Crumpler, D., Dalen, L., Grimshaw, K.,…Stevenson, J. (2007). Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: A randomised, double-blinded, placebo-controlled

trial. *Lancet*, *370*(9598), 1560–1567.

Moldin, S. O. (2003). Editorial: Neurobiology of autism: The new frontier. *Genes, Brain & Behavior*, *2*(5), 253–254.

Olfson, M., Gameroff, M., Marcus, S., & Jensen, P. (2003). National trends in the treatment of attention deficit hyperactivity disorder. *American Journal of Psychiatry*, *160*, 1071–1077.

Ozawa, A., & Yaeda, J. (2007). Employer attitudes toward employing persons with psychiatric disability in Japan. *Journal of Vocational Rehabilitation*, *26*(2), 105–113.

Pulido, F., Diaz, M., & Ramírez, M. (2004). Work integration of people with severe mental disorder: A pending question. *Revista Psiquis*, *25*(6), 26–43.

Sawa, A., & Snyder, S. (2002). Schizophrenia: Diverse approaches to a complex disease. *Science*, *296*(5568), 692–695. doi:10.1126/science.1070532.

Schefer, R. (2003, May 28). *Addressing stigma: Increasing public understanding of mental illness*. Presented to the Standing Senate Committee on Social Affairs, Science and Technology. Retrieved from http://www.camh.net/education/Resources_communities_organizations/addressing_stigma_senatepres03.pdf

Seidman, L., Valera, E., & Makris, N. (2005). Structural brain imaging of attention deficit/hyperactivity disorder. *Biological Psychiatry*, *57*, 1263–1272.

Walker, E., Kestler, L., Bollini, A., & Hochman, K. (2004). Schizophrenia: Etiology and course. *Annual Review of Psychology*, *55*, 401–430. doi:10.1146/annurev.psych.55.090902.141950

Weyandt, L. L., & DuPaul, G. (2006). ADHD in college students. *Journal of Attention Disorders*, *10*(1), 9–19.

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14.2: Anxiety and Dissociative Disorders- Fearing the World Around Us

Charles Stangor and Jennifer Walinga

Learning Objectives

- Outline and describe the different types of anxiety disorders.
- Outline and describe the different types of dissociative disorders.
- Explain the biological and environmental causes of anxiety and dissociative disorders.

Anxiety, *the nervousness or agitation that we sometimes experience, often about something that is going to happen*, is a natural part of life. We all feel anxious at times, maybe when we think about our upcoming visit to the dentist or the presentation we have to give to our class next week. Anxiety is an important and useful human emotion; it is associated with the activation of the sympathetic nervous system and the physiological and behavioural responses that help protect us from danger. But too much anxiety can be debilitating, and every year millions of people suffer from **anxiety disorders**, which are *psychological disturbances marked by irrational fears, often of everyday objects and situations* (Kessler, Chiu, Demler, & Walters, 2005).

Generalized Anxiety Disorder

Consider the following, in which Chase describes her feelings of a persistent and exaggerated sense of anxiety, even when there is little or nothing in her life to provoke it:

> For a few months now I've had a really bad feeling inside of me. The best way to describe it is like a really bad feeling of negative inevitability, like something really bad is impending, but I don't know what. It's like I'm on trial for murder or I'm just waiting to be sent down for something. I have it all of the time but it gets worse in waves that come from nowhere with no apparent triggers. I used to get it before going out for nights out with friends, and it kinda stopped me from doing it as I'd rather not go out and stress about the feeling, but now I have it all the time so it doesn't really make a difference anymore (Chase, 2010).

Chase is probably suffering from a **generalized anxiety disorder (GAD)**, *a psychological disorder diagnosed in situations in which a person has been excessively worrying about money, health, work, family life, or relationships* for at least six months, even though he or she knows that the concerns are exaggerated, and when the anxiety causes significant distress and dysfunction.

In addition to their feelings of anxiety, people who suffer from GAD may also experience a variety of physical symptoms, including irritability, sleep troubles, difficulty concentrating, muscle aches, trembling, perspiration, and hot flashes. The sufferer cannot deal with what is causing the anxiety, nor avoid it, because there is no clear cause for anxiety. In fact, the sufferer frequently knows, at least cognitively, that there is really nothing to worry about.

About 3% of the general population suffer from GAD, and about two-thirds are women (Kessler, Chiu, Demler, & Walters, 2005; Robins & Regier, 1991). Generalized anxiety disorder is most likely to develop between the ages of seven and 40 years, but its influence may in some cases lessen with age (Rubio & Lopez-Ibor, 2007).

Panic Disorder

> When I was about 30 I had my first panic attack. I was driving home, my three little girls were in their car seats in the back, and all of a sudden I couldn't breathe, I broke out into a sweat, and my heart began racing and literally beating against my ribs! I thought I was going to die. I pulled off the road and put my head on the wheel. I remember songs playing on the CD for about 15 minutes and my kids' voices singing along. I was sure I'd never see them again. And then, it passed. I slowly got back on the road and drove home. I had no idea what it was (Ceejay, 2006).

Ceejay is experiencing **panic disorder**, *a psychological disorder characterized by sudden attacks of anxiety and terror that have led to significant behavioural changes in the person's life*. Symptoms of a panic attack include shortness of breath, heart palpitations, trembling, dizziness, choking sensations, nausea, and an intense feeling of dread or impending doom. Panic attacks can often be mistaken for heart attacks or other serious physical illnesses, and they may lead the person experiencing them to go to a hospital emergency room. Panic attacks may last as little as one or as much as 20 minutes, but they often peak and subside within about 10 minutes.

Sufferers are often anxious because they fear that they will have another attack. They focus their attention on the thoughts and images of their fears, becoming excessively sensitive to cues that signal the possibility of threat (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). They may also become unsure of the source of their arousal, misattributing it to situations that are not actually the cause. As a result, they may begin to avoid places where attacks have occurred in the past, such as driving, using an elevator, or being in public places. In Canada, 12-month and lifetime prevalence rates for panic attacks are 1.6% and 3.7%, respectively (Health Canada, 2006).

Phobias

A **phobia** (from the Greek word *phobos*, which means fear) is *a specific fear of a certain object, situation, or activity*. The fear experience can range from a sense of unease to a full-blown panic attack. Most people learn to live with their phobias, but for others the fear can be so debilitating that they go to extremes to avoid the fearful situation. A sufferer of arachnophobia (fear of spiders), for example, may refuse to enter a room until it has been checked thoroughly for spiders, or may refuse to vacation in the countryside because spiders may be there. Phobias are characterized by their specificity and their irrationality. A person with acrophobia (a fear of height) could fearlessly sail around the world on a sailboat with no concerns yet refuse to go out onto the balcony on the fifth floor of a building.

A common phobia is **social phobia**, *extreme shyness around people or discomfort in social situations*. Social phobia may be specific to a certain event, such as speaking in public or using a public restroom, or it can be a more generalized anxiety toward almost all people outside of close family and friends. People with social phobia will often experience physical symptoms in public, such as sweating profusely, blushing, stuttering, nausea, and dizziness. They are convinced that everybody around them notices these symptoms as they are occurring. Women are somewhat more likely than men to suffer from social phobia.

The most incapacitating phobia is **agoraphobia**, defined as *anxiety about being in places or situations from which escape might be difficult or embarrassing, or in which help may not be available* (American Psychiatric Association, 2000). Typical places that provoke the panic attacks are parking lots; crowded streets or shops; and bridges, tunnels, or expressways. People (mostly women) who suffer from agoraphobia may have great difficulty leaving their homes and interacting with other people.

Phobias are one of the most common anxiety disorders, are among the most common psychiatric illnesses, and are about twice as prevalent in women as in men (Fredrikson, Annas, Fischer, & Wik, 1996; Kessler, Meron-Ruscio, Shear, & Wittchen, 2009). In most cases phobias first appear in childhood and adolescence, and usually persist into adulthood. Table 17.3, “The Most Common Phobias,” presents a list of the common phobias that are diagnosed by psychologists.

Table 17.3 The Most Common Phobias.

Name	Description
Acrophobia	Fear of heights
Agoraphobia	Fear of situations in which escape is difficult
Arachnophobia	Fear of spiders
Astraphobia	Fear of thunder and lightning
Claustrophobia	Fear of closed-in spaces
Cynophobia	Fear of dogs
Mysophobia	Fear of germs or dirt
Ophidiophobia	Fear of snakes
Pteromerhanophobia	Fear of flying
Social phobia	Fear of social situations
Trypanophobia	Fear of injections
Zoophobia	Fear of small animals

Obsessive-Compulsive Disorders

Although he is best known his perfect shots on the field, the British soccer star David Beckham (Figure 17.6, “David Beckham”) also suffers from obsessive-compulsive disorder (OCD). As he describes it, “I have got this obsessive-compulsive disorder where I have to have everything in a straight line or everything has to be in pairs. I’ll put my Pepsi cans in the fridge and if there’s one too many then I’ll put it in another cupboard somewhere. I’ve got that problem. I’ll go into a hotel room. Before I can relax, I have to move all the leaflets and all the books and put them in a drawer. Everything has to be perfect” (Dolan, 2006).

David Beckham’s experience with obsessive behaviour is not unusual. We all get a little obsessive at times. We may continuously replay a favourite song in our heads, worry about getting the right outfit for an upcoming party, or find ourselves analyzing a series of numbers that seem to have a certain pattern. And our everyday compulsions can be useful. Going back inside the house once more to be sure that we really did turn off the sink faucet or checking the mirror a couple of times to be sure that our hair is combed are not necessarily bad ideas.



Figure 17.6 David Beckham.

Obsessive-compulsive disorder (OCD) is *a psychological disorder that is diagnosed when an individual continuously experiences distressing or frightening thoughts, and engages in* **obsessions** *(repetitive thoughts) or* **compulsions** *(repetitive behaviours) in an attempt to calm these thoughts*. OCD is diagnosed when the obsessive thoughts are so disturbing and the compulsive behaviours are so time consuming that they cause distress and significant dysfunction in a person’s everyday life. Washing your hands once or even twice to make sure that they are clean is normal; washing them 20 times is not. Keeping your fridge neat is a good idea; spending hours a day on it is not. The sufferers know that these rituals are senseless, but they cannot bring themselves to stop them, in part because the relief that they feel after they perform them acts as a reinforcer, making the behaviour more likely to occur again.

Sufferers of OCD may avoid certain places that trigger the obsessive thoughts, or use alcohol or drugs to try to calm themselves down. OCD has a low prevalence rate (about 1% of the population in a given year) in relation to other anxiety disorders, and usually develops in adolescence or early adulthood (Horwath & Weissman, 2000; Samuels & Nestadt, 1997). The course of OCD varies from person to person. Symptoms can come and go, decrease, or worsen over time.

Post-traumatic Stress Disorder (PTSD)

People who have survived a terrible ordeal, such as combat, torture, sexual assault, imprisonment, abuse, natural disasters, or the death of someone close to them may develop *post-traumatic stress disorder (PTSD)*. The anxiety may begin months or even years after the event. People with **PTSD** experience *high levels of anxiety* along with *reexperiencing* the trauma (flashbacks), and a strong desire to *avoid any reminders of the event*. They may lose interest in things they used to enjoy; startle easily; have difficulty feeling affection; and may experience terror, rage, depression, or insomnia. The symptoms may be felt especially when approaching the area where the event took place or when the anniversary of that event is near.

PTSD has affected approximately 8% of the population (Kessler, Berglund, Jin, Demler, & Walters, 2005). PTSD is a frequent outcome of childhood or adult*sexual abuse*, a disorder that has its own*Diagnostic and Statistical Manual of Mental Disorders**DSM* diagnosis. Women are more likely to develop PTSD than men (Davidson, 2000).

Romeo Dallaire, seen in Figure 17.7 "Roméo Dallaire," who served as Canadian Lieutenant General and Force Commander of UNAMIR, the ill-fated United Nations peacekeeping force for Rwanda in 1993 and 1994, attempted to stop the genocide that was being waged by Hutu extremists against Tutsis and Hutu moderates. Dallaire has worked to bring understanding of post-traumatic stress disorder to the general public. He was a visiting lecturer at several Canadian and American universities and a Fellow of the Carr Center for Human Rights Policy, Kennedy School of Government at Harvard University. He has also pursued research on conflict resolution and the use of child soldiers and written several articles and chapters in publications on conflict resolution, humanitarian assistance, and human rights. Recently he wrote a book about the use of child soldiers, *They Fight Like Soldiers, They Die Like Children*.



Figure 17.7 Roméo Dallaire.

Risk factors for PTSD include the degree of the trauma's severity, the lack of family and community support, and additional life stressors (Brewin, Andrews, & Valentine, 2000). Many people with PTSD also suffer from another mental disorder, particularly depression, other anxiety disorders, and substance abuse (Brady, Back, & Coffey, 2004).

Dissociative Disorders: Losing the Self to Avoid Anxiety

In 1985, Michelle Philpots of England suffered a head injury in a motorcycle accident. Five years later, she reinjured her head in a serious car accident. These injuries did enough cumulative damage to Philpots's brain that she eventually started having seizures and was diagnosed with epilepsy. By 1994, she was suffering from anterograde amnesia and had completely lost the ability to create new memories, as all of her memories are wiped clean after she goes to sleep. Upon waking, she believes that it is still 1994. Even though Philpots was in a relationship with her husband long before she suffered amnesia, they did not actually get married until 1997. As a result, Philpots's husband has to show her their wedding pictures every morning in order to remind her that they're married. A popular movie, *50 First Dates*, is loosely based on Philpots's story.

People who experience anxiety are haunted by their memories and experiences, and although they desperately wish to get past them, they normally cannot. In some cases, however, such as with Michelle Philpots, people who become overwhelmed by stress experience an altered state of consciousness in which they become detached from the reality of what is happening to them. A **dissociative disorder** is *a condition that involves disruptions or breakdowns of memory, awareness, and identity*. The dissociation is used as a defence against the trauma.

Dissociative Amnesia and Fugue

Dissociative amnesia is *a psychological disorder that involves extensive, but selective, memory loss, but in which there is no physiological explanation for the forgetting* (van der Hart & Nijenhuis, 2009). The amnesia is normally brought on by a trauma — a situation that causes such painful anxiety that the individual "forgets" in order to escape. These kinds of trauma include disasters, accidents, physical abuse, rape, and other forms of severe stress (Cloninger & Dokucu, 2008). Although the personality of people who experience dissociative amnesia remains fundamentally unchanged — and they recall how to carry out daily tasks such as reading, writing, and problem solving — they tend to forget things about their personal lives — for instance, their name, age, and occupation — and may fail to recognize family and friends (van der Hart & Nijenhuis, 2009).

A related disorder, **dissociative fugue**, is *a psychological disorder in which an individual loses complete memory of his or her identity and may even assume a new one, often far from home*. The individual with dissociative fugue experiences all the symptoms of dissociative amnesia but also leaves the situation entirely. The fugue state may last for just a matter of hours or may continue for months. Recovery from the fugue state tends to be rapid, but when people recover they commonly have no memory of the stressful event that triggered the fugue or of events that occurred during their fugue state (Cardeña & Gleaves, 2007).

Dissociative Identity Disorder

You may remember the story of Sybil (a pseudonym for Shirley Ardell Mason, who was born in 1923), a person who, over a period of 40 years, claimed to possess 16 distinct personalities (Figure 17.8, "Sybil"). Mason was in therapy for many years trying to integrate these personalities into one complete self. A TV movie about Mason's life, starring Sally Field as Sybil, appeared in 1976.



Figure 17.8 Sybil (Shirley Ardell Mason).

Sybil suffered from the most severe of the dissociative disorders, *dissociative identity disorder*. **Dissociative identity disorder** is *a psychological disorder in which two or more distinct and individual personalities exist in the same person, and there is an extreme memory disruption regarding personal information about the other personalities* (van der Hart & Nijenhuis, 2009). Dissociative identity disorder was once known as *multiple personality disorder*, and this label is still sometimes used. This disorder is sometimes mistakenly referred to as schizophrenia.

In some cases of dissociative identity disorder, there can be more than 10 different personalities in one individual. Switches from one personality to another tend to occur suddenly, often triggered by a stressful situation (Gillig, 2009). The **host personality** is the *personality in control of the body most of the time*, and the *alter personalities* tend to differ from each other in terms of age, race, gender, language, manners, and even sexual orientation (Kluft, 1996). A shy, introverted individual may develop a boisterous, extroverted alter personality. Each personality has unique memories and social relationships (Dawson, 1990). Women are more frequently diagnosed with dissociative identity disorder than are men, and when they are diagnosed also tend to have more "personalities" (American Psychiatric Association, 2000).

The dissociative disorders are relatively rare conditions and are most frequently observed in adolescents and young adults. In part because they are so unusual and difficult to diagnose, clinicians and researchers disagree about the legitimacy of the disorders, and particularly about dissociative identity disorder. Some clinicians argue that the descriptions in the *DSM* accurately reflect the symptoms of these patients, whereas others believe that patients are faking, role-playing, or using the disorder as a way to justify behaviour (Barry-Walsh, 2005; Kihlstrom, 2004; Lilienfeld & Lynn, 2003; Lipsanen et al., 2004). Even the diagnosis of Shirley

Ardell Mason (Sybil) is disputed. Some experts claim that Mason was highly hypnotizable and that her therapist unintentionally suggested the existence of her multiple personalities (Miller & Kantrowitz, 1999).

Explaining Anxiety and Dissociation Disorders

Both nature and nurture contribute to the development of anxiety disorders. In terms of our evolutionary experiences, humans have evolved to fear dangerous situations. Those of us who had a healthy fear of the dark, of storms, of high places, of closed spaces, and of spiders and snakes were more likely to survive and have descendants. Our evolutionary experience can account for some modern fears as well. A fear of elevators may be a modern version of our fear of closed spaces, while a fear of flying may be related to a fear of heights.

Also supporting the role of biology, anxiety disorders, including PTSD, are heritable (Hettema, Neale, & Kendler, 2001), and molecular genetics studies have found a variety of genes that are important in the expression of such disorders (Smoller et al., 2008; Thoeringer et al., 2009). Neuroimaging studies have found that anxiety disorders are linked to areas of the brain that are associated with emotion, blood pressure and heart rate, decision making, and action monitoring (Brown & McNiff, 2009; Damsa, Kosel, & Moussally, 2009). People who experience PTSD also have a somewhat smaller hippocampus in comparison with those who do not, and this difference leads them to have a very strong sensitivity to traumatic events (Gilbertson et al., 2002).

Whether the genetic predisposition to anxiety becomes expressed as a disorder depends on environmental factors. People who were abused in childhood are more likely to be anxious than those who had normal childhoods, even with the same genetic disposition to anxiety sensitivity (Stein, Schork, & Gelernter, 2008). And the most severe anxiety and dissociative disorders, such as PTSD, are usually triggered by the experience of a major stressful event. One problem is that modern life creates a lot of anxiety. Although our life expectancy and quality of life have improved over the past 50 years, the same period has also created a sharp increase in anxiety levels (Twenge, 2006). These changes suggest that most anxiety disorders stem from perceived, rather than actual, threats to our well-being.

Anxieties are also learned through classical and operant conditioning. Just as rats that are shocked in their cages develop a chronic anxiety toward their laboratory environment (which has become a conditioned stimulus for fear), rape victims may feel anxiety when passing by the scene of the crime, and victims of PTSD may react to memories or reminders of the stressful event. Classical conditioning may also be accompanied by *stimulus generalization*. A single dog bite can lead to generalized fear of all dogs; a panic attack that follows an embarrassing moment in one place may be generalized to a fear of all public places. People's responses to their anxieties are often reinforced. Behaviours become compulsive because they provide relief from the torment of anxious thoughts. Similarly, leaving or avoiding fear-inducing stimuli leads to feelings of calmness or relief, which reinforces phobic behaviour.

In contrast to the anxiety disorders, the causes of the dissociative orders are less clear, which is part of the reason that there is disagreement about their existence. Unlike most psychological orders, there is little evidence of a genetic predisposition; they seem to be almost entirely environmentally determined. Severe emotional trauma during childhood, such as physical or sexual abuse, coupled with a strong stressor, is typically cited as the underlying cause (Alpher, 1992; Cardeña & Gleaves, 2007). Kihlstrom, Glisky, and Angiulo (1994) suggest that people with personalities that lead them to fantasize and become intensely absorbed in their own personal experiences are more susceptible to developing dissociative disorders under stress. Dissociative disorders can in many cases be successfully treated, usually by psychotherapy (Lilienfeld & Lynn, 2003).

Key Takeaways

- Anxiety is a natural part of life, but too much anxiety can be debilitating. Every year millions of people suffer from anxiety disorders.
- People who suffer from generalized anxiety disorder experience anxiety, as well as a variety of physical symptoms.
- Panic disorder involves the experience of panic attacks, including shortness of breath, heart palpitations, trembling, and dizziness.
- Phobias are specific fears of a certain object, situation, or activity. Phobias are characterized by their specificity and their irrationality.
- A common phobia is social phobia — extreme shyness around people or discomfort in social situations.

- Obsessive-compulsive disorder is diagnosed when a person's repetitive thoughts are so disturbing and his or her compulsive behaviours so time consuming that they cause distress and significant disruption in a person's everyday life.
- People who have survived a terrible ordeal, such as combat, torture, rape, imprisonment, abuse, natural disasters, or the death of someone close to them, may develop PTSD.
- Dissociative disorders, including dissociative amnesia and dissociative fugue, are conditions that involve disruptions or breakdowns of memory, awareness, and identity. The dissociation is used as a defence against the trauma.
- Dissociative identity disorder, in which two or more distinct and individual personalities exist in the same person, is relatively rare and difficult to diagnose.
- Both nature and nurture contribute to the development of anxiety disorders.

Exercises and Critical Thinking

1. Under what situations do you experience anxiety? Are these experiences rational or irrational? Does the anxiety keep you from doing some things that you would like to be able to do?
2. Do you or people you know suffer from phobias? If so, what are the phobias and how do you think the phobias began? Do they seem more genetic or more environmental in origin?

Image Attributions

Figure 17.6: Photo courtesy of Raj Patel, http://commons.wikimedia.org/wiki/Fi...xy_cropped.jpg

Figure 17.7: Roméo Dallaire by gdcgraphics (http://commons.wikimedia.org/wiki/Fi...aire07TIFF.jpg) used under CC BY 2.0 (http://creativecommons.org/licenses/by/2.0/deed.en).

Figure 17.8: http://en.wikipedia.org/wiki/File:Sh...dell_Mason.jpg.

References

Alpher, V. S. (1992). Introject and identity: Structural-interpersonal analysis and psychological assessment of multiple personality disorder. *Journal of Personality Assessment. 58*(2), 347–367.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Barry-Walsh, J. (2005). Dissociative identity disorder. *Australian and New Zealand Journal of Psychiatry, 39*, 109–110.

Brady, K. T., Back, S. E., & Coffey, S. F. (2004). Substance abuse and posttraumatic stress disorder. *Current Directions in Psychological Science, 13*(5), 206–209.

Brewin, C., Andrews, B., & Valentine, J. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*(5), 748–766.

Brown, T., & McNiff, J. (2009). Specificity of autonomic arousal to *DSM-IV* panic disorder and posttraumatic stress disorder. *Behaviour Research and Therapy, 47*(6), 487–493.

Cardeña, E., & Gleaves, D. (2007). Dissociative disorders. In M. M. Hersen, S. M. Turner, & D. C. Beidel (Eds.), *Adult psychological disorder and diagnosis* (5th ed., pp. 473–503). Hoboken, NJ: John Wiley & Sons.

Ceejay. (2006, September). *My dance with panic* [Web log post]. Panic Survivor. Retrieved from http://www.panicsurvivor.com/index.p...ith-Panic.html

Chase. (2010, February 28). Re: "anxiety?" [Online forum comment]. Mental Health Forum. Retrieved from http://www.mentalhealthforum.net/for...ead.php?t=9359

Cloninger, C., & Dokucu, M. (2008). Somatoform and dissociative disorders. In S. H. Fatemi & P. J. Clayton (Eds.), *The medical basis of psychiatry* (3rd ed., pp. 181–194). Totowa, NJ: Humana Press.

Damsa, C., Kosel, M., & Moussally, J. (2009). Current status of brain imaging in anxiety disorders. *Current Opinion in Psychiatry, 22*(1), 96–110.

Davidson, J. (2000). Trauma: The impact of post-traumatic stress disorder. *Journal of Psychopharmacology, 14*(2 Suppl 1), S5–S12.

Dawson, P. L. (1990). Understanding and cooperation among alter and host personalities. *American Journal of Occupational Therapy, 44*(11), 994–997.

Dolan, A. (2006, April 3). The obsessive disorder that haunts my life. *Daily Mail*. Retrieved from http://www.dailymail.co.uk/tvshowbiz...unts-life.html

Fredrikson, M., Annas, P., Fischer, H., & Wik, G. (1996). Gender and age differences in the prevalence of specific fears and phobias. *Behaviour Research and Therapy, 34*(1), 33–39.

Gilbertson, M. W., Shenton, M. E., Ciszewski, A., Kasai, K., Lasko, N. B., Orr, S. P.,…Pitman, R. K. (2002). Smaller hippocampal volume predicts pathologic vulnerability to psychological trauma. *Nature Neuroscience, 5*(11), 1242.

Gillig, P. M. (2009). Dissociative identity disorder: A controversial diagnosis. *Psychiatry, 6*(3), 24–29.

Gould, M. (2007, October 10). You can teach a man to kill but not to see dying. *The Guardian*. Retrieved from http://www.guardian.co.uk/society/20...nt.socialcare2

Health Canada. (2006). *It's your health: Mental health – anxiety disorders.* Retrieved July 2014 from http://www.hc-sc.gc.ca/hl-vs/iyh-vsv...nxieux-eng.php

Hettema, J. M., Neale, M. C., & Kendler, K. S. (2001). A review and meta-analysis of the genetic epidemiology of anxiety disorders. *The American Journal of Psychiatry, 158*(10), 1568–1578.

Horwath, E., & Weissman, M. (2000). The epidemiology and cross-national presentation of obsessive-compulsive disorder. *Psychiatric Clinics of North America, 23*(3), 493–507.

Kessler, R. C. , Berglund P., Demler O., Jin R, & Walters E. E. (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Archives of General Psychiatry, *62*(6):593-602.

Kessler, R., Chiu, W., Demler, O., & Walters, E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 617–627.

Kessler, R., Meron-Ruscio, A., Shear, K., & Wittchen, H. (2009). Epidemiology of anxiety disorders. In M. Anthony, & M. Stein (Eds). *Oxford handbook of anxiety and related disorders*. New York, NY: Oxford University Press.

Kihlstrom, J. F., Glisky, M. L., & Angiulo, M. J. (1994). Dissociative tendencies and dissociative disorders. *Journal of Abnormal Psychology, 103*, 117–124.

Kihlstrom, J. F. (2004). An unbalanced balancing act: Blocked, recovered, and false memories in the laboratory and clinic. *Clinical Psychology: Science and Practice, 11*(1), 34–41.

Kluft, R. P. (1996). The diagnosis and treatment of dissociative identity disorder. In *The Hatherleigh guide to psychiatric disorders* (1st ed., Vol. 1, pp. 49–96). New York, NY: Hatherleigh Press.

Lilienfeld, S. O., & Lynn, S. J. (2003). Dissociative identity disorder: Multiple personalities, multiple controversies. In S. O. Lilienfeld, S. J. Lynn, & J. M. Lohr (Eds.), *Science and pseudoscience in clinical psychology* (pp. 109–142). New York, NY: Guilford Press.

Lipsanen, T., Korkeila, J., Peltola, P., Jarvinen, J., Langen, K., & Lauerma, H. (2004). Dissociative disorders among psychiatric patients: Comparison with a nonclinical sample. *European Psychiatry, 19*(1), 53–55.

MacLeod, C., Rutherford, E., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: Assessing the causal basis of their association through the experimental manipulation of attentional bias. *Journal of Abnormal Psychology, 111*(1), 107–123.

Miller, M., & Kantrowitz, B. (1999, January 25). Unmasking Sybil: A reexamination of the most famous psychiatric patient in history. *Newsweek*, pp. 11–16.

Robins, L., & Regier, D. A. (1991). *Psychiatric disorders in America: The Epidemiologic Catchment Area Study*. New York, NY: Free Press.

Rubio, G., & Lopez-Ibor, J. (2007). Generalized anxiety disorder: A 40-year follow up study. *Acta Psychiatric Scandinavica, 115*, 372–379.

Samuels, J., & Nestadt, G. (1997). Epidemiology and genetics of obsessive-compulsive disorder. *International Review of Psychiatry, 9*, 61–71.

Smoller, J., Paulus, M., Fagerness, J., Purcell, S., Yamaki, L., Hirshfeld-Becker, D.,…Stein, M. (2008). Influence of RGS2 on anxiety-related temperament, personality, and brain function. *Archives of General Psychiatry, 65*(3), 298–308.

Stein, M., Schork, N., & Gelernter, J. (2008). Gene-by-environment (serotonin transporter and childhood maltreatment) interaction for anxiety sensitivity, an intermediate phenotype for anxiety disorders. *Neuropsychopharmacology, 33*(2), 312–319.

Thoeringer, C., Ripke, S., Unschuld, P., Lucae, S., Ising, M., Bettecken, T.,…Erhardt, A. (2009). The GABA transporter 1 (SLC6A1): A novel candidate gene for anxiety disorders. *Journal of Neural Transmission, 116*(6), 649–657.

Twenge, J. (2006). *Generation me*. New York, NY: Free Press.

van der Hart, O., & Nijenhuis, E. R. S. (2009). Dissociative disorders. In P. H. Blaney & T. M. Millon (Eds.), *Oxford textbook of psychological disorder* (2nd ed., pp. 452–481). New York, NY: Oxford University Press.

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14.3: Mood Disorders- Emotions as Illness

Charles Stangor and Jennifer Walinga

Learning Objectives

- Summarize and differentiate the various forms of mood disorders, in particular dysthymia, major depressive disorder, and bipolar disorder.
- Explain the genetic and environmental factors that increase the likelihood that a person will develop a mood disorder.

The everyday variations in our feelings of happiness and sadness reflect our **mood**, which can be defined as *the positive or negative feelings that are in the background of our everyday experiences*. In most cases we are in a relatively good mood, and this positive mood has some positive consequences — it encourages us to do what needs to be done and to make the most of the situations we are in (Isen, 2003). When we are in a good mood our thought processes open up, and we are more likely to approach others. We are more friendly and helpful to others when we are in a good mood than we are when we are in a bad mood, and we may think more creatively (De Dreu, Baas, & Nijstad, 2008). On the other hand, when we are in a bad mood we are more likely to prefer to be alone rather than interact with others, we focus on the negative things around us, and our creativity suffers.

It is not unusual to feel down or low at times, particularly after a painful event such as the death of someone close to us, a disappointment at work, or an argument with a partner. We often get depressed when we are tired, and many people report being particularly sad during the winter when the days are shorter. **Mood (or affective) disorders** are *psychological disorders in which the person's mood negatively influences his or her physical, perceptual, social, and cognitive processes*. People who suffer from mood disorders tend to experience more intense — and particularly more intense negative — moods. About 5% of the Canadian population suffers from a mood disorder in a given year (Health Canada, 2002).

The most common symptom of mood disorders is negative mood, also known as sadness or *depression (*Figure 17.9, "Depression"). Consider the feelings of this person, who was struggling with depression and was diagnosed with *major depressive disorder*:

> *I didn't want to face anyone; I didn't want to talk to anyone. I didn't really want to do anything for myself…I couldn't sit down for a minute really to do anything that took deep concentration…It was like I had big huge weights on my legs and I was trying to swim and just kept sinking. And I'd get a little bit of air, just enough to survive and then I'd go back down again. It was just constantly, constantly just fighting, fighting, fighting, fighting, fighting. (National Institute of Mental Health, 2010)*



Figure 17.9 Depression.

Mood disorders can occur at any age, and the median age of onset is 32 years (Kessler, Berglund, Demler, Jin, & Walters, 2005). Recurrence of depressive episodes is fairly common and is greatest for those who first experience depression before the age of 15 years. About twice as many women as men suffer from depression (Culbertson, 1997). This gender difference is consistent across many countries and cannot be explained entirely by the fact that women are more likely to seek treatment for their depression. Rates of depression have been increasing, although the reasons for this increase are not known (Kessler et al., 2003).

As you can see in the list below, the experience of depression has a variety of negative effects on our behaviours. In addition to the loss of interest, productivity, and social contact that accompanies depression, the person's sense of hopelessness and sadness may become so severe that he or she considers or even succeeds in committing suicide. In 2009 there were 3,890 suicides in Canada, a rate of 11.5 per 100,000 (Navaneelan, 2012). Almost all the people who commit suicide have a diagnosable psychiatric disorder at the time of their death (Statistics Canada, 2012; Sudak, 2005).

Behaviours Associated with Depression

- Changes in appetite; weight loss or gain
- Difficulty concentrating, remembering details, and making decisions
- Fatigue and decreased energy
- Feelings of hopelessness, helplessness, and pessimism
- Increased use of alcohol or drugs
- Irritability, restlessness
- Loss of interest in activities or hobbies once pleasurable, including sex
- Loss of interest in personal appearance
- Persistent aches or pains, headaches, cramps, or digestive problems that do not improve with treatment
- Sleep disorders, either trouble sleeping or excessive sleeping
- Thoughts of suicide or attempts at suicide

Dysthymia and Major Depressive Disorder

The level of depression observed in people with mood disorders varies widely. People who experience depression for many years, to the point that it becomes to seem normal and part of their everyday life, and who feel that they are rarely or never happy, will likely be diagnosed with a mood disorder. If the depression is mild but long-lasting, they will be diagnosed with **dysthymia**, *a condition characterized by mild, but chronic, depressive symptoms that last for at least two years*.

If the depression continues and becomes even more severe, the diagnosis may become that of *major depressive disorder*. **Major depressive disorder (clinical depression)** is *a mental disorder characterized by an all-encompassing low mood accompanied by low self-esteem and loss of interest or pleasure in normally enjoyable activities*. Those who suffer from major depressive disorder feel an intense sadness, despair, and loss of interest in pursuits that once gave them pleasure. These negative feelings profoundly limit the individual's day-to-day functioning and ability to maintain and develop interests in life (Fairchild & Scogin, 2008).

About 21 million American adults suffer from a major depressive disorder in any given year; this is approximately 7% of the American population. Major depressive disorder occurs about twice as often in women as it does in men (Kessler, Chiu, Demler, & Walters, 2005; Kessler et al., 2003). In some cases clinically depressed people lose contact with reality and may receive a diagnosis of *major depressive episode with psychotic features*. In these cases the depression includes delusions and hallucinations.

Bipolar Disorder

Juliana is a 21-year-old single woman. Over the past several years she had been treated by a psychologist for depression, but for the past few months she had been feeling a lot better. Juliana had landed a good job in a law office and found a steady boyfriend. She told her friends and parents that she had been feeling particularly good — her energy level was high and she was confident in herself and her life.

One day Juliana was feeling so good that she impulsively quit her new job and left town with her boyfriend on a road trip. But the trip didn't turn out well because Juliana became impulsive, impatient, and easily angered. Her euphoria continued, and in one of the

towns that they visited she left her boyfriend and went to a party with some strangers that she had met. She danced into the early morning and ended up having sex with several of the men.

Eventually Juliana returned home to ask for money, but when her parents found out about her recent behaviour and confronted her, she acted aggressively and abusively to them, so they referred her to a social worker. Juliana was hospitalized, where she was diagnosed with bipolar disorder.

While dysthymia and major depressive disorder are characterized by overwhelming negative moods, **bipolar disorder** is *a psychological disorder characterized by swings in mood from overly "high" to sad and hopeless, and back again, with periods of near-normal mood in between*. Bipolar disorder is diagnosed in cases such as Juliana's, where experiences with depression are followed by a more normal period and then a period of mania or euphoria in which the person feels particularly awake, alive, excited, and involved in everyday activities but is also impulsive, agitated, and distracted. Without treatment, it is likely that Juliana would cycle back into depression and then eventually into mania again, with the likelihood that she would harm herself or others in the process.

Based on his intense bursts of artistic productivity (in one two-month period in 1889 he produced 60 paintings), personal writings, and behaviour (including cutting off his own ear), it is commonly thought that Vincent van Gogh suffered from bipolar disorder. He committed suicide at age 37 (Thomas & Bracken, 2001). His painting, *Starry Night*, is shown in Figure 17.10.



Figure 17.10 Starry Night by Vincent van Gogh.

Bipolar disorder is an often chronic and lifelong condition that may begin in childhood. Although the normal pattern involves swings from high to low, in some cases the person may experience both highs and lows at the same time. Determining whether a person has bipolar disorder is difficult due to the frequent presence of comorbidity with both depression and anxiety disorders. Bipolar disorder is more likely to be diagnosed when it is initially observed at an early age, when the frequency of depressive episodes is high, and when there is a sudden onset of the symptoms (Bowden, 2001).

Explaining Mood Disorders

Mood disorders are known to be at least in part genetic, because they are heritable (Berrettini, 2006; Merikangas et al., 2002). Neurotransmitters also play an important role in mood disorders. Serotonin, dopamine, and norepinephrine are all known to influence mood (Sher & Mann, 2003), and drugs that influence the actions of these chemicals are often used to treat mood disorders.

The brains of those with mood disorders may in some cases show structural differences from those without them. Videbech and Ravnkilde (2004) found that the hippocampus was smaller in depressed subjects than in normal subjects, and this may be the result of reduced *neurogenesis* (the process of generating new neurons) in depressed people (Warner-Schmidt & Duman, 2006). Antidepressant drugs may alleviate depression in part by increasing neurogenesis (Duman & Monteggia, 2006).

Avshalom Caspi and his colleagues (Caspi et al., 2003) used a longitudinal study to test whether genetic predispositions might lead some people, but not others, to suffer from depression as a result of environmental stress. Their research focused on a particular gene, the 5-HTT gene, which is known to be important in the production and use of the neurotransmitter *serotonin*. The researchers focused on this gene because serotonin is known to be important in depression, and because selective serotonin reuptake inhibitors (SSRIs) have been shown to be effective in treating depression.

People who experience stressful life events, for instance involving threat, loss, humiliation, or defeat, are likely to experience depression. But biological-situational models suggest that a person's sensitivity to stressful events depends on his or her genetic makeup. The researchers therefore expected that people with one type of genetic pattern would show depression following stress to a greater extent than people with a different type of genetic pattern.

The research included a sample of 1,037 adults from Dunedin, New Zealand. Genetic analysis on the basis of DNA samples allowed the researchers to divide the sample into two groups on the basis of the characteristics of their 5-HTT gene. One group had a short version (or *allele*) of the gene, whereas the other group did not have the short allele of the gene.

The participants also completed a measure where they indicated the number and severity of stressful life events that they had experienced over the past five years. The events included employment, financial, housing, health, and relationship stressors. The dependent measure in the study was the level of depression reported by the participant, as assessed using a structured interview test (Robins, Cottler, Bucholtz, & Compton, 1995).

As you can see in Figure 17.11 as the number of stressful experiences the participants reported increased from 0 to 4, depression also significantly increased for the participants with the short version of the gene (top panel). But for the participants who did not have a short allele, increasing stress did not increase depression (bottom panel). Furthermore, for the participants who experienced four stressors over the past five years, 33% of the participants who carried the short version of the gene became depressed, whereas only 17% of participants who did not have the short version did.

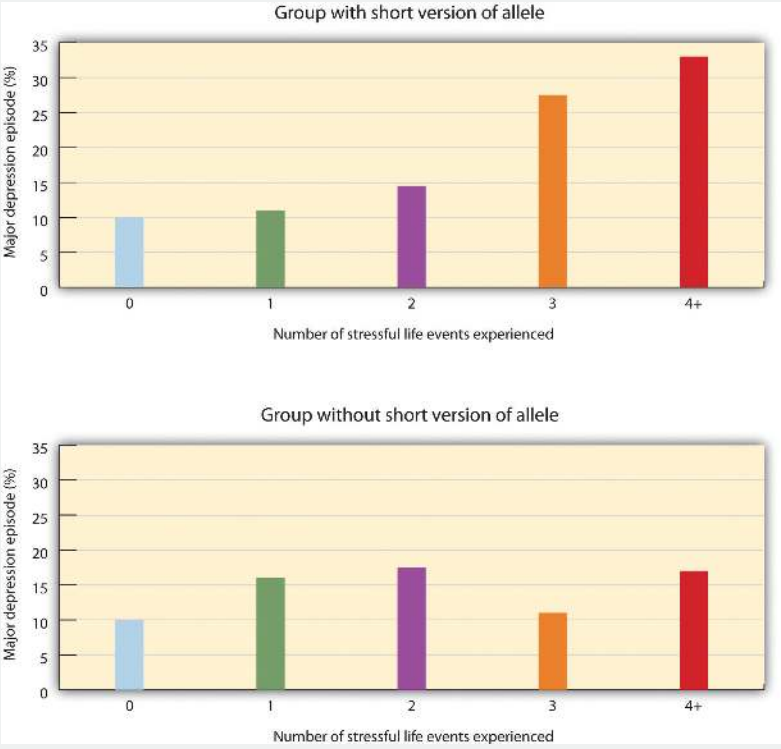


Figure 17.11 Research. [Long Description]

This important study provides an excellent example of how genes and environment work together: an individual's response to environmental stress was influenced by his or her genetic makeup.

But psychological and social determinants are also important in creating mood disorders and depression. In terms of psychological characteristics, mood states are influenced in large part by our cognitions. Negative thoughts about ourselves and our relationships to others create negative moods, and a goal of cognitive therapy for mood disorders is to attempt to change people's cognitions to be more positive. Negative moods also create negative behaviours toward others, such as acting sad, slouching, and avoiding others, which may lead those others to respond negatively to the person, for instance by isolating that person, which then creates even more depression (Figure 17.12, "Cycle of Depression"). You can see how it might become difficult for people to break out of this "cycle of depression."



Figure 17.12 Cycle of Depression. Negative thoughts cause negative emotions which may cause negative behaviours which may lead to negative responses from others which may cause more negative thoughts.

Weissman et al. (1996) found that rates of depression varied greatly among countries, with the highest rates in European and North American countries and the lowest rates in Asian countries. These differences seem to be due to discrepancies between individual feelings and cultural expectations about what one should feel. People from European and North American cultures report that it is important to experience emotions such as happiness and excitement, whereas the Chinese report that it is more important to be stable and calm. Because North Americans may feel that they are not happy or excited but that they are supposed to be, this may increase their depression (Tsai, Knutson, & Fung, 2006).

Key Takeaways

- Mood is the positive or negative feelings that are in the background of our everyday experiences.
- We all may get depressed in our daily lives, but people who suffer from mood disorders tend to experience more intense — and particularly more intense negative — moods.
- The most common symptom of mood disorders is negative mood.
- If a person experiences mild but long-lasting depression, he or she will be diagnosed with dysthymia. If the depression continues and becomes even more severe, the diagnosis may become that of major depressive disorder.
- Bipolar disorder is characterized by swings in mood from overly "high" to sad and hopeless, and back again, with periods of near-normal mood in between.
- Mood disorders are caused by the interplay among biological, psychological, and social variables.

Exercises and Critical Thinking

1. Give a specific example of the negative cognitions, behaviours, and responses of others that might contribute to a cycle of depression like that shown in Figure 17.12, "Cycle of Depression."

2. Given the discussion about the causes of negative moods and depression, what might people do to try to feel better on days that they are experiencing negative moods?

Image Attributions

Figure 17.9: "sad looking woman" by Bradley Gordon is licensed under CC BY 2.0 license (http://creativecommons.org/licenses/by/2.0/deed.en_CA)

Figure 17.11: Adapted from Caspi, A., et al., 2003.

References

Berrettini, W. (2006). Genetics of bipolar and unipolar disorders. In D. J. Stein, D. J. Kupfer, & A. F. Schatzberg (Eds.), *Textbook of mood disorders*. Washington, DC: American Psychiatric Publishing.

Bowden, C. L. (2001). Strategies to reduce misdiagnosis of bipolar depression. *Psychiatric Services*, *52*(1), 51–55.

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H.,…Poulton, R. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science*, *301*(5631), 386–389.

Culbertson, F. M. (1997). Depression and gender: An international review. *American Psychologist*, *52*, 25–31.

De Dreu, C. K. W., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood-creativity link: Toward a dual pathway to creativity model. *Journal of Personality and Social Psychology*, *94*(5), 739–756.

Duman, R. S., & Monteggia, L. M. (2006). A neurotrophic model for stress-related mood disorders. *Biological Psychiatry*, *59*, 1116–1127.

Fairchild, K., & Scogin, F. (2008). Assessment and treatment of depression. In K. Laidlow & B. Knight (Eds.), *Handbook of emotional disorders in later life: Assessment and treatment*. New York, NY: Oxford University Press.

Health Canada. (2002). *A Report on Mental Illnesses in Canada*. Ottawa, Canada. Retrieved July 2014 from http://www.phac-aspc.gc.ca/publicat/...chap_2-eng.php

Isen, A. M. (2003). Positive affect as a source of human strength. In J. Aspinall, *A psychology of human strengths: Fundamental questions and future directions for a positive psychology* (pp. 179–195). Washington, DC: American Psychological Association.

Kessler, R. C., Berglund, P. A., Demler, O., Jin, R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of *DSM-IV* disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*, *62*(6), 593–602.

Kessler, R. C., Berglund, P., Demler, O, Jin, R., Koretz, D., Merikangas, K. R.,…Wang, P. S. (2003). The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association*, *289*(23), 3095–3105.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 617–27.

Merikangas, K., Chakravarti, A., Moldin, S., Araj, H., Blangero, J., Burmeister, M,…Takahashi, A. S. (2002). Future of genetics of mood disorders research. *Biological Psychiatry*, *52*(6), 457–477.

National Institute of Mental Health. (2010, April 8). People with depression discuss their illness. Retrieved from http://www.nimh.nih.gov/media/video/...pression.shtml

Navaneelan, T. (2012). *Health at a Glance: Suicide rates: an overview*. Statistics Canada. Retrieved 2014 from http://www.statcan.gc.ca/pub/82-624-.../11696-eng.htm

Robins, L. N., Cottler, L., Bucholtz, K., & Compton, W. (1995). *Diagnostic interview schedule for DSM-1V*. St. Louis, MO: Washington University.

Sher, L., & Mann, J. J. (2003). Psychiatric pathophysiology: Mood disorders. In A. Tasman, J. Kay, & J. A. Lieberman (Eds.), *Psychiatry*. New York, NY: John Wiley & Sons.

Statistics Canada. (2012). Suicides and suicide rate by sex and age group. Retrieved July 2014 from http://www.statcan.gc.ca/tables-tabl...lth66a-eng.htm

Sudak, H. S. (2005). Suicide. In B. J. Sadock & V. A. Sadock (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry*. Philadelphia, PA: Lippincott Williams & Wilkins.

Thomas, P., & Bracken, P. (2001). Vincent's bandage: The art of selling a drug for bipolar disorder. *British Medical Journal*, 323, 1434.

Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology, 90*, 288–307.

Videbech, P., & Ravnkilde, B. (2004). Hippocampal volume and depression: A meta-analysis of MRI studies. *American Journal of Psychiatry, 161*, 1957–1966.

Warner-Schmidt, J. L., & Duman, R. S. (2006). Hippocampal neurogenesis: Opposing effects of stress and antidepressant treatment. *Hippocampus*, *16*, 239–249.

Weissman, M. M., Bland, R. C., Canino, G. J., Greenwald, S., Hwu, H-G., Joyce, P. R., Yeh, E-K. (1996). Cross-national epidemiology of major depression and bipolar disorder. *Journal of the American Medical Association*, *276*, 293–299.

Long Description

Figure 17.11 long description: Genetics and Causes of Depression

Number of stressful life events experienced	Major Depression Episode (%)	
	Group with short version of allele	Group without short version of allele
0	10%	10%
1	11%	16%
2	14%	18%
3	28%	11%
4 or more	33%	18%

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14.4: Schizophrenia- The Edge of Reality and Consciousness

Charles Stangor, Jennifer Walinga, and Jorden A. Cummings

Learning Objectives

- Categorize and describe the three major symptoms of schizophrenia.
- Differentiate the five types of schizophrenia and their characteristics.
- Identify the biological and social factors that increase the likelihood that a person will develop schizophrenia.

The term *schizophrenia*, which in Greek means split mind, was first used to describe a psychological disorder by Eugen Bleuler (1857-1939), a Swiss psychiatrist who was studying patients who had very severe thought disorders. **Schizophrenia** is *a serious psychological disorder marked by delusions, hallucinations, loss of contact with reality, inappropriate affect, disorganized speech, social withdrawal, and deterioration of adaptive behaviour* (Figure 17.13, “Schizophrenia”).



Figure 17.13 Schizophrenia. People with schizophrenia may exhibit disorganized behaviour, as this person does.

Schizophrenia is the most chronic and debilitating of all psychological disorders. It affects men and women equally, occurs in similar rates across ethnicities and across cultures, and affects at any one time approximately 350,000 people in Canada (Public Health Agency of Canada, 2012). Onset of schizophrenia is usually between the ages of 16 and 30 and rarely after the age of 45 or in children (Mueser & McGurk, 2004; Nicolson, Lenane, Hamburger, Fernandez, Bedwell, & Rapoport, 2000).

Symptoms of Schizophrenia

Schizophrenia is accompanied by a variety of symptoms, but not all patients have all of them (Lindenmayer & Khan, 2006). As you can see in Table 17.4, “Positive, Negative, and Cognitive Symptoms of Schizophrenia,” the symptoms are divided into *positive symptoms*, *negative symptoms*, and *cognitive symptoms* (American Psychiatric Association, 2008; National Institute of Mental Health, 2010). Positive symptoms refer to the presence of abnormal behaviours or experiences (such as hallucinations) that are not observed in normal people, whereas negative symptoms (such as lack of affect and an inability to socialize with others) refer to the loss or deterioration of thoughts and behaviours that are typical of normal functioning. Finally, cognitive symptoms are the changes in cognitive processes that accompany schizophrenia (Skrabalo, 2000). Because the patient has lost contact with reality, we say that he or she is experiencing **psychosis**, which is *a psychological condition characterized by a loss of contact with reality*.

Table 17.4 Positive, Negative, and Cognitive Symptoms of Schizophrenia.

Positive symptoms	Negative symptoms	Cognitive symptoms
Hallucinations	Social withdrawal	Poor executive control
Delusions (of grandeur or persecution)	Flat affect and lack of pleasure in everyday life	Trouble focusing
Derailment	Apathy and loss of motivation	Working memory problems
Grossly disorganized behaviour	Distorted sense of time	Poor problem-solving abilities
Inappropriate affect	Lack of goal-oriented activity	
Movement disorders	Limited speech	
	Poor hygiene and grooming	

People with schizophrenia almost always suffer from **hallucinations** — *imaginary sensations that occur in the absence of a real stimulus or which are gross distortions of a real stimulus*. Auditory hallucinations are the most common and are reported by approximately three-quarters of patients (Nicolson, Mayberg, Pennell, & Nemeroff, 2006). Schizophrenic patients frequently report hearing imaginary voices that curse them, comment on their behaviour, order them to do things, or warn them of danger (National Institute of Mental Health, 2009). Visual hallucinations are less common and frequently involve seeing God or the devil (De Sousa, 2007).

Schizophrenic people also commonly experience **delusions**, which are *false beliefs not commonly shared by others within one's culture, and maintained even though they are obviously out of touch with reality*. People with *delusions of grandeur* believe that they are important, famous, or powerful. They often become convinced that they are someone else, such as the president or God, or that they have some special talent or ability. Some claim to have been assigned to a special covert mission (Buchanan & Carpenter, 2005). People with *delusions of persecution* believe that a person or group seeks to harm them. They may think that people are able to read their minds and control their thoughts (Maher, 2001). If a person suffers from delusions of persecution, there is a good chance that he or she will become violent, and this violence is typically directed at family members (Buchanan & Carpenter, 2005).

People suffering from schizophrenia also often suffer from the positive symptom of **derailment** — *the shifting from one subject to another, without following any one line of thought to conclusion* — and may exhibit *grossly disorganized behaviour* including inappropriate sexual behaviour, peculiar appearance and dress, unusual agitation (e.g., shouting and swearing), strange body movements, and awkward facial expressions. It is also common for schizophrenia sufferers to experience *inappropriate affect*. For example, a patient may laugh uncontrollably when hearing sad news. Movement disorders typically appear as agitated movements, such as repeating a certain motion again and again, but can in some cases include *catatonia*, a state in which a person does not move and is unresponsive to others (Janno, Holi, Tuisku, & Wahlbeck, 2004; Rosebush & Mazurek, 2010).

Negative symptoms of schizophrenia include social withdrawal, poor hygiene and grooming, poor problem-solving abilities, and a distorted sense of time (Skrabalo, 2000). Patients often suffer from flat affect, which means that they express almost no emotional response (e.g., they speak in a monotone and have a blank facial expression) even though they may report feeling emotions (Kring, 1999). Another negative symptom is the tendency toward incoherent language, such as repeating the speech of others ("echo speech"). Some schizophrenics experience motor disturbances, ranging from complete catatonia and apparent obliviousness to their environment to random and frenzied motor activity during which they become hyperactive and incoherent (Kirkpatrick & Tek, 2005).

Not all schizophrenic patients exhibit negative symptoms, but those who do also tend to have the poorest outcomes (Fenton & McGlashan, 1994). Negative symptoms are predictors of deteriorated functioning in everyday life and often make it impossible for sufferers to work or to care for themselves.

Cognitive symptoms of schizophrenia are typically difficult for outsiders to recognize but make it extremely difficult for the sufferer to lead a normal life. These symptoms include *difficulty comprehending information and using it to make decisions* (the **lack of executive control**), difficulty maintaining focus and attention, and problems with working memory (the ability to use information immediately after it is learned).

Explaining Schizophrenia

There is no single cause of schizophrenia. Rather, a variety of biological and environmental risk factors interact in a complex way to increase the likelihood that someone might develop schizophrenia (Walker, Kestler, Bollini, & Hochman, 2004).

Studies in molecular genetics have not yet identified the particular genes responsible for schizophrenia, but it is evident from research using family, twin, and adoption studies that genetics are important (Walker & Tessner, 2008). As you can see in Figure 17.14 ,"Genetic Disposition to Develop Schizophrenia," the likelihood of developing schizophrenia increases dramatically if a close relative also has the disease.

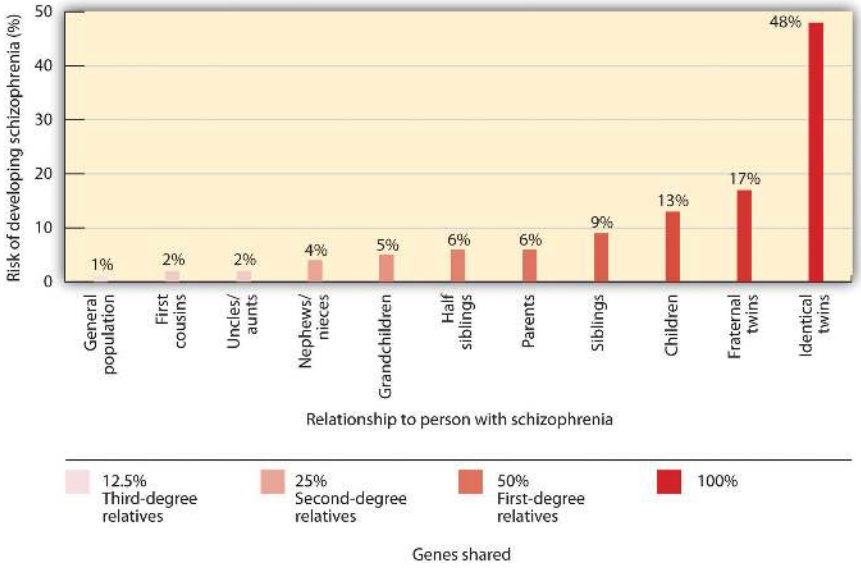


Figure 17.14 Genetic Disposition to Develop Schizophrenia. The risk of developing schizophrenia increases substantially if a person has a relative with the disease. [Long Description]

Neuroimaging studies have found some differences in brain structure between schizophrenic and normal patients. In some people with schizophrenia, the cerebral ventricles (fluid-filled spaces in the brain) are enlarged (Suddath, Christison, Torrey, Casanova, & Weinberger, 1990). People with schizophrenia also frequently show an overall loss of neurons in the cerebral cortex, and some show less activity in the frontal and temporal lobes, which are the areas of the brain involved in language, attention, and memory. This would explain the deterioration of functioning in language and thought processing that is commonly experienced by schizophrenic patients (Galderisi et al., 2008).

Many researchers believe that schizophrenia is caused in part by excess dopamine, and this theory is supported by the fact that most of the drugs useful in treating schizophrenia inhibit dopamine activity in the brain (Javitt & Laruelle, 2006). Levels of serotonin may also play a part (Inayama et al., 1996). But recent evidence suggests that the role of neurotransmitters in schizophrenia is more complicated than was once believed. It also remains unclear whether observed differences in the neurotransmitter systems of people with schizophrenia cause the disease, or if they are the result of the disease itself or its treatment (Csernansky & Grace, 1998).

A genetic predisposition to developing schizophrenia does not always develop into the actual disorder. Even if a person has an identical twin with schizophrenia, that person still has less than a 50% chance of developing it, and over 60% of all schizophrenic people have no first- or second-degree relatives with schizophrenia (Gottesman & Erlenmeyer-Kimling, 2001; Riley & Kendler, 2005). This suggests that there are important environmental causes as well.

One hypothesis is that schizophrenia is caused in part by disruptions to normal brain development in infancy that may be caused by poverty, malnutrition, and disease (Brown et al., 2004; Murray & Bramon, 2005; Susser et al., 1996; Waddington, Lane, Larkin, & O'Callaghan, 1999). Stress also increases the likelihood that a person will develop schizophrenic symptoms; onset and relapse of schizophrenia typically occur during periods of increased stress (Walker, Mittal, & Tessner, 2008). However, it may be that people

who develop schizophrenia are more vulnerable to stress than others and not necessarily that they experience more stress than others (Walker, Mittal, & Tessner, 2008). Many homeless people are likely to be suffering from undiagnosed schizophrenia.

Another social factor that has been found to be important in schizophrenia is the degree to which one or more of the patient's relatives is highly critical or highly emotional in their attitude toward the patient. Hooley and Hiller (1998) found that schizophrenic patients who ended a stay in a hospital and returned to a family with high expressed emotion were three times more likely to relapse than patients who returned to a family with low expressed emotion. It may be that the families with high expressed emotion are a source of stress to the patient.

Key Takeaways

- Schizophrenia is a serious psychological disorder marked by delusions, hallucinations, and loss of contact with reality.
- Schizophrenia is accompanied by a variety of symptoms, but not all patients have all of them.
- Because the schizophrenic patient has lost contact with reality, we say that he or she is experiencing psychosis.
- Positive symptoms of schizophrenia include hallucinations, delusions, derailment, disorganized behaviour, inappropriate affect, and catatonia.
- Negative symptoms of schizophrenia include social withdrawal, poor hygiene and grooming, poor problem-solving abilities, and a distorted sense of time.
- Cognitive symptoms of schizophrenia include difficulty comprehending and using information and problems maintaining focus.
- There is no single cause of schizophrenia. Rather, there are a variety of biological and environmental risk factors that interact in a complex way to increase the likelihood that someone might develop schizophrenia.

Image Attributions

Figure 17.13: by Max Avdeev, http://www.flickr.com/photos/avdeev/4203380988

Figure 17.14: Adapted from Gottesman, 1991.

References

American Psychiatric Association. (2008). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Brown, A. S., Begg, M. D., Gravenstein, S., Schaefer, C. S., Wyatt, R. J., Bresnahan, M.,…Susser, E. S. (2004). Serologic evidence of prenatal influenza in the etiology of schizophrenia. *Archives of General Psychiatry, 61*, 774–780.

Buchanan, R. W., & Carpenter, W. T. (2005). Concept of schizophrenia. In B. J. Sadock & V. A. Sadock (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry*. Philadelphia, PA: Lippincott Williams & Wilkins.

Csernansky, J. G., & Grace, A. A. (1998). New models of the pathophysiology of schizophrenia: Editors' introduction. *Schizophrenia Bulletin, 24*(2), 185–187.

De Sousa, A. (2007). Types and contents of hallucinations in schizophrenia. *Journal of Pakistan Psychiatric Society, 4*(1), 29.

Fenton, W. S., & McGlashan, T. H. (1994). Antecedents, symptom progression, and long-term outcome of the deficit syndrome in schizophrenia. *American Journal of Psychiatry, 151*, 351–356.

Galderisi, S., Quarantelli, M., Volper, U., Mucci, A., Cassano, G. B., Invernizzi, G.,…Maj, M. (2008). Patterns of structural MRI abnormalities in deficit and nondeficit schizophrenia. *Schizophrenia Bulletin, 34*, 393–401.

Gottesman, I. I. (1991). *Schizophrenia genesis: The origins of madness*. New York, NY: W. H. Freeman.

Gottesman, I. I., & Erlenmeyer-Kimling, L. (2001). Family and twin studies as a head start in defining prodomes and endophenotypes for hypothetical early interventions in schizophrenia. *Schizophrenia Research, 5*(1), 93–102.

Hooley, J. M., & Hiller, J. B. (1998). Expressed emotion and the pathogenesis of relapse in schizophrenia. In M. F. Lenzenweger & R. H. Dworkin (Eds.), *Origins and development of schizophrenia: Advances in experimental psychopathology* (pp. 447–468). Washington, DC: American Psychological Association.

Inayama, Y., Yoneda, H., Sakai, T., Ishida, T., Nonomura, Y., Kono, Y.,…Asaba, H. (1996). Positive association between a DNA sequence variant in the serotonin 2A receptor gene and schizophrenia. *American Journal of Medical Genetics*, *67*(1), 103–105.

Janno, S., Holi, M., Tuisku, K., & Wahlbeck, K. (2004). Prevalence of neuroleptic-induced movement disorders in chronic schizophrenia patients. *American Journal of Psychiatry, 161*, 160–163.

Javitt, D. C., & Laruelle, M. (2006). Neurochemical theories. In J. A. Lieberman, T. S. Stroup, & D. O. Perkins (Eds.), *Textbook of schizophrenia* (pp. 85–116). Washington, DC: American Psychiatric Publishing.

Kirkpatrick, B., & Tek, C. (2005). Schizophrenia: Clinical features and psychological disorder concepts. In B. J. Sadock & S. V. Sadock (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry* (pp. 1416–1435). Philadelphia, PA: Lippincott Williams & Wilkins.

Kring, A. M. (1999). Emotion in schizophrenia: Old mystery, new understanding. *Current Directions in Psychological Science*, *8*, 160–163.

Lindenmayer, J. P., & Khan, A. (2006). Psychological disorder. In J. A. Lieberman, T. S. Stroup, & D. O. Perkins (Eds.), *Textbook of schizophrenia* (pp. 187–222). Washington, DC: American Psychiatric Publishing.

Maher, B. A. (2001). Delusions. In P. B. Sutker & H. E. Adams (Eds.), *Comprehensive handbook of psychological disorder* (3rd ed., pp. 309–370). New York, NY: Kluwer Academic/Plenum.

Mueser, K. T., & McGurk, S. R. (2004). Schizophrenia. *Lancet*, *363*(9426), 2063–2072.

Murray, R. M., & Bramon, E. (2005). Developmental model of schizophrenia. In B. J. Sadock & V. A. Sadock (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry* (pp. 1381–1395). Philadelphia, PA: Lippincott Williams & Wilkins.

National Institute of Mental Health (2009, September 8). What are the symptoms of schizophrenia? Retrieved from http://www.nimh.nih.gov/health/publi...ophrenia.shtml

National Institute of Mental Health. (2010, April 26). What is schizophrenia? Retrieved from http://www.nimh.nih.gov/health/topic...ia/index.shtml

Nicolson, R., Lenane, M., Hamburger, S. D., Fernandez, T., Bedwell, J., & Rapoport, J. L. (2000). Lessons from childhood-onset schizophrenia. *Brain Research Review,* 31(2–3), 147–156.

Nicolson, S. E., Mayberg, H. S., Pennell, P. B., & Nemeroff, C. B. (2006). Persistent auditory hallucinations that are unresponsive to antipsychotic drugs. *The American Journal of Psychiatry, 163*, 1153–1159.

Public Health Agency of Canada. (2012). *A report on mental illnesses in Canada*. Retrieved May 2014 from http://www.phac-aspc.gc.ca/publicat/...ac/sum-eng.php

Riley, B. P., & Kendler, K. S. (2005). Schizophrenia: Genetics. In B. J. Sadock & V. A. Sadock (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry* (pp.1354–1370). Philadelphia, PA: Lippincott Williams & Wilkins.

Rosebush, P. I., & Mazurek, M. F. (2010). Catatonia and its treatment. *Schizophrenia Bulleting*, *36*(2), 239–242.

Skrabalo, A. (2000). Negative symptoms in schizophrenia(s): The conceptual basis. *Harvard Brain*, *7*, 7–10.

Suddath, R. L., Christison, G. W., Torrey, E. F., Casanova, M. F., & Weinberger, D. R. (1990). Anatomical abnormalities in the brains of monozygotic twins discordant for schizophrenia. *New England Journal of Medicine*, *322*(12), 789–794.

Susser, E. B., Neugebauer, R., Hock, H.W., Brown, A. S., Lin, S., Labowitz, D., & Gorman, J. M. (1996). Schizophrenia after prenatal famine: Further evidence. *Archives of general psychiatry, 53*, 25–31.

Waddington J. L., Lane, A., Larkin, C., & O'Callaghan, E. (1999). The neurodevelopmental basis of schizophrenia: Clinical clues from cerebro-craniofacial dysmorphogenesis, and the roots of a lifetime trajectory of disease. *Biological Psychiatry, 46*(1), 31–9.

Walker, E., & Tessner, K. (2008). Schizophrenia. *Perspectives on Psychological Science, 3*(1), 30–37.

Walker, E., Kesler, L., Bollini, A., & Hochman, K. (2004). Schizophrenia: Etiology and course. *Annual Review of Psychology, 55*, 401–430.

Walker, E., Mittal, V., & Tessner, K. (2008). Stress and the hypothalamic pituitary adrenal axis in the developmental course of schizophrenia. *Annual Review of Clinical Psychology, 4*, 189–216.

Long Descriptions

Figure 17.14 long description: Genetic disposition to develop schizophrenia

Genes shared	Relationship to person with schizophrenia	Risk of developing schizophrenia (%)
Third-degree relatives (12.5%)	First cousins	2%
	Uncles and aunts	2%
Second-degree relatives (25%)	Nephews and nieces	4%
	Grandchildren	5%
First-degree relatives (50%)	Half-siblings	6%
	Parents	6%
100%	Siblings	9%
	Children	13%
	Fraternal twins	17%
	Identical twins	48%

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14.5: Personality Disorders

Charles Stangor and Jennifer Walinga

Learning Objectives

- Categorize the different types of personality disorders and differentiate antisocial personality disorder from borderline personality disorder.
- Outline the biological and environmental factors that may contribute to a person developing a personality disorder.

To this point in the chapter we have considered the psychological disorders of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) categorization system. A **personality disorder** is *a disorder characterized by inflexible patterns of thinking, feeling, or relating to others that cause problems in personal, social, and work situations*. Personality disorders tend to emerge during late childhood or adolescence and usually continue throughout adulthood (Widiger, 2006). The disorders can be problematic for the people who have them, but they are less likely to bring people to a therapist for treatment.

The personality disorders are summarized in Table 17.5, “Descriptions of the Personality Disorders.” They are categorized into three types: those characterized by *odd or eccentric behaviour*, those characterized by *dramatic or erratic behaviour*, and those characterized by *anxious or inhibited* behaviour. As you consider the personality types described in Table 13.5, I’m sure you’ll think of people that you know who have each of these traits, at least to some degree. Probably you know someone who seems a bit suspicious and paranoid, who feels that other people are always “ganging up on him,” and who really do not trust other people very much. Perhaps you know someone who fits the bill of being overly dramatic — the “drama queen” who is always raising a stir and whose emotions seem to turn everything into a big deal. Or you might have a friend who is overly dependent on others and can’t seem to get a life of her own.

The personality traits that make up the personality disorders are common — we see them in the people with whom we interact every day — yet they may become problematic when they are rigid, overused, or interfere with everyday behaviour (Lynam & Widiger, 2001). What is perhaps common to all the disorders is the person’s inability to accurately understand and be sensitive to the motives and needs of the people around them.

Table 17.5 Descriptions of the Personality Disorders.

Cluster	Personality disorder	Characteristics
A. Odd/eccentric	Schizotypal	Peculiar or eccentric manners of speaking or dressing. Strange beliefs. “Magical thinking” such as belief in ESP or telepathy. Difficulty forming relationships. May react oddly in conversation, not respond, or talk to self. Speech elaborate or difficult to follow. (Possibly a mild form of schizophrenia.)
	Paranoid	Distrust in others, suspicion that people have sinister motives. Apt to challenge the loyalties of friends and read hostile intentions into others’ actions. Prone to anger and aggressive outbursts but otherwise emotionally cold. Often jealous, guarded, secretive, overly serious.
	Schizoid	Extreme introversion and withdrawal from relationships. Prefers to be alone, little interest in others. Humourless, distant, often absorbed with own thoughts and feelings, a daydreamer. Fearful of closeness, with poor social skills, often seen as a “loner.”
B. Dramatic/erratic	Antisocial	Impoverished moral sense or “conscience.” History of deception, crime, legal problems, impulsive and aggressive or violent behaviour. Little emotional empathy or remorse for hurting others. Manipulative, careless, callous. At high risk for substance abuse and alcoholism.
	Borderline	Unstable moods and intense, stormy personal relationships. Frequent mood changes and anger, unpredictable impulses. Self-mutilation or suicidal threats or gestures to get attention or manipulate others. Self-image fluctuation and a tendency to see others as “all good” or “all bad.”
	Histrionic	Constant attention seeking. Grandiose language, provocative dress, exaggerated illnesses, all to gain attention. Believes that everyone loves him. Emotional, lively, overly dramatic, enthusiastic, and excessively flirtatious.
	Narcissistic	Inflated sense of self-importance, absorbed by fantasies of self and success. Exaggerates own achievement, assumes others will recognize they are superior.

Cluster	Personality disorder	Characteristics
		Good first impressions but poor longer-term relationships. Exploitative of others.
C. Anxious/inhibited	Avoidant	Socially anxious and uncomfortable unless he or she is confident of being liked. In contrast with schizoid person, yearns for social contact. Fears criticism and worries about being embarrassed in front of others. Avoids social situations due to fear of rejection.
	Dependent	Submissive, dependent, requiring excessive approval, reassurance, and advice. Clings to people and fears losing them. Lacking self-confidence. Uncomfortable when alone. May be devastated by end of close relationship or suicidal if breakup is threatened.
	Obsessive-compulsive	Conscientious, orderly, perfectionist. Excessive need to do everything "right." Inflexibly high standards and caution can interfere with his or her productivity. Fear of errors can make this person strict and controlling. Poor expression of emotions. (Not the same as obsessive-compulsive disorder.)

Adapted from American Psychiatric Association, 2013.

The personality disorders create a bit of a problem for diagnosis. For one, it is frequently difficult for the clinician to accurately diagnose which of the many personality disorders a person has, although the friends and colleagues of the person can generally do a good job of it (Oltmanns & Turkheimer, 2006). And the personality disorders are highly comorbid; if a person has one, it's likely that he or she has others as well. Also, the number of people with personality disorders is estimated to be as high as 15% of the population (Grant et al., 2004), which might make us wonder if these are really disorders in any real sense of the word.

Although they are considered as separate disorders, the personality disorders are essentially milder versions of more severe disorders (Huang et al., 2009). For example, *obsessive-compulsive personality disorder* is a milder version of **obsessive-compulsive disorder (OCD)**, and *schizoid and schizotypal personality disorders* are characterized by symptoms similar to those of schizophrenia. This overlap in classification causes some confusion, and some theorists have argued that the personality disorders should be eliminated from the *DSM*. But clinicians normally differentiate Axis I and Axis II disorders, and thus the distinction is useful for them (Krueger, 2005; Phillips, Yen, & Gunderson, 2003; Verheul, 2005).

Although it is not possible to consider the characteristics of each of the personality disorders in this book, let's focus on two that have important implications for behaviour. The first, *borderline personality disorder (BPD)*, is important because it is so often associated with suicide, and the second, *antisocial personality disorder (APD)*, because it is the foundation of criminal behaviour. Borderline and antisocial personality disorders are also good examples to consider because they are so clearly differentiated in terms of their focus. BPD (more frequently found in women than men) is known as an *internalizing disorder* because the behaviours that it entails (e.g., suicide and self-mutilation) are mostly directed toward the self. APD (mostly found in men), on the other hand, is a type of *externalizing disorder* in which the problem behaviours (e.g., lying, fighting, vandalism, and other criminal activity) focus primarily on harm to others.

Borderline Personality Disorder

Borderline personality disorder (BPD) is *a psychological disorder characterized by a prolonged disturbance of personality accompanied by mood swings, unstable personal relationships, identity problems, threats of self-destructive behaviour, fears of abandonment, and impulsivity*. BPD is widely diagnosed — up to 20% of psychiatric patients are given the diagnosis, and it may occur in up to 2% of the general population (Hyman, 2002). About three-quarters of diagnosed cases of BDP are women.

People with BPD fear being abandoned by others. They often show a clinging dependency on the other person and engage in manipulation to try to maintain the relationship. They become angry if the other person limits the relationship, but also deny that they care about the person. As a defence against fear of abandonment, borderline people are compulsively social. But their behaviours, including their intense anger, demands, and suspiciousness, repel people.

People with BPD often deal with stress by engaging in self-destructive behaviours, for instance by being sexually promiscuous, getting into fights, binge eating and purging, engaging in self-mutilation or drug abuse, and threatening suicide. These behaviours are designed to call forth a "saving" response from the other person. People with BPD are a continuing burden for police, hospitals, and therapists. Borderline individuals also show disturbance in their concepts of identity: they are uncertain about self-image, gender identity, values, loyalties, and goals. They may have chronic feelings of emptiness or boredom and be unable to tolerate being alone.

BPD has both genetic and environmental roots. In terms of genetics, research has found that those with BPD frequently have neurotransmitter imbalances (Zweig-Frank et al., 2006), and the disorder is heritable (Minzenberg, Poole, & Vinogradov, 2008). In terms of environment, many theories about the causes of BPD focus on a disturbed early relationship between the child and his or her parents. Some theories focus on the development of attachment in early childhood, while others point to parents who fail to provide adequate attention to the child's feelings. Others focus on parental abuse (both sexual and physical) in adolescence, as well as on divorce, alcoholism, and other stressors (Lobbestael & Arntz, 2009). The dangers of BPD are greater when they are associated with childhood sexual abuse, early age of onset, substance abuse, and aggressive behaviours. The problems are amplified when the diagnosis is comorbid (as it often is) with other disorders, such as substance abuse disorder, major depressive disorder, and post-traumatic stress disorder (PTSD) (Skodol et al., 2002).

Research Focus: Affective and Cognitive Deficits in BPD

Posner et al. (2003) hypothesized that the difficulty that individuals with BPD have in regulating their lives (e.g., in developing meaningful relationships with other people) may be due to imbalances in the fast and slow emotional pathways in the brain. Specifically, they hypothesized that the fast emotional pathway through the amygdala is too active, and the slow cognitive-emotional pathway through the prefrontal cortex is not active enough in those with BPD.

The participants in their research were 16 patients with BPD and 14 healthy comparison participants. All participants were tested in a functional magnetic resonance imaging (fMRI) machine while they performed a task that required them to read emotional and nonemotional words, and then press a button as quickly as possible whenever a word appeared in a normal font and not press the button whenever the word appeared in an italicized font.

The researchers found that while all participants performed the task well, the patients with BPD had more errors than the controls (both in terms of pressing the button when they should not have and not pressing it when they should have). These errors primarily occurred on the negative emotional words.

Figure 17.15 shows the comparison of the level of brain activity in the emotional centres in the amygdala (left panel) and the prefrontal cortex (right panel). In comparison to the controls, the BPD patients showed relatively larger affective responses when they were attempting to quickly respond to the negative emotions, and showed less cognitive activity in the prefrontal cortex in the same conditions. This research suggests that excessive affective reactions and lessened cognitive reactions to emotional stimuli may contribute to the emotional and behavioural volatility of borderline patients.

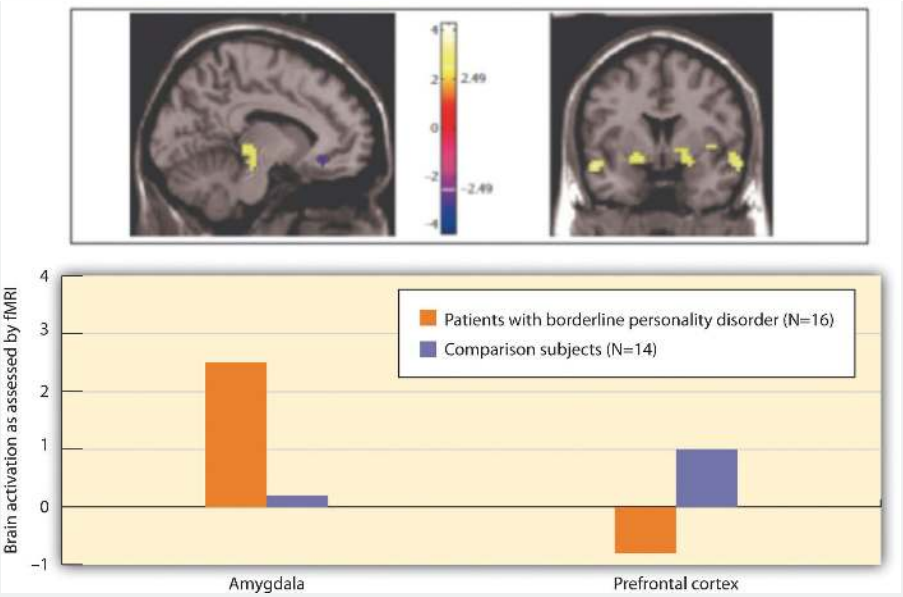


Figure 17.15 BPD Research. Individuals with BPD showed less cognitive and greater emotional brain activity in response to negative emotional words.

Antisocial Personality Disorder (APD)

In contrast to borderline personality disorder, which involves primarily feelings of inadequacy and a fear of abandonment, antisocial personality disorder (APD) is characterized by a disregard of the rights of others, and a tendency to violate those rights without being concerned about doing so. **APD** is *a pervasive pattern of violation of the rights of others that begins in childhood or early adolescence and continues into adulthood*. APD is about three times more likely to be diagnosed in men than in women. To be diagnosed with APD the person must be 18 years of age or older and have a documented history of conduct disorder before the age of 15. People having antisocial personality disorder are sometimes referred to as “sociopaths” or “psychopaths.”

People with APD feel little distress for the pain they cause others. They lie, engage in violence against animals and people, and frequently have drug and alcohol abuse problems. They are egocentric and frequently impulsive, for instance suddenly changing jobs or relationships. People with APD soon end up with a criminal record and often spend time incarcerated. The intensity of antisocial symptoms tends to peak during the 20s and then may decrease over time.

Biological and environmental factors are both implicated in the development of antisocial personality disorder (Rhee & Waldman, 2002). Twin and adoption studies suggest a genetic predisposition (Rhee & Waldman, 2002), and biological abnormalities include low autonomic activity during stress, biochemical imbalances, right hemisphere abnormalities, and reduced gray matter in the frontal lobes (Lyons-Ruth et al., 2007; Raine, Lencz, Bihrle, LaCasse, & Colletti, 2000). Environmental factors include neglectful and abusive parenting styles, such as the use of harsh and inconsistent discipline and inappropriate modelling (Huesmann & Kirwil, 2007).

Key Takeaways

- A personality disorder is a disorder characterized by inflexible patterns of thinking, feeling, or relating to others that causes problems in personal, social, and work situations.
- Personality disorders are categorized into three clusters, characterized by odd or eccentric behaviour, dramatic or erratic behaviour, and anxious or inhibited behaviour.
- Although they are considered as separate disorders, the personality disorders are essentially milder versions of more severe Axis I disorders.
- *Borderline personality disorder* is a prolonged disturbance of personality accompanied by mood swings, unstable personal relationships, and identity problems, and it is often associated with suicide.

- *Antisocial personality disorder* is characterized by a disregard of others' rights and a tendency to violate those rights without being concerned about doing so.

Exercises and Critical Thinking

1. What characteristics of men and women do you think make them more likely to have APD and BDP, respectively? Do these differences seem to you to be more genetic or more environmental?
2. Do you know people who suffer from antisocial personality disorder? What behaviours do they engage in, and why are these behaviours so harmful to them and others?

Image Attributions

Figure 17.15: Adapted from Posner et al., 2003.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC: Author.

Grant, B., Hasin, D., Stinson, F., Dawson, D., Chou, S., Ruan, W., & Pickering, R. P. (2004). Prevalence, correlates, and disability of personality disorders in the United States: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry, 65*(7), 948–958.

Huang, Y., Kotov, R., de Girolamo, G., Preti, A., Angermeyer, M., Benjet, C.,…Kessler, R. C. (2009). DSM-IV personality disorders in the WHO World Mental Health Surveys. *British Journal of Psychiatry, 195*(1), 46–53.

Huesmann, L. R., & Kirwil, L. (2007). Why observing violence increases the risk of violent behavior by the observer. In D. J. Flannery, A. T. Vazsonyi, & I. D. Waldman (Eds.), *The Cambridge handbook of violent behavior and aggression* (pp. 545–570). New York, NY: Cambridge University Press.

Hyman, S. E. (2002). A new beginning for research on borderline personality disorder. *Biological Psychiatry, 51*(12), 933–935.

Krueger, R. F. (2005). Continuity of Axes I and II: Towards a unified model of personality, personality disorders, and clinical disorders. *Journal of Personality Disorders, 19*, 233–261.

Lobbestael, J., & Arntz, A. (2009). Emotional, cognitive and physiological correlates of abuse-related stress in borderline and antisocial personality disorder. *Behaviour Research and Therapy, 48*(2), 116–124.

Lynam, D., & Widiger, T. (2001). Using the five-factor model to represent the *DSM-IV* personality disorders: An expert consensus approach. *Journal of Abnormal Psychology, 110*(3), 401–412.

Lyons-Ruth, K., Holmes, B. M., Sasvari-Szekely, M., Ronai, Z., Nemoda, Z., & Pauls, D. (2007). Serotonin transporter polymorphism and borderline or antisocial traits among low-income young adults. *Psychiatric Genetics, 17*, 339–343.

Minzenberg, M. J., Poole, J. H., & Vinogradov, S. (2008). A neurocognitive model of borderline personality disorder: Effects of childhood sexual abuse and relationship to adult social attachment disturbance. *Development and Psychological disorder. 20*(1), 341–368.

Oltmanns, T. F., & Turkheimer, E. (2006). Perceptions of self and others regarding pathological personality traits. In R. F. Krueger & J. L. Tackett (Eds.), *Personality and psychopathology* (pp. 71–111). New York, NY: Guilford Press.

Phillips, K. A., Yen, S., & Gunderson, J. G. (2003). Personality disorders. In R. E. Hales & S. C. Yudofsky (Eds.), *Textbook of clinical psychiatry*. Washington, DC: American Psychiatric Publishing.

Posner, M., Rothbart, M., Vizueta, N., Thomas, K., Levy, K., Fossella, J.,…Kernberg, O. (2003). An approach to the psychobiology of personality disorders. *Development and Psychopathology, 15*(4), 1093–1106.

Raine, A., Lencz, T., Bihrle, S., LaCasse, L., & Colletti, P. (2000). Reduced prefrontal gray matter volume and reduced autonomic activity in antisocial personality disorder. *Archive of General Psychiatry, 57*, 119–127.

Rhee, S. H., & Waldman, I. D. (2002). Genetic and environmental influences on anti-social behavior: A meta-analysis of twin and adoptions studies. *Psychological Bulletin, 128*(3), 490–529.

Skodol, A. E., Gunderson, J. G., Pfohl, B., Widiger, T. A., Livesley, W. J., & Siever, L. J. (2002). The borderline diagnosis I: Psychopathology, comorbidity, and personality structure. *Biological Psychiatry, 51*(12), 936–950.

Verheul, R. (2005). Clinical utility for dimensional models of personality pathology. *Journal of Personality Disorders, 19*, 283–302.

Widiger, T.A. (2006). Understanding personality disorders. In S. K. Huprich (Ed.), *Rorschach assessment to the personality disorders. The LEA series in personality and clinical psychology* (pp. 3–25). Mahwah, NJ: Lawrence Erlbaum Associates.

Zweig-Frank, H., Paris, J., Kin, N. M. N. Y., Schwartz, G., Steiger, H., & Nair, N. P. V. (2006). Childhood sexual abuse in relation to neurobiological challenge tests in patients with borderline personality disorder and normal controls. *Psychiatry Research, 141*(3), 337–341.

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CHAPTER OVERVIEW

15: Treating Psychological Disorders

In this Chapter, we turn to consider the treatment of these disorders through psychotherapy and drug therapy.

15.1: Reducing Disorder by Confronting It - Psychotherapy

15.2: Reducing Disorder Biologically- Drug and Brain Therapy

15.3: Evaluating Treatment and Prevention- What Works?

15.4: Reducing Disorder by Changing the Social Situation

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15.1: Reducing Disorder by Confronting It - Psychotherapy

Learning Objectives

1. Outline and differentiate the psychodynamic, humanistic, behavioral, and cognitive approaches to psychotherapy.
2. Explain the behavioral and cognitive aspects of cognitive-behavioral therapy and how CBT is used to reduce psychological disorders.

Treatment for psychological disorder begins when the individual who is experiencing distress visits a counselor or therapist, perhaps in a church, a community center, a hospital, or a private practice. The therapist will begin by systematically learning about the patient's needs through a formal **psychological assessment**, which is *an evaluation of the patient's psychological and mental health*. During the assessment the psychologist may give personality tests such as the Minnesota Multiphasic Personal Inventory (MMPI-2) or projective tests, and will conduct a thorough interview with the patient. The therapist may get more information from family members or school personnel.

In addition to the psychological assessment, the patient is usually seen by a physician to gain information about potential Axis III (physical) problems. In some cases of psychological disorder—and particularly for sexual problems—medical treatment is the preferred course of action. For instance, men who are experiencing erectile dysfunction disorder may need surgery to increase blood flow or local injections of muscle relaxants. Or they may be prescribed medications (Viagra, Cialis, or Levitra) that provide an increased blood supply to the penis, which are successful in increasing performance in about 70% of men who take them.

After the medical and psychological assessments are completed, the therapist will make a formal diagnosis using the detailed descriptions of the disorder provided in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*; see below). The therapist will summarize the information about the patient on each of the five *DSM* axes, and the diagnosis will likely be sent to an insurance company to justify payment for the treatment.

Criteria for Diagnosing Attention-Deficit/Hyperactivity Disorder (ADHD)

To be diagnosed with ADHD the individual must display either A or B below (American Psychiatric Association, 2000)[1]:

A. **Six or more of the following symptoms of inattention have been present for at least 6 months to a point that is disruptive and inappropriate for developmental level:**

- Often does not give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- Often has trouble keeping attention on tasks or play activities
- Often does not seem to listen when spoken to directly
- Often does not follow instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
- Often has trouble organizing activities
- Often avoids, dislikes, or doesn't want to do things that take a lot of mental effort for a long period of time (such as schoolwork or homework)
- Often loses things needed for tasks and activities (e.g., toys, school assignments, pencils, books, or tools)
- Is often easily distracted
- Is often forgetful in daily activities

B. **Six or more of the following symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for developmental level:**

- Often fidgets with hands or feet or squirms in seat
- Often gets up from seat when remaining in seat is expected
- Often runs about or climbs when and where it is not appropriate (adolescents or adults may feel very restless)
- Often has trouble playing or enjoying leisure activities quietly
- Is often "on the go" or often acts as if "driven by a motor"
- Often talks excessively

- Often blurts out answers before questions have been finished
- Often has trouble waiting one's turn
- Often interrupts or intrudes on others (e.g., butts into conversations or games)

If a diagnosis is made, the therapist will select a course of therapy that he or she feels will be most effective. One approach to treatment is **psychotherapy**, *the professional treatment for psychological disorder through techniques designed to encourage communication of conflicts and insight*. The fundamental aspect of psychotherapy is that the patient directly confronts the disorder and works with the therapist to help reduce it. Therapy includes assessing the patient's issues and problems, planning a course of treatment, setting goals for change, the treatment itself, and an evaluation of the patient's progress. Therapy is practiced by thousands of psychologists and other trained practitioners in the United States and around the world, and is responsible for billions of dollars of the health budget.

To many people therapy involves a patient lying on a couch with a therapist sitting behind and nodding sagely as the patient speaks. Though this approach to therapy (known as *psychoanalysis*) is still practiced, it is in the minority. It is estimated that there are over 400 different kinds of therapy practiced by people in many fields, and the most important of these are shown in Figure 15.1.2. The therapists who provide these treatments include psychiatrists (who have a medical degree and can prescribe drugs) and clinical psychologists, as well as social workers, psychiatric nurses, and couples, marriage, and family therapists.

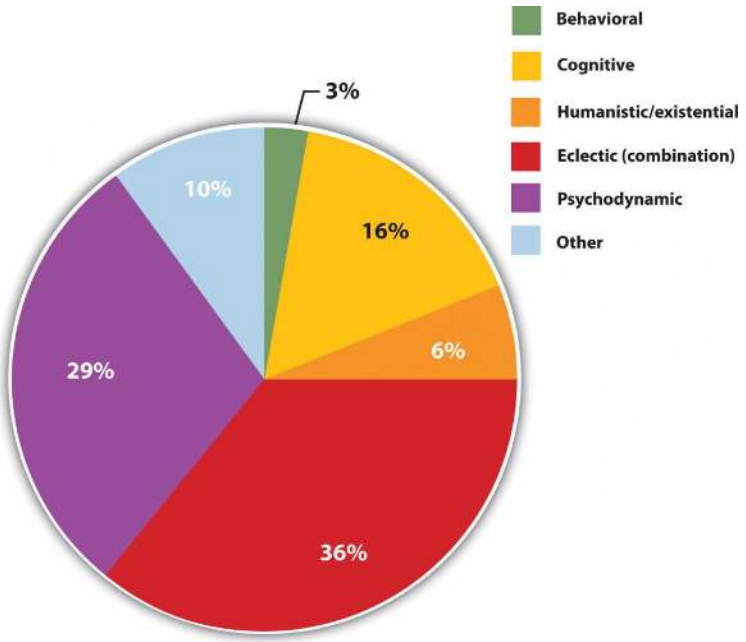


Figure 15.1.2: The Many Types of Therapy Practiced in the United States. These data show the proportion of psychotherapists who reported practicing each type of therapy. Adapted from Norcross, J. C., Hedges, M., & Castle, P. H. (2002). Psychologists conducting psychotherapy in 2001: A study of the Division 29 membership. *Psychotherapy: Theory, Research, Practice, Training, 39*(1), 97–102.

Psychology in Everyday Life: Seeking Treatment for Psychological Difficulties

Many people who would benefit from psychotherapy do not get it, either because they do not know how to find it or because they feel that they will be stigmatized and embarrassed if they seek help. The decision to not seek help is a very poor choice because the effectiveness of mental health treatments is well documented and, no matter where a person lives, there are treatments available (U.S. Department of Health and Human Services, 1999)[2].

The first step in seeking help for psychological problems is to accept the stigma. It is possible that some of your colleagues, friends, and family members will know that you are seeking help and some may at first think more negatively of you for it. But you must get past these unfair and close-minded responses. Feeling good about yourself is the most important thing you can do, and seeking help may be the first step in doing so.

One question is how to determine if someone needs help. This question is not always easy to answer because there is no clear demarcation between “normal” and “abnormal” behavior. Most generally, you will know that you or others need help when the person’s psychological state is negatively influencing his or her everyday behavior, when the behavior is adversely affecting those around the person, and when the problems continue over a period of time. Often people seek therapy as a result of a life-changing event such as diagnosis of a fatal illness, an upcoming marriage or divorce, or the death of a loved one. But therapy is also effective for general depression and anxiety, as well as for specific everyday problems.

There are a wide variety of therapy choices, many of which are free. Begin in your school, community, or church, asking about community health or counseling centers and pastoral counseling. You may want to *ask friends and family members for recommendations*. You’ll probably be surprised at how many people have been to counseling, and how many recommend it.

There are many therapists who offer a variety of treatment options. Be sure to ask about the degrees that the therapist has earned, and about the reputation of the center in which the therapy occurs. If you have choices, try to find a person or location that you like, respect, and trust. This will allow you to be more open, and you will get more out of the experience. Your sessions with the help provider will require discussing your family history, personality, and relationships, and you should feel comfortable sharing this information.

Remember also that confronting issues requires time to reflect, energy to get to the appointments and deal with consequential feelings, and discipline to explore your issues on your own. Success at therapy is difficult, and it takes effort.

The bottom line is that going for therapy should not be a difficult decision for you. All people have the right to appropriate mental health care just as they have a right to general health care. Just as you go to a dentist for a toothache, you may go to therapy for psychological difficulties. Furthermore, you can be confident that you will be treated with respect and that your privacy will be protected, because therapists follow ethical principles in their practices. The following provides a summary of these principles as developed by the American Psychological Association (2010)[3].

- Psychologists inform their clients/patients as early as possible in the therapeutic relationship about the nature and anticipated course of therapy, fees, involvement of third parties, and limits of confidentiality, and provide sufficient opportunity for the client/patient to ask questions and receive answers.
- Psychologists inform their clients/patients of the developing nature of the treatment, the potential risks involved, alternative treatments that may be available, and about the voluntary nature of their participation.
- When the therapist is a trainee, the client/patient is informed that the therapist is in training and is being supervised, and is given the name of the supervisor.
- When psychologists agree to provide services to several persons who have a relationship (such as spouses, significant others, or parents and children), they take reasonable steps to clarify at the outset which of the individuals are clients/patients and the relationship the psychologist will have with each person.
- If it becomes apparent that a psychologist may be called on to perform potentially conflicting roles (such as family therapist and then witness for one party in divorce proceedings), the psychologist takes reasonable steps to clarify and modify, or withdraw from, roles appropriately.
- When psychologists provide services to several persons in a group setting, they describe at the outset the roles and responsibilities of all parties and the limits of confidentiality.
- Psychologists do not engage in sexual intimacies with current therapy clients/patients, or with individuals they know to be close relatives, guardians, or significant others of current clients/patients. Psychologists do not terminate therapy to circumvent this standard. Psychologists do not accept as therapy clients/patients persons with whom they have engaged in sexual intimacies, nor do they have sexual intimacies with former clients/patients for at least 2 years after cessation or termination of therapy.
- Psychologists terminate therapy when it becomes reasonably clear that the client/patient no longer needs the service, is not likely to benefit, or is being harmed by continued service.

Psychodynamic Therapy

Psychodynamic therapy (psychoanalysis) is *a psychological treatment based on Freudian and neo-Freudian personality theories in which the therapist helps the patient explore the unconscious dynamics of personality*. The analyst engages with the patient, usually in one-on-one sessions, often with the patient lying on a couch and facing away. The goal of the psychotherapy is for the

patient to talk about his or her personal concerns and anxieties, *allowing the therapist to try to understand the underlying unconscious problems that are causing the symptoms* (the process of interpretation). The analyst may try out some interpretations on the patient and observe how he or she responds to them.

The patient may be asked to verbalize his or her thoughts through **free association**, in which the *therapist listens while the client talks about whatever comes to mind, without any censorship or filtering*. The client may also be asked to report on his or her dreams, and the therapist will use **dream analysis** to *analyze the symbolism of the dreams in an effort to probe the unconscious thoughts of the client and interpret their significance*. On the basis of the thoughts expressed by the patient, the analyst discovers the unconscious conflicts causing the patient's symptoms and interprets them for the patient.

The goal of psychotherapy is to help the patient develop **insight**—that is, *an understanding of the unconscious causes of the disorder* (Epstein, Stern, & Silbersweig, 2001; Lubarsky & Barrett, 2006), but the patient often shows resistance to these new understandings, *using defense mechanisms to avoid the painful feelings in his or her unconscious*. The patient might forget or miss appointments, or act out with hostile feelings toward the therapist. The therapist attempts to help the patient develop insight into the causes of the resistance. The sessions may also lead to **transference**, in which *the patient unconsciously redirects feelings experienced in an important personal relationship toward the therapist*. For instance, the patient may transfer feelings of guilt that come from the father or mother to the therapist. Some therapists believe that transference should be encouraged, as it allows the client to resolve hidden conflicts and work through feelings that are present in the relationships.

Important Characteristics and Experiences in Psychoanalysis

- **Free association.** The therapist listens while the client talks about whatever comes to mind, without any censorship or filtering. The therapist then tries to interpret these free associations, looking for unconscious causes of symptoms.
- **Dream analysis.** The therapist listens while the client describes his or her dreams and then analyzes the symbolism of the dreams in an effort to probe the unconscious thoughts of the client and interpret their significance.
- **Insight.** An understanding by the patient of the unconscious causes of his or her symptoms.
- **Interpretation.** The therapist uses the patient's expressed thoughts to try to understand the underlying unconscious problems. The analyst may try out some interpretations on the patient and observe how he or she responds to them.
- **Resistance.** The patient's use of defense mechanisms to avoid the painful feelings in his or her unconscious. The patient might forget or miss appointments, or act out with hostile feelings toward the therapist. The therapist attempts to help the patient develop insight into the causes of the resistance.
- **Transference.** The unconscious redirection of the feelings experienced in an important personal relationship toward the therapist. For instance, the patient may transfer feelings of guilt that come from the father or mother to the therapist.

One problem with traditional psychoanalysis is that the sessions may take place several times a week, go on for many years, and cost thousands of dollars. To help more people benefit, modern psychodynamic approaches frequently use shorter-term, focused, and goal-oriented approaches. In these "brief psychodynamic therapies," the therapist helps the client determine the important issues to be discussed at the beginning of treatment and usually takes a more active role than in classic psychoanalysis (Levenson, 2010).

Humanistic Therapies

Just as psychoanalysis is based on the personality theories of Freud and the neo-Freudians, **humanistic therapy** is *a psychological treatment based on the personality theories of Carl Rogers and other humanistic psychologists*. Humanistic therapy is based on the idea that people develop psychological problems when they are burdened by limits and expectations placed on them by themselves and others, and the treatment emphasizes the person's capacity for self-realization and fulfillment. Humanistic therapies attempt to promote growth and responsibility by helping clients consider their own situations and the world around them and how they can work to achieve their life goals.

Carl Rogers developed **person-centered therapy** (or client-centered therapy), *an approach to treatment in which the client is helped to grow and develop as the therapist provides a comfortable, nonjudgmental environment*. In his book, *A Way of Being* (1980), Rogers argued that therapy was most productive when the therapist created a positive relationship with the client—a *therapeutic alliance*. The **therapeutic alliance** is *a relationship between the client and the therapist that is facilitated when the*

therapist is genuine *(i.e., he or she creates no barriers to free-flowing thoughts and feelings), when the therapist treats the client with* unconditional positive regard *(i.e., values the client without any qualifications, displaying an accepting attitude toward whatever the client is feeling at the moment), and when the therapist develops* empathy *with the client (i.e., that he or she actively listens to and accurately perceives the personal feelings that the client experiences).*

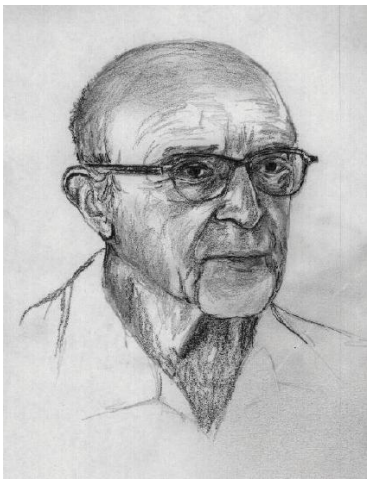


Figure **15.1.3**: Carl Rogers was among the founders of the humanistic approach to therapy and developed the fundamentals of person-centered therapy. Didius – Carl Ransom Rogers – CC BY 2.5.

The development of a positive therapeutic alliance has been found to be exceedingly important to successful therapy. The ideas of genuineness, empathy, and unconditional positive regard in a nurturing relationship in which the therapist actively listens to and reflects the feelings of the client is probably the most fundamental part of contemporary psychotherapy (Prochaska & Norcross, 2007).

Psychodynamic and humanistic therapies are recommended primarily for people suffering from generalized anxiety or mood disorders, and who desire to feel better about themselves overall. But the goals of people with other psychological disorders, such as phobias, sexual problems, and obsessive-compulsive disorder (OCD), are more specific. A person with a social phobia may want to be able to leave his or her house, a person with a sexual dysfunction may want to improve his or her sex life, and a person with OCD may want to learn to stop letting his obsessions or compulsions interfere with everyday activities. In these cases it is not necessary to revisit childhood experiences or consider our capacities for self-realization—we simply want to deal with what is happening in the present.

Cognitive Behavior Therapy

Cognitive-behavior therapy (CBT) is *a structured approach to treatment that attempts to reduce psychological disorders through systematic procedures based on cognitive and behavioral principles*. As you can see in Figure **15.1.4**, CBT is based on the idea that there is a recursive link among our thoughts, our feelings, and our behavior. For instance, if we are feeling depressed, our negative thoughts (“I am doing poorly in my chemistry class”) lead to negative feelings (“I feel hopeless and sad”), which then contribute to negative behaviors (lethargy, disinterest, lack of studying). When we or other people look at the negative behavior, the negative thoughts are reinforced and the cycle repeats itself (Beck, 1976). Similarly, in panic disorder a patient may misinterpret his or her feelings of anxiety as a sign of an impending physical or mental catastrophe (such as a heart attack), leading to an avoidance of a particular place or social situation. The fact that the patient is avoiding the situation reinforces the negative thoughts. Again, the thoughts, feelings, and behavior amplify and distort each other.

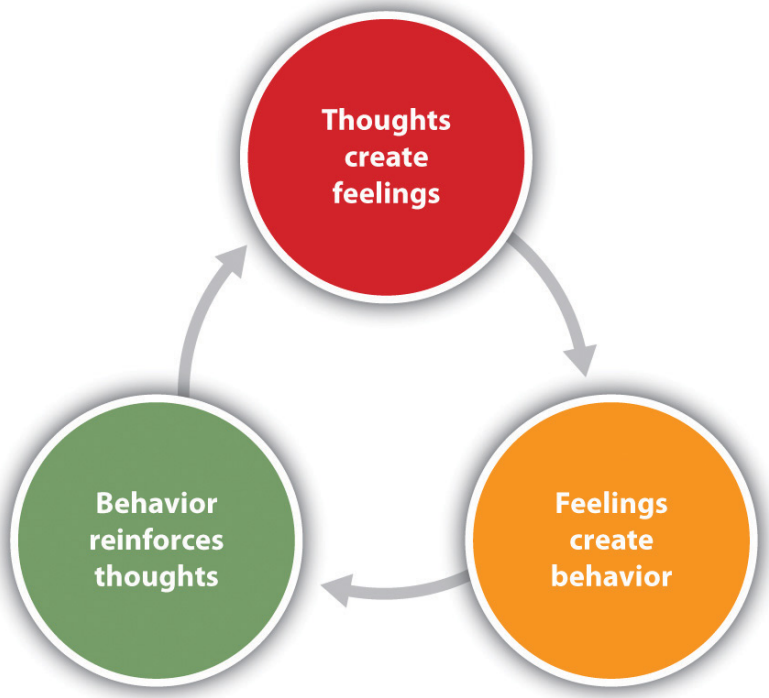


Figure 15.1.4: Cognitive-Behavior Therapy. Cognitive-behavior therapy (CBT) is based on the idea that our thoughts, feelings, and behavior reinforce each other and that changing our thoughts or behavior can make us feel better.

CBT is a very broad approach that is used for the treatment of a variety of problems, including mood, anxiety, personality, eating, substance abuse, attention-deficit, and psychotic disorders. CBT treats the symptoms of the disorder (the behaviors or the cognitions) and does not attempt to address the underlying issues that cause the problem. The goal is simply to stop the negative cycle by intervening to change cognition or behavior. The client and the therapist work together to develop the goals of the therapy, the particular ways that the goals will be reached, and the timeline for reaching them. The procedures are problem-solving and action-oriented, and the client is forced to take responsibility for his or her own treatment. The client is assigned tasks to complete that will help improve the disorder and takes an active part in the therapy. The treatment usually lasts between 10 and 20 sessions.

Depending on the particular disorder, some CBT treatments may be primarily behavioral in orientation, focusing on the principles of classical, operant, and observational learning, whereas other treatments are more cognitive, focused on changing negative thoughts related to the disorder. But almost all CBT treatments use a combination of behavioral and cognitive approaches.

Behavioral Aspects of CBT

In some cases the primary changes that need to be made are behavioral. **Behavioral therapy** is *psychological treatment that is based on principles of learning*. The most direct approach is through operant conditioning using reward or punishment. Reinforcement may be used to teach new skills to people, for instance, those with autism or schizophrenia (Granholm et al., 2008; Herbert et al., 2005; Scattone, 2007). If the patient has trouble dressing or grooming, then reinforcement techniques, such as providing tokens that can be exchanged for snacks, are used to reinforce appropriate behaviors such as putting on one's clothes in the morning or taking a shower at night. If the patient has trouble interacting with others, reinforcement will be used to teach the client how to more appropriately respond in public, for instance, by maintaining eye contact, smiling when appropriate, and modulating tone of voice.

As the patient practices the different techniques, the appropriate behaviors are shaped through reinforcement to allow the client to manage more complex social situations. In some cases observational learning may also be used; the client may be asked to observe the behavior of others who are more socially skilled to acquire appropriate behaviors. People who learn to improve their interpersonal skills through skills training may be more accepted by others and this social support may have substantial positive effects on their emotions.

When the disorder is anxiety or phobia, then the goal of the CBT is to reduce the negative affective responses to the feared stimulus. **Exposure therapy** is *a behavioral therapy based on the classical conditioning principle of extinction, in which people are confronted with a feared stimulus with the goal of decreasing their negative emotional responses to it* (Wolpe, 1973). Exposure treatment can be carried out in real situations or through imagination, and it is used in the treatment of panic disorder, agoraphobia, social phobia, OCD, and posttraumatic stress disorder (PTSD).

In **flooding**, a client is exposed to the source of his fear all at once. An agoraphobic might be taken to a crowded shopping mall or someone with an extreme fear of heights to the top of a tall building. The assumption is that the fear will subside as the client habituates to the situation while receiving emotional support from the therapist during the stressful experience. An advantage of the flooding technique is that it is quick and often effective, but a disadvantage is that the patient may relapse after a short period of time.

More frequently, the exposure is done more gradually. **Systematic desensitization** is *a behavioral treatment that combines imagining or experiencing the feared object or situation with relaxation exercises* (Wolpe, 1973). The client and the therapist work together to prepare a *hierarchy of fears*, starting with the least frightening, and moving to the most frightening scenario surrounding the object (Table **15.1.1**). The patient then confronts her fears in a systematic manner, sometimes using her imagination but usually, when possible, in real life.

Table **15.1.1** Hierarchy of Fears Used in Systematic Desensitization

Behavior	Fear rating
Think about a spider.	10
Look at a photo of a spider.	25
Look at a real spider in a closed box.	50
Hold the box with the spider.	60
Let a spider crawl on your desk.	70
Let a spider crawl on your shoe.	80
Let a spider crawl on your pants leg.	90
Let a spider crawl on your sleeve.	95
Let a spider crawl on your bare arm.	100

Desensitization techniques use the principle of **counterconditioning**, in which a second incompatible response (relaxation, e.g., through deep breathing) is conditioned to an already conditioned response (the fear response). The continued pairing of the relaxation responses with the feared stimulus as the patient works up the hierarchy gradually leads the fear response to be extinguished and the relaxation response to take its place.

Behavioral therapy works best when people directly experience the feared object. Fears of spiders are more directly habituated when the patient interacts with a real spider, and fears of flying are best extinguished when the patient gets on a real plane. But it is often difficult and expensive to create these experiences for the patient. Recent advances in virtual reality have allowed clinicians to provide CBT in what seem like real situations to the patient. In **virtual reality CBT**, the therapist uses computer-generated, three-dimensional, lifelike images of the feared stimulus in a systematic desensitization program. Specially designed computer equipment, often with a head-mount display, is used to create a simulated environment. A common use is in helping soldiers who are experiencing PTSD return to the scene of the trauma and learn how to cope with the stress it invokes.

Some of the advantages of the virtual reality treatment approach are that it is economical, the treatment session can be held in the therapist's office with no loss of time or confidentiality, the session can easily be terminated as soon as a patient feels uncomfortable, and many patients who have resisted live exposure to the object of their fears are willing to try the new virtual reality option first.

Aversion therapy is *a type of behavior therapy in which positive punishment is used to reduce the frequency of an undesirable behavior*. An unpleasant stimulus is intentionally paired with a harmful or socially unacceptable behavior until the behavior becomes associated with unpleasant sensations and is hopefully reduced. A child who wets his bed may be required to sleep on a pad that sounds an alarm when it senses moisture. Over time, the positive punishment produced by the alarm reduces the bedwetting behavior (Houts, Berman, & Abramson, 1994). Aversion therapy is also used to stop other specific behaviors such as nail biting (Allen, 1996).

Alcoholism has long been treated with aversion therapy (Baker & Cannon, 1988). In a standard approach, patients are treated at a hospital where they are administered a drug, *antabuse*, that makes them nauseous if they consume any alcohol. The technique works very well if the user keeps taking the drug (Krampe et al., 2006), but unless it is combined with other approaches the patients are likely to relapse after they stop the drug.

Cognitive Aspects of CBT

While behavioral approaches focus on the actions of the patient, **cognitive therapy** is *a psychological treatment that helps clients identify incorrect or distorted beliefs that are contributing to disorder*. In cognitive therapy the therapist helps the patient develop new, healthier ways of thinking about themselves and about the others around them. The idea of cognitive therapy is that changing thoughts will change emotions, and that the new emotions will then influence behavior (Figure **15.1.4**).

The goal of cognitive therapy is not necessarily to get people to think more positively but rather to think more accurately. For instance, a person who thinks “no one cares about me” is likely to feel rejected, isolated, and lonely. If the therapist can remind the person that she has a mother or daughter who does care about her, more positive feelings will likely follow. Similarly, changing beliefs from “I have to be perfect” to “No one is always perfect—I’m doing pretty good,” from “I am a terrible student” to “I am doing well in some of my courses,” or from “She did that on purpose to hurt me” to “Maybe she didn’t realize how important it was to me” may all be helpful.

The psychiatrist Aaron T. Beck and the psychologist Albert Ellis (1913–2007) together provided the basic principles of cognitive therapy. Ellis (2004) called his approach *rational emotive behavior therapy (REBT)* or *rational emotive therapy (RET)*, and he focused on pointing out the flaws in the patient’s thinking. Ellis noticed that people experiencing strong negative emotions tend to personalize and overgeneralize their beliefs, leading to an inability to see situations accurately (Leahy, 2003). In REBT, the therapist’s goal is to challenge these irrational thought patterns, helping the patient replace the irrational thoughts with more rational ones, leading to the development of more appropriate emotional reactions and behaviors.

Beck’s (Beck, 1995; Beck, Freeman, & Davis, 2004)) cognitive therapy was based on his observation that people who were depressed generally had a large number of highly accessible negative thoughts that influenced their thinking. His goal was to develop a short-term therapy for depression that would modify these unproductive thoughts. Beck’s approach challenges the client to test his beliefs against concrete evidence. If a client claims that “everybody at work is out to get me,” the therapist might ask him to provide instances to corroborate the claim. At the same time the therapist might point out contrary evidence, such as the fact that a certain coworker is actually a loyal friend or that the patient’s boss had recently praised him.

Combination (Eclectic) Approaches to Therapy

To this point we have considered the different approaches to psychotherapy under the assumption that a therapist will use only one approach with a given patient. But this is not the case; as you saw in Figure **15.1.2**, the most commonly practiced approach to therapy is an **eclectic therapy**, *an approach to treatment in which the therapist uses whichever techniques seem most useful and relevant for a given patient*. For bipolar disorder, for instance, the therapist may use both psychological skills training to help the patient cope with the severe highs and lows, but may also suggest that the patient consider biomedical drug therapies (Newman, Leahy, Beck, Reilly-Harrington, & Gyulai, 2002). Treatment for major depressive disorder usually involves antidepressant drugs as well as CBT to help the patient deal with particular problems (McBride, Farvolden, & Swallow, 2007).

As we have seen in Chapter 12 “Defining Psychological Disorders”, one of the most commonly diagnosed disorders is borderline personality disorder (BPD). Consider this description, typical of the type of borderline patient who arrives at a therapist’s office:

Even as an infant, it seemed that there was something different about Bethany. She was an intense baby, easily upset and difficult to comfort. She had very severe separation anxiety—if her mother left the room, Bethany would scream until she returned. In her

early teens, Bethany became increasingly sullen and angry. She started acting out more and more—yelling at her parents and teachers and engaging in impulsive behavior such as promiscuity and running away from home. At times Bethany would have a close friend at school, but some conflict always developed and the friendship would end.

By the time Bethany turned 17, her mood changes were totally unpredictable. She was fighting with her parents almost daily, and the fights often included violent behavior on Bethany's part. At times she seemed terrified to be without her mother, but at other times she would leave the house in a fit of rage and not return for a few days. One day, Bethany's mother noticed scars on Bethany's arms. When confronted about them, Bethany said that one night she just got more and more lonely and nervous about a recent breakup until she finally stuck a lit cigarette into her arm. She said "I didn't really care for him that much, but I had to do something dramatic."

When she was 18 Bethany rented a motel room where she took an overdose of sleeping pills. Her suicide attempt was not successful, but the authorities required that she seek psychological help.

Most therapists will deal with a case such as Bethany's using an eclectic approach. First, because her negative mood states are so severe, they will likely recommend that she start taking antidepressant medications. These drugs are likely to help her feel better and will reduce the possibility of another suicide attempt, but they will not change the underlying psychological problems. Therefore, the therapist will also provide psychotherapy.

The first sessions of the therapy will likely be based primarily on creating trust. Person-centered approaches will be used in which the therapist attempts to create a therapeutic alliance conducive to a frank and open exchange of information.

If the therapist is trained in a psychodynamic approach, he or she will probably begin intensive face-to-face psychotherapy sessions at least three times a week. The therapist may focus on childhood experiences related to Bethany's attachment difficulties but will also focus in large part on the causes of the present behavior. The therapist will understand that because Bethany does not have good relationships with other people, she will likely seek a close bond with the therapist, but the therapist will probably not allow the transference relationship to develop fully. The therapist will also realize that Bethany will probably try to resist the work of the therapist.

Most likely the therapist will also use principles of CBT. For one, cognitive therapy will likely be used in an attempt to change Bethany's distortions of reality. She feels that people are rejecting her, but she is probably bringing these rejections on herself. If she can learn to better understand the meaning of other people's actions, she may feel better. And the therapist will likely begin using some techniques of behavior therapy, for instance, by rewarding Bethany for successful social interactions and progress toward meeting her important goals.

The eclectic therapist will continue to monitor Bethany's behavior as the therapy continues, bringing into play whatever therapeutic tools seem most beneficial. Hopefully, Bethany will stay in treatment long enough to make some real progress in repairing her broken life.

One example of an eclectic treatment approach that has been shown to be successful in treating BPD is **dialectical behavioral therapy** (DBT; Linehan & Dimeff, 2001). DBT is essentially a cognitive therapy, but it includes a particular emphasis on attempting to enlist the help of the patient in his or her own treatment. A dialectical behavioral therapist begins by attempting to develop a positive therapeutic alliance with the client, and then tries to encourage the patient to become part of the treament process. In DBT the therapist aims to accept and validate the client's feelings at any given time while nonetheless informing the client that some feelings and behaviors are maladaptive, and showing the client better alternatives. The therapist will use both individual and group therapy, helping the patient work toward improving interpersonal effectiveness, emotion regulation, and distress tolerance skills.

[1]American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

[2]U.S. Department of Health and Human Services. (1999). *Mental health: A report of the surgeon general*. Washington, DC: U.S. Government Printing Office.

[3]American Psychological Association. (2010). Ethical principles of psychologists and code of conduct. Retrieved from http://www.apa.org/ethics/code/index.aspx?item=7#402

References

Allen K. W. (1996). Chronic nailbiting: A controlled comparison of competing response and mild aversion treatments. *Behaviour Research and Therapy, 34*, 269–272. doi:10.1016/0005-7967(95)00078-X

Baker, T. B., & Cannon, D. S. (1988). *Assessment and treatment of addictive disorders*. New York, NY: Praeger.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York, NY: New American Library.

Beck, A. T., Freeman, A., & Davis, D. D. (2004). *Cognitive therapy of personality disorders* (2nd ed.). New York, NY: Guilford Press.

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond*. New York, NY: Guilford Press

Ellis, A. (2004). Why rational emotive behavior therapy is the most comprehensive and effective form of behavior therapy. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 22*, 85–92.

Epstein J., Stern E., & Silbersweig, D. (2001). Neuropsychiatry at the millennium: The potential for mind/brain integration through emerging interdisciplinary research strategies. *Clinical Neuroscience Research, 1*, 10–18.

Granholm, E., McQuaid, J. R., Link, P. C., Fish, S., Patterson, T., & Jeste, D. V. (2008). Neuropsychological predictors of functional outcome in cognitive behavioral social skills training for older people with schizophrenia. *Schizophrenia Research, 100*, 133–143. doi:10.1016/j.schres.2007.11.032.

Herbert, J. D., Gaudini, B. A., Rheingold, A. A., Myers, V. H., Dalrymple, K., & Nolan, E. M. (2005). Social skills training augments the effectiveness of cognitive behavioral group therapy for social anxiety disorder. *Behavior Therapy, 36*, 125–138.

Houts, A. C., Berman, J. S., & Abramson, H. (1994). Effectiveness of psychological and pharmacological treatments for nocturnal enuresis. *Journal of Consulting and Clinical Psychology, 62*(4), 737–745.

Krampe, H., Stawicki, S., Wagner, T., Bartels, C., Aust, C., Rüther, E.,…Ehrenreich, H. (2006). Follow-up of 180 alcoholic patients for up to 7 years after outpatient treatment: Impact of alcohol deterrents on outcome. *Alcoholism: Clinical and Experimental Research, 30*(1), 86–95.

Leahy, R. L. (2003). *Cognitive therapy techniques: A practitioner's guide*. New York, NY: Guilford Press.

Levenson, H. (2010). *Brief dynamic therapy*. Washington, DC: American Psychological Association.

Linehan, M. M., & Dimeff, L. (2001). Dialectical behavior therapy in a nutshell. *The California Psychologist, 34*, 10–13.

Lubarsky, L., & Barrett, M. S. (2006). The history and empirical status of key psychoanalytic concepts. *Annual Review of Clinical Psychology, 2*, 1–19.

McBride, C., Farvolden, P., & Swallow, S. R. (2007). Major depressive disorder and cognitive schemas. In L. P. Riso, P. L. du Toit, D. J. Stein, & J. E. Young (Eds.), *Cognitive schemas and core beliefs in psychological problems: A scientist-practitioner guide* (pp. 11–39). Washington, DC: American Psychological Association.

Newman, C. F., Leahy, R. L., Beck, A. T., Reilly-Harrington, N. A., & Gyulai, L. (2002). Clinical management of depression, hopelessness, and suicidality in patients with bipolar disorder. In C. F. Newman, R. L. Leahy, A. T. Beck, N. A. Reilly-Harrington, & L. Gyulai (Eds.), *Bipolar disorder: A cognitive therapy approach* (pp. 79–100). Washington, DC: American Psychological Association. doi:10.1037/10442-004

Prochaska, J. O., & Norcross, J. C. (2007). *Systems of psychotherapy: A transtheoretical analysis* (6th ed.). Pacific Grove, CA: Brooks/Cole.

Rogers, C. (1980). *A way of being*. New York, NY: Houghton Mifflin.

Scattone, D. (2007). Social skills interventions for children with autism. *Psychology in the schools, 44*, 717–726.

Wolpe J. (1973). *The practice of behavior therapy*. New York, NY: Pergamon.

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15.2: Reducing Disorder Biologically- Drug and Brain Therapy

Learning Objectives

1. Classify the different types of drugs used in the treatment of mental disorders and explain how they each work to reduce disorder.
2. Critically evaluate direct brain intervention methods that may be used by doctors to treat patients who do not respond to drug or other therapy.

Like other medical problems, psychological disorders may in some cases be treated biologically. **Biomedical therapies** are *treatments designed to reduce psychological disorder by influencing the action of the central nervous system*. These therapies primarily involve the use of medications but also include direct methods of brain intervention, including *electroconvulsive therapy (ECT)*, *transcranial magnetic stimulation (TMS)*, and *psychosurgery*.

Drug Therapies

Psychologists understand that an appropriate balance of neurotransmitters in the brain is necessary for mental health. If there is a proper balance of chemicals, then the person's mental health will be acceptable, but psychological disorder will result if there is a chemical imbalance. The most frequently used biological treatments provide the patient with medication that influences the production and reuptake of neurotransmitters in the central nervous system (CNS). The use of these drugs is rapidly increasing, and drug therapy is now the most common approach to treatment of most psychological disorders.

Unlike some medical therapies that can be targeted toward specific symptoms, current psychological drug therapies are not so specific; they don't change particular behaviors or thought processes, and they don't really solve psychological disorders. However, although they cannot "cure" disorder, drug therapies are nevertheless useful therapeutic approaches, particularly when combined with psychological therapy, in treating a variety of psychological disorders. The best drug combination for the individual patient is usually found through trial and error (Biedermann & Fleischhacker, 2009). The major classes and brand names of drugs used to treat psychological disorders are shown in Table **15.2.2**.

Table **15.2.2** Common Medications Used to Treat Psychological Disorders

Class	Type	Brand names	Disorder	Notes
Psychostimulants		Ritalin, Adderall, Dexedrine	Attention-deficit/hyperactivity disorder (ADHD)	Very effective in most cases, at least in the short term, at reducing hyperactivity and inattention
Antidepressants	Tricyclics	Elavil, Tofranil	Depression and anxiety disorders	Less frequently prescribed today than are the serotonin reuptake inhibitors (SSRIs)
	Monamine oxidase inhibitors (MAOIs)	Ensam, Nardil, Parnate, Marpaln	Depression and anxiety disorders	Less frequently prescribed today than are the SSRIs
	SSRIs	Prozac, Paxil, Zoloft	Depression and anxiety disorders	The most frequently prescribed antidepressant medications; work by blocking the reuptake of serotonin
	Other reuptake inhibitors	Effexor, Celexa, Wellbutrin	Depression and anxiety disorders	Prescribed in some cases; work by blocking the reuptake of serotonin, norepinephrine, and dopamine
Mood stabilizers		Eskalith, Lithobid, Depakene	Bipolar disorder	Effective in reducing the mood swings associated with bipolar disorder
Antianxiety drugs	Tranquilizers (benzodiazepines)	Valium, Xanax	Anxiety, panic, and mood disorders	Work by increasing the action of the neurotransmitter GABA (gamma-aminobutyric acid)
Antipsychotics (Neuroleptics)		Thorazine, Haldol, Clozaril, Risperdal, Zyprexa	Schizophrenia	Treat the positive and, to some extent, the negative symptoms of schizophrenia by reducing the transmission of dopamine and increasing the transmission of serotonin

Using Stimulants to Treat ADHD

Attention-deficit/hyperactivity disorder (ADHD) is frequently treated with biomedical therapy, usually along with cognitive-behavior therapy (CBT). The most commonly prescribed drugs for ADHD are psychostimulants, including Ritalin, Adderall, and Dexedrine. Short-acting forms of the drugs are taken as pills and last between 4 and 12 hours, but some of the drugs are also available in long-acting forms (skin patches) that can be worn on the hip and last up to 12 hours. The patch is placed on the child early in the morning and worn all day.

Stimulants improve the major symptoms of ADHD, including inattention, impulsivity, and hyperactivity, often dramatically, in about 75% of the children who take them (Greenhill, Halperin, & Abikof, 1999). But the effects of the drugs wear off quickly. Additionally, the best drug and best dosage varies from child to child, so it may take some time to find the correct combination.

It may seem surprising to you that a disorder that involves hyperactivity is treated with a psychostimulant, a drug that normally increases activity. The answer lies in the dosage. When large doses of stimulants are taken, they increase activity, but in smaller doses the same stimulants improve attention and decrease motor activity (Zahn, Rapoport, & Thompson, 1980).

The most common side effects of psychostimulants in children include decreased appetite, weight loss, sleeping problems, and irritability as the effect of the medication tapers off. Stimulant medications may also be associated with a slightly reduced growth rate in children, although in most cases growth isn't permanently affected (Spencer, Biederman, Harding, & O'Donnell, 1996).

Antidepressant Medications

Antidepressant medications are *drugs designed to improve moods*. Although they are used primarily in the treatment of depression, they are also effective for patients who suffer from anxiety, phobias, and obsessive-compulsive disorders. Antidepressants work by influencing the production and reuptake of neurotransmitters that relate to emotion, including serotonin, norepinephrine, and dopamine. Although exactly why they work is not yet known, as the amount of the neurotransmitters in the CNS is increased through the action of the drugs, the person often experiences less depression.

The antidepressants most prescribed today are the ***s*elective serotonin reuptake inhibitors** (*SSRIs*), including Prozac, Paxil, and Zoloft, which are designed to selectively block the reuptake of serotonin at the synapse, thereby leaving more serotonin available in the CNS. SSRIs are safer and have fewer side effects than the tricyclics or the MAOIs (Fraser, 2000; Hollon, Thase, & Markowitz, 2002). SSRIs are effective, but patients taking them often suffer a variety of sometimes unpleasant side effects, including dry mouth, constipation, blurred vision, headache, agitation, drowsiness, as well as a reduction in sexual enjoyment.

Recently, there has been concern that SSRIs may increase the risk of suicide among teens and young adults, probably because when the medications begin working they give patients more energy, which may lead them to commit the suicide that they had been planning but lacked the energy to go through with. This concern has led the FDA to put a warning label on SSRI medications and has led doctors to be more selective about prescribing antidepressants to this age group (Healy & Whitaker, 2003; Simon, 2006; Simon, Savarino, Operskalski, & Wang, 2006).

Because the effects of antidepressants may take weeks or even months to develop, doctors usually work with each patient to determine which medications are most effective, and may frequently change medications over the course of therapy. In some cases other types of antidepressants may be used instead of or in addition to the SSRIs. These medications also work by blocking the reuptake of neurotransmitters, including serotonin, norepinephrine, and dopamine. Brand names of these medications include Effexor and Wellbutrin.

Patients who are suffering from bipolar disorder are not helped by the SSRIs or other antidepressants because their disorder also involves the experience of overly positive moods. Treatment is more complicated for these patients, often involving a combination of antipsychotics and antidepressants along with *mood stabilizing medications* (McElroy & Keck, 2000). The most well-known mood stabilizer, lithium carbonate (or **lithium**), was approved by the FDA in the 1970s for treating both manic and depressive episodes, and it has proven very effective. Anticonvulsant medications can also be used as mood stabilizers. Another drug, Depakote, has also proven very effective, and some bipolar patients may do better with it than with lithium (Kowatch et al., 2000).

People who take lithium must have regular blood tests to be sure that the levels of the drug are in the appropriate range. Potential negative side effects of lithium are loss of coordination, slurred speech, frequent urination, and excessive thirst. Though side effects often cause patients to stop taking their medication, it is important that treatment be continuous, rather than intermittent. There is no cure for bipolar disorder, but drug therapy does help many people.

Antianxiety Medications

Antianxiety medications are *drugs that help relieve fear or anxiety*. They work by increasing the action of the neurotransmitter GABA. The increased level of GABA helps inhibit the action of the sympathetic division of the autonomic nervous system, creating a calming experience.

The most common class of antianxiety medications is the *tranquilizers*, known as *benzodiazepines*. These drugs, which are prescribed millions of times a year, include Ativan, Valium, and Xanax. The benzodiazepines act within a few minutes to treat mild anxiety disorders but also have major side effects. They are addictive, frequently leading to tolerance, and they can cause drowsiness, dizziness, and unpleasant withdrawal symptoms including relapses into increased anxiety (Otto et al., 1993). Furthermore, because the effects of the benzodiazepines are very similar to those of alcohol, they are very dangerous when combined with it.

Antipsychotic Medications

Until the middle of the 20th century, schizophrenia was inevitably accompanied by the presence of positive symptoms, including bizarre, disruptive, and potentially dangerous behavior. As a result, schizophrenics were locked in asylums to protect them from themselves and to protect society from them. In the 1950s, a drug called chlorpromazine (Thorazine) was discovered that could reduce many of the positive symptoms of schizophrenia. Chlorpromazine was the first of many *antipsychotic drugs*.

Antipsychotic drugs (neuroleptics) are *drugs that treat the symptoms of schizophrenia and related psychotic disorders*. Today there are many antipsychotics, including Thorazine, Haldol, Clozaril, Risperdal, and Zyprexa. Some of these drugs treat the positive symptoms of schizophrenia, and some treat both the positive, negative, and cognitive symptoms.

The discovery of chlorpromazine and its use in clinics has been described as the single greatest advance in psychiatric care, because it has dramatically improved the prognosis of patients in psychiatric hospitals worldwide. Using antipsychotic medications has allowed hundreds of thousands of people to move out of asylums into individual households or community mental health centers, and in many cases to live near-normal lives.

Antipsychotics reduce the positive symptoms of schizophrenia by reducing the transmission of dopamine at the synapses in the limbic system, and they improve negative symptoms by influencing levels of serotonin (Marangell, Silver, Goff, & Yudofsky, 2003). Despite their effectiveness, antipsychotics have some negative side effects, including restlessness, muscle spasms, dizziness, and blurred vision. In addition, their long-term use can cause permanent neurological damage, a condition called *tardive dyskinesia* that causes uncontrollable muscle movements, usually in the mouth area (National Institute of Mental Health, 2008)[1]. Newer antipsychotics treat more symptoms with fewer side effects than older medications do (Casey, 1996).

Direct Brain Intervention Therapies

In cases of severe disorder it may be desirable to directly influence brain activity through electrical activation of the brain or through brain surgery. **Electroconvulsive therapy (ECT)** is *a medical procedure designed to alleviate psychological disorder in which electric currents are passed through the brain, deliberately triggering a brief seizure* (Figure **15.2.7**). ECT has been used since the 1930s to treat severe depression.

When it was first developed, the procedure involved strapping the patient to a table before the electricity was administered. The patient was knocked out by the shock, went into severe convulsions, and awoke later, usually without any memory of what had happened. Today ECT is used only in the most severe cases when all other treatments have failed, and the practice is more humane. The patient is first given muscle relaxants and a general anesthesia, and precisely calculated electrical currents are used to achieve the most benefit with the fewest possible risks.

ECT is very effective; about 80% of people who undergo three sessions of ECT report dramatic relief from their depression. ECT reduces suicidal thoughts and is assumed to have prevented many suicides (Kellner et al., 2005). On the other hand, the positive effects of ECT do not always last; over one-half of patients who undergo ECT experience relapse within one year, although antidepressant medication can help reduce this outcome (Sackheim et al., 2001). ECT may also cause short-term memory loss or cognitive impairment (Abrams, 1997; Sackheim et al., 2007).

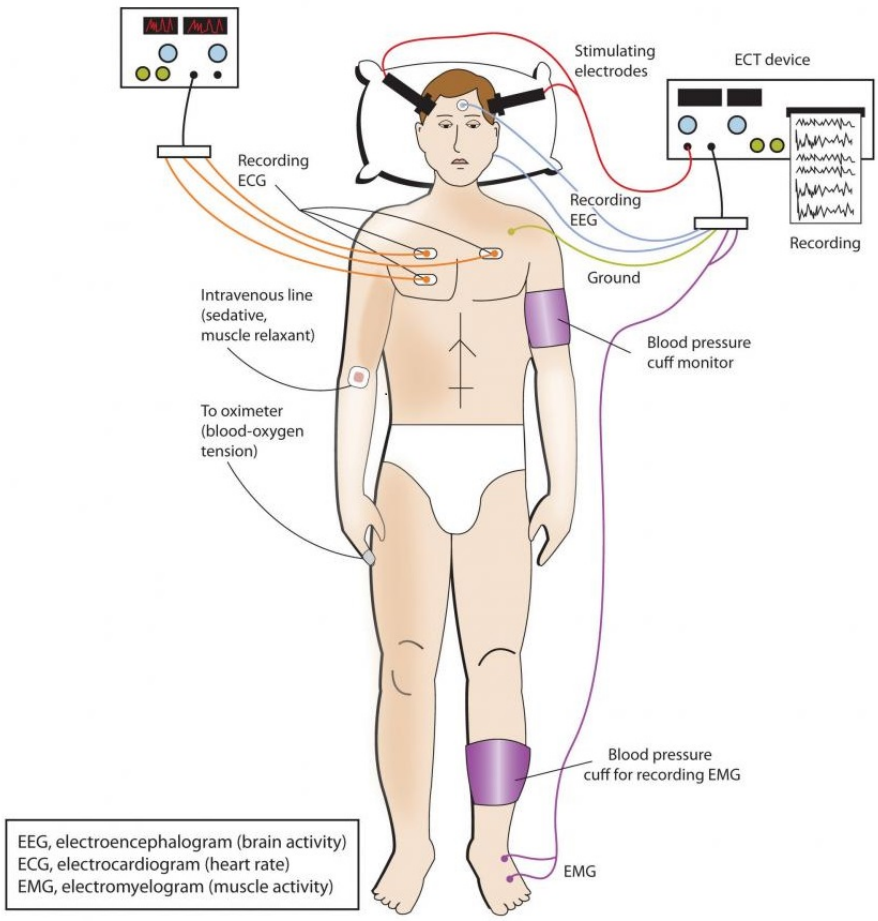


Figure **15.2.7**: Electroconvulsive Therapy (ECT). Today's ECT uses precisely calculated electrical currents to achieve the most benefit with the fewest possible risks.

Although ECT continues to be used, newer approaches to treating chronic depression are also being developed. A newer and gentler method of brain stimulation is transcranial magnetic stimulation (TMS), *a medical procedure designed to reduce psychological disorder that uses a pulsing magnetic coil to electrically stimulate the brain* (Figure **15.2.8**). TMS seems to work by activating neural circuits in the prefrontal cortex, which is less active in people with depression, causing an elevation of mood. TMS can be performed without sedation, does not cause seizures or memory loss, and may be as effective as ECT (Loo, Schweitzer, & Pratt, 2006; Rado, Dowd, & Janicak, 2008). TMS has also been used in the treatment of Parkinson's disease and schizophrenia.

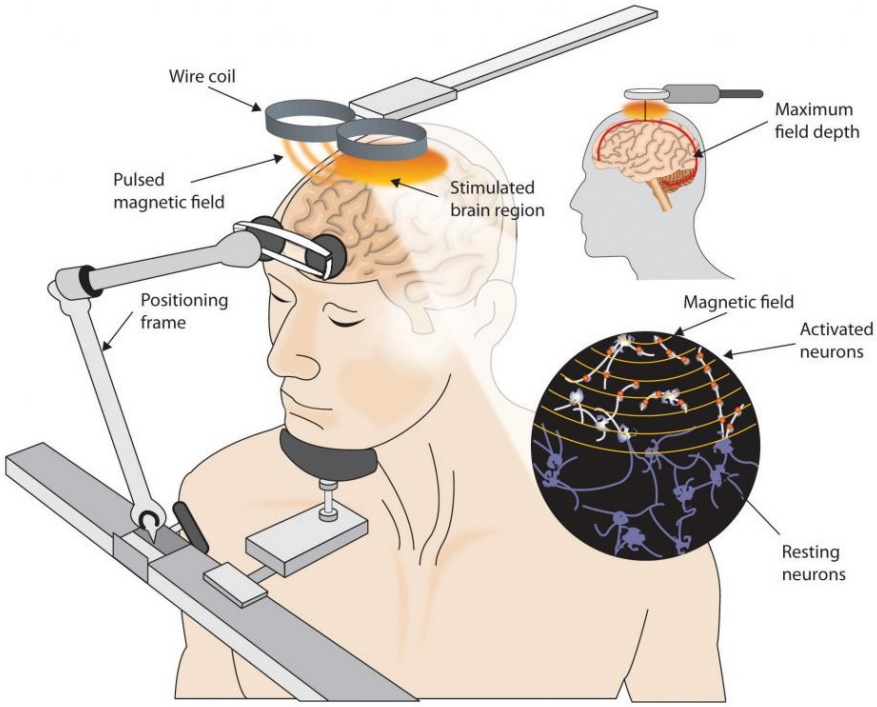


Figure 15.2.8: Transcranial Magnetic Stimulation (TMS). TMS is a noninvasive procedure that uses a pulsing magnetic coil to electrically stimulate the brain. Recently, TMS has been used in the treatment of Parkinson's disease.

Still other biomedical therapies are being developed for people with severe depression that persists over years. One approach involves implanting a device in the chest that stimulates the vagus nerve, a major nerve that descends from the brain stem toward the heart (Corcoran, Thomas, Phillips, & O'Keane, 2006; Nemeroff et al., 2006). When the vagus nerve is stimulated by the device, it activates brain structures that are less active in severely depressed people.

Psychosurgery, that is, *surgery that removes or destroys brain tissue in the hope of improving disorder,* is reserved for the most severe cases. The most well-known psychosurgery is the *prefrontal lobotomy*. Developed in 1935 by Nobel Prize winner Egas Moniz to treat severe phobias and anxiety, the procedure destroys the connections between the prefrontal cortex and the rest of the brain. Lobotomies were performed on thousands of patients. The procedure—which was never validated scientifically—left many patients in worse condition than before, subjecting the already suffering patients and their families to further heartbreak (Valenstein, 1986). Perhaps the most notable failure was the lobotomy performed on Rosemary Kennedy, the sister of President John F. Kennedy, which left her severely incapacitated.

There are very few centers that still conduct psychosurgery today, and when such surgeries are performed they are much more limited in nature and called *cingulotomy* (Dougherty et al., 2002). The ability to more accurately image and localize brain structures using modern neuroimaging techniques suggests that new, more accurate, and more beneficial developments in psychosurgery may soon be available (Sachdev & Chen, 2009).

[1]National Institute of Mental Health. (2008). *Mental health medications* (NIH Publication No. 08-3929). Retrieved from http://www.nimh.nih.gov/health/publications/mental-health-medications/complete-index.shtml#pub4

References

Abrams, R. (1997). *Electroconvulsive therapy* (3rd ed.). Oxford, England: Oxford University Press.

Biedermann, F., & Fleischhacker, W. W. (2009). Antipsychotics in the early stage of development. *Current Opinion Psychiatry, 22*, 326–330.

Casey, D. E. (1996). Side effect profiles of new antipsychotic agents. *Journal of Clinical Psychiatry, 57*(Suppl. 11), 40–45.

Corcoran, C. D., Thomas, P., Phillips, J., & O'Keane, V. (2006). Vagus nerve stimulation in chronic treatment-resistant depression: Preliminary findings of an open-label study. *The British Journal of Psychiatry, 189*, 282–283.

Dougherty, D., Baer, L., Cosgrove, G., Cassem, E., Price, B., Nierenberg, A.,…Rauch, S. L. (2002). Prospective long-term follow-up of 44 patients who received cingulotomy for treatment-refractory obsessive-compulsive disorder. *American Journal of Psychiatry, 159*(2), 269.

Fraser, A. R. (2000). Antidepressant choice to minimize treatment resistance. *The British Journal of Psychiatry, 176*, 493.

Greenhill, L. L., Halperin, J. M., & Abikof, H. (1999). Stimulant medications. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(5), 503–512.

Healy, D., & Whitaker, C. J. (2003). Antidepressants and suicide: Risk-benefit conundrums. *Journal of Psychiatry & Neuroscience, 28*, 331–339.

Hollon, S. D., Thase, M. E., & Markowitz, J. C. (2002). Treatment and prevention of depression. *Psychological Science in the Public Interest, 3*, 39–77.

Kellner, C. H., Fink, M., Knapp, R., Petrides, G., Husain, M., Rummans, T.,…Malur, C. (2005). Relief of expressed suicidal intent by ECT: A consortium for research in ECT study. *The American Journal of Psychiatry, 162*(5), 977–982.

Kowatch, R. A., Suppes, T., Carmody, T. J., Bucci, J. P., Hume, J. H., Kromelis, M.,…Rush, A. J. (2000). Effect size of lithium, divalproex sodium, and carbamazepine in children and adolescents with bipolar disorder. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*, 713–20.

Loo, C. K., Schweitzer, I., & Pratt, C. (2006). Recent advances in optimizing electroconvulsive therapy. *Australian and New Zealand Journal of Psychiatry, 40*, 632–638.

Marangell, L. B., Silver, J. M., Goff, D. C., & Yudofsky, S. C. (2003). Psychopharmacology and electroconvulsive therapy. In R. E. Hales & S. C. Yudofsky (Eds.), *The American Psychiatric Publishing textbook of clinical psychiatry* (4th ed., pp. 1047–1149). Arlington, VA: American Psychiatric Publishing.

McElroy, S. L., & Keck, P. E. (2000). Pharmacologic agents for the treatment of acute bipolar mania. *Biological Psychiatry, 48*, 539–557.

Nemeroff, C., Mayberg, H., Krahl, S., McNamara, J., Frazer, A., Henry, T.,…Brannan, S. (2006). VNS therapy in treatment-resistant depression: Clinical evidence and putative neurobiological mechanisms. *Neuropsychopharmacology, 31*(7), 1345–1355.

Otto, M. W., Pollack, M. H., Sachs, G. S., Reiter, S. R., Meltzer-Brody, S., & Rosenbaum, J. F. (1993). Discontinuation of benzodiazepine treatment: Efficacy of cognitive-behavioral therapy for patients with panic disorder. *American Journal of Psychiatry, 150*, 1485–1490.

Rado, J., Dowd, S. M., & Janicak, P. G. (2008). The emerging role of transcranial magnetic stimulation (TMS) for treatment of psychiatric disorders. *Directions in Psychiatry, 28*(4), 315–332.

Sachdev, P. S., & Chen, X. (2009). Neurosurgical treatment of mood disorders: Traditional psychosurgery and the advent of deep brain stimulation. *Current Opinion in Psychiatry, 22*(1), 25–31.

Sackeim, H. A., Prudic, J., Fuller, R., Keilp, J., Philip, W., Lavori, P. W., & Olfson, M. (2007). The cognitive effects of electroconvulsive therapy in community settings. *Neuropsychopharmacology, 32*, 244–254. doi:10.1038/sj.npp.1301180

Sackheim, H. A., Haskett, R. F., Mulsant, B. H., Thase, M. E., Mann, J. J., Pettinati, H.,…Prudic, J. (2001). Continuation pharmacotherapy in the prevention of relapse following electroconvulsive therapy: A randomized controlled trial. *Journal of the American Medical Association, 285*, 1299–1307.

Simon, G. E. (2006). The antidepressant quandary—Considering suicide risk when treating adolescent depression. *The New England Journal of Medicine, 355*, 2722–2723.

Simon, G. E., Savarino, J., Operskalski, B., & Wang, P. S. (2006). Suicide risk during antidepressant treatment. *American Journal of Psychiatry, 163*, 41–47. doi:10.1176/appi.ajp.163.1.41

Spencer, T. J., Biederman, J., Harding, M., & O'Donnell, D. (1996). Growth deficits in ADHD children revisited: Evidence for disorder-associated growth delays? *Journal of the American Academy of Child & Adolescent Psychiatry, 35*(11), 1460–1469.

Valenstein, E. (1986). *Great and desperate cures: The rise and decline of psychosurgery and other radical treatments for mental illness*. New York, NY: Basic Books.

Zahn, T. P., Rapoport, J. L., & Thompson, C. L. (1980). Autonomic and behavioral effects of dextroamphetamine and placebo in normal and hyperactive prepubertal boys. *Journal of Abnormal Child Psychology, 8*(2), 145–160.

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15.3: Evaluating Treatment and Prevention- What Works?

Learning Objectives

1. Summarize the ways that scientists evaluate the effectiveness of psychological, behavioral, and community service approaches to preventing and reducing disorders.
2. Summarize which types of therapy are most effective for which disorders.

We have seen that psychologists and other practitioners employ a variety of treatments in their attempts to reduce the negative outcomes of psychological disorders. But we have not yet considered the important question of whether these treatments are effective, and if they are, which approaches are most effective for which people and for which disorders. Accurate empirical answers to these questions are important as they help practitioners focus their efforts on the techniques that have been proven to be most promising, and will guide societies as they make decisions about how to spend public money to improve the quality of life of their citizens (Hunsley & Di Giulio, 2002).

Psychologists use **outcome research**, that is, *studies that assess the effectiveness of medical treatments*, to determine the effectiveness of different therapies. As you can see in Figure **15.3.10**, in these studies the independent variable is the type of the treatment—for instance, whether it was psychological or biological in orientation or how long it lasted. In most cases characteristics of the client (e.g., his or her gender, age, disease severity, and prior psychological histories) are also collected as control variables. The dependent measure is an assessment of the benefit received by the client. In some cases we might simply ask the client if she feels better, and in other cases we may directly measure behavior: Can the client now get in the airplane and take a flight? Has the client remained out of juvenile detention?

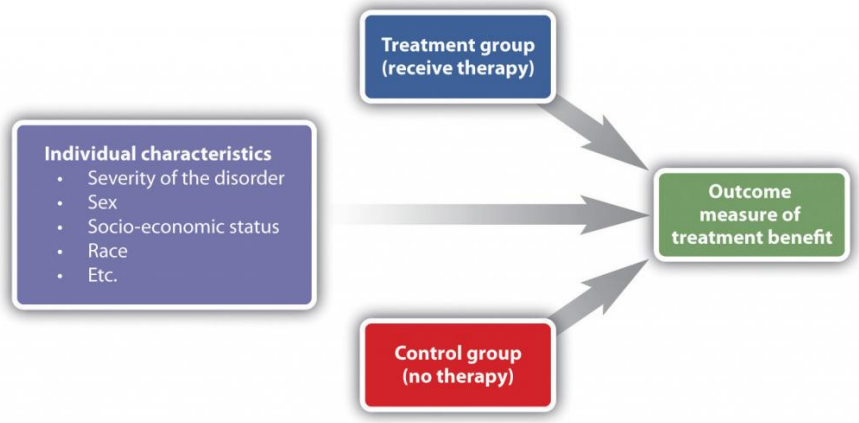


Figure **15.3.10**: Outcome Research. The design of an outcome study includes a dependent measure of benefit received by the client, as predicted by independent variables including type of treatment and characteristics of the individual.

In every case the scientists evaluating the therapy must keep in mind the potential that other effects rather than the treatment itself might be important, that some treatments that seem effective might not be, and that some treatments might actually be harmful, at least in the sense that money and time are spent on programs or drugs that do not work.

One threat to the validity of outcome research studies is **natural improvement**—the possibility that people might get better over time, even without treatment. People who begin therapy or join a self-help group do so because they are feeling bad or engaging in unhealthy behaviors. After being in a program over a period of time, people frequently feel that they are getting better. But it is possible that they would have improved even if they had not attended the program, and that the program is not actually making a difference. To demonstrate that the treatment is effective, the people who participate in it must be compared with another group of people who do not get treatment.

Another possibility is that therapy works, but that it doesn't really matter which type of therapy it is. **Nonspecific treatment effects** occur when the patient gets better over time simply by coming to therapy, even though it doesn't matter what actually happens at the therapy sessions. The idea is that therapy works, in the sense that it is better than doing nothing, but that all therapies are pretty

much equal in what they are able to accomplish. Finally, **placebo effects** are improvements that occur as a result of the expectation that one will get better rather than from the actual effects of a treatment.

Effectiveness of Psychological Therapy

Thousands of studies have been conducted to test the effectiveness of psychotherapy, and by and large they find evidence that it works. Some outcome studies compare a group that gets treatment with another (control) group that gets no treatment. For instance, Ruwaard, Broeksteeg, Schrieken, Emmelkamp, and Lange (2010) found that patients who interacted with a therapist over a website showed more reduction in symptoms of panic disorder than did a similar group of patients who were on a waiting list but did not get therapy. Although studies such as this one control for the possibility of natural improvement (the treatment group improved more than the control group, which would not have happened if both groups had only been improving naturally over time), they do not control for either nonspecific treatment effects or for placebo effects. The people in the treatment group might have improved simply by being in the therapy (nonspecific effects), or they may have improved because they expected the treatment to help them (placebo effects).

An alternative is to compare a group that gets "real" therapy with a group that gets only a placebo. For instance, Keller et al. (2001) had adolescents who were experiencing anxiety disorders take pills that they thought would reduce anxiety for 8 weeks. However, one-half of the patients were randomly assigned to actually receive the antianxiety drug Paxil, while the other half received a placebo drug that did not have any medical properties. The researchers ruled out the possibility that only placebo effects were occurring because they found that both groups improved over the 8 weeks, but the group that received Paxil improved significantly more than the placebo group did.

Studies that use a control group that gets no treatment or a group that gets only a placebo are informative, but they also raise ethical questions. If the researchers believe that their treatment is going to work, why would they deprive some of their participants, who are in need of help, of the possibility for improvement by putting them in a control group?

Another type of outcome study compares different approaches with each other. For instance, Herbert et al. (2005) tested whether social skills training could boost the results received for the treatment of social anxiety disorder with cognitive-behavioral therapy (CBT) alone. As you can see in Figure **15.3.11**, they found that people in both groups improved, but CBT coupled with social skills training showed significantly greater gains than CBT alone.

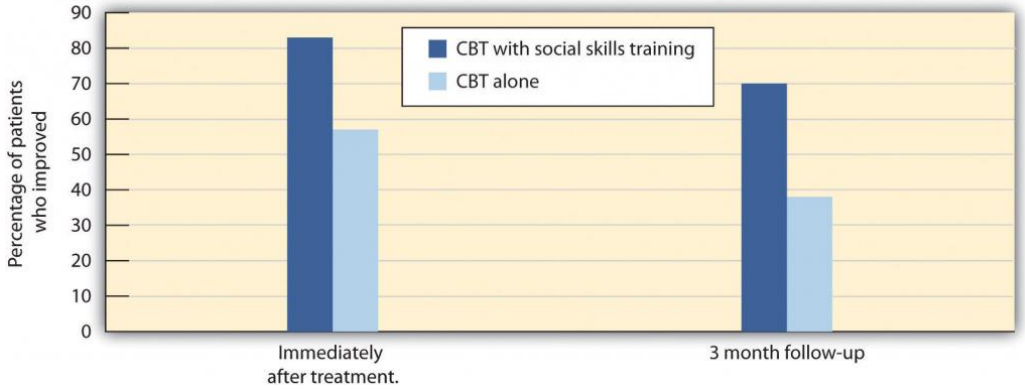


Figure **15.3.11**: Herbert et al. (2005) compared the effectiveness of CBT alone with CBT along with social skills training. Both groups improved, but the group that received both therapies had significantly greater gains than the group that received CBT alone. Adapted from Herbert, J. D., Gaudiano, B. A., Rheingold, A. A., Myers, V. H., Dalrymple, K., & Nolan, E. M. (2005). Social skills training augments the effectiveness of cognitive behavioral group therapy for social anxiety disorder. *Behavior Therapy, 36*(2), 125–138.

Other studies (Crits-Christoph, 1992; Crits-Christoph et al., 2004) have compared brief sessions of psychoanalysis with longer-term psychoanalysis in the treatment of anxiety disorder, humanistic therapy with psychodynamic therapy in treating depression, and cognitive therapy with drug therapy in treating anxiety (Dalgleish, 2004; Hollon, Thase, & Markowitz, 2002). These studies are advantageous because they compare the specific effects of one type of treatment with another, while allowing all patients to get treatment.

Research Focus: Meta-Analyzing Clinical Outcomes

Because there are thousands of studies testing the effectiveness of psychotherapy, and the independent and dependent variables in the studies vary widely, the results are often combined using a *meta-analysis*. A **meta-analysis** is *a statistical technique that uses the results of existing studies to integrate and draw conclusions about those studies*. In one important meta-analysis analyzing the effect of psychotherapy, Smith, Glass, and Miller (1980) summarized studies that compared different types of therapy or that compared the effectiveness of therapy against a control group. To find the studies, the researchers systematically searched computer databases and the reference sections of previous research reports to locate every study that met the inclusion criteria. Over 475 studies were located, and these studies used over 10,000 research participants.

The results of each of these studies were systematically coded, and a measure of the effectiveness of treatment known as the **effect size** was created for each study. Smith and her colleagues found that the average effect size for the influence of therapy was 0.85, indicating that psychotherapy had a relatively large positive effect on recovery. What this means is that, overall, receiving psychotherapy for behavioral problems is substantially better for the individual than not receiving therapy (Figure **15.3.12**). Although they did not measure it, psychotherapy presumably has large societal benefits as well—the cost of the therapy is likely more than made up for by the increased productivity of those who receive it.

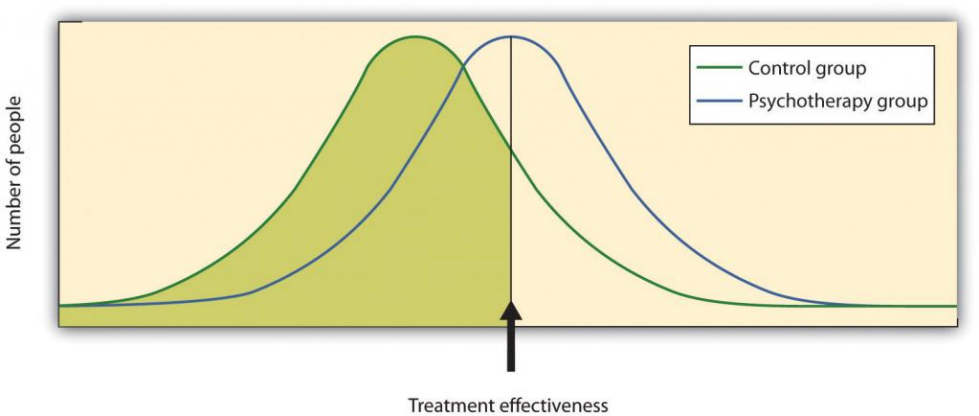


Figure **15.3.12**: Normal Curves of Those Who Do and Do Not Get Treatment. Meta-analyses of the outcomes of psychotherapy have found that, on average, the distribution for people who get treatment is higher than for those who do not get treatment.

Other meta-analyses have also found substantial support for the effectiveness of specific therapies, including cognitive therapy, CBT (Butler, Chapman, Forman, & Beck, 2006; Deacon & Abramowitz, 2004), couples and family therapy (Shadish & Baldwin, 2002), and psychoanalysis (Shedler, 2010). On the basis of these and other meta-analyses, a list of *empirically supported therapies*—that is, therapies that are known to be effective—has been developed (Chambless & Hollon, 1998; Hollon, Stewart, & Strunk (2006). These therapies include cognitive therapy and behavioral therapy for depression; cognitive therapy, exposure therapy, and stress inoculation training for anxiety; CBT for bulimia; and behavior modification for bed-wetting.

Is one type of therapy better than others?

Smith, Glass, and Miller (1980) did not find much evidence that any one type of therapy was more effective than any other type, and more recent meta-analyses have not tended to find many differences either (Cuijpers, van Straten, Andersson, & van Oppen, 2008). What this means is that a good part of the effect of therapy is nonspecific, in the sense that simply coming to any type of therapy is helpful in comparison to not coming. This is true partly because there are fewer distinctions among the ways that different therapies are practiced than the theoretical differences among them would suggest. What a good therapist practicing psychodynamic approaches does in therapy is often not much different from what a humanist or a cognitive-behavioral therapist does, and so no one approach is really likely to be better than the other.

What all good therapies have in common is that they give people hope; help them think more carefully about themselves and about their relationships with others; and provide a positive, empathic, and trusting relationship with the therapist—the therapeutic alliance (Ahn & Wampold, 2001). This is why many self-help groups are also likely to be effective and perhaps why having a psychiatric service dog may also make us feel better.

Effectiveness of Biomedical Therapies

Although there are fewer of them because fewer studies have been conducted, meta-analyses also support the effectiveness of drug therapies for psychological disorder. For instance, the use of psychostimulants to reduce the symptoms of attention-deficit/hyperactivity disorder (ADHD) is well known to be successful, and many studies find that the positive and negative symptoms of schizophrenia are substantially reduced by the use of antipsychotic medications (Lieberman et al., 2005).

People who take antidepressants for mood disorders or antianxiety medications for anxiety disorders almost always report feeling better, although drugs are less helpful for phobic disorder and obsessive-compulsive disorder. Some of these improvements are almost certainly the result of placebo effects (Cardeña & Kirsch, 2000), but the medications do work, at least in the short term. An analysis of U.S. Food and Drug Administration databases found effect sizes of 0.26 for Prozac, 0.26 for Zoloft, 0.24 for Celexa, 0.31 for Lexapro, and 0.30 for Cymbalta. The overall average effect size for antidepressant medications approved by the FDA between 1987 and 2004 was 0.31 (Deshauer et al., 2008; Turner, Matthews, Linardatos, Tell, & Rosenthal, 2008).

One problem with drug therapies is that although they provide temporary relief, they don't treat the underlying cause of the disorder. Once the patient stops taking the drug, the symptoms often return in full force. In addition many drugs have negative side effects, and some also have the potential for addiction and abuse. Different people have different reactions, and all drugs carry warning labels. As a result, although these drugs are frequently prescribed, doctors attempt to prescribe the lowest doses possible for the shortest possible periods of time.

Older patients face special difficulties when they take medications for mental illness. Older people are more sensitive to drugs, and drug interactions are more likely because older patients tend to take a variety of different drugs every day. They are more likely to forget to take their pills, to take too many or too few, or to mix them up due to poor eyesight or faulty memory.

Like all types of drugs, medications used in the treatment of mental illnesses can carry risks to an unborn infant. Tranquilizers should not be taken by women who are pregnant or expecting to become pregnant, because they may cause birth defects or other infant problems, especially if taken during the first trimester. Some selective serotonin reuptake inhibitors (SSRIs) may also increase risks to the fetus (Louik, Lin, Werler, Hernandez, & Mitchell, 2007; U.S. Food and Drug Administration, 2004)[1], as do antipsychotics (Diav-Citrin et al., 2005).

Decisions on medication should be carefully weighed and based on each person's needs and circumstances. Medications should be selected based on available scientific research, and they should be prescribed at the lowest possible dose. All people must be monitored closely while they are on medications.

Effectiveness of Social-Community Approaches

Measuring the effectiveness of community action approaches to mental health is difficult because they occur in community settings and impact a wide variety of people, and it is difficult to find and assess valid outcome measures. Nevertheless, research has found that a variety of community interventions can be effective in preventing a variety of psychological disorders (Price, Cowen, Lorion, & Ramos-McKay,1988).

Data suggest that federally funded prevention programs such as the *Special Supplemental Program for Women, Infants, and Children (WIC)*, which provides federal grants to states for supplemental foods, health-care referral, and nutrition education for low-income women and their children, are successful. WIC mothers have higher birth weight babies and lower infant mortality than other low-income mothers (Ripple & Zigler, 2003). And the average blood-lead levels among children have fallen approximately 80% since the late 1970s as a result of federal legislation designed to remove lead paint from housing (Centers for Disease Control and Prevention, 2000)[2].

Although some of the many community-based programs designed to reduce alcohol, tobacco, and drug abuse; violence and delinquency; and mental illness have been successful, the changes brought about by even the best of these programs are, on average, modest (Wandersman & Florin, 2003; Wilson, Gottfredson, & Najaka, 2001). This does not necessarily mean that the programs are not useful. What is important is that community members continue to work with researchers to help determine which aspects of which programs are most effective, and to concentrate efforts on the most productive approaches (Weissberg, Kumpfer, & Seligman, 2003). The most beneficial preventive interventions for young people involve coordinated, systemic efforts to enhance their social and emotional competence and health. Many psychologists continue to work to promote policies that support community prevention as a model of preventing disorder.

References

Ahn, H.-N., & Wampold, B. E. (2001). Where oh where are the specific ingredients? A meta-analysis of component studies in counseling and psychotherapy. *Journal of Counseling Psychology, 48*(3), 251–257.

Butler A. C., Chapman, J. E., Forman, E. M., Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review, 26*(1), 17–31. doi:10.1016/j.cpr.2005.07.003.

Cardeña, E., & Kirsch, I. (2000). True or false: The placebo effect as seen in drug studies is definitive proof that the mind can bring about clinically relevant changes in the body: What is so special about the placebo effect? *Advances in Mind-Body Medicine, 16*(1), 16–18.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*(1), 7–18.

Crits-Christoph, P. (1992). The efficacy of brief dynamic psychotherapy: A meta-analysis. *American Journal of Psychiatry, 149*, 151–158.

Crits-Christoph, P., Gibbons, M. B., Losardo, D., Narducci, J., Schamberger, M., & Gallop, R. (2004). Who benefits from brief psychodynamic therapy for generalized anxiety disorder? *Canadian Journal of Psychoanalysis, 12*, 301–324.

Cuijpers, P., van Straten, A., Andersson, G., & van Oppen, P. (2008). Psychotherapy for depression in adults: A meta-analysis of comparative outcome studies. *Journal of Consulting and Clinical Psychology, 76*(6), 909–922.

Dalgleish, T. (2004). Cognitive approaches to posttraumatic stress disorder: The evolution of multirepresentational theorizing. *Psychological Bulletin, 130*, 228–260.

Deacon, B. J., & Abramowitz, J. S. (2004). Cognitive and behavioral treatments for anxiety disorders: A review of meta-analytic findings. *Journal of Clinical Psychology, 60*(4), 429–441.

Deshauer, D., Moher, D., Fergusson, D., Moher, E., Sampson, M., & Grimshaw, J. (2008). Selective serotonin reuptake inhibitors for unipolar depression: A systematic review of classic long-term randomized controlled trials. *Canadian Medical Association Journal, 178*(10), 1293–301. doi:10.1503/cmaj.071068.

Diav-Citrin, O., Shechtman, S., Ornoy, S., Arnon, J., Schaefer, C., Garbis, H.,…Ornoy, A. (2005). Safety of haloperidol and penfluridol in pregnancy: A multicenter, prospective, controlled study. *Journal of Clinical Psychiatry, 66*, 317–322.

Herbert, J. D., Gaudiano, B. A., Rheingold, A. A., Myers, V. H., Dalrymple, K., & Nolan, E. M. (2005). Social skills training augments the effectiveness of cognitive behavioral group therapy for social anxiety disorder. *Behavior Therapy, 36*(2), 125–138.

Hollon, S., Stewart, M., & Strunk, D. (2006). Enduring effects for cognitive therapy in the treatment of depression and anxiety. *Annual Review of Psychology, 57*, 285–316.

Hollon, S. D., Thase, M. E., & Markowitz, J. C. (2002). Treatment and prevention of depression. *Psychological Science in the Public Interest, 3*, 39–77.

Hunsley, J., & Di Giulio, G. (2002). Dodo bird, phoenix, or urban legend? The question of psychotherapy equivalence. *The Scientific Review of Mental Health Practice: Objective Investigations of Controversial and Unorthodox Claims in Clinical Psychology, Psychiatry, and Social Work, 1*(1), 11–22.

Keller, M. B., Ryan, N. D., Strober, M., Klein, R. G., Kutcher, S. P., Birmaher, B.,…McCafferty, J. P. (2001). Efficacy of paroxetine in the treatment of adolescent major depression: A randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(7), 762–772.

Lieberman, J., Stroup, T., McEvoy, J., Swartz, M., Rosenheck, R., Perkins, D.,…Lebowitz, B. D. (2005). Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *New England Journal of Medicine, 353*(12), 1209.

Louik, C., Lin, A. E., Werler M. M., Hernandez, S., & Mitchell, A. A. (2007). First-trimester use of selective serotonin-reuptake inhibitors and the risk of birth defects. *New England Journal of Medicine, 356*, 2675–2683.

Price, R. H., Cowen, E. L., Lorion, R. P., & Ramos-McKay, J. (Eds.). (1988). *Fourteen ounces of prevention: A casebook for practitioners*. Washington, DC: American Psychological Association.

Ripple, C. H., & Zigler, E. (2003). Research, policy, and the federal role in prevention initiatives for children. *American Psychologist*, *58*(6–7), 482–490.

Ruwaard, J., Broeksteeg, J., Schrieken, B., Emmelkamp, P., & Lange, A. (2010). Web-based therapist-assisted cognitive behavioral treatment of panic symptoms: A randomized controlled trial with a three-year follow-up. *Journal of Anxiety Disorders*, *24*(4), 387–396.

Shadish, W. R., & Baldwin, S. A. (2002). Meta-analysis of MFT interventions. In D. H. Sprenkle (Ed.), *Effectiveness research in marriage and family therapy* (pp. 339–370). Alexandria, VA: American Association for Marriage and Family Therapy.

Shedler, J. (2010). The efficacy of psychodynamic psychotherapy. *American Psychologist*, *65*(2), 98–109.

Smith, M. L., Glass, G. V., & Miller, R. L. (1980). *The benefits of psychotherapy*. Baltimore, MD: Johns Hopkins University Press.

Turner, E. H., Matthews, A. M., Linardatos, E., Tell, R. A., & Rosenthal, R. (2008). Selective publication of antidepressant trials and its influence on apparent efficacy. *New England Journal of Medicine*, *358*(3), 252–60.

Wandersman, A., & Florin, P. (2003). Community interventions and effective prevention. *American Psychologist*, *58*(6–7), 441–448.

Weissberg, R. P., Kumpfer, K. L., & Seligman, M. E. P. (2003). Prevention that works for children and youth: An introduction. *American Psychologist*, *58*(6–7), 425–432.

Wilson, D. B., Gottfredson, D. C., & Najaka, S. S. (2001). School-based prevention of problem behaviors: A meta-analysis. *Journal of Quantitative Criminology*, *17*(3), 247–272.

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15.4: Reducing Disorder by Changing the Social Situation

Learning Objectives

1. Explain the advantages of group therapy and self-help groups for treating disorder.
2. Evaluate the procedures and goals of community mental health services.

Although the individual therapies that we have discussed so far in this chapter focus primarily on the psychological and biological aspects of the bio-psycho-social model of disorder, the social dimension is never out of the picture. Therapists understand that disorder is caused, and potentially prevented, in large part by the people with whom we interact. A person with schizophrenia does not live in a vacuum. He interacts with his family members and with the other members of the community, and the behavior of those people may influence his disease. And depression and anxiety are created primarily by the affected individual's perceptions (and misperceptions) of the important people around them. Thus prevention and treatment are influenced in large part by the social context in which the person is living.

Group, Couples, and Family Therapy

Practitioners sometimes incorporate the social setting in which disorder occurs by conducting therapy in groups. Group therapy is *psychotherapy in which clients receive psychological treatment together with others*. A professionally trained therapist guides the group, usually between 6 and 10 participants, to create an atmosphere of support and emotional safety for the participants (Yalom & Leszcz, 2005).

Group therapy provides a safe place where people come together to share problems or concerns, to better understand their own situations, and to learn from and with each other. Group therapy is often cheaper than individual therapy, as the therapist can treat more people at the same time, but economy is only one part of its attraction. Group therapy allows people to help each other, by sharing ideas, problems, and solutions. It provides social support, offers the knowledge that other people are facing and successfully coping with similar situations, and allows group members to model the successful behaviors of other group members. Group therapy makes explicit the idea that our interactions with others may create, intensify, and potentially alleviate disorders.

Group therapy has met with much success in the more than 50 years it has been in use, and it has generally been found to be as or more effective than individual therapy (McDermut, Miller, & Brown, 2001). Group therapy is particularly effective for people who have life-altering illness, as it helps them cope better with their disease, enhances the quality of their lives, and in some cases has even been shown to help them live longer (American Group Psychotherapy Association, 2000)[1].



Figure **15.4.9**: Group therapy provides a therapeutic setting where people meet with others to share problems or concerns, to better understand their own situation, and to learn from and with each other. Rose Physical Therapy Group – strider -_-10 – CC BY 2.0l.

Sometimes group therapy is conducted with people who are in close relationships. *Couples therapy* is treatment in which two people who are cohabitating, married, or dating meet together with the practitioner to discuss their concerns and issues about their relationship. These therapies are in some cases educational, providing the couple with information about what is to be expected in a relationship. The therapy may focus on such topics as sexual enjoyment, communication, or the symptoms of one of the partners (e.g., depression).

Family therapy involves families meeting together with a therapist. In some cases the meeting is precipitated by a particular problem with one family member, such as a diagnosis of bipolar disorder in a child. Family therapy is based on the assumption that the problem, even if it is primarily affecting one person, is the result of an interaction among the people in the family.

Self-Help Groups

Group therapy is based on the idea that people can be helped by the positive social relationships that others provide. One way for people to gain this social support is by joining a self-help group, which is *a voluntary association of people who share a common desire to overcome psychological disorder or improve their well-being* (Humphreys & Rappaport, 1994). Self-help groups have been used to help individuals cope with many types of addictive behaviors. Three of the best-known self-help groups are Alcoholics Anonymous, of which there are more than two million members in the United States, Gamblers Anonymous, and Overeaters Anonymous.

The idea behind self-groups is very similar to that of group therapy, but the groups are open to a broader spectrum of people. As in group therapy, the benefits include social support, education, and observational learning. Religion and spirituality are often emphasized, and self-blame is discouraged. Regular group meetings are held with the supervision of a trained leader.

Community Mental Health: Service and Prevention

The social aspect of disorder is also understood and treated at the community level. Community mental health services are *psychological treatments and interventions that are distributed at the community level*. Community mental health services are provided by nurses, psychologists, social workers, and other professionals in sites such as schools, hospitals, police stations, drug treatment clinics, and residential homes. The goal is to establish programs that will help people get the mental health services that they need (Gonzales, Kelly, Mowbray, Hays, & Snowden, 1991).

Unlike traditional therapy, the primary goal of community mental health services is prevention. Just as widespread vaccination of children has eliminated diseases such as polio and smallpox, mental health services are designed to prevent psychological disorder (Institute of Medicine, 1994)[2]. Community prevention can be focused on one more of three levels: primary prevention, secondary prevention, and tertiary prevention.

Primary prevention is prevention in which all members of the community receive the treatment. Examples of primary prevention are programs designed to encourage all pregnant women to avoid cigarettes and alcohol because of the risk of health problems for the fetus, and programs designed to remove dangerous lead paint from homes.

Secondary prevention is more limited and focuses on people who are most likely to need it—those who display *risk factors* for a given disorder. Risk factors are *the social, environmental, and economic vulnerabilities that make it more likely than average that a given individual will develop a disorder* (Werner & Smith, 1992). The following presents a list of potential risk factors for psychological disorders.

Some Risk Factors for Psychological Disorders

Community mental health workers practicing secondary prevention will focus on youths with these markers of future problems.

- Academic difficulties
- Attention-deficit/hyperactivity disorder (ADHD)
- Child abuse and neglect
- Developmental disorders
- Drug and alcohol abuse
- Dysfunctional family
- Early pregnancy
- Emotional immaturity
- Homelessness
- Learning disorder
- Low birth weight
- Parental mental illness
- Poor nutrition
- Poverty

Finally, *tertiary prevention* is treatment, such as psychotherapy or biomedical therapy, that focuses on people who are already diagnosed with disorder.

Community prevention programs are designed to provide support during childhood or early adolescence with the hope that the interventions will prevent disorders from appearing or will keep existing disorders from expanding. Interventions include such things as help with housing, counseling, group therapy, emotional regulation, job and skills training, literacy training, social responsibility training, exercise, stress management, rehabilitation, family therapy, or removing a child from a stressful or dangerous home situation.

The goal of community interventions is to make it easier for individuals to continue to live a normal life in the face of their problems. Community mental health services are designed to make it less likely that vulnerable populations will end up in institutions or on the streets. In summary, their goal is to allow at-risk individuals to continue to participate in community life by assisting them within their own communities.

Research Focus: The Implicit Association Test as a Behavioral Marker for Suicide

Secondary prevention focuses on people who are at risk for disorder or for harmful behaviors. Suicide is a leading cause of death worldwide, and prevention efforts can help people consider other alternatives, particularly if it can be determined who is most at risk. Determining whether a person is at risk of suicide is difficult, however, because people are motivated to deny or conceal such thoughts to avoid intervention or hospitalization. One recent study found that 78% of patients who die by suicide explicitly deny suicidal thoughts in their last verbal communications before killing themselves (Busch, Fawcett, & Jacobs, 2003).

Nock et al. (2010) tested the possibility that implicit measures of the association between the self-concept and death might provide a more direct behavioral marker of suicide risk that would allow professionals to more accurately determine whether a person is likely to commit suicide in comparison to existing self-report measures. They measured implicit associations about death and suicide in 157 people seeking treatment at a psychiatric emergency department.

The participants all completed a version of the Implicit Association Test (IAT), which was designed to assess the strength of a person's mental associations between death and the self (Greenwald, McGhee, & Schwartz, 1998). Using a notebook computer, participants classified stimuli representing the constructs of "death" (i.e., die, dead, deceased, lifeless, and suicide) and "life" (i.e., alive, survive, live, thrive, and breathing) and the attributes of "me" (i.e., I, myself, my, mine, and self) and "not me" (i.e., they, them, their, theirs, and other). Response latencies for all trials were recorded and analyzed, and the strength of each participant's association between "death" and "me" was calculated.

The researchers then followed participants over the next 6 months to test whether the measured implicit association of death with self could be used to predict future suicide attempts. The authors also tested whether scores on the IAT would add to prediction of risk above and beyond other measures of risk, including questionnaire and interview measures of suicide risk. Scores on the IAT predicted suicide attempts in the next 6 months above all the other risk factors that were collected by the hospital staff, including past history of suicide attempts. These results suggest that measures of implicit cognition may be useful for determining risk factors for clinical behaviors such as suicide.

Key Takeaways

- Group therapy is psychotherapy in which clients receive psychological treatment together with others. A professionally trained therapist guides the group. Types of group therapy include couples therapy and family therapy.
- Self-help groups have been used to help individuals cope with many types of disorder.
- The goal of community health service programs is to act during childhood or early adolescence with the hope that interventions might prevent disorders from appearing or keep existing disorders from expanding. The prevention provided can be primary, secondary, or tertiary.

Exercise and Critical Thinking

1. Imagine the impact of a natural disaster like Hurricane Katrina on the population of the city of New Orleans. How would you expect such an event to affect the prevalence of psychological disorders in the community? What recommendations would you

make in terms of setting up community support centers to help the people in the city?

[1]American Group Psychotherapy Association. (2000). *About group psychotherapy*. Retrieved from www.groupsinc.org/group/consumersguide2000.html

[2]Institute of Medicine. (1994). *Reducing risks for mental disorders: Frontiers for preventive intervention research*. Washington, DC: National Academy Press.

References

Busch, K. A., Fawcett, J., & Jacobs, D. G. (2003). Clinical correlates of inpatient suicide. *Journal of Clinical Psychiatry, 64*(1), 14–19.

Gonzales, L. R., Kelly, J. G., Mowbray, C. T., Hays, R. B., & Snowden, L. R. (1991). Community mental health. In M. Hersen, A. E. Kazdin, & A. S. Bellack (Eds.), *The clinical psychology handbook* (2nd ed., pp. 762–779). Elmsford, NY: Pergamon Press.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology, 74*, 1464–1480.

Humphreys, K., & Rappaport, J. (1994). Researching self-help/mutual aid groups and organizations: Many roads, one journey. *Applied and Preventative Psychology, 3*(4), 217–231.

McDermut, W., Miller, I. W., & Brown, R. A. (2001). The efficacy of group psychotherapy for depression: A meta-analysis and review of the empirical research. *Clinical Psychology: Science and Practice, 8*(1), 98–116.

Nock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: Implicit cognition predicts suicidal behavior. *Psychological Science, 21*(4), 511–517.

Werner, E. E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. New York, NY: Cornell University Press.

Yalom, I., & Leszcz, M. (2005). *The theory and practice of group psychotherapy* (5th ed.). New York, NY: Basic Books.

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References

American Board of Forensic Psychology. (2014). *Brochure*. http://www.abfp.com/brochure.asp

American Psychological Association. (2014). www.apa.org

American Psychological Association. (2014). *Graduate training and career possibilities in exercise and sport psychology.* http://www.apadivisions.org/division...ng.aspx?item=1

American Psychological Association. (2019). *Maime Phipps Clark, PhD,* and *Kenneth Clark, PhD*. https://www.apa.org/pi/oema/resource...ologists/clark

American Psychological Association. (2011). *Psychology as a career.* http://www.apa.org/education/undergr...ch-career.aspx

Benjamin, L., Henry, K., & McMahon, L. (2005). Inez Beverly Prosser and the education of African Americans. *Journal of the History of the Behavioral Sciences*, *41*, 43–62. https://onlinelibrary.wiley.com/doi/...002/jhbs.20058

Betancourt, H., & López, S. R. (1993). The study of culture, ethnicity, and race in American psychology. *American Psychologist*, *48*, 629–637.

Black, S. R., Spence, S. A., & Omari, S. R. (2004). Contributions of African Americans to the field of psychology. *Journal of Black Studies*, *35*, 40–64.

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*, 1–49.

Calkins, M. W. (1906). A reconciliation between structural and functional psychology. *Psychological Review*, *13*, 61–81.

Carlson, N. R. (2013). *Physiology of Behavior* (11th ed.). Pearson.

Confer, J. C., Easton, J. A., Fleischman, D. S., Goetz, C. D., Lewis, D. M. G., Perilloux, C., & Buss, D. M. (2010). Evolutionary psychology. Controversies, questions, prospects, and limitations. *American Psychologist*, *65*, 100–126.

Crawford, M., & Marecek, J. (1989). Psychology reconstructs the female 1968–1988. *Psychology of Women Quarterly*, *13*, 147–165.

Danziger, K. (1980). The history of introspection reconsidered. *Journal of the History of the Behavioral Sciences*, *16*, 241–262.

Danziger, K. (1980). Wundt's psychological experiment in the light of his philosophy of science. *Psychological Research*, *42*, 109–122.

Darwin, C. (1871). *The descent of man and selection in relation to sex*. John Murray.

Darwin, C. (1872). *The expression of the emotions in man and animals*. John Murray.

DeAngelis, T. (2010). Fear not. *gradPSYCH Magazine*, *8*, 38.

Department of Health and Human Services. (n.d.). Projected future growth of the older population. http://www.aoa.gov/Aging_Statistics/...rowth.aspx#age

Endler, J. A. (1986). *Natural Selection in the Wild*. Princeton University Press.

Fogg, N. P., Harrington, P. E., Harrington, T. F., & Shatkin, L. (2012). *College majors handbook with real career paths and payoffs* (3rd ed.). JIST Publishing.

Franko, D. L., et al. (2012). Racial/ethnic differences in adults in randomized clinical trials of binge eating disorder. *Journal of Consulting and Clinical Psychology*, *80*, 186–195.

Friedman, H. (2008), Humanistic and positive psychology: The methodological and epistemological divide. *The Humanistic Psychologist*, *36*, 113–126.

Gordon, O. E. (1995). *A brief history of psychology.* http://www.psych.utah.edu/gordon/Cla...ex.html#maptop

Greengrass, M. (2004). 100 years of B.F. Skinner. *Monitor on Psychology*, *35*, 80.

Guthrie, R. (1998). *Even the rat was white* (2nd edition). Allyn and Bacon.

Halonen, J. S. (2011). *White paper: Are there too many psychology majors?* Prepared for the Staff of the State University System of Florida Board of Governors. http://www.cogdop.org/page_attachmen...op_posting.pdf

Hock, R. R. (2009). Social psychology. *Forty studies that changed psychology: Explorations into the history of psychological research* (pp. 308–317). Pearson.

Hoffman, C. (2012). *Careers in clinical, counseling, or school psychology; mental health counseling; clinical social work; marriage & family therapy and related professions*. http://www.indiana.edu/~psyugrad/adv...Counseling.pdf

Jang, K. L., Livesly, W. J., & Vernon, P. A. (1996). Heritability of the Big Five personality dimensions and their facets: A twin study. *Journal of Personality*, *64*, 577–591.

Johnson, R., & Lubin, G. (2011). College exposed: What majors are most popular, highest paying and most likely to get you a job. *Business Insider.com*. http://www.businessinsider.com/best-...dy-2011-6?op=1

Jones, M. C. (1924). A laboratory study of fear: The case of Peter. *Pedagogical Seminary*, *31*, 308–315.

Knekt, P. P., et al. (2008). Randomized trial on the effectiveness of long- and short-term psychodynamic psychotherapy and solution-focused therapy on psychiatric symptoms during a 3-year follow-up. *Psychological Medicine: A Journal of Research In Psychiatry And The Allied Sciences*, *38*, 689–703.

Landers, R. N. (2011, June 14). Grad school: Should I get a PhD or Master's in I/O psychology? http://neoacademic.com/2011/06/14/gr.../#.UuKKLftOnGg

Macdonald, C. (2013). *Health psychology center presents: What is health psychology?* http://healthpsychology.org/what-is-...th-psychology/

Madigan, S. & O'Hara, R. (1992). Short-term memory at the turn of the century: Mary Whiton Calkins's memory research. *American Psychologist*, *47*, 170–174.

McCrae, R. R. & Costa, P. T. (2008). Empirical and theoretical status of the five-factor model of personality traits. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment. Vol. 1 Personality theories and models*. Sage.

Michalski, D., Kohout, J., Wicherski, M., & Hart, B. (2011). *2009 Doctorate Employment Survey*. APA Center for Workforce Studies. http://www.apa.org/workforce/publica...mpl/index.aspx

Miller, G. A. (2003). The cognitive revolution: A historical perspective. *Trends in Cognitive Sciences*, *7*, 141–144.

Munakata, Y., McClelland, J. L., Johnson, M. H., & Siegler, R. S. (1997). Rethinking infant knowledge: Toward an adaptive process account of successes and failures in object permanence tasks. *Psychological Review*, *104*, 689–713.

Mundasad, S. (2013). *Word-taste synaesthesia: Tasting names, places, and Anne Boleyn*. http://www.bbc.co.uk/news/health-21060207

Munsey, C. (2009). More states forgo a postdoc requirement. *Monitor on Psychology*, *40*, 10.

National Association of School Psychologists. (n.d.). *Becoming a nationally certified school psychologist (NCSP)*. http://www.nasponline.org/CERTIFICAT...ecomeNCSP.aspx

Nicolas, S., & Ferrand, L. (1999). Wundt's laboratory at Leipzig in 1891. *History of Psychology*, *2*, 194–203.

Norcross, J. C. (n.d.) Clinical versus counseling psychology: What's the diff? http://www.csun.edu/~hcpsy002/Clinic...Psychology.pdf

Norcross, J. C., & Castle, P. H. (2002). Appreciating the PsyD: The facts. *Eye on Psi Chi*, *7*, 22–26.

O'Connor, J. J., & Robertson, E. F. (2002). *John Forbes Nash*. http://www-groups.dcs.st-and.ac.uk/~...hies/Nash.html

O'Hara, M. (n.d.). Historic review of humanistic psychology. http://www.ahpweb.org/index.php?opti...d=14&Itemid=24

Person, E. S. (1980). Sexuality as the mainstay of identity: Psychoanalytic perspectives. *Signs*, *5*, 605–630.

Pickren, W. & Rutherford, A. (2010). *A history of modern psychology in context*. Wiley.

Rantanen, J., Metsäpelto, R. L., Feldt, T., Pulkkinen, L., & Kokko, K. (2007). Long-term stability in the Big Five personality traits in adulthood. *Scandinavian Journal of Psychology*, *48*, 511–518.

Riggio, R. E. (2013). What is industrial/organizational psychology? *Psychology Today*. http://www.psychologytoday.com/blog/...nal-psychology

Romo, R. (1986). George I. Sanchez and the civil rights movement: 1940–1960. *La Raza Law Journal*, *1*, 342–362.

Sacks, O. (2007). A neurologists notebook: The abyss, music and amnesia. *The New Yorker*. http://www.newyorker.com/reporting/2...urrentPage=all

Shedler, J. (2010). The efficacy of psychodynamic psychotherapy. *American Psychologist*, *65*(2), 98–109.

Soldz, S., & Vaillant, G. E. (1999). The Big Five personality traits and the life course: A 45-year longitudinal study. *Journal of Research in Personality*, *33*, 208–232.

Thorne, B. M., & Henley, T. B. (2005). *Connections in the history and systems of psychology* (3rd ed.). Houghton Mifflin Company.

Tolman, E. C. (1938). The determiners of behavior at a choice point. *Psychological Review*, *45*, 1–41.

U.S. Department of Education, National Center for Education Statistics. (2016). *The Condition of Education*, *2016* (NCES 2016-144).

Weisstein, N. (1993). Psychology constructs the female: Or, the fantasy life of the male psychologist (with some attention to the fantasies of his friends, the male biologist and the male anthropologist). *Feminism and Psychology*, *3*, 195–210.

Westen, D. (1998). The scientific legacy of Sigmund Freud, toward a psychodynamically informed psychological science. *Psychological Bulletin*, *124*, 333–371.

Psychological Research

American Cancer Society. (n.d.). History of the cancer prevention studies. http://www.cancer.org/research/resea...evention-study

American Psychological Association. (2009). *Publication Manual of the American Psychological Association* (6th ed.). Author.

American Psychological Association. (n.d.). *Research with animals in psychology.* https://www.apa.org/research/respons...ch-animals.pdf

Arnett, J. (2008). The neglected 95%: Why American psychology needs to become less American. *American Psychologist, 63*(7), 602–614.

Aschwanden, C. (2018, December 6). Psychology's replication crisis has made the field better. *FiveThirtyEight*. https://fivethirtyeight.com/features...-field-better/

Barnett, W. S. (2011). Effectiveness of early educational intervention. *Science*, *333*(6045), 975–978. https://science.sciencemag.org/content/333/6045/975

Barton, B. A., Eldridge, A. L., Thompson, D., Affenito, S. G., Striegel-Moore, R. H., Franko, D. L., . . . Crockett, S. J. (2005). The relationship of breakfast and cereal consumption to nutrient intake and body mass index: The national heart, lung, and blood institute growth and health study. *Journal of the American Dietetic Association*, *105*(9), 1383–1389. http://dx.doi.org/10.1016/j.jada.2005.06.003

Blann, L.E. (2005). Early intervention for children and families: With special needs. *MCN: The American Journal of Maternal Child Nursing*, *30*, 263–67.

Chwalisz, K., Diener, E., & Gallagher, D. (1988). Autonomic arousal feedback and emotional experience: Evidence from the spinal cord injured. *Journal of Personality and Social Psychology, 54*, 820–828.

Dominus, S. (2011, May 25). Could conjoined twins share a mind? *New York Times Sunday Magazine*. http://www.nytimes.com/2011/05/29/ma...html?_r=5&hp&

Egnor, M. (2017, November 24). What the craniopagus twins teach us about the mind and the brain. *Evolution News & Science Today*. https://evolutionnews.org/2017/11/wh...and-the-brain/

Ethnicity and Health in America Series: Featured Psychologists (n.d.). *American Psychological Association*. https://www.apa.org/pi/oema/resource...sumner-prosser

Fanger, S. M., Frankel, L. A., & Hazen, N. (2012). Peer exclusion in preschool children's play: Naturalistic observations in a playground setting. *Merrill-Palmer Quarterly, 58*, 224–254.

Fiedler, K. (2004). Illusory correlation. In R. F. Pohl (Ed.), *Cognitive illusions: A handbook on fallacies and biases in thinking, judgment and memory* (pp. 97–114). Psychology Press.

Frantzen, L. B., Treviño, R. P., Echon, R. M., Garcia-Dominic, O., & DiMarco, N. (2013). Association between frequency of ready-to-eat cereal consumption, nutrient intakes, and body mass index in fourth- to sixth-grade low-income minority children. *Journal of the Academy of Nutrition and Dietetics*, *113*(4), 511–519.

Godoy, J. C., & Brussino, S. (2010). Psychology in Argentina. *The Corsini Encyclopedia of Psychology*. John Wiley & Sons.

Gunamudian David Boaz. (n.d.). *World Library*. http://www.worldlibrary.org/articles...ian_David_Boaz

Harper, J. (2013, July 5). Ice cream and crime: Where cold cuisine and hot disputes intersect. *The Times-Picaune*. http://www.nola.com/crime/index.ssf/...where_hot.html

Jenkins, W. J., Ruppel, S. E., Kizer, J. B., Yehl, J. L., & Griffin, J. L. (2012). An examination of post 9-11 attitudes towards Arab Americans. *North American Journal of Psychology, 14*, 77–84.

Jones, J. M. (2013, May 13). Same-sex marriage support solidifies above 50% in U.S. *Gallup Politics*. http://www.gallup.com/poll/162398/se...ies-above.aspx

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for predicting first-year college grade point average* (Research Report No. 2008-5). https://research.collegeboard.org/si...nt-average.pdf

Lewin, T. (2014, March 5). A new SAT aims to realign with schoolwork. *New York Times*. http://www.nytimes.com/2014/03/06/ed...ege-board.html.

Lowcock, E. C., Cotterchio, M., Anderson, L. N., Boucher, B. A., & El-Sohemy, A. (2013). High coffee intake, but not caffeine, is associated with reduced estrogen receptor negative and postmenopausal breast cancer risk with no effect modification by CYP1A2 genotype. *Nutrition and Cancer, 65*(3), 398–409. doi:10.1080/01635581.2013.768348

Lowry, M., Dean, K., & Manders, K. (2010). The link between sleep quantity and academic performance for the college student. *Sentience: The University of Minnesota Undergraduate Journal of Psychology, 3*(Spring), 16–19. http://www.psych.umn.edu/sentience/f...IENCE_Vol3.pdf

Margaret Floy Washburn, PhD. (n.d.). *American Psychological*

Association. https://www.apa.org/about/governance...garet-washburn.

Mary Whiton Calkins. (n.d.). *American Psychological Association*. https://www.apa.org/about/governance...whiton-calkins

Massimini, M., & Peterson, M. (2009). Information and communication technology: Affects of U.S. college students. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *3*(1).

McKie, R. (2010, June 26). Chimps with everything: Jane Goodall's 50 years in the jungle. *The Guardian*. http://www.theguardian.com/science/2...rica-interview

Narendra Nath Sen Gupta. (n.d.). *Veethi: The face of India*. https://www.veethi.com/india-people/...le-4893-16.htm

Neil, A. L., & Christensen, H. (2009). Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety. *Clinical Psychology Review*, *29*, 208–15.

Nobel Prize-winning scientist Frances Arnold retracts paper. (2020, January 3). *BBC News*. https://www.bbc.com/news/world-us-canada-50989423

Offit, P. (2008). *Autism's false prophets: Bad science, risky medicine, and the search for a cure*. Columbia University Press.

Patel, M., Lee, A. D., Clemmons, N. S., Redd, S. B., Poser, S., Blog, D., … Gastañaduy, P. A. (2019, October 11). National update on measles cases and outbreaks—United States, January 1–October 1, 2019. *Morbidity and Mortality Weekly Report*, *68*, 893–96.

Perkins, H. W., Haines, M. P., & Rice, R. (2005). Misperceiving the college drinking norm and related problems: A nationwide study of exposure to prevention information, perceived norms and student alcohol misuse. *J. Stud. Alcohol*, *66*(4), 470–478.

Peters-Scheffer, N., Didden, R., Korzilius, H., & Sturmey, P. (2011). A meta-analytic study on the effectiveness of comprehensive ABA-based early intervention programs for children with Autism Spectrum Disorders. *Research in Autism Spectrum Disorders*, *5*, 60–69.

Rimer, S. (2008, September 21). College panel calls for less focus on SATs. *The New York Times*. http://www.nytimes.com/2008/09/22/ed...ions.html?_r=0

Rothstein, J. M. (2004). College performance predictions and the SAT. *Journal of Econometrics*, *121*, 297–317.

Rotton, J., & Kelly, I. W. (1985). Much ado about the full moon: A meta-analysis of lunar-lunacy research. *Psychological Bulletin*, *97*(2), 286–306. doi:10.1037/0033-2909.97.2.286

Santelices, M. V., & Wilson, M. (2010). Unfair treatment? The case of Freedle, the SAT, and the standardization approach to differential item functioning. *Harvard Education Review*, *80*, 106–134.

Sears, D. O. (1986). College sophomores in the laboratory: Influences of a narrow data base on social psychology's view of human nature. *Journal of Personality and Social Psychology*, *51*, 515–530.

Shaw, C. M., & Tan, S. A. (2015). Integration of mobile technology in educational materials improves participation: Creation of a novel smartphone application for resident education. *Journal of Surgical Education*, *72*(4), 670–73. https://www.sciencedirect.com/scienc...31720415000318

Shrout, P. E., & Rodgers, J. L. (2018). Psychology, science, and knowledge construction: Broadening perspectives from the replication crisis. *Annual Review of Psychology*, *69*, 487-510.

Strauss, V. (2019, March 19). Is it finally time to get rid of the SAT and ACT college admissions tests? *The Washington Post*. https://www.washingtonpost.com/educa...issions-tests/

Tuskegee University. (n.d.). *About the USPHS Syphilis Study*. http://www.tuskegee.edu/about_us/cen...lis_study.aspx.

Women and Minorities in Psychology. (n.d.). *IResearch*. http://psychology.iresearchnet.com/h...nd-minorities/

Biopsychology

Anderson, P. J., & Leuzzi, V. (2010). White matter pathology in phenylketonuria. *Molecular Genetics and Metabolism*, *99*, S3–S9.

Arnst, C. (2003, November). Commentary: Getting rational about health-care rationing. *Bloomberg Businessweek Magazine*. http://www.businessweek.com/stories/...care-rationing

Azevedo, F. A., Carvalho, L. R., Grinberg, L. T., Farfel, J. M., Ferretti, R. E., Leite, R. E., ... & Herculano-Houzel, S. (2009). Equal numbers of neuronal and nonneuronal cells make the human brain an isometrically scaled-up primate brain. *Journal of Comparative Neurology*, *513*(5), 532–541.

Banich, M. T., & Heller, W. (1998). Evolving perspectives on lateralization of function. *Current Directions in Psychological Science*, *7*(1), 1–2.

Berridge, K. C., & Robinson, T. E. (1998). What is the role of dopamine in reward: Hedonic impact, reward learning,

or incentive salience? *Brain Research Reviews*, *28*, 309–369.

Chandola, T., Brunner, E., & Marmot, M. (2006). Chronic stress at work and the metabolic syndrome: A prospective study. *BMJ*, *332*, 521–524.

Comings, D. E., Gonzales, N., Saucier, G., Johnson, J. P., & MacMurray, J. P. (2000). The DRD4 gene and the spiritual transcendence scale of the character temperament index. *Psychiatric Genetics*, *10*, 185–189.

Confer, J. C., Easton, J. A., Fleischman, D. S., Goetz, C. D., Lewis, D. M. G, Perilloux, C., & Buss, D. M. (2010). Evolutionary psychology: Controversies, questions, prospects, and limitations. *American Psychologist*, *65*, 110–126.

Connors, B. W., & Long, M. A. (2004). Electrical synapses in the mammalian brain. *Annual Review of Neuroscience*, *27*, 393–418.

Ehret, G. (2006). Hemisphere dominance of brain function—which functions are lateralized and why?. *23 Problems in Systems Neuroscience*, 44–61.

Fernandez, A. (2008, October 16). ABC reporter Bob Woodruff's incredible recovery from traumatic brain injury. *The Huffington Post*. https://www.huffpost.com/entry/abc-r...druff_b_125863

Gaines, C. (2013, August). An A-Rod suspension would save the Yankees as much as $37.5 million in 2014 alone. *Business Insider*. http://www.businessinsider.com/an-a-...in-2014-2013-8

Gardner, E. L. (2011). Addiction and brain reward and antireward pathways. *Advances in Psychosomatic Medicine*, *30*, 22–60.

Gazzaniga, M. S. (2005). Forty-five years of split-brain research and still going strong. *Nature Reviews Neuroscience*, *6*(8), 653–659.

George, O., Le Moal, M., & Koob, G. F. (2012). Allostasis and addiction: Role of the dopamine and corticotropin-releasing factor systems. *Physiology & Behavior, 106*, 58–64.

Glaser, R., & Kiecolt-Glaser, J. K. (2005). Stress-induced immune dysfunction: Implications for health. *Nature Reviews Immunology*, *5*, 243–251.

Gong, L., Parikh, S., Rosenthal, P. J., & Greenhouse, B. (2013). Biochemical and immunological mechanisms by which sickle cell trait protects against malaria. *Malaria Journal*. Advance online publication. doi:10.1186/1475-2875-12-317

Hardt, O., Einarsson, E. Ö., & Nader, K. (2010). A bridge over troubled water: Reconsolidation as a link between cognitive and neuroscientific memory research traditions. *Annual Review of Psychology*, *61*, 141–167.

Herculano-Houzel, S. (2009). The human brain in numbers: a linearly scaled-up primate brain. *Frontiers in Human Neuroscience*, *3*, 31.

Herculano-Houzel, S. (2012). The remarkable, yet not extraordinary, human brain as a scaled-up primate brain and its associated cost. *Proceedings of the National Academy of Sciences*, *109*(Supplement 1), 10661–10668.

Huttenlocher, P. R. (2000). The neuropathology of phenylketonuria: human and animal studies. *European Journal of Pediatrics*, *159*(2), S102–S106.

Macmillan, M. (1999). The Phineas Gage Information Page. http://www.uakron.edu/gage

March, J. S., Silva, S., Petrycki, S., Curry, J., Wells, K., Fairbank, J., … Severe, J. (2007). The treatment for adolescents with depression study (TADS): Long-term effectiveness and safety outcomes. *Arch Gen Psychiatry, 64*, 1132–1143.

Miguel, P. M., Pereira, L. O., Silveira, P. P., & Meaney, M. J. (2019). Early environmental influences on the development of children's brain structure and function. *Developmental Medicine and Child Neurology*, *61*, 1127–33.

Mustanski, B. S., DuPree, M. G., Nievergelt, C. M., Bocklandt, S., Schork, N. J., & Hamer, D. H. (2005). A genome wide scan of male sexual orientation. *Human Genetics*, *116*, 272–278.

National Institute on Drug Abuse. (2001, July). Anabolic steroid abuse: What are the health consequences of steroid abuse? *National Institutes of Health*. http://www.drugabuse.gov/publication...-steroid-abuse

Short, A. K., and Baram, T. Z. (2019). Early-life adversity and neurological disease: Age-old questions and novel answers. *Nature Reviews Neurology*, *15*, 657–69.

Squire, L. R. (2009). The legacy of patient H. M. for neuroscience. *Neuron*, *61*, 6–9.

Tienari, P., Wynne, L. C., Sorri, A., et al. (2004). Genotype–environment interaction in schizophrenia spectrum disorder: long-term follow-up study of Finnish adoptees. *British Journal of Psychiatry, 184*, 216–222.

University of Utah Genetic Science Learning Center. (n.d.). What are genetic disorders? http://learn.genetics.utah.edu/conte...ers/whataregd/

Yudell, M., Roberts, D., DeSalle, R., & Tishkoff, S. (2016). Taking race out of human genetics. *Science*, *351*(6273), 564–565.

Aggarwal, S. K., Carter, G. T., Sullivan, M. D., ZumBrunnen, C., Morrill, R., & Mayer, J. D. (2009). Medicinal use of cannabis in the United States: Historical perspectives, current trends, and future directions. *Journal of Opioid Management*, *5*, 153–168.

Alhola, P. & Polo-Kantola, P. (2007). Sleep Deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment*, *3*, 553–557.

Alladin, A. (2012). Cognitive hypnotherapy for major depressive disorder. *The American Journal of Clinical Hypnosis*, *54*, 275–293.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Author.

Aquina, C. T., Marques-Baptista, A., Bridgeman, P., & Merlin, M. A. (2009). Oxycontin abuse and overdose. *Postgraduate Medicine*, *121*, 163–167.

Arnulf, I. (2012). REM sleep behavior disorder: Motor manifestations and pathophysiology. *Movement Disorders*, *27*, 677–689.

Banks, S., & Dinges, D. F. (2007). Behavioral and physiological consequences of sleep restriction. *Journal of Clinical Sleep Medicine*, *3*, 519–528.

Bartke, A., Sun, L. Y., & Longo, V. (2013). Somatotropic signaling: Trade-offs between growth, reproductive development, and longevity. *Physiological Reviews*, *93*, 571–598.

Berkowitz, C. D. (2012). Sudden infant death syndrome, sudden unexpected infant death, and apparent life-threatening events. *Advances in Pediatrics*, *59*, 183–208.

Berry, R. B., Kryger, M. H., & Massie, C. A. (2011). A novel nasal excitatory positive airway pressure (EPAP) device for the treatment of obstructive sleep apnea: A randomized controlled trial. *Sleep*, *34*, 479–485.

Bixler, E. O., Kales, A., Soldatos, C. R., Kales, J. D., & Healey, S. (1979). Prevalence of sleep disorders in the Los Angeles metropolitan area. *American Journal of Psychiatry*, *136*, 1257–1262.

Bostwick, J. M. (2012). Blurred boundaries: The therapeutics and politics of medical marijuana. *Mayo Clinic Proceedings*, *87*, 172–186.

Brook, R. D., Appel, L. J., Rubenfire, M., Ogedegbe, G., Bisognano, J. D., Elliott, W. K., . . . Rajagopalan, S. (2013). Beyond medications and diet: Alternative approaches to lowering blood pressure: A scientific statement from the American Heart Association. *Hypertension*, *61*, 1360–1383.

Broughton, R., Billings, R., Cartwright, R., Doucette, D., Edmeads, J., Edwardh, M., . . . Turrell, G. (1994). Homicidal somnambulism: A case report. *Sleep*, *17*, 253–264.

Brown, L. K. (2012). Can sleep deprivation studies explain why human adults sleep? *Current Opinion in Pulmonary Medicine*, *18*, 541–545.

Burgess, C. R., & Scammell, T. E. (2012). Narcolepsy: Neural mechanisms of sleepiness and cataplexy. *Journal of Neuroscience*, *32*, 12305–12311.

Cai, D. J., Mednick, S. A., Harrison, E. M., Kanady, J. C., & Mednick, S. C. (2009). REM, not incubation, improves creativity by priming associative networks. *Proceedings of the National Academy of Sciences, USA*, *106*, 10130–10134.

Caldwell, K., Harrison, M., Adams, M., Quin, R. H., & Greeson, J. (2010). Developing mindfulness in college students through movement based courses: Effects on self-regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health*, *58*, 433–442.

Capellini, I., Barton, R. A., McNamara, P., Preston, B. T., & Nunn, C. L. (2008). Phylogenetic analysis of the ecology and evolution of mammalian sleep. *Evolution*, *62*, 1764–1776.

Cartwright, R. (2004). Sleepwalking violence: A sleep disorder, a legal dilemma, and a psychological challenge. *American Journal of Psychiatry*, *161*, 1149–1158.

Cartwright, R., Agargun, M. Y., Kirkby, J., & Friedman, J. K. (2006). Relation of dreams to waking concerns. *Psychiatry Research*, *141*, 261–270.

Casati, A., Sedefov, R., & Pfeiffer-Gerschel, T. (2012). Misuse of medications in the European Union: A systematic review of the literature. *European Addiction Research*, *18*, 228–245.

Chen, K. W., Berger, C. C., Manheimer, E., Forde, D., Magidson, J., Dachman, L., & Lejuez, C. W. (2013). Meditative therapies for reducing anxiety: A systematic review and meta-analysis of randomized controlled trials. *Depression and Anxiety*, *29*, 545–562.

Chokroverty, S. (2010). Overview of sleep & sleep disorders. *Indian Journal of Medical Research*, *131*, 126–140.

Christensen, A., Bentley, G. E., Cabrera, R., Ortega, H. H., Perfito, N., Wu, T. J., & Micevych, P. (2012). Hormonal regulation of female reproduction. *Hormone and Metabolic Research*, *44*, 587–591.

CNN. (1999, June 25). 'Sleepwalker' convicted of murder. http://www.cnn.com/US/9906/25/sleepwalker.01/

Coe, W. C. (2009). Hypnosis as role enactment: The role demand variable. *American Journal of Clinical Hypnosis*, *51*(4), 395–398.

https://pdfs.semanticscholar.org/5af...b60955e71a.pdf

Coe, W. C., & Sarbin, T. R. (1966). An experimental demonstration of hypnosis as role enactment. *Journal of Abnormal Psychology, 71*(6), 400–406. https://psycnet.apa.org/doiLanding?d...037%2Fh0023920

Cropley, M., Theadom, A., Pravettoni, G., & Webb, G. (2008). The effectiveness of smoking cessation interventions prior to surgery: A systematic review. *Nicotine and Tobacco Research*, *10*, 407–412.

De la Herrán-Arita, A. K., & Drucker-Colín, R. (2012). Models for narcolepsy with cataplexy drug discovery. *Expert Opinion on Drug Discovery*, *7*, 155–164.

Del Casale, A., Ferracuti, S., Rapinesi, C., Serata, D., Sani, G., Savoja, V., . . . Girardi, P. (2012). Neurocognition under hypnosis: Findings from recent functional neuroimaging studies. *International Journal of Clinical and Experimental Hypnosis*, *60*, 286–317.

Elkins, G., Johnson, A., & Fisher, W. (2012). Cognitive hypnotherapy for pain management. *The American Journal of Clinical Hypnosis*, *54*, 294–310.

Ellenbogen, J. M., Hu, P. T., Payne, J. D., Titone, D., & Walker, M. P. (2007). Human relational memory requires time and sleep. *Proceedings of the National Academy of Sciences, USA*, *104*, 7723–7728.

Fenn, K. M., Nusbaum, H. C., & Margoliash, D. (2003). Consolidation during sleep of perceptual learning of spoken language. *Nature*, *425*, 614–616.

Ferini-Strambi, L. (2011). Does idiopathic REM sleep behavior disorder (iRBD) really exist? What are the potential markers of neurodegeneration in iRBD? *Sleep Medicine*, *12*(2 Suppl.), S43–S49.

Fiorentini, A., Volonteri, L.S., Dragogna, F., Rovera, C., Maffini, M., Mauri, M. C., & Altamura, C. A. (2011). Substance-induced psychoses: A critical review of the literature. *Current Drug Abuse Reviews*, *4*, 228–240.

Fogel, S. M., & Smith, C. T. (2011). The function of the sleep spindle: A physiological index of intelligence and a mechanism for sleep-dependent memory consolidation. *Neuroscience and Biobehavioral Reviews*, *35*, 1154–1165.

Frank, M. G. (2006). The mystery of sleep function: Current perspectives and future directions. *Reviews in the Neurosciences*, *17*, 375–392.

Freeman, M. P., Fava, M., Lake, J., Trivedi, M. H., Wisner, K. L., & Mischoulon, D. (2010). Complementary and alternative medicine in major depressive disorder: The American Psychiatric Association task force report. *The Journal of Clinical Psychiatry*, *71*, 669–681.

Gold, D. R., Rogacz, S. R., Bock, N., Tosteson, T. D., Baum, T. M., Speizer, F. M., & Czeisler, C. A. (1992). Rotating shift work, sleep, and accidents related to sleepiness in hospital nurses. *American Journal of Public Health*, *82*, 1011–1014.

Golden, W. L. (2012). Cognitive hypnotherapy for anxiety disorders. *The American Journal of Clinical Hypnosis*, *54*, 263–274.

Gómez, R. L., Bootzin, R. R., & Nadel, L. (2006). Naps promote abstraction in language-learning infants. *Psychological Science*, *17*, 670–674.

Guilleminault, C., Kirisoglu, C., Bao, G., Arias, V., Chan, A., & Li, K. K. (2005). Adult chronic sleepwalking and its treatment based on polysomnography. *Brain*, *128*, 1062–1069.

Guldenmund, P., Vanhaudenhuyse, A., Boly, M., Laureys, S., & Soddu, A. (2012). A default mode of brain function in altered states of consciousness. *Archives Italiennes de Biologie*, *150*, 107–121.

Halász, P. (1993). Arousals without awakening—Dynamic aspect of sleep. *Physiology and Behavior*, *54*, 795–802.

Han, F. (2012). Sleepiness that cannot be overcome: Narcolepsy and cataplexy. *Respirology*, *17*, 1157–1165.

Hardeland, R., Pandi-Perumal, S. R., & Cardinali, D. P. (2006). Melatonin. *International Journal of Biochemistry & Cell Biology*, *38*, 313–316.

Henry, D., & Rosenthal, L. (2013). "Listening for his breath:" The significance of gender and partner reporting on the diagnosis, management, and treatment of obstructive sleep apnea. *Social Science & Medicine*, *79*, 48–56.

Hicks, R. A., Fernandez, C., & Pellegrini, R. J. (2001). The changing sleep habits of university students: An update. *Perceptual and Motor Skills*, *93*, 648.

Hicks, R. A., Johnson, C., & Pellegrini, R. J. (1992). Changes in the self-reported consistency of normal habitual sleep duration of college students (1978 and 1992). *Perceptual and Motor Skills*, *75*, 1168–1170.

Hilgard, E. R., & Hilgard, J. R. (1994). *Hypnosis in the Relief of Pain*. Brunner/Mazel.

Hishikawa, Y., & Shimizu, T. (1995). Physiology of REM sleep, cataplexy, and sleep paralysis. *Advances in Neurology*, *67*, 245–271.

Herman, A., & Herman, A. P. (2013). Caffeine's mechanism of action and its cosmetic use. *Skin Pharmacology and Physiology*, *26*, 8–14.

Hobson, J. A. (2002). *Dreaming: An introduction to the science of sleep*. Oxford University Press.

Hobson, J. A. (2009). REM sleep and dreaming: Towards a theory of protoconsciousness. *Nature Reviews Neuroscience*, *10*, 803–814.

Horikawa,T., Tamaki, M., Miyawaki, Y. & Kamitani, Y. (2013). Neural Decoding of Visual Imagery During Sleep. *Science*, *340*(6132), 639–642. doi:10.1126/science.1234330

Hossain, J. L., & Shapiro, C. M. (2002). The prevalence, cost implications, and management of sleep disorders: An overview. *Sleep and Breathing*, *6*, 85–102.

Huang, L. B., Tsai, M. C., Chen, C. Y., & Hsu, S. C. (2013). The effectiveness of light/dark exposure to treat insomnia in female nurses undertaking shift work during the evening/night shift. *Journal of Clinical Sleep Medicine*, *9*, 641–646.

Huber, R., Ghilardi, M. F., Massimini, M., & Tononi, G. (2004). Local sleep and learning. *Nature*, *430*, 78–81.

Jayanthi, L. D., & Ramamoorthy, S. (2005). Regulation of monoamine transporters: Influence of psychostimulants and therapeutic antidepressants. *The AAPS Journal*, *7*, E728–738.

Julien, R. M. (2005). Opioid analgesics. In *A primer of drug action: A comprehensive guide to the actions, uses, and side effects of psychoactive drugs* (pp. 461–500). Worth.

Kihlstrom, J. F. (2013). Neuro-hypnotism: Prospects for hypnosis and neuroscience. *Cortex*, *49*, 365–374.

Killgore, W. D. S., Killgore, D. B., Day, L. M., Li, C., Kamimori, G. H., & Balkin, T. J. (2007). The effects of 53 hours of sleep deprivation on moral judgment. *Sleep: Journal of Sleep and Sleep Disorders Research*, *30*(3), 345–352. https://academic.oup.com/sleep/artic.../3/345/2708190

Killgore, W. D. S., & Weber, M. (2014). Sleep deprivation and cognitive performance. In M. T. Bianchi (Ed.), *Sleep deprivation and disease: Effects on the body, brain and behavior.* (pp. 209–229). Springer Science + Business Media. https://link.springer.com/chapter/10...4614-9087-6_16

Klein, D. C., Moore, R. Y., & Reppert, S. M. (Eds.). (1991). *Suprachiasmatic nucleus: The mind's clock*. Oxford University Press.

Kogan, N. M., & Mechoulam, R. (2007). Cannabinoids in health and disease. *Dialogues in Clinical Neuroscience*, *9*, 413–430.

Kromann, C. B., & Nielson, C. T. (2012). A case of cola dependency in a woman with recurrent depression. *BMC Research Notes*, *5*, 692.

LaBerge, S. (1990). Lucid dreaming: Psychophysiological studies of consciousness during REM sleep. In R. R. Bootzen, J. F. Kihlstrom, & D. L. Schacter (Eds.), *Sleep and cognition* (pp. 109–126). American Psychological Association.

Lang, A. J., Strauss, J. L., Bomeya, J., Bormann, J. E., Hickman, S. D., Good, R. C., & Essex, M. (2012). The theoretical and empirical basis for meditation as an intervention for PTSD. *Behavior Modification*, *36*, 759–786.

Lesku, J. A., Roth, T. C., 2nd, Amlaner, C. J., & Lima, S. L. (2006). A phylogenetic analysis of sleep architecture in mammals: The integration of anatomy, physiology, and ecology. *The American Naturalist*, *168*, 441–453.

Levitt, C., Shaw, E., Wong, S., & Kaczorowski, J. (2007). Systematic review of the literature on postpartum care: Effectiveness of interventions for smoking relapse prevention, cessation, and reduction in postpartum women. *Birth*, *34*, 341–347.

Luppi, P. H., Clément, O., Sapin, E., Gervasoni, D., Peyron, C., Léger, L., . . . Fort, P. (2011). The neuronal network responsible for paradoxical sleep and its dysfunctions causing narcolepsy and rapid eye movement (REM) behavior disorder. *Sleep Medicine Reviews*, *15*, 153–163.

Mage, D. T., & Donner, M. (2006). Female resistance to hypoxia: Does it explain the sex difference in mortality rates? *Journal of Women's Health*, *15*, 786–794.

Mahowald, M. W., & Schenck, C. H. (2000). Diagnosis and management of parasomnias. *Clinical Cornerstone*, *2*, 48–54.

Mahowald, M. W., Schenck, C. H., & Cramer Bornemann, M. A. (2005). Sleep-related violence. *Current Neurology and Neuroscience Reports*, *5*, 153–158.

Mayo Clinic. (n.d.). *Sleep terrors (night terrors)*. http://www.mayoclinic.org/diseases-c...t/con-20032552

Mather, L. E., Rauwendaal, E. R., Moxham-Hall, V. L., & Wodak, A. D. (2013). (Re)introducing medical cannabis. *The Medical Journal of Australia*, *199*, 759–761.

Maxwell, J. C. (2006). *Trends in the abuse of prescription drugs. Gulf Coast Addiction Technology Transfer Center*. http://asi.nattc.org/userfiles/file/...Trends_Web.pdf

McCarty, D. E. (2010). A case of narcolepsy with strictly unilateral cataplexy. *Journal of Clinical Sleep Medicine*, *15*, 75–76.

McDaid, C., Durée, K. H., Griffin, S. C., Weatherly, H. L., Stradling, J. R., Davies, R. J., . . . Westwood, M. E. (2009). A systematic review of continuous positive airway pressure for obstructive sleep apnoea-hypopnoea syndrome. *Sleep Medicine Reviews*, *13*, 427–436.

McKim, W. A., & Hancock, S. D. (2013). *Drugs and behavior: An introduction to behavioral pharmacology, 7th edition.* Pearson.

Mignot, E. J. M. (2012). A practical guide to the therapy of narcolepsy and hypersomnia syndromes. *Neurotherapeutics, 9*, 739–752.

Miller, N. L., Shattuck, L. G., & Matsangas, P. (2010). Longitudinal study of sleep patterns of United States Military Academy cadets. *Sleep, 33*, 1623–1631.

Mitchell, E. A. (2009). SIDS: Past, present and future. *Acta Paediatrica, 98*, 1712–1719.

Montgomery, G. H., Schnur, J. B., & Kravits, K. (2012). Hypnosis for cancer care: Over 200 years young. *CA: A Cancer Journal for Clinicians, 63*, 31–44.

National Institute on Drug Abuse. (2019, January). *Opioid Overdose Crisis.* NIDA. https://www.drugabuse.gov/drugs-abus...verdose-crisis

National Institute on Drug Abuse. (2019, October). *Methamphetamine: Overview.* NIDA. https://www.drugabuse.gov/publicatio...amine/overview

National Institutes of Health. (n.d.). *Information about sleep*. http://science.education.nih.gov/sup...info-sleep.htm

National Research Council. (1994). *Learning, remembering, believing: Enhancing human performance*. The National Academies Press.

National Sleep Foundation. (n.d.). *How much sleep do we really need?* http://sleepfoundation.org/how-sleep...we-really-need

Ohayon, M. M. (1997). Prevalence of DSM-IV diagnostic criteria of insomnia: Distinguishing insomnia related to mental disorders from sleep disorders. *Journal of Psychiatric Research, 31*, 333–346.

Ohayon, M. M. (2002). Epidemiology of insomnia: What we know and what we still need to learn. *Sleep Medicine Reviews, 6*, 97–111.

Ohayon, M. M., Carskadon, M. A., Guilleminault, C., & Vitiello, M. V. (2004). Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normative sleep values across the human lifespan. *Sleep, 27*, 1255–1273.

Ohayon, M. M., & Roth, T. (2002). Prevalence of restless legs syndrome and periodic limb movement disorder in the general population. *Journal of Psychosomatic Research, 53*, 547–554.

Poe, G. R., Walsh, C. M., & Bjorness, T. E. (2010). Cognitive neuroscience of sleep. *Progress in Brain Research, 185*, 1–19.

Porkka-Heiskanen, T. (2011). Methylxanthines and sleep. *Handbook of Experimental Pharmacology, 200*, 331–348.

Presser, H. B. (1995). Job, family, and gender: Determinants of nonstandard work schedules among employed Americans in 1991. *Demography, 32*, 577–598.

Pressman, M. R. (2007). Disorders of arousal from sleep and violent behavior: The role of physical contact and proximity. *Sleep, 30*, 1039–1047.

Provini, F., Tinuper, P., Bisulli, F., & Lagaresi, E. (2011). Arousal disorders. *Sleep Medicine, 12*(2 Suppl.), S22–S26.

Rattenborg, N. C., Lesku, J. A., Martinez-Gonzalez, D., & Lima, S. L. (2007). The non-trivial functions of sleep. *Sleep Medicine Reviews, 11*, 405–409.

Raz, A. (2011). Hypnosis: A twilight zone of the top-down variety: Few have never heard of hypnosis but most know little about the potential of this mind-body regulation technique for advancing science. *Trends in Cognitive Sciences, 15*, 555–557.

Reiner, K., Tibi, L., & Lipsitz, J. D. (2013). Do mindfulness-based interventions reduce pain intensity? A critical review of the literature. *Pain Medicine, 14*, 230–242.

Restless Legs Syndrome Foundation. (n.d.). *Restless legs syndrome: Causes, diagnosis, and treatment for the patient living with Restless legs syndrome (RSL)*. www.rls.org

Rial, R. V., Nicolau, M. C., Gamundí, A., Akaârir, M., Aparicio, S., Garau, C., . . . Esteban, S. (2007). The trivial function of sleep. *Sleep Medicine Reviews, 11*, 311–325.

Reissig, C. J., Strain, E. C., & Griffiths, R. R. (2009). Caffeinated energy drinks—A growing problem. *Drug and Alcohol Dependence, 99*, 1–10.

Robson, P. J. (2014). Therapeutic potential of cannabinoid medicines. *Drug Testing and Analysis, 6*, 24–30.

Roth, T. (2007). Insomnia: Definition, prevalence, etiology, and consequences. *Journal of Clinical Sleep Medicine, 3*(5 Suppl.), S7–S10.

Rothman, R. B., Blough, B. E., & Baumann, M. H. (2007). Dual dopamine/serotonin releasers as potential medications for stimulant and alcohol addictions. *The AAPS Journal, 9*, E1–10.

Sánchez-de-la-Torre, M., Campos-Rodriguez, F., & Barbé, F. (2012). Obstructive sleep apnoea and cardiovascular disease. *The Lancet Respiratory Medicine, 1*, 31–72.

Savard, J., Simard, S., Ivers, H., & Morin, C. M. (2005). Randomized study on the efficacy of cognitive-behavioral therapy for insomnia secondary to breast cancer, part I: Sleep and psychological

effects. *Journal of Clinical Oncology, 23*, 6083–6096.

Schicho, R., & Storr, M. (2014). Cannabis finds its way into treatment of Crohn's disease. *Pharmacology, 93*, 1–3.

Schmerling, R. H. (2019, September 4). Can Vaping Damage Your Lungs? What we Do and Don't Know. *Harvard Health Publishing*. https://www.health.harvard.edu/blog/...-2019090417734

Shukla, R. K, Crump, J. L., & Chrisco, E. S. (2012). An evolving problem: Methamphetamine production and trafficking in the United States. *International Journal of Drug Policy, 23*, 426–435.

Siegel, J. M. (2008). Do all animals sleep? *Trends in Neuroscience, 31*, 208–213.

Siegel, J. M. (2001). The REM sleep-memory consolidation hypothesis. *Science, 294*, 1058–1063.

Singh, G. K., & Siahpush, M. (2006). Widening socioeconomic inequalities in US life expectancy, 1980–2000. *International Journal of Epidemiology, 35*, 969–979.

Smedslund, G., Fisher, K. J., Boles, S. M., & Lichtenstein, E. (2004). The effectiveness of workplace smoking cessation programmes: A meta-analysis of recent studies. *Tobacco Control, 13*, 197–204.

Sofikitis, N., Giotitsas, N., Tsounapi, P., Baltogiannis, D., Giannakis, D., & Pardalidis, N. (2008). Hormonal regulation of spermatogenesis and spermiogenesis. *Journal of Steroid Biochemistry and Molecular Biology, 109*, 323–330.

Steriade, M., & Amzica, F. (1998). Slow sleep oscillation, rhythmic K-complexes, and their paroxysmal developments. *Journal of Sleep Research, 7*(1 Suppl.), 30–35.

Stickgold, R. (2005). Sleep-dependent memory consolidation. *Nature, 437*, 1272–1278.

Stone, K. C., Taylor, D. J., McCrae, C. S., Kalsekar, A., & Lichstein, K. L. (2008). Nonrestorative sleep. *Sleep Medicine Reviews, 12*, 275–288.

Suchecki, D., Tiba, P. A., & Machado, R. B. (2012). REM sleep rebound as an adaptive response to stressful situations. Frontiers in Neuroscience, 3. doi: 10.3389/fneur.2012.00041

Task Force on Sudden Infant Death Syndrome. (2011). SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics, 128*, 1030–1039.

Taillard, J., Philip, P., Coste, O., Sagaspe, P., & Bioulac, B. (2003). The circadian and homeostatic modulation of sleep pressure during wakefulness differs between morning and evening chronotypes. *Journal of Sleep Research, 12*, 275–282.

Thach, B. T. (2005). The role of respiratory control disorders in SIDS. *Respiratory Physiology & Neurobiology, 149*, 343–353.

U.S. Food and Drug Administration. (2013, October 24). *Statement on Proposed Hydrocodone Reclassification from Janet Woodcock, M.D., Director, Center for Drug Evaluation and Research*. http://www.fda.gov/drugs/drugsafety/ucm372089.htm

Vøllestad, J., Nielsen, M. B., & Nielsen, G. H. (2012). Mindfulness- and acceptance-based interventions for anxiety disorders: A systematic review and meta-analysis. *The British Journal of Clinical Psychology, 51*, 239–260.

Wagner, U., Gais, S., & Born, J. (2001). Emotional memory formation is enhanced across sleep intervals with high amounts of rapid eye movement sleep. *Learning & Memory, 8*, 112–119.

Wagner, U., Gais, S., Haider, H., Verleger, R., & Born, J. (2004). Sleep improves insight. *Nature, 427*, 352–355.

Walker, M. P. (2009). The role of sleep in cognition and emotion. *Annals of the New York Academy of Sciences, 1156*, 168–197.

Waterhouse. J., Fukuda, Y., & Morita, T. (2012). Daily rhythms of the sleep-wake cycle. *Journal of Physiological Anthropology, 31*(5). doi:10.1186/1880-6805-31-5

Welsh, D. K. Takahashi, J. S., & Kay, S. A. (2010). Suprachiasmatic nucleus: Cell autonomy and network properties. *Annual Review of Physiology, 72*, 551–577.

West, S., Boughton, M., & Byrnes, M. (2009). Juggling multiple temporalities: The shift work story of mid-life nurses. *Journal of Nursing Management, 17*, 110–119.

White, D. P. (2005). Pathogenesis of obstructive and central sleep apnea. *American Journal of Respiratory and Critical Care Medicine, 172*, 1363–1370.

Wickens, C. D., Hutchins, S. D., Laux, L., & Sebok, A. (2015). The impact of sleep disruption on complex cognitive tasks: A meta-analysis. *Human Factors, 57*(6), 930–946. https://journals.sagepub.com/doi/10....18720815571935

Williams, J., Roth, A., Vatthauer, K., & McCrae, C. S. (2013). Cognitive behavioral treatment of insomnia. *Chest, 143*, 554–565.

Williamson, A. M., & Feyer, A. M. (2000). Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occupational and Environmental Medicine, 57*, 649–655.

Wolt, B. J., Ganetsky, M., & Babu, K. M. (2012). Toxicity of energy drinks. *Current Opinion in Pediatrics*, *24*, 243–251.

Zangini, S., Calandra-Buonaura, G., Grimaldi, D., & Cortelli, P. (2011). REM behaviour disorder and neurodegenerative diseases. *Sleep Medicine*, *12*(2 Suppl.), S54–S58.

Zeidan, F., Grant, J. A., Brown, C. A., McHaffie, J. G., & Coghill, R. C. (2012). Mindfulness meditation-related pain relief: Evidence for unique brain mechanisms in the regulation of pain. *Neuroscience Letters*, *520*, 165–173.

Sensation and Perception

Aaron, J. I., Mela, D. J., & Evans, R. E. (1994). The influences of attitudes, beliefs, and label information on perceptions of reduced-fat spread. *Appetite*, *22*, 25–37.

Abraira, V. E., & Ginty, D. D. (2013). The sensory neurons of touch. *Neuron*, *79*, 618–639.

Animals in science/alternatives. *NEAVS*. https://www.navs.org/what-we-do/keep.../#.XmsJ1qhKhPY

Ayabe-Kanamura, S., Saito, S., Distel, H., Martínez-Gómez, M., & Hudson, R. (1998). Differences and similarities in the perception of everyday odors: A Japanese-German cross-cultural study. *Annals of the New York Academy of Sciences*, *855*, 694–700.

Birch, J. (2012). Worldwide prevalence of red-green color deficiency. *Journal of the Optical Society of America A*, *29*, 313–320. https://www.osapublishing.org/josaa/...josaa-29-3-313

Chen, Q., Deng, H., Brauth, S. E., Ding, L., & Tang, Y. (2012). Reduced performance of prey targeting in pit vipers with contralaterally occluded infrared and visual senses. *PloS ONE*, *7*(5), e34989. doi:10.1371/journal.pone.0034989

Comfort, A. (1971). Likelihood of human pheromones. *Nature*, *230*, 432–479.

Correll, J., Park, B., Judd, C. M., & Wittenbrink, B. (2002). The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, *83*, 1314–1329.

Correll, J., Urland, G. R., & Ito, T. A. (2006). Event-related potentials and the decision to shoot: The role of threat perception and cognitive control. *The Journal of Experimental Social Psychology*, *42*, 120–128.

Dunkle T. (1982). The sound of silence. *Science*, *82*, 30–33.

Egeth, H., & Yantis, S. (1997). Visual attention: Control, representation, and time course. *Annual Review of Psychology*, *48*, 269–297. https://www.researchgate.net/publica...nd_Time_Course

Fawcett, S. L., Wang, Y., & Birch, E. E. (2005). The critical period for susceptibility of human stereopsis. *Investigative Ophthalmology and Visual Science*, *46*, 521–525.

Fine, M. S., & Minnery, B. S. (2009). Visual salience affects performance in a working memory task. *Journal of Neuroscience*, *29*, 8016–8021. https://www.jneurosci.org/content/29/25/8016

Furlow, F. B. (1996, 2012). The smell of love. http://www.psychologytoday.com/artic...the-smell-love

Galanter, E. (1962). Contemporary Psychophysics. In R. Brown, E.Galanter, E. H. Hess, & G. Mandler (Eds.), New directions in psychology. Holt, Rinehart & Winston.

Garland, E. L. (2012). Pain processing in the human nervous system: A selective review of nociceptive and biobehavioral pathways. *Primary Care*, *39*, 561–571.

Goolkasian, P. & Woodbury, C. (2010). Priming effects with ambiguous figures. *Attention, Perception & Psychophysics*, *72*, 168–178.

Grothe, B., Pecka, M., & McAlpine, D. (2010). Mechanisms of sound localization in mammals. *Physiological Reviews*, *90*, 983–1012.

Hartline, P. H., Kass, L., & Loop, M. S. (1978). Merging of modalities in the optic tectum: Infrared and visual integration in rattlesnakes. *Science*, *199*, 1225–1229.

Hubel, D. H., & Wiesel, T. N. (1959). Receptive fields of single neurones in the cat's striate cortex. *Journal of Physiology*, *148*, 574–591. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1363130/

Hubel, D. H., & Wiesel, T. N. (1962). Receptive fields, binocular interaction and functional architecture in the cat's visual cortex. *Journal of Physiology*, *160*, 106–154. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1359523/

Hubel, D. H., & Weisel, T. N. (1963). Single-cell responses in striate cortex of kittens deprived of vision in one eye. *Journal of Neurophysiology*. https://journals.physiology.org/doi/...1963.26.6.1003

Hubel, D. H., & Wiesel, T. N. (1970). The period of susceptibility to the physiological effects of unilateral eye closure in kittens. *The Journal of Physiology*, *206*(2). https://physoc.onlinelibrary.wiley.c....1970.sp009022

Kaiser, P. K. (1997). *The joy of visual perception: A web book*. http://www.yorku.ca/eye/noframes.htm

Khan, S., & Chang, R. (2013). Anatomy of the vestibular system: A review. *NeuroRehabilitation*, *32*, 437–443.

Kinnamon, S. C., & Vandenbeuch, A. (2009). Receptors and transduction of umami taste stimuli. *Annals of the New York Academy of Sciences*, *1170*, 55–59.

Kujawa, S. G., & Liberman, M. C. (2006). Acceleration of age-related hearing loss by early noise exposure: Evidence of a misspent youth. *Journal of Neuroscience*, *26*, 2115–2123. https://www.jneurosci.org/content/26/7/2115

Kunst-Wilson, W. R., & Zajonc, R. B. (1980). Affective discrimination of stimuli that cannot be recognized. *Science*, *207*, 557–558.

Lackner, J. R., & DiZio, P. (2005). Vestibular, proprioceptive, and haptic contributions to spatial orientation. *Annual Review of Psychology*, *56*, 115–147.

Land, E. H. (1959). Color vision and the natural image. Part 1. *Proceedings of the National Academy of Science*, *45*(1), 115–129.

Latham, S. (2012). U.S. law and animal experimentation: A critical primer. *The Hastings Center*. http://animalresearch.thehastingscen...itical-primer/

Le, T. N., Straatman, L. V., Lea, J., & Westerberg, B. (2017). Current insights in noise-induced hearing loss: A literature review of the underlying mechanism, pathophysiology, asymmetry, and management options. *Journal of Otolaryngology - Head & Neck Surgery*, *46*(1), 41. https://journalotohns.biomedcentral....463-017-0219-x

Liem, D. G., Westerbeek, A., Wolterink, S., Kok, F. J., & de Graaf, C. (2004). Sour taste preferences of children relate to preference for novel and intense stimuli. *Chemical Senses*, *29*, 713–720.

Lodovichi, C., & Belluscio, L. (2012). Odorant receptors in the formation of olfactory bulb circuitry. *Physiology*, *27*, 200–212.

Loersch, C., Durso, G. R. O., & Petty, R. E. (2013). Vicissitudes of desire: A matching mechanism for subliminal persuasion. *Social Psychological and Personality Science*, *4*(5), 624–631.

Mack, A., & Rock, I. (1998). *Inattentional Blindness*. MIT Press.

Maffei, A., Haley, M., & Fontanini, A. (2012). Neural processing of gustatory information in insular circuits. *Current Opinion in Neurobiology*, *22*, 709–716.

Miller, B. T., & D'Esposito, M. (2005). Searching for "the top" in top-down control. *Neuron*, *48*, 535–538. https://www.sciencedirect.com/scienc...96627305009360

Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, *24*, 167–202. https://www.annualreviews.org/doi/ab...neuro.24.1.167

Milner, A. D., & Goodale, M. A. (2008). Two visual systems re-viewed. *Neuropsychological*, *46*, 774–785.

Mizushige, T., Inoue, K., Fushiki, T. (2007). Why is fat so tasty? Chemical reception of fatty acid on the tongue. *Journal of Nutritional Science and Vitaminology*, *53*, 1–4.

Most, S. B., Simons, D. J., Scholl, B. J., & Chabris, C. F. (2000). Sustained inattentional blindness: The role of location in the detection of unexpected dynamic events. *PSYCHE*, *6*(14).

Nelson, M. R. (2008). The hidden persuaders: Then and now. *Journal of Advertising*, *37*(1), 113–126.

Niimura, Y., & Nei, M. (2007). Extensive gains and losses of olfactory receptor genes in mammalian evolution. *PLoS ONE*, *2*, e708.

Okawa, H., & Sampath, A. P. (2007). Optimization of single-photon response transmission at the rod-to-rod bipolar synapse. *Physiology*, *22*, 279–286.

Payne, B. K. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, *81*, 181–192.

Payne, B. K., Shimizu, Y., & Jacoby, L. L. (2005). Mental control and visual illusions: Toward explaining race-biased weapon misidentifications. *Journal of Experimental Social Psychology*, *41*, 36–47.

Peck, M. (2012, July 19). *How a movie changed one man's vision forever*. http://www.bbc.com/future/story/2012...rom-a-2d-world

Peterson, M. A., & Gibson, B. S. (1994). Must figure-ground organization precede object recognition? An assumption in peril. *Psychological Science*, *5*, 253–259.

Petho, G., & Reeh, P. W. (2012). Sensory and signaling mechanisms of bradykinin, eicosanoids, platelet-activating factor, and nitric oxide in peripheral nociceptors. *Physiological Reviews*, *92*, 1699–1775.

Proske, U. (2006). Kinesthesia: The role of muscle receptors. *Muscle & Nerve*, *34*, 545–558.

Proske, U., & Gandevia, S. C. (2012). The proprioceptive senses: Their roles in signaling body shape, body position and movement, and muscle force. *Physiological Reviews*, *92*, 1651–1697.

Purvis, K., & Haynes, N. B. (1972). The effect of female rat proximity on the reproductive system of male rats. *Physiology & Behavior*, *9*, 401–407.

Radel, R., Sarrazin, P., Legrain, P., & Gobancé, L. (2009). Subliminal priming of motivational orientation in educational settings: Effect on academic performance moderated by mindfulness. *Journal of Research in Personality*, *43*(4), 1–18.

Rauschecker, J. P., & Tian, B. (2000). Mechanisms and streams for processing "what" and "where" in auditory cortex. *Proceedings of the National Academy of Sciences, USA*, *97*, 11800–11806.

Renier, L. A., Anurova, I., De Volder, A. G., Carlson, S., VanMeter, J., & Rauschecker, J. P. (2009). Multisensory integration of sounds and vibrotactile stimuli in processing streams for "what" and "where." *Journal of Neuroscience*, *29*, 10950–10960.

Rensink, R. A. (2004). Visual sensing without seeing. *Psychological Science*, *15*, 27–32.

Rock, I., & Palmer, S. (1990). The legacy of Gestalt psychology. *Scientific American*, *262*, 84–90.

Roper, S. D. (2013). Taste buds as peripheral chemosensory receptors. *Seminars in Cell & Developmental Biology*, *24*, 71–79.

Russell, M. J. (1976). Human olfactory communication. *Nature*, *260*, 520–522.

Sachs, B. D. (1997). Erection evoked in male rats by airborne scent from estrous females. *Physiology & Behavior*, *62*, 921–924.

Segall, M. H., Campbell, D. T., & Herskovits, M. J. (1963). Cultural differences in the perception of geometric illusions. *Science*, *139*, 769–771.

Segall, M. H., Campbell, D. T., & Herskovits, M. J. (1966). *The influence of culture on visual perception.* Bobbs-Merrill.

Segall, M. H., Dasen, P. P., Berry, J. W., & Poortinga, Y. H. (1999). *Human behavior in global perspective* (2nd ed.). Allyn & Bacon.

Semaan, M. T., & Megerian, C. A. (2010). Contemporary perspectives on the pathophysiology of Meniere's disease: implications for treatment. *Current opinion in Otolaryngology & Head and Neck Surgery*, *18*(5), 392–398.

Shamma, S. (2001). On the role of space and time in auditory processing. *Trends in Cognitive Sciences*, *5*, 340–348.

Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattentional blindness for dynamic events. *Perception*, *28*, 1059–1074.

Spors, H., Albeanu, D. F., Murthy, V. N., Rinberg, D., Uchida, N., Wachowiak, M., & Friedrich, R. W. (2013). Illuminating vertebrate olfactory processing. *Journal of Neuroscience*, *32*, 14102–14108.

Spray, D. C. (1986). Cutaneous temperature receptors. *Annual Review of Physiology*, *48*, 625–638.

Strain, G. M. (2003). *How well do dogs and other animals hear?* http://www.lsu.edu/deafness/HearingRange.html

Swets, J. A. (1964). Signal detection and recognition by human observers. *Psychological Bulletin*, *60*, 429–441.

Ungerleider, L. G., & Haxby, J. V. (1994). 'What' and 'where' in the human brain. *Current Opinion in Neurobiology*, *4*, 157–165.

U.S. Department of Health and Human Services, National Institutes of Health, & National Institute on Deafness and Other Communication Disorders (NIDCD). (2014). Noise-induced hearing loss. *NIH Publication No. 14-4233*. https://www.nidcd.nih.gov/health/noi...d-hearing-loss

U.S. National Library of Medicine. (2013). Genetics home reference: Congenital insensitivity to pain. http://ghr.nlm.nih.gov/condition/con...tivity-to-pain

Vecera, S. P., & O'Reilly, R. C. (1998). Figure-ground organization and object recognition processes: An interactive account. *Journal of Experimental Psychology-Human Perception and Performance*, *24*, 441–462.

Wakakuwa, M., Stavenga, D. G., & Arikawa, K. (2007). Spectral organization of ommatidia in flower-visiting insects. *Photochemistry and Photobiology*, *83*, 27–34.

Weisel, T. N., & Hubel, D. H. (1963). Single-cell responses in striate cortext of kittens deprived of vision in one eye. *Journal of Neurophysiology*. https://journals.physiology.org/doi/...1963.26.6.1003

Weller, A. (1998). Human pheromones: Communication through body odour. *Nature*, *392*, 126–127.

Wells, D. L. (2010). Domestic dogs and human health: An overview. *British Journal of Health Psychology*, *12*, 145–156.

Wolfgang-Kimball, D. (1992). Pheromones in humans: myth or reality?. http://www.anapsid.org/pheromones.html

Wysocki, C. J., & Preti, G. (2004). Facts, fallacies, fears, and frustrations with human pheromones. *The Anatomical Record Part A: Discoveries in Molecular, Cellular, and Evolutionary Biology*, *281*, 1201–1211.

Yantis, S., & Egeth, H. (1999). On the distinction between visual salience and stimulus-driven attentional capture. *Journal of Experimental Psychology: Human Perception and Performance*, *25*, 661–676. https://psycnet.apa.org/doiLanding?d...-1523.25.3.661

Learning

Adibsereshki, N., Abkenar, S. J., Ashoori, M., & Mirzamani, M. (2015). The effectiveness of using reinforcements in the classroom on the academic achievement of students with intellectual disabilities. *Journal of Intellectual Disabilities*, *19*(1), 83–93. https://doi.org/10.1177/1744629514559313

Anderson, C. A., & Gentile, D. A. (2008). Media violence, aggression, and public policy. In E. Borgida & S. Fiske (Eds.), *Beyond common sense: Psychological science in the courtroom* (p. 322). Blackwell.

Anderson, C. A., Bushman, B. J., Donnerstein, E., Hummer, T. A., & Warburton, W. (2015). SPSSI research summary on media violence. *Analyses of Social Issues and Public Policy* (ASAP), 15(1), 4–19. https://doi.org/10.1111/asap.12093

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H.R., & Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin*, 136(2), 151–173. HYPERLINK "https://psycnet.apa.org/doi/10.1037/a0018251"https://doi.org/10.1037/a0018251

Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology*, *63*, 575–582.

Bushman, B. J., Anderson, C. A., Donnerstein, E., Hummer, T. A., & Warburton, W. A. (2016). Reply to comments on SPSSI research summary on media violence by Cupit (2016), Gentile (2016), Glackin and Gray (2016), Gollwitzer (2016), and Krahé (2016). *Analyses of Social Issues and Public Policy* (ASAP), 16(1), 443–450. https://doi.org/10.1111/asap.12123

Cangi, K., & Daly, M. (2013). The effects of token economies on the occurrence of appropriate and inappropriate behaviors by children with autism in a social skills setting. *West Chester University: Journal of Undergraduate Research*. http://www.wcupa.edu/UndergraduateRe...angi_S2012.pdf

Carlson, L., Holscher, C., Shipley, T., & Conroy Dalton, R. (2010). Getting lost in buildings. *Current Directions in Psychological Science*, *19*(5), 284–289.

Chance, P. (2009). *Learning and behavior* (6th ed.). Wadsworth, Cengage Learning.

Chase, H. W., & Clark, L. (2010). Gambling severity predicts midbrain response to near-miss outcomes. *The Journal of Neuroscience*, *30*(18), 6180–6187. https://www.jneurosci.org/content/30/18/6180.short

Cialdini, R. B. (2008). *Influence: Science and practice* (5th ed.). Pearson Education.

DeAngelis, T. (2010). 'Little Albert' regains his identity. *Monitor on Psychology*, *41*(1), 10.

Ferguson, C. J. (2011). Video games and youth violence: A prospective analysis in adolescents. *Journal of Youth and Adolescence*, *40*(4), 377–391. https://link.springer.com/article/10...964-010-9610-x

Fryer, R. G., Jr. (2010, April). Financial incentives and student achievement: Evidence from randomized trials. *National Bureau of Economic Research [NBER] Working Paper, No. 15898*. http://www.nber.org/papers/w15898

Garcia, J., & Koelling, R. A. (1966). Relation of cue to consequence in avoidance learning. *Psychonomic Science*, *4*, 123–124.

Garcia, J., & Rusiniak, K. W. (1980). What the nose learns from the mouth. In D. Müller-Schwarze & R. M. Silverstein (Eds.), *Chemical signals: Vertebrates and aquatic invertebrates* (pp. 141–156). Plenum Press.

Gentile, D. A. (2016). The evolution of scientific skepticism in the media violence "debate." *Analyses of Social Issues and Public Policy*, *16*, 429–434.

Gershoff, E. T. (2002). Corporal punishment by parents and associated child behaviors and experiences: A meta-analytic and theoretical review. *Psychological Bulletin*, *128*(4), 539–579. doi:10.1037//0033-2909.128.4.539

Gershoff, E.T., Grogan-Kaylor, A., Lansford, J. E., Chang, L., Zelli, A., Deater-Deckard, K., & Dodge, K. A. (2010). Parent discipline practices in an international sample: Associations with child behaviors and moderation by perceived normativeness. *Child Development*, *81*(2), 487–502.

Hickock, G. (2010). The role of mirror neurons in speech and language processing. *Brain and Language*, *112*, 1–2.

Holmes, S. (1993). Food avoidance in patients undergoing cancer chemotherapy. *Support Care Cancer*, *1*(6), 326–330.

Hunt, M. (2007). *The story of psychology*. Doubleday.

Huston, A. C., Donnerstein, E., Fairchild, H., Feshbach, N. D., Katz, P. A., Murray, J. P., . . . Zuckerman, D. (1992). *Big world, small screen: The role of television in American society*. University of Nebraska Press.

Hutton, J. L., Baracos, V. E., & Wismer, W. V. (2007). Chemosensory dysfunction is a primary factor in the evolution of

declining nutritional status and quality of life with patients with advanced cancer. *Journal of Pain Symptom Management, 33*(2), 156–165.

Jacobsen, P. B., Bovbjerg, D. H., Schwartz, M. D., Andrykowski, M. A., Futterman, A. D., Gilewski, T., . . . Redd, W. H. (1993). Formation of food aversions in cancer patients receiving repeated infusions of chemotherapy. *Behaviour Research and Therapy, 31*(8), 739–748.

Kirsch, SJ (2010). Media and youth: A developmental perspective. Wiley Blackwell.

Laskowski, C. S., Dorchak, D. L., Ward, K. M., Christensen, D. R., & Euston, D. R. (2019). Can slot-machine reward schedules induce gambling addiction in rats? *Journal of Gambling Studies*, *35*(3), 887–914. https://www.ncbi.nlm.nih.gov/pubmed/31049772

Lefrançois, G. R. (2012). *Theories of human learning: What the professors said* (6th ed.). Wadsworth, Cengage Learning.

Miller, L. E., Grabell, A., Thomas, A., Bermann, E., & Graham-Bermann, S. A. (2012). The associations between community violence, television violence, intimate partner violence, parent-child aggression, and aggression in sibling relationships of a sample of preschoolers. *Psychology of Violence, 2(2)*, 165–78. doi:10.1037/a0027254

Murch, W. S., & Clark, L. (2016). Games in the brain: Neural substrates of gambling addiction. *The Neuroscientist, 22*(5), 534–545. https://www.ncbi.nlm.nih.gov/pubmed/26116634

Murrell, A., Christoff, K. & Henning, K. (2007) Characteristics of domestic violence offenders: associations with childhood exposure to violence. *Journal of Family Violence, 22*(7), 523-532.

Pavlov, I. P. (1927). *Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex* (G. V. Anrep, Ed. & Trans.). Oxford University Press.

Potenza, M. N. (2013). Neurobiology of gambling behaviors. *Current Opinion in Neurobiology, 23*(4), 660–667. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3803105/

Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. *Classical Conditioning II: Current Research and Theory*, *2*, 64-99.

Rizzolatti, G., Fadiga, L., Fogassi, L., & Gallese, V. (2002). From mirror neurons to imitation: Facts and speculations. In A. N. Meltzoff & W. Prinz (Eds.), *The imitative mind: Development, evolution, and brain bases* (pp. 247–66). Cambridge University Press.

Rizzolatti, G., Fogassi, L., & Gallese, V. (2006, November). Mirrors in the mind. *Scientific American*, pp. 54–61.

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Appleton-Century-Crofts.

Skinner, B. F. (1953). *Science and human behavior*. Macmillan.

Skinner, B. F. (1961). *Cumulative record: A selection of papers*. Appleton-Century-Crofts.

Skinner's utopia: Panacea, or path to hell? (1971, September 20). *Time*. http://www.wou.edu/~girodm/611/Skinner%27s_utopia.pdf

Skolin, I., Wahlin, Y. B., Broman, D. A., Hursti, U-K. K., Larsson, M. V., & Hernell, O. (2006). Altered food intake and taste perception in children with cancer after start of chemotherapy: Perspectives of children, parents and nurses. *Supportive Care in Cancer, 14*, 369–78.

Thorndike, E. L. (1911). Animal intelligence: An experimental study of the associative processes in animals. *Psychological Monographs*, *8*.

Tolman, E. C., & Honzik, C. H. (1930). Degrees of hunger, reward, and non-reward, and maze performance in rats. *University of California Publications in Psychology*, *4*, 241–256.

Tolman, E. C., Ritchie, B. F., & Kalish, D. (1946). Studies in spatial learning: II. Place learning versus response learning. *Journal of Experimental Psychology, 36*, 221–229. doi:10.1037/h0060262

Watson, J. B. & Rayner, R. (1920). Conditioned emotional reactions. *Journal of Experimental Psychology*, *3*, 1–14.

Watson, J. B. (1919). *Psychology from the standpoint of a behaviorist*. J. B. Lippincott.

Yamamoto, S., Humle, T., & Tanaka, M. (2013). Basis for cumulative cultural evolution in chimpanzees: Social learning of a more efficient tool-use technique. *PLoS ONE*, *8*(1): e55768. doi:10.1371/journal.pone.0055768

Thinking and Intelligence

Abler, W. (2013). Sapir, Harris, and Chomsky in the twentieth century. *Cognitive Critique*, *7*, 29–48.

American Association on Intellectual and Developmental Disabilities. (2013). *Definition of intellectual disability*. http://aaidd.org/intellectual-disabi...n#.UmkR2xD2Bh4

American Psychiatric Association. (2013). In *Diagnostic and statistical manual of psychological disorders* (5th ed., pp. 34–36). American Psychiatric Association.

Aronson, E. (Ed.). (1995). Social cognition. In *The social animal* (p. 151). W.H. Freeman and Company.

Atkins v. Virginia, 00-8452 (2002).

Bartels, M., Rietveld, M., Van Baal, G., & Boomsma, D. I. (2002). Genetic and environmental influences on the development of intelligence. *Behavior Genetics*, *32*(4), 237–238.

Bartlett, F. C. (1932). Remembering: A study in experimental and social psychology. Cambridge University Press.

Bayer, J. B., & Campbell, S. W. (2012). Texting while driving on automatic: Considering the frequency-independent side of habit. *Computers in Human Behavior, 28*, 2083–2090.

Barton, S. M. (2003). Classroom accommodations for students with dyslexia. *Learning Disabilities Journal*, *13*, 10–14.

Berlin, B., & Kay, P. (1969). *Basic color terms: Their universality and evolution.* University of California Press.

Berninger, V. W. (2008). Defining and differentiating dysgraphia, dyslexia, and language learning disability within a working memory model. In M. Mody & E. R. Silliman (Eds.), *Brain, behavior, and learning in language and reading disorders* (pp. 103–134). The Guilford Press.

Blossom, M., & Morgan, J. L. (2006). Does the face say what the mouth says? A study of infants' sensitivity to visual prosody. In the 30th annual Boston University Conference on Language Development, Somerville, MA.

Boake, C. (2002, May 24). From the Binet-Simon to the Wechsler-Bellevue: Tracing the history of intelligence testing. *Journal of Clinical and Experimental Neuropsychology*, *24*(3), 383–405.

Boroditsky, L. (2001). Does language shape thought? Mandarin and English speakers' conceptions of time. *Cognitive Psychology*, *43*, 1–22.

Boroditsky, L. (2011, February). How language shapes thought. *Scientific American*, 63–65.

Bouchard, T. J., Lykken, D. T., McGue, M., Segal, N. L., & Tellegen, A. (1990). Sources of human psychological differences: The Minnesota Study of Twins Reared Apart. *Science*, *250*, 223–228.

Buck v. Bell, 274 U.S. 200

Cairns Regional Council. (n.d.). Cultural greetings. http://www.cairns.qld.gov.au/__data/...ng Exercise.pdf

Callero, P. L. (1994). From role-playing to role-using: Understanding role as resource. *Social Psychology Quarterly*, *57*, 228–243.

Cattell, R. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology*, *54*(1), 1–22.

Cianciolo, A. T., & Sternberg, R. J. (2004). *Intelligence: A brief history.* Blackwell Publishing.

Chomsky, N. (1965). *Aspects of the theory of syntax*. MIT Press

Corballis, M. C., & Suddendorf, T. (2007). Memory, time, and language. In C. Pasternak (Ed.), *What makes us human* (pp. 17–36). Oneworld Publications.

Cropley, A. (2006). In praise of convergent thinking. *Creativity Research Journal*, *18*(3), 391–404.

Csikszentmihalyi, M., & Csikszentmihalyi, I. (1993). Family influences on the development of giftedness. *Ciba Foundation Symposium*, *178*, 187–206.

Curtiss, S. (1981). Dissociations between language and cognition: Cases and implications. *Journal of Autism and Developmental Disorders*, *11*(1), 15–30.

Cyclopedia of Puzzles. (n.d.) http://www.mathpuzzle.com/loyd/

Dates and Events. (n.d.). *Oprah Winfrey timeline*. http://www.datesandevents.org/people...y-timeline.htm

Duncker, K. (1945). On problem-solving (L. S. Lees, Trans.) *Psychological Monographs*, *58*(5), i–113. https://psycnet.apa.org/record/2011-16110-001

Fernández, E. M., & Cairns, H. S. (2011). *Fundamentals of psycholinguistics.* Wiley-Blackwell.

Flanagan, D., & Kaufman, A. (2004). *Essentials of WISC-IV assessment.* John Wiley and Sons, Inc.

Flynn, J., Shaughnessy, M. F., & Fulgham, S. W. (2012) Interview with Jim Flynn about the Flynn effect. *North American Journal of Psychology*, *14*(1), 25–38.

Fox, M. (2012, November 1). Arthur R. Jensen dies at 89; Set off debate about I.Q. *New York Times*, p. B15.

Fromkin, V., Krashen, S., Curtiss, S., Rigler, D., & Rigler, M. (1974). The development of language in Genie: A case of language acquisition beyond the critical period. *Brain and Language*, *1*, 81–107.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* Basic Books.

German, T. P., & Barrett, H. C. (2005). Functional fixedness in a technologically sparse culture. *Psychological Science*, *16*, 1–5.

Goad, B. (2013, January 25). *SSA wants to stop calling people 'mentally retarded.'* http://thehill.com/blogs/regwatch/pe...tally-retarded

Goldstone, R. L., & Kersten, A. (2003). Concepts and categorization. In A. F. Healy, R. W. Proctor, & I.B. Weiner (Eds.), *Handbook of psychology* (Volume IV, pp. 599–622). John Wiley & Sons, Inc.

Goleman, D. (1995). *Emotional intelligence; Why it can matter more than IQ*. Bantam Books.

Gordon, O. E. (1995). *Francis Galton (1822–1911)*. http://www.psych.utah.edu/gordon/Cla...ds/Galton.html

Gottfredson, L. S. (2004). *Social consequences of group differences in cognitive ability*. University of Delaware.

Gresham, F. M., & Witt, J. C. (1997). Utility of intelligence tests for treatment planning, classification, and placement decisions: Recent empirical findings and future directions. *School Psychology Quarterly, 12*(3), 249–267.

Guilford, J. P. (1967). *The nature of human intelligence.* McGraw Hill.

Heaton, S. (2004). Making the switch: Unlocking the mystery of the WISC-IV. *Case Conference.* University of Florida.

Jensen, J. (2011). Phoneme acquisition: Infants and second language learners. *The Language Teacher, 35*(6), 24–28.

Johnson, J. S., & Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology, 21*, 60–99.

Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus, and Giroux.

Kishyama, M. M., Boyce, W. T., Jimenez, A. M., Perry, L. M., & Knight, R. T. (2009). Socioeconomic disparities affect prefrontal function in children. *Journal of Cognitive Neuroscience, 21*(6), 1106–1115.

Ko, L. (2016). Unwanted sterilization and eugenics programs in the United States. *Independent Lens*. http://www.pbs.org/independentlens/b...united-states/

Larry P v. Riles, C-71-2270 RFP. (1979).

Lenneberg, E. (1967). *Biological foundations of language*. Wiley.

Liptak, A. (2008, January 19). Lawyer reveals secret, toppling death sentence. *New York Times*. http://www.nytimes.com/2008/01/19/us...eath.html?_r=0

Locke, E. A. (2005, April 14). Why emotional intelligence is an invalid concept. *Journal of Organizational Behavior, 26*, 425–431.

Mayer, J. D., Salovey, P., & Caruso, D. (2004). Emotional intelligence: Theory, findings, and implications, *Psychological Inquiry, 15*(3), 197–215.

Modgil, S., & Routledge, C. M. (Eds.). (1987). *Arthur Jensen: Consensus and controversy.* Falmer Press.

Moskowitz, B. A. (1978). The acquisition of language. *Scientific American, 239*, 92–108. Petitto, L. A., Holowka, S., Sergio, L. E., Levy, B., & Ostry, D. J. (2004). Baby hands that move to the rhythm of language: Hearing babies acquiring sign languages babble silently on the hands. *Cognition, 93*, 43–73.

Naglieri, J. A. (2020). 100 years of intelligence tests: We can do better. *The Score*. http://www.apadivisions.org/division...lligence-tests

Neyfakh, L. (2013, October 7). "Why you can't stop checking your phone." http://www.bostonglobe.com/ideas/201...DcM/story.html

Parker, J. D., Saklofske, D. H., & Stough, C. (Eds.). (2009). *Assessing emotional intelligence: Theory, research, and applications.* Springer.

Petitto, L. A., Holowka, S., Sergio, L. E., Levy, B., & Ostry, D. J. (2004). Baby hands that move to the rhythm of language: Hearing babies acquiring sign languages babble silently on the hands. Cognition, 93, 43–73.

Pickens, J. (1994). Full-term and preterm infants' perception of face-voice synchrony. *Infant Behavior and Development, 17*, 447–455.

Pratkanis, A. (1989). The cognitive representation of attitudes. In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), *Attitude structure and function* (pp. 71–98). Erlbaum.

Regier, T., & Kay, P. (2009). Language, thought, and color: Whorf was half right. *Trends in Cognitive Sciences, 13*(10), 439–446.

Riccio, C. A., Gonzales, J. J., & Hynd, G. W. (1994). Attention-deficit Hyperactivity Disorder (ADHD) and learning disabilities. *Learning Disability Quarterly, 17*, 311–322.

Richardson, K. (2002). What IQ tests test. *Theory & Psychology, 12*(3), 283–314.

Roberts, D. (2014, May 27). U.S. Supreme Court bars Florida from using IQ score cutoff for executions. *The Guardian.* http://www.theguardian.com/world/201...rida-execution

Rushton, J. P., & Jensen, A. R. (2005). Thirty years of research on race differences in cognitive ability. *Psychology, public policy, and law, 11*(2), 235–294.

Rymer, R. (1993). *Genie: A Scientific Tragedy.* Harper Collins.

Sapir, E. (1964). *Culture, language, and personality.* University of California Press. (Original work published 1941)

Schlinger, H. D. (2003). The myth of intelligence. *The Psychological Record, 53*(1), 15–32.

Schneider, W. J., & McGrew, K. S. (2018). The Cattell-Horn-Carroll theory of cognitive abilities. In D. P. Flanagan & E. M. McDonough (Eds.), *Contemporary intellectual assessment: Theories, tests, and issues* (pp. 73–163). The Guilford Press.

Severson, K. (2011, December 9). Thousands sterilized, a state weighs restitution. *The New York Times*. http://www.nytimes.com/2011/12/10/us...anted=all&_r=0

Singleton, D. M. (1995). Introduction: A critical look at the critical period hypothesis in second language acquisition research. In D.M. Singleton & Z. Lengyel (Eds.), *The age factor in second language acquisition: A critical look at the critical period hypothesis in second language acquisition research* (pp. 1–29). Multilingual Matters Ltd.

Skinner, B. F. (1957). *Verbal behavior.* Copley Publishing Group.

Smits-Engelsman, B. C. M., & Van Galen, G. P. (1997). Dysgraphia in children: Lasting psychomotor deficiency or transient developmental delay? *Journal of Experimental Child Psychology, 67*, 164–184.

Spelke, E. S., & Cortelyou, A. (1981). Perceptual aspects of social knowing: Looking and listening in infancy. In M.E. Lamb & L.R. Sherrod (Eds.), *Infant social cognition: Empirical and theoretical considerations* (pp. 61–83). Erlbaum.

Steitz, T. (2010). *Thomas A. Steitz – Biographical.* (K. Grandin, Ed.) http://www.nobelprize.org/nobel_priz...teitz-bio.html

Sternberg, R. J. (1988). *The triarchic mind: A new theory of intelligence.* Viking-Penguin.

Taylor, J. (1992). A Conversation with Arthur Jensen. *American Renaissance*. Retrieved January 2, 2022. https://www.amren.com/news/2012/10/a...nsen-has-died/

Terman, L. M. (1925). *Mental and physical traits of a thousand gifted children (I).* Stanford University Press.

Terman, L. M., & Oden, M. H. (1947). *The gifted child grows up: 25 years' follow-up of a superior group: Genetic studies of genius (Vol. 4).* Stanford University Press.

Terman, L. M. (1916). *The measurement of intelligence.* Houghton-Mifflin.

Tomasello, M., & Rakoczy, H. (2003). What makes human cognition unique? From individual to shared to collective intentionality. *Mind & Language, 18*(2), 121–147.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*(4157), 1124–1131.

van Troyer, G. (1994). Linguistic determinism and mutability: The Sapir-Whorf "hypothesis" and intercultural communication. *JALT Journal, 2*, 163–178.

Wechsler, D. (1958). *The measurement of adult intelligence*. Williams & Wilkins.

Wechsler, D. (1981). *Manual for the Wechsler Adult Intelligence Scale—revised.* Psychological Corporation.

Wechsler, D. (2002). *WPPSI-R manual*. Psychological Corporation.

Werker, J. F., & Lalonde, C. E. (1988). Cross-language speech perception: Initial capabilities and developmental change. *Developmental Psychology, 24*, 672–683.

Werker, J. F., & Tees, R. C. (1984). Cross-language speech perception: Evidence for perceptual reorganization during the first year of life. *Infant Behavior and Development, 7*, 49–63.

Whorf, B. L. (1956). *Language, thought and relativity*. MIT Press.

Williams, R. L., (1970). Danger: Testing and dehumanizing Black children. *Clinical Child Psychology Newsletter, 9*(1), 5–6.

Zwicker, J. G. (2005). *Effectiveness of occupational therapy in remediating handwriting difficulties in primary students: Cognitive versus multisensory interventions.* Unpublished master's thesis, University of Victoria, Victoria, British Columbia, Canada). http://dspace.library.uvic.ca:8080/b...pdf?sequence=1

Memory

Abel, M., & Bäuml, K.-H. T. (2013). Sleep can reduce proactive interference. *Memory, 22*(4), 332–339. doi:10.1080/09658211.2013.785570. http://www.psychologie.uni-regensbur...ss/sleepPI.pdf

Adams, J. K. (1957). Laboratory studies of behavior without awareness. *Psychological Bulletin, 54*, 383–405. https://psycnet.apa.org/record/1959-00483-001

Anderson, J. R., & Reder, L. M. (1999). The fan effect: New results and new theories. *Journal of Experimental Psychology: General, 128*, 186–197. https://psycnet.apa.org/record/1999-05245-004

Anderson, N. S. (1969). The influence of acoustic similarity on serial recall of letter sequences. *Quarterly Journal of Experimental Psychology, 21*(3), 248–255.

Anderson, R. C. (1984). Role of the reader's schema in comprehension, learning, and memory. In R. C. Anderson, J. Osborn, & R. J. Tierney (Eds.), *Learning to read in American schools: Basal Readers and Content Texts* (pp. 243–257). Erlbaum.

Atkinson, R. C., & Shiffrin, R. M. (1968). Human memory: A proposed system and its control processes. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation: Volume 2* (pp. 89–195). Academic Press.

Baddeley, A. (2004). *Your memory: A user's guide*. Firefly Books.

Baddeley, A. D. (2000). The episodic buffer: A new component of working memory? *Trends in Cognitive Sciences*, *4*, 417–423. https://www.ncbi.nlm.nih.gov/pubmed/11058819

Baddeley, A. D., & Hitch, G. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 8, pp. 47–89). Academic Press.

Bayley, P. J., & Squire, L. R. (2002). Medial temporal lobe amnesia: Gradual acquisition of factual information by nondeclarative memory. *Journal of Neuroscience*, *22*, 5741–5748.

Bellezza, F. S. (1981). Mnemonic devices: Classification, characteristics and criteria. *Review of Educational Research*, *51*, 247–275.

Benjamin N. Cardozo School of Law, Yeshiva University. (2009). Reevaluating lineups: Why witnesses make mistakes and how to reduce the chance of a misidentification. The Innocence Project website: http://www.innocenceproject.org/docs..._ID_Report.pdf

Blockland, A. (1996). Acetylcholine: A neurotransmitter for learning and memory? *Brain Research Reviews*, *21*, 285–300.

Bodie, G. D., Powers, W. G., & Fitch-Hauser, M. (2006). Chunking, priming, and active learning: Toward an innovative approach to teaching communication-related skills. *Interactive Learning Environment*, *14*(2), 119–135.

Bousfield, W. (1935). The occurrence of clustering in the recall of randomly arranged associates. *Journal of General Psychology*, *49*, 229–240.

Bransford, J. D., & McCarrell, N. S. (1974). A sketch of a cognitive approach to comprehension. In W. B. Weimer & D. J. Palermo (Eds.), *Cognition and the symbolic processes* (pp. 189–229). Lawrence Erlbaum Associates.

Briere, J., & Conte, J. (1993). Self-reported amnesia for abuse in adults molested as children. *Journal of Traumatic Stress*, *6*, 21–31.

Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition*, *5*(1), 73–99. https://doi.org/10.1016/0010-0277(77)90018-X

Carli, L. (1999). Cognitive reconstruction, hindsight, and reactions to victims and perpetrators. *Personality and Social Psychology Bulletin*, *25*(8), 966–979. doi:10.1177/01461672992511005

Ceci, S. J., & Bruck, M. (1993). Child witness: Translating research into policy. *Social Policy Report*, *7*(3), 1–30.

Ceci, S. J., & Bruck, M. (1995). *Jeopardy in the courtroom: A scientific analysis of children's testimony.* American Psychological Association.

Cheit, R. E. (2007). *The recovered memory project.* http://blogs.brown.edu/recovered memory/.

Christianson, S. A. (1992). *The handbook of emotion and memory: Research and theory*. Erlbaum.

Clark, R. E., Zola, S. M., & Squire, L. R. (2000). Impaired recognition memory in rats after damage to the hippocampus. *The Journal of Neuroscience*, *20*(23), 8853–8860.

Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review*, *82*, 407–428. https://psycnet.apa.org/record/1976-03421-001

Corkin, S. (1965). Tactually-guided maze learning in man: Effects of unilateral cortical excisions and bilateral hippocampal lesions. *Neuropsychologia*, *3*, 339–351.

Corkin, S. (1968). Acquisition of motor skill after bilateral medial temporal-lobe excision. *Neuropsychologia*, *6*, 255–264.

Corkin, S., Amaral D. G., González, R. G., Johnson, K. A., & Hyman, B. T. (1997). H. M.'s medial temporal lobe lesion: Findings from magnetic resonance imaging. *Journal of Neuroscience*, *17*(10), 3964–3979.

Cowan, N. (2010). The magical mystery tour: How is working memory capacity limited, and why? *Current Directions in Psychological Science*, *19*, 51–57. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2864034/

Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, *11*, 671–684.

Craik, F. I. M., Moroz, T. M., Moscovitch, M., Stuss, D. T., Winocur, G., Tulving, E., & Kapur, S. (1999). In search of the self: A positron emission tomography study. *Psychological Science*, *10*(1), 26–34.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology*, *104*(3), 268–294.

Craik, F. I. M., & Watkins, M. J. (1973). The role of rehearsal in short-term memory. *Journal of Verbal Learning and Verbal Behavior*, *12*, 599–607.

Green, J. T., & Woodruff-Pak, D. S. (2000). Eyeblink classical conditioning in aging animals. In D. S. Woodruff-Pak & J. E. Steinmetz (Eds.), *Eyeblink classical*

conditioning: Animal models (Vol. 2, pp.155–178). Kluwer Academic.

Greenberg, D. L. (2004). President Bush's false [flashbulb] memory of 9/11/01. *Applied. Cognitive Psychology, 18*(3), 363–370. doi:10.1002/acp.1016

Devilly, G. J. (2007). If nothing happened why do I still hurt? An update on the memory wars. *InPsych, 29*(2), 16–18.

Ebbinghaus, H. (1964). *Memory: A contribution to experimental psychology* (H. A. Ruger & C. E. Bussenius, Trans.). Dover. (Original work published 1885)

Giddan, N. S., & Eriksen, C. W. (1959). Generalization of response biases acquired with and without verbal awareness. *Journal of Personality*, *27*, 104–115. https://psycnet.apa.org/record/1960-03930-001

Goodman, G. S. (2006). Children's eyewitness memory: A modern history and contemporary commentary. *Journal of Social Issues, 62*, 811–832.

Greenspoon, J. (1955). The reinforcing effect of two spoken sounds on the frequency of two responses. *American Journal of Psychology*, *68*, 409–416. https://psycnet.apa.org/record/1956-04488-001

Hassabis D., & Maguire E. A. (2007). Deconstructing episodic memory with construction. *Trends in Cognitive Sciences*, *11*(7), 299–306.

Hirst, W., & Phelps, E. A. (2016). Flashbulb Memories. *Current directions in psychological science*, *25*(1), 36–41. https://doi.org/10.1177/0963721415622487

Jacobs, J. (1887). Experiments on "prehension." *Mind, 12*, 75–79.

Jacoby, L. L. (1983). Perceptual enhancement: Persistent effects of an experience. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *9*, 21–38. https://www.ncbi.nlm.nih.gov/pubmed/6220114

Jacoby, L. L., & Witherspoon, D. (1982). Remembering without awareness. *Canadian Journal of Psychology*, *36*, 300–324. https://psycnet.apa.org/record/1983-04928-001

Johnson, K. E., & Mervis, C. B. (1997). Effects of varying levels of expertise on the basic level of categorization. *Journal of Experimental Psychology, General*, *126*, 248–277. https://psycnet.apa.org/record/1997-05801-003

Johnson, K. E., & Mervis, C. B. (1998). Impact of intuitive theories on feature recruitment throughout the continuum of expertise. *Memory & Cognition*, *26*, 382–401. https://link.springer.com/article/10.3758/BF03201148

Josselyn, J. A. (2010). Continuing the search for the engram: Examining the mechanism of fear memories. *Journal of Psychiatry Neuroscience*, *35*(4), 221–228.

Kapur, S., Craik, F. I. M., Tulving, E., Wilson, A. A., Houle, S., & Brown, G. M. (1994). Neuroanatomical correlates of encoding in episodic memory: Levels of processing effect. *Proceedings of the National Academy of Sciences of the United States of America*, *91*(6), 208–2011.

Keppel, G., & Underwood, B. J. (1962). Proactive inhibition in short-term retention of single items. *Journal of Verbal Learning & Verbal Behavior, 1*, 153–161. https://www.sciencedirect.com/scienc...22537162800231

Krieckhaus, E. E., & Eriksen, C. W. (1960). A study of awareness and its effects on learning and generalization. *Journal of Personality*, *28*, 503–517. https://psycnet.apa.org/record/1961-04444-001

Lacey, J. L., & Smith, R. L. (1954). Conditioning and generalization of unconscious anxiety. *Science*, *120*, 1045–1052. https://www.ncbi.nlm.nih.gov/pubmed/13216221

Lashley K. S. (1950). In search of the engram. *Society of Experimental Biology Symposium, 4: Psychological Mechanisms in Animal Behavior*. Cambridge University Press.

Lazarus, R. S., & McCleary, R. (1951). Autonomic discrimination without awareness: A study of subception. *Psychological Review*, *58*, 113–122. https://www.ncbi.nlm.nih.gov/pubmed/14834294

Loftus, E. F., & Palmer, J. C. (1974). Reconstruction of auto-mobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior, 13*, 585–589.

MacLeod, C. M., Gopie, N., Hourihan, K. L., Neary, K. R., & Ozubko, J. D. (2010). The production effect: Delineation of a phenomenon. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *36*(3), 671–685.

Mayford, M., Siegelbaum, S. A., & Kandel, E. R. (2012). *Synapses and memory storage*. Cold Spring Harbor Perspectives in Biology, Cold Spring Harbor Laboratory Press.

McGaugh, J. L. (2003). *Memory and emotion: The making of lasting memories*. Columbia University Press.

McLeod, S. A. (2011). Anterograde amnesia. http://www.simplypsychology.org/ante...e-amnesia.html

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on

our capacity for processing information. *Psychological Review, 68*, 81–87.

Myhrer, T. (2003). Neurotransmitter systems involved in learning and memory in the rat: A meta-analysis based on studies of four behavioral tasks. *Brain Research Reviews, 41*(2–3), 268–287.

Newseum. (n.d.). G-men and journalists: D. C. sniper. http://www.newseum.org/exhibits-and-...alists/sniper/

Nickerson, R. S., & Adams, M. J. (1979). Long-term memory for a common object. *Cognitive Psychology, 11*(3), 287–307.

Olson, M. A., & Fazio, R. H. (2001). Implicit attitude formation through classical conditioning. *Psychological Science, 12*, 413–417. https://www.ncbi.nlm.nih.gov/pubmed/11554676

Paivio, A. (1986). *Mental representations: A dual coding approach*. Oxford University Press.

Palmer, C. F., Jones, R. K., Hennessy, B. L., Unze, M. G., & Pick, A. D. (1989). How is a trumpet known? The "basic object level" concept and perception of musical instruments. *American Journal of Psychology, 102*, 17–37. https://www.jstor.org/stable/1423114?seq=1

Parker, E. S., Cahill, L., & McGaugh, J. L. (2006). A case of unusual autobiographical remembering. *Neurocase, 12*, 35–49.

Payne, B. K., Jacoby, L. L., & Lambert, A. J. (2004). Memory monitoring and the control of stereotype distortion. *Journal of Experimental Social Psychology, 40*, 52–64.

Peterson, L., & Peterson, M. J. (1959). Short-term retention of individual verbal items. *Journal of Experimental Psychology, 58*(3), 193–198. https://psycnet.apa.org/record/1960-05499-001

Pew Research Center (2011, September 1). *Ten years after 9/11: United in remembrance, divided over policies*. People Press.

Pipe, M.-E. (1996). Children's eyewitness memory. *New Zealand Journal of Psychology, 25*(2), 36–43.

Pipe, M.-E., Lamb, M., Orbach, Y., & Esplin, P. W. (2004). Recent research on children's testimony about experienced and witnessed events. *Developmental Review, 24*, 440–468.

Reber, A. S. (1976). Implicit learning of synthetic languages: The role of instructional set. *Journal of Experimental Psychology: Human Learning and Memory, 2*, 88–94. https://psycnet.apa.org/doiLanding?d...78-7393.2.1.88

Roediger, H. L., III. (1990). Implicit memory: Retention without remembering. *American Psychologist, 45*, 1043–1056. https://www.ncbi.nlm.nih.gov/pubmed/2221571

Roediger, H. L., & DeSoto, K. A. (2015). The psychology of reconstructive memory. In J. Wright (Ed.), *International Encyclopedia of the Social and Behavioral sciences*, 2e. Elsevier.

Roediger, H. L., III, & McDermott, K. B. (2000). Tricks of memory. *Current Directions in Psychological Science, 9*, 123–127.

Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personal Social Psychology, 35*(9), 677–688. https://psycnet.apa.org/record/1976-27194-001

Rosch, E., Mervis, C. B., Gray, W. D., Johnson, D. M., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology, 8*(3), 382–439.

Schacter, D. L. (1987). Implicit memory: History and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 13*, 501–551. https://pdfs.semanticscholar.org/8c3...80fcb5365b.pdf

Schacter, D. L. (1992). Priming and multiple memory systems: Perceptual mechanisms of implicit memory. *Journal of Cognitive Neuroscience 4*, 244–256. https://dash.harvard.edu/bitstream/h...pdf?sequence=2

Schacter, D. (2001). *The seven sins of memory: How the mind forgets and remembers*. Houghton Mifflin.

Steinmetz, J. E. (1999). A renewed interest in human classical eyeblink conditioning. *Psychological Science, 10*, 24–25.

Tanaka, J. M., & Taylor, M. (1991). Object categories and expertise: Is the basic level in the eye of the beholder? *Cognitive Psychology, 23*, 457–482. http://citeseerx.ist.psu.edu/viewdoc...=rep1&type=pdf

Tigner, R. B. (1999). Putting memory research to good use. *College Teaching, 47*(4), 149–152.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Dolandson (Eds.), *Organization of memory* (pp. 381–403). Academic Press.

Tulving, E. (2002, February). Episodic memory: From mind to brain. *Annual Review of Psychology, 53*, 1–25. doi:10.1146/annurev.psych.53.100901.135114

van Praag, H. (2008). Neurogenesis and exercise: Past and future directions. *NeuroMolecular Medicine, 10*(2), 128–140.

Wells, G. L., & Quinlivan, D. S. (2009). Suggestive eyewitness identification

procedures and the Supreme Court's reliability test in light of eyewitness science: 30 years later. *Law and Human Behavior, 33*, 1–24. doi:10.1007/s10979-008-9130-3

Wrubel, B. (Writer), & Spiller, M. (Director). (2010). The Old Wagon. In S. Levitan & C. Lloyd (Executive producers), *Modern Family*. 20th Century Fox Television.

Yang, J., Xu, X., Du, X., Shi, C., & Fang, F. (2011). Effects of unconscious processing on implicit memory for fearful faces. *PLoS One*, *6*(2). https://journals.plos.org/plosone/ar...l.pone.0014641

Yogo, M., & Fujihara, S. (2008). Working memory capacity can be improved by expressive writing: A randomized experiment in a Japanese sample. *British Journal of Health Psychology, 13*(1), 77–80. doi:10.1348/135910707X252440

Lifespan Development

Ainsworth, M. D. S., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development, 41*, 49–67.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Erlbaum.

American Academy of Pediatrics. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, *199*(1), 182–191.

American Psychological Association. (2019). *Ruth Howard, PhD*. https://www.apa.org/pi/oema/resource...ts/ruth-howard

Amsterdam, B. (1972). Mirror image reactions before age two. *Developmental Psychobiology, 5*, 297–305.

Archer, J. (1992). *Ethology and human development*. Harvester Wheatsheaf.

Arnett, J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*(5), 469–480.

Arora, R., Mittal, A., & Kakkar, R. (2015). Alzheimer's disease: Recent advances. *Journal of Biochemistry and Molecular Biology Research, 1*, 87–104.

Ashley, S. J., Magnuson, S. I., Omnell, L. M., & Clarren, S. K. (1999). Fetal alcohol syndrome: Changes in craniofacial form with age, cognition, and timing of ethanol exposure in the macaque. *Teratology, 59*(3), 163–172.

Bahr, S. J., & Hoffman, J. P. (2010). Parenting style, religiosity, peers, and adolescent heavy drinking. *Journal of Studies on Alcohol and Drugs*, *71*, 539–543.

Baillargeon, R. (2004). Infants' reasoning about hidden objects: Evidence for event-general and event-specific expectations. *Developmental Science*, *7*(4), 391–424.

Baillargeon, R. (1987). Young infants' reasoning about the physical and spatial properties of a hidden object. *Cognitive Development*, *2*(3), 179–200.

Baillargeon, R., Li, J., Gertner, Y., & Wu, D. (2011). How do infants reason about physical events. *The Wiley-Blackwell handbook of childhood cognitive development*, *2*, 11–48.

Barber, B. K. (1994). Cultural, family, and person contexts of parent-adolescent conflict. *Journal of Marriage and the Family, 56*, 375–386.

Basseches, M. (1984). Dialectical thinking as metasystematic form of cognitive organization. In M. L. Commons, F. A. Richards, & C. Armon (Eds.), *Beyond formal operations: Late adolescent and adult cognitive development* (pp. 216–238). Praeger.

Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology, 4*(1, Pt. 2), 1–103. doi:10.1037/h0030372

Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence, 11*(1), 56–95.

Bayley, N., & Oden, M. H. (1955). The maintenance of intellectual ability in gifted adults. *Journal of Gerontology, 10*, 91–107.

Benjamin, L., Henry, K., & McMahon, L. (2005). Inez Beverly Prosser and the education of African Americans. *Journal of the History of the Behavioral Sciences*, *41*, 43–62.

Bjorklund, D. F. (1987). A note on neonatal imitation. *Developmental Review, 7*, 86–92.

Blossom, M., & Morgan, J.L. (2006). Does the face say what the mouth says? A study of infants' sensitivity to visual prosody. In *30th anuual Boston University conference on language development, Somerville, MA.*

Bogartz, R. S., Shinskey, J. L., & Schilling, T. (2000). *Infancy, 1*(4), 403–428.

Bowlby, J. (1969). *Attachment and loss: Attachment* (Vol. 1). Basic Books.

Bowlby, J. (1988). *A secure base: Parent-child attachment and health human development*. Basic Books.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*, 513–531.

Brumley, R., Enquidanos, S., Jamison, P., Seitz, R., Morgenstern, N., Saito, S., . . . Gonzalez, J. (2007). Increased satisfaction with care and lower costs: Results of a randomized trial of in-home

palliative care. *Journal of the American Geriatric Society*, *55*(7), 993–1000.

Brumley, R. D., Enquidanos, S., & Cherin, D. A. (2003). Effectiveness of a home-based palliative care program for end-of-life. *Journal of Palliative Medicine*, *6*(5), 715–724.

Callaghan, T. C., Rochat, P., Lillard, A., Claux, M.L., Odden, H., Itakura, S., . . . Singh, S. (2005). Synchrony in the onset of mental-state reasoning. *Psychological Science*, *16*, 378–384.

Carel, J-C., Lahlou, N., Roger, M., & Chaussain, J. L. (2004). Precocious puberty and statural growth. *Human Reproduction Update*, *10*(2), 135–147.

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity. *Psychology and Aging*, *7*(3), 331–338.

Case, R. (1985). *Intellectual development: Birth to Adulthood*. Academic.

Casey, B. J., Tottenham, N., Liston, C., & Durston, S. (2005). Imaging the developing brain: What have we learned about cognitive development? *TRENDS in Cognitive Sciences*, *19*(3), 104–110.

Centers for Disease Control and Prevention. (2013). *Smoking during pregnancy*. http://www.cdc.gov/tobacco/basic_inf...cts/pregnancy/

Chick, K., Heilman-Houser, R., & Hunter, M. (2002). The impact of child care on gender role development and gender stereotypes. *Early Childhood Education Journal*, *29*(3), 149–154.

Chomsky, N. (1957). *Syntactic structures*. Mouton.

Clark, K. & Clark, M. (1950). Emotional factors in racial identification and preference in Negro children. *Journal of Negro Education*, *19*, 341–350.

Clements, R. (2004). An investigation of the status of outdoor play. *Contemporary Issues in Early Childhood*, *5*(1), 68–80.

Commons, M. L., & Bresette, L. M. (2006). Illuminating major creative scientific innovators with postformal stages. In C. Hoare (Ed.), *Handbook of adult development and learning* (pp. 255–280). Oxford University Press.

Connor, S. R., Pyenson, B., Fitch, K., Spence, C., & Iwasaki, K. (2007). Comparing hospice and nonhospice patient survival among patients who die within a three-year window. *Journal of Pain and Symptom Management*, *33*(3), 238–246.

Courage, M. L., & Howe, M. L. (2002). From infant to child: The dynamics of cognitive change in the second year of life. *Psychological Bulletin*, *128*, 250–277.

Curtiss, S. (1981). Dissociations between language and cognition: Cases and implications. *Journal of Autism and Developmental Disorders*, *11*(1), 15–30.

Darling, N. (1999). *Parenting style and its correlates*. ERIC database (EDO-PS-99-3) http://ecap.crc.illinois.edu/eecearc...9/darlin99.pdf

Davidson, Adam. 2014. It's Official, the Boomerang Kids Won't Leave. *New York Times*, June 20. Retrieved October 27, 2014 (http://www.nytimes.com/2014/06/22/ma...eave.html?_r=0).

de Hevia, M. D., & Spelke, E. S. (2010). Number-space mapping in human infants. *Psychological Science*, *21*(5), 653–660.

Dennett, D. (1987). *The intentional stance*. MIT Press.

Diamond, A. (2009). The interplay of biology and the environment broadly defined. *Developmental Psychology*, *45*(1), 1–8.

Donenberg, G. R., Wilson, H. W., Emerson, E., Bryant, F. B. (2002). Holding the line with a watchful eye: The impact of perceived parental permissiveness and parental monitoring on risky sexual behavior among adolescents in psychiatric care. *AIDS Education Prevention*, *14*(2), 138–157.

Dornbusch, S. M., Ritter, P. L., Leiderman, P. H., Roberts, D. F., & Fraleigh, M. J. (1987). The relation of parenting style to adolescent school performance. *Child Development*, *58*(5), 1244–1257.

Duncan, G. J., & Magnuson, K. A. (2005). Can family socioeconomic resources account for racial and ethnic test score gaps? *The Future of Children*, *15*(1), 35–54.

Erikson, E. H. (1963). *Childhood and Society* (2nd ed.). Norton.

Erikson, E. H. (1968). *Identity: Youth and crisis*. Norton.

Ferrer, M., & Fugate, A. (2003). *Helping your school-age child develop a healthy self-concept*. http://edis.ifas.ufl.edu/fy570#FOOTNOTE_2

Figdor, E., & Kaeser, L. (1998). Concerns mount over punitive approaches to substance abuse among pregnant women. *The Guttmacher Report on Public Policy 1*(5), 3–5.

Fischer, K. W., Yan, Z., & Stewart, J. (2003). Adult cognitive development: Dynamics in the developmental web. In J. Valsiner & K Connolly (Eds.), *Handbook of developmental psychology* (pp. 491–516). Sage Publications.

Flannery, D. J., Rowe, D. C., & Gulley, B. L. (1993). Impact of pubertal status, timing, and age on adolescent sexual experience and delinquency. *Journal of Adolescent Research*, *8*, 21–40.

Forstmann, B., Tittgemeyer, M., Wagenmakers, E., Derrfuss, J., Imperati,

D., & Brown, S. (2011). The speed-accuracy tradeoff in the elderly brain: A structural model-based approach. *Journal of Neuroscience*, *31*, 17242–17249.

Freud, S. (1909). Analysis of a phobia in a five-year-old boy. In *Collected Papers: Volume 111, Case Histories (1949)* (pp. 149–289). Hogarth Press.

Fromkin, V., Krashen, S., Curtiss, S., Rigler, D., & Rigler, M. (1974). The development of language in Genie: A case of language acquisition beyond the critical period. *Brain and Language*, *1*, 81–107.

Galambos, N. L., & Almeida, D. M. (1992). Does parent-adolescent conflict increase in early adolescence? *Journal of Marriage and the Family*, *54*, 737–747.

Galvan, A., Hare, T., Voss, H., Glover, G., & Casey, B. J. (2007). Risk-taking and the adolescent brain: Who is at risk? *Developmental Science*, *10*, F8–F14.

Ganger, J., & Brent, M.R. (2004). Reexamining the vocabulary spurt. *Developmental Psychology, 40*(4), 621–632.

Garcia-Betances, R., Jimenez-Mixco, V., Arredondo, M., & Cabrera-Umpierrez, M. (2015). Using virtual reality for cognitive training of the elderly. *American Journal of Alzheimer's Disease and Other Dementias*, *30*, 49–54.

Ge, X., Conger, R. D., & Elder, G. H. (2001). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology, 37*, 404–417.

Gervai, J. (2009). Environmental and genetic influences on early attachment. *Child and Adolescent Psychiatry and Mental Health*, *3*, 25.

Gesell, A. (1933). Maturation and the patterning of behavior. In C. Murchison (Ed.), *A handbook of child psychology* (2nd ed., pp. 209–235). Clark University Press.

Gesell, A. (1939). *Biographies of child development*. Paul B. Hoeber.

Gesell, A. (1940). *The first five years of life*. Harper.

Gesell, A., & Ilg, F. L. (1946). *The child from five to ten*. Harper.

Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Harvard University Press.

Gleitman, L. R., & Newport, E. L. (1995). The invention of language by children: Environmental and biological influences on the acquisition of language. In L. R. Gleitman & M. Liberman (Eds.), *An invitation to cognitive science, Vol. 1: Language*. (2nd ed.) (pp. 1–24). MIT Press.

Godkin, M., Krant, M., & Doster, N. (1984). The impact of hospice care on families. *International Journal of Psychiatry in Medicine*, *13*, 153–165.

Graber, J. A., Lewinsohn, P. M., Seeley, J. R., & Brooks-Gunn, J. (1997). Is psychopathology associated with the timing of pubertal development? *Journal of the Academy of Child and Adolescent Psychiatry*, *36*, 1768–1776.

Hair, E. C., Moore, K. A., Garrett, S. B., Kinukawa, A., Lippman, L., & Michelson, E. (2005). The parent-adolescent relationship scale. In L. Lippman (Ed.), *Conceptualizing and Measuring Indicators of Positive Development: What Do Children Need to Fluorish?* (pp. 183–202). Kluwer Academic/Plenum Press.

Hall, G. S. (1904). *Adolescence*. Appleton.

Hall, S. S. (2004, May). The good egg. *Discover*, 30–39.

Harlow, H. (1958). The nature of love. *American Psychologist*, *13*, 673–685.

Harris, J. R. (2009). *The nurture assumption: Why children turn out the way they do* (2nd ed.). Free Press.

Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap. *American Educator, 27*(1), 4–9.

Hatch, E. (1983). *Psycholinguistics: A second language perspective*. Newbury House.

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2009). Enrichment effects on adult cognitive development. *Psychological Science in the Public Interest*, *9*(1), 1–65.

Hood, R. W., Jr., Spilka, B., Hunsberger, B., & Corsuch, R. (1996). *The psychology of religion: An empirical approach* (2nd ed.). Guilford.

Huebler, F. (2005, December 14). International education statistics. http://huebler.blogspot.com/2005/12/...n-nigeria.html

Hutchinson, N. (2011). A geographically informed vision of skills development. *Geographical Education*, *24*, 15.

Iverson, J.M., & Goldin-Meadow, S. (2005). Gesture paves the way for language development. *Psychological Science*, *16*(5), 367–71.

Iyengar, S. S., Wells, R. E., & Schwartz, B. (2006). Doing better but feeling worse: Looking for the best job undermines satisfaction. *Psychological Science, 17*, 143–150.

John-Steiner, V. & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist*, *31*, 191–206.

Jos, P. H., Marshall, M. F., & Perlmutter, M. (1995). The Charleston policy on cocaine use during pregnancy: A cautionary tale. *The Journal of Law, Medicine & Ethics*, *23*(2), 120–128.

Kaltiala-Heino, R. A., Rimpela, M., Rissanen, A., & Rantanen, P. (2001). Early puberty and early sexual activity are associated with bulimic-type eating pathology in middle adolescence. *Journal of Adolescent Health, 28*, 346–352.

Kaplan, H., & Dove, H. (1987). Infant development among the Aché of Eastern Paraguay. *Developmental Psychology, 23*, 190–198.

Karasik, L. B., Adolph, K. E., Tamis-LeMonda, C. S., & Bornstein, M. H. (2010). WEIRD Walking: Cross-cultural research on motor development. *Behavioral & Brain Sciences*, *33*(2-3), 95–96.

Karnik, S., & Kanekar, A. (2012). Childhood obesity: A global public health crisis. *International Journal of Preventive Medicine*, *3*(1), 1–7.

Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (p. 379). Rand McNally.

Kolb, B., & Whishaw, I. Q. (2009). *Fundamentals of human neuropsychology*. Worth.

Kübler-Ross, E. (1969). *On death and dying*. Macmillan.

Labouvie-Vief, G., & Diehl, M. (1999). Self and personality development. In J. C. Cavanaugh & S. K. Whitbourne (Eds.), *Gerontology: An interdisciplinary perspective* (pp. 238–268). Oxford University Press.

Larson, E. B., Wang, L., Bowen, J. D., McCormick, W. C., Teri, L., Crane, P., & Kukull, W. (2006). Exercise is associated with reduced risk for incident dementia among persons 65 years of age or older. *Annals of Internal Medicine*, *144*, 73–81.

Lee, V. E., & Burkam, D. T. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school*. Economic Policy Institute.

Lobo, I. (2008) Environmental influences on gene expression. *Nature Education 1*(1), 39.

Loop, E. (2013). *Major milestones in cognitive development in early childhood*. http://everydaylife.globalpost.com/m...hood-4625.html

Maccoby, E. (1980). *Social development: Psychological growth and the parent-child relationship*. Harcourt Brace Jovanovich.

MacFarlane, A. (1978, February). What a baby knows. *Human Nature*, 74–81.

Maier, S. E., & West, J. R. (2001). Drinking patterns and alcohol-related birth defects. *Alcohol Research & Health, 25*(3), 168–174.

Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the Preschool Years* (pp. 121–160). University of Chicago Press.

Markus, H. R., Ryff, C. D., Curan, K., & Palmersheim, K. A. (2004). In their own words: Well-being at midlife among high school-educated and college-educated adults. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 273–319). University of Chicago Press.

McIntosh, D. N., Silver, R. C., & Wortman, C. B. (1993). Religion's role in adjustment to a negative life event: Coping with the loss of a child. *Journal of Personality and Social Psychology, 65*, 812–821.

McMillan, S. C., Small, B. J., Weitzner, M., Schonwetter, R., Tittle, M., Moody, L., & Haley, W. E. (2006). Impact of coping skills intervention with family caregivers of hospice patients with cancer. *Cancer*, *106*(1), 214-222.

Miklikowska, M., Duriez, B., & Soenens, B. (2011). Family roots of empathy-related characteristics: The role of perceived maternal and paternal need support in adolescence. *Developmental Psychology, 47*(5), 1342–1352.

Mills, M., & Melhuish, E. (1974). Recognition of mother's voice in early infancy. *Nature*, *252*, 123–124.

Mohr, R. D., & Zoghi, C. (2006). Is job enrichment really enriching? (U.S. Bureau of Labor Statistics Working Paper 389). Washington, DC: U.S. Bureau of Labor Statistics. http://www.bls.gov/ore/pdf/ec060010.pdf

Moore, K. A., Guzman, L., Hair, E. C., Lippman, L., & Garrett, S. B. (2004). Parent-teen relationships and interactions: Far more positive than not. *Child Trends Research Brief, 2004-25*. Child Trends.

National Institutes of Health. (2013). *What is prenatal care and why is it important?* http://www.nichd.nih.gov/health/topi...atal-care.aspx

National Institute of Neurological Disorders and Stroke. (2019). *Brain basics: The life and death of a neuron.* https://www.ninds.nih.gov/Disorders/...d-Death-Neuron

Neblett, E., Smalls, C., Ford, K., Nguyen, H., & Sellers, R. (2009). Racial socialization and racial identity: African American parents' messages about race as precursors to identity. *Journal of Youth and Adolescence*, *38*, 189–203.

Newcombe, N. (2011). What is neoconstructivism? *Child Development Perspectives*, *5*, 157–160.

Nolen-Hoeksema, S., & Larson, J. (1999). *Coping with loss*. Erlbaum.

Olson, K. R., Durwood, L., DeMeules, M., & McLaughlin, K. A. (2016). Mental Health of Transgender Children Who Are

Supported in Their Identities. *Pediatrics, 137*(3), e20153223. https://doi.org/10.1542/peds.2015-3223

Overman, W. H., Bachevalier, J., Turner, M., & Peuster, A. (1992). Object recognition versus object discrimination: Comparison between human infants and infant monkeys. *Behavioral Neuroscience, 106*, 15–29.

Paloutzian, R. F. (1996). *Invitation to the psychology of religion*. Allyn & Bacon.

Parent, J., Forehand, R., Merchant, M. J., Edwards, M. C., Conners-Burrow, N. A., Long, N., & Jones, D. J. (2011). The relation of harsh and permissive discipline with child disruptive behaviors: Does child gender make a difference in an at-risk sample? *Journal of Family Violence, 26*, 527–533.

Piaget, J. (1954). *The construction of reality in the child*. Basic Books.

Pickens, J. (1994). Full-term and preterm infants' perception of face-voice synchrony. *Infant Behavior and Development, 17*, 447–455.

Piaget, J. (1930). *The child's conception of the world*. Harcourt, Brace & World.

Piaget, J. (1932). *The moral judgment of the child*. Harcourt, Brace & World.

Podewils, L. J., Guallar, E., Kuller, L. H., Fried, L. P., Lopez, O. L., Carlson, M., & Lyketsos, C. G. (2005). Physical activity, APOE genotype, and dementia risk: Findings from the Cardiovascular Health Cognition Study. *American Journal of Epidemiology, 161*, 639–651.

Pollack, W., & Shuster, T. (2000). *Real boys' voices*. Random House.

Rhodes, R. L., Mitchell, S. L., Miller, S. C., Connor, S. R., & Teno, J. M. (2008). Bereaved family members' evaluation of hospice care: What factors influence overall satisfaction with services? *Journal of Pain and Symptom Management, 35*, 365–371.

Risley, T. R., & Hart, B. (2006). Promoting early language development. In N. F. Watt, C. Ayoub, R. H. Bradley, J. E. Puma, & W. A. LeBoeuf (Eds.), *The crisis in youth mental health: Early intervention programs and policies* (Vol. 4, pp. 83–88). Praeger.

Rogers, L. & Meltzoff, A. (2017). Is gender more important and meaningful than race? An analysis of racial and gender identity among Black, White, and mixed-race children. *Cultural Diversity and Ethnic Minority Psychology, 23*, 323–334.

Rothbaum, R., Weisz, J., Pott, M., Miyake, K., & Morelli, G. (2000). Attachment and culture: Security in the United States and Japan. *American Psychologist, 55*, 1093–1104.

Ruggiero, G., D'Errico, O., & Iachini, T. (2016). Development of egocentric and allocentric spatial representations from childhood to elderly age. *Psychological Research, 80*, 259–272.

Russell, S. T., Crockett, L. J., & Chao, R. (Eds.). (2010). Asian American parenting and parent-adolescent relationships. In R. Levesque (Series Ed.), *Advancing responsible adolescent development*. Springer.

Ryff, C. D., & Singer, B. (2009). Understanding healthy aging: Key components and their integration. In V. L. Bengtson, D. Gans., N. M. Putney, & M. Silverstein. (Eds.), *Handbook of theories of aging* (2nd ed., pp. 117–144). Springer.

Samarel, N. (1991). *Caring for life after death*. Hemisphere.

Sanson, A., & Rothbart, M. K. (1995). Child temperament and parenting. In M. Bornstein (Ed.), *Applied and practical parenting* (Vol. 4, pp. 299–321). Lawrence Erlbaum.

Schechter, C., & Byeb, B. (2007). Preliminary evidence for the impact of mixed-income preschools on low-income children's language growth. *Early Childhood Research Quarterly, 22*, 137–146.

Shamay-Tsoory, S. G., Tomer, R., & Aharon-Peretz, J. (2005). The neuroanatomical basis of understanding sarcasm and its relationship to social cognition. *Neuropsychology, 19*(3), 288–300.

Shanahan, L., McHale, S. M., Osgood, D. W., & Crouter, A. C. (2007). Conflict frequency with mothers and fathers from middle childhood to late adolescence: Within and between family comparisons. *Developmental Psychology, 43*, 539–550.

Siegler, R. S. (2005). *Children's thinking* (4th ed). Erlbaum.

Siegler, R. S. (2006). Microgenetic analyses of learning. In D. Kuhn & R. S. Siegler (Eds.), *Handbook of child psychology: Cognition, perception, and language* (6th ed., Vol. 2). Wiley.

Sinnott, J. D. (1998). *The development of logic in adulthood: Postformal thought and its applications*. Springer.

Small, M. F. (1999). *Our babies, ourselves: How biology and culture shape the way we parent*. Anchor Books.

Spelke, E.S., & Cortelyou, A. (1981). Perceptual aspects of social knowing: Looking and listening in infancy. In M.E. Lamb & L.R. Sherrod (Eds.), *Infant social cognition: Empirical and theoretical considerations* (pp. 61–83). Erlbaum.

Spencer, M. B., Dupree, D., & Hartmann, T. (1997). A phenomenological variant of ecological systems theory (PVEST): A self-organization perspective in context. *Development and Psychopathology, 9*, 817–833.

Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology, 52*, 83–110.

Sterns, H. L., & Huyck, M. H. (2001). The role of work in midlife. In M.

Lachman (Ed.), *The handbook of midlife development* (pp. 447–486). Wiley.

Steven L. Youngentob, et. al. (2007). Experience-induced fetal plasticity: The effect of gestational ethanol exposure on the behavioral and neurophysiologic olfactory response to ethanol odor in early postnatal and adult rats. *Behavioral Neuroscience*, *121*(6), 1293–1305.

Stork, F. C., & Widdowson, D. A. (1974). *Learning about linguistics*. Hutchinson Ltd.

Streissguth, A. P., Bookstein, F. L., Barr, H. M., Sampson, P. D., O'Malley, K., & Young, J. K. (2004). Risk factors for adverse life outcomes in fetal alcohol syndrome and fetal alcohol effects. *Developmental and Behavioral Pediatrics*, *25*(4), 228–238.

Striegel-Moore, R. H., & Cachelin, F. M. (1999). Body image concerns and disordered eating in adolescent girls: Risk and protective factors. In N. G. Johnson, M. C. Roberts, & J. Worell (Eds.), *Beyond appearance: A new look at adolescent girls*. American Psychological Association

Tanner, J. M. (1978). *Fetus into man: Physical growth from conception to maturity*. Harvard University Press.

Temel, J. S., Greer, J. A., Muzikansky, A., Gallagher, E. R., Admane, S., Jackson, V. A. . . . Lynch, T. J. (2010). Early palliative care for patients with metastic non-small-cell lung cancer. *New England Journal of Medicine*, *363*, 733–742.

Thomas, A. (1984). Temperament research: Where we are, where we are going. *Merrill-Palmer Quarterly*, *30*(2), 103–109.

Tran, T. D., & Kelly, S. J. (2003). Critical periods for ethanol-induced cell loss in the hippocampal formation. *Neurotoxicology and Teratology*, *25*(5), 519–528.

Umberson, D., Pudrovska, T., & Reczek, C. (2010). Parenthood, childlessness, and well-being: A life course perspective. *Journal of Marriage and the Family*, *72*(3), 612–629.

United Nations Educational, Scientific and Cultural Organization. (2013, June). *UIS Fact Sheet: Schooling for millions of children jeopardized by reductions in aid*. UNESCO Institute for Statistics.

Vaillant, G. E. (2002). *Aging well*. Little Brown & Co.

Van der Graaff, J., Branje, S., De Wied, M., Hawk, S., Van Lier, P., & Meeus, W. (2013). Perspective taking and empathetic concern in adolescence: Gender differences in developmental changes. *Developmental Psychology*, *50*(3), 881.

van Ijzendoorn, M. H., & Sagi-Schwartz, A. (2008). Cross-cultural patterns of attachment: Universal and contextual dimensions. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment*. Guilford.

Vouloumanos, A., & Werker, J. F. (2004). Tuned to the signal: The privileged status of speech for young infants. *Developmental Science*, *7*, 270–276.

Westermann, G., Mareschal, D., Johnson, M., Sirois, S., Spratling, M., & Thomas, M. (2007). Neuroconstructivism. *Developmental Science*, *10*, 75–83.

WHO Multicentre Growth Reference Study Group. (2006). *WHO Child growth standards: Methods and development: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age*. World Health Organization.

Winerman, L. (2011). Closing the achievement gap. *Monitor of Psychology*, *42*(8), 36.

Wortman, J. H., & Park, C. L. (2008). Religion and spirituality in adjustment following bereavement: An integrative review. *Death Studies*

Emotion and Motivation

Adelmann, P. K., & Zajonc, R. B. (1989). Facial efference and the experience of emotion. *Annual Review of Psychology*, *40*, 249–280. https://www.annualreviews.org/doi/ab....020189.001341

Ahima, R. S., & Antwi, D. A. (2008). Brain regulation of appetite and satiety. *Endocrinology and Metabolism Clinics of North America*, *37*, 811–823.

Aldao, A., & Dixon-Gordon, K. L. (2014). Broadening the scope of research on emotion regulation strategies and psychopathology. *Cognitive Behaviour Therapy*, *43*(1), 22–33. https://www.tandfonline.com/doi/abs/...73.2013.816769

Aldao, A., Nolen-Hoeksema, S., Schweizer, S. (2010). Emotion regulation strategies across psychopathology: A meta-analysis. *Clinical Psychology Review*, *30*, 217–237. https://www.ncbi.nlm.nih.gov/pubmed/20015584

Allen, L. S., & Gorski, R. A. (1992). Sexual orientation and the size of the anterior commissure in the human brain. *Proceedings of the National Academy of Sciences, USA*, *89*, 7199–7202.

American Psychiatric Association. (2013). *Feeding and eating disorders*. http://www.dsm5.org/documents/eating...ct%20sheet.pdf

Arnold, H. J. (1976). Effects of performance feedback and extrinsic reward upon high intrinsic motivation. *Organizational Behavior and Human Performance*, *17*, 275–288.

Bailey, M. J., & Pillard, R. C. (1991). A genetic study of male sexual orientation. *Archives of General Psychiatry, 48*, 1089–1096.

Baldwin, J. D., & Baldwin, J. I. (1989). The socialization of homosexuality and heterosexuality in a non-western society. *Archives of Sexual Behavior, 18*, 13–29.

Bancroft, J. (2004). Alfred C. Kinsey and the politics of sex research. *Annual Review of Sex Research, 15*, 1–39.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachandran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). Academic Press.

Barrett, L. F. (2017). The theory of constructed emotion: An active inference account of interoception and categorization. *Social Cognitive and Affective Neuroscience, 12*, 1–23. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5691871/

Bauminger, N. (2002). The facilitation of social-emotional understanding and social interaction in high-functioning children with autism: Intervention outcomes. *Journal of Autism and Developmental Disorders, 32*, 283–298.

Becker, J. B., Rudick, C. N., & Jenkins, W. J. (2001). The role of dopamine in the nucleus accumbens and striatum during sexual behavior in the female rat. *Journal of Neuroscience, 21*, 3236–3241.

Becker, J. M. (2012, April 25). Dr. Robert Spitzer apologizes to gay community for infamous "ex-gay" study. http://www.truthwinsout.org/news/2012/04/24542/

Beedie, C. J., Terry, P. C., Lane, A. M., & Devonport, T. J. (2011). Differential assessment of emotions and moods: Development and validation of the emotion and mood components of anxiety questionnaire. *Personality and Individual Differences, 50*, 228–233.

Bell, A. P., Weinberg, M. S., & Hammersmith, S. K. (1981). *Sexual preferences: Its development in men and women*. Indiana University Press.

Berlyne, D. E. (1960). Toward a theory of exploratory behavior: II. Arousal potential, perceptual curiosity, and learning. In (Series Ed.), *Conflict, arousal, and curiosity* (pp. 193–227). McGraw-Hill Book Company.

Bhasin, S., Enzlin, P., Coviello, A., & Basson, R. (2007). Sexual dysfunction in men and women with endocrine disorders. *The Lancet, 369*, 597–611.

Blackford, J. U., & Pine, D. S. (2012). Neural substrates of childhood anxiety disorders: A review of neuroimaging findings. *Child and Adolescent Psychiatric Clinics of North America, 21*, 501–525.

Boiger, M., & Mesquita, B. (2012). The construction of emotion in interactions, relationships, and cultures. *Emotion Review, 4*, 221–229. https://journals.sagepub.com/doi/10....54073912439765

Bremner, J. D., & Vermetten, E. (2004). Neuroanatomical changes associated with pharmacotherapy in posttraumatic stress disorder. *Annals of the New York Academy of Sciences, 1032*, 154–157.

Buck, R. (1980). Nonverbal behavior and the theory of emotion: The facial feedback hypothesis. *Journal of Personality and Social Psychology, 38*, 811–824.

Bullough, V. L. (1998). Alfred Kinsey and the Kinsey report: Historical overview and lasting contributions. *The Journal of Sex Research, 35*, 127–131.

Byne, W., Tobet, S., Mattiace, L. A., Lasco, M. S., Kemether, E., Edgar, M. A., . . . Jones, L. B. (2001). The interstitial nuclei of the human anterior hypothalamus: An investigation of variation with sex, sexual orientation, and HIV status. *Hormones and Behavior, 40*, 86–92.

Cameron, J., & Pierce, W. D. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research, 64*, 363–423.

Capella, J. N. (1993). The facial feedback hypothesis in human interaction: Review and speculation. *Journal of Language and Social Psychology, 12*(12), 13–29. https://journals.sagepub.com/doi/10....61927X93121002

Carey, B. (2012, May 18). Psychiatry giant sorry for backing gay 'cure.' *The New York Times*. http://www.nytimes.com/2012/05/19/he...cure.html?_r=0

Carter, C. S. (1992). Hormonal influences on human sexual behavior. In J. B. Becker, S. M. Breedlove, & D. Crews (Eds.), *Behavioral Endocrinology* (pp.131–142). MIT Press.

Cassidy, S. B., & Driscoll, D. J. (2009). Prader-Willi syndrome. *European Journal of Human Genetics, 17*, 3–13.

Centers for Disease Control and Prevention. (2012). *Overweight and obesity*. http://www.cdc.gov/obesity/index.html

Chwalisz, K., Diener, E., & Gallagher, D. (1988). Autonomic arousal feedback and emotional experience: Evidence from the spinal cord injured. *Journal of Personality and Social Psychology, 54*, 820–828.

Colapinto, J. (2000). *As nature made him: The boy who was raised as a girl*. Harper Collins.

Collier, D. A., & Treasure, J. L. (2004). The aetiology of eating disorders. *The British Journal of Psychiatry, 185*, 363–365.

Conrad, P. (2005). The shifting engines of medicalization. *Journal of Health and Social Behavior, 46*, 3–14.

Cornelius, R. R. (1991). Gregorio Marañon's two-factor theory of emotion. *Personality and Social Psychology Bulletin*, *17*(1), 65–69. https://psycnet.apa.org/doi/10.1177/0146167291171010

Creighton, S. (2001). Surgery for intersex. *Journal of the Royal Society of Medicine*, *94*, 218–220. https://journals.sagepub.com/doi/10....07680109400505

Cunha, C., Monfils, M. H., & LeDoux, J. E. (2010). GABA(C) receptors in the lateral amygdala: A possible novel target for the treatment of fear and anxiety disorders? *Frontiers in Behavioral Neuroscience*, *4*, 6.

Daniel, T. L., & Esser, J. K. (1980). Intrinsic motivation as influenced by rewards, task interest, and task structure. *Journal of Applied Psychology*, *65*, 566–573.

Darwin, C. (1872). *The expression of emotions in man and animals*. Appleton.

Davies, S. G. (2018). The transcendent bissu. *Aeon*. June 12, 2018. https://aeon.co/essays/the-west-can-...ender-heritage

Davis, J. I., Senghas, A., & Ochsner, K. N. (2009). How does facial feedback modulate emotional experience? *Journal of Research in Personality*, *43*, 822–829.

Deci, E. L. (1972). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology*, *22*, 113–120.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*, 627–668.

de Gelder, B. (2006). Towards the neurobiology of emotional body language. *Nature Reviews Neuroscience*, *7*, 242–249.

Drazen, D. L., & Woods, S. C. (2003). Peripheral signals in the control of satiety and hunger. *Current Opinion in Clinical Nutrition and Metabolic Care*, *5*, 621–629.

Druce, M.R., Small, C.J., & Bloom, S.R. (2004). Minireview: Gut peptides regulating satiety. *Endocrinology*, *145*, 2660–2665.

Ekman, P. (1972). Universals and cultural differences in facial expressions of emotions. In J. Cole (Ed.), *Nebraska Symposium on Motivation* (pp. 207–282). University of Nebraska Press. https://1ammce38pkj41n8xkp1iocwe-wpe...essions-Of.pdf

Ekman, P., & Keltner, D. (1997). Universal facial expressions of emotion: An old controversy and new findings. In U. Segerstråle & P. Molnár (Eds.), *Nonverbal communication: Where nature meets culture* (pp. 27–46). Lawrence Erlbaum.

Everett, B. J. (1990). Sexual motivation: A neural and behavioural analysis of the mechanisms underlying appetitive and copulatory responses of male rats. *Neuroscience and Biobehavioral Reviews*, *14*, 217–232.

Faris, E. (1921). Are instincts data or hypotheses? *American Journal of Sociology*, *27*, 184–196.

Femenía, T., Gómez-Galán, M., Lindskog, M., & Magara, S. (2012). Dysfunctional hippocampal activity affects emotion and cognition in mood disorders. *Brain Research*, *1476*, 58–70.

Fossati, P. (2012). Neural correlates of emotion processing: From emotional to social brain. *European Neuropsychopharmacology*, *22*, S487–S491.

Fournier, J. C., Keener, M. T., Almeida, J., Kronhaus, D. M., & Phillips, M. L. (2013). Amygdala and whole-brain activity to emotional faces distinguishes major depressive disorder and bipolar disorder. *Bipolar Disorders*. Advance online publication. doi:10.1111/bdi.12106

Francis, N. H., & Kritsonis, W. A. (2006). A brief analysis of Abraham Maslow's original writing of *Self-Actualizing People: A Study of Psychological Health*. *Doctoral Forum National Journal of Publishing and Mentoring Doctoral Student Research*, *3*, 1–7.

Frijda, N. H. (1988). The laws of emotion. *American Psychologist*, *43*, 349–358. https://psycnet.apa.org/record/1988-28577-001

Gloy, V. L., Briel, M., Bhatt, D. L., Kashyap, S. R., Schauer, P. R., Mingrone, G., . . . Nordmann, A. J. (2013, October 22). Bariatric surgery versus non-surgical treatment for obesity: A systematic review and meta-analysis of randomized controlled trials. *BMJ*, *347*. doi:http://dx.doi.org/10.1136/bmj.f5934

Golan, O., & Baron-Cohen, S. (2006). Systemizing empathy: Teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology*, *18*, 591–617.

Goosens, K. A., & Maren, S. (2002). Long-term potentiation as a substrate for memory: Evidence from studies of amygdaloid plasticity and Pavlovian fear conditioning. *Hippocampus*, *12*, 592–599.

Graham, S., & Weiner, B. (1996). Theories and principles of motivation. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 63–84). Routledge.

Greary, N. (1990). Pancreatic glucagon signals postprandial satiety. *Neuroscience and Biobehavioral Reviews*, *14*, 323–328.

Gross, J. J. (1999). Emotion regulation: Past, present, and future. *Cognition & Emotion*, *13*, 551–573. https://www.tandfonline.com/doi/abs/...26999399379186

Guastella, A. J., Einfeld, S. L., Gray, K. M., Rinehart, N. J., Tonge, B. J., Lambert, T. J., & Hickie, I. B. (2010). Intranasal oxytocin improves emotion recognition for youth with autism spectrum disorders. *Biological Psychiatry, 67*, 692–694.

Hall, J. A., & Kimura, D. (1994). Dermatoglyphic asymmetry and sexual orientation in men. *Behavioral Neuroscience, 108*(6), 1203–1206.

Hamer, D. H., Hu. S., Magnuson, V. L., Hu, N., & Pattatucci, A. M. (1993). A linkage between DNA markers on the X chromosome and male sexual orientation. *Science, 261*, 321-327.

Havas, D. A., Glenberg, A. M., Gutowski, K. A., Lucarelli, M. J., & Davidson, R. J. (2010). Cosmetic use of botulinum toxin-A affects processing of emotional language. *Psychological Science, 21*, 895–900.

Hobson, R. P. (1986). The autistic child's appraisal of expressions of emotion. *The Journal of Child Psychology and Psychiatry, 27*, 321–342.

Hock, R. R. (2008). Emotion and Motivation. In *Forty studies that changed psychology: Explorations into the history of psychological research* (6th ed.) (pp. 158–168). Pearson.

Hopp, H., Troy, A. S., & Mauss, I. B. (2011). The unconscious pursuit of emotion regulation: Implications for psychological health. *Cognition and Emotion, 25*, 532–545. https://www.ocf.berkeley.edu/~eerlab...regulation.pdf

Hu, S. H., Wei, N., Wang, Q. D., Yan, L. Q., Wei, E.Q., Zhang, M. M., . . . Xu, Y. (2008). Patterns of brain activation during visually evoked sexual arousal differ between homosexual and heterosexual men. *American Journal of Neuroradiology, 29*, 1890–1896.

Hughes, I. A., Houk, C., Ahmed, S. F., Lee, P. A., LWPES Consensus Group, & ESPE Consensus Group. (2006). Consensus statement on management of intersex disorders. *Archives of Disease in Childhood, 91*, 554–563. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2082839/

Human Rights Campaign. (n.d.). *The lies and dangers of efforts to change sexual orientation or gender identity.* http://www.hrc.org/resources/entry/t...rative-therapy

Ibrahim, F. M. (2019). Homophobia and rising intolerance push Indonesia's intersex bissu priests to the brink. Australian Broadcasting Company News. February 26, 2019. https://www.abc.net.au/news/2019-02-...ppear/10846570

interACT. (2021). FAQ: What Is Intersex. InterACT Advocates for Intersex Youth. January 4, 2022. https://interactadvocates.org/faq/#

Jenkins, W. J. (2010). Can anyone tell me why I'm gay? What research suggests regarding the origins of sexual orientation. *North American Journal of Psychology, 12*, 279–296.

Jenkins, W. J., & Becker, J. B. (2001). Role of the striatum and nucleus accumbens in paced copulatory behavior in the female rat. *Behavioural Brain Research, 121*, 19–28.

Kennedy, K. (2017). Coverage in transition: Considerations when expanding employer-provided health coverage to LGBTI employees and beneficiaries. *The John Marhsall Institutional Repository*, *24*(1). https://repository.jmls.edu/cgi/view...ontext=facpubs

Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male.* W.B. Saunders Company.

Koltko-Rivera, M. E. (2006). Rediscovering the later version of Maslow's hierarchy of needs: Self-transcendence and opportunities for theory, research, and unification. *Review of General Psychology, 10*, 302–317.

Konturek, S. J., Pepera, J., Zabielski, K., Konturek, P. C., Pawlick, T., Szlachcic, A., & Hahn. (2003). Brain-gut axis in pancreatic secretion and appetite control. *Journal of Physiology and Pharmacology, 54*, 293–317.

Lang, P. J. (1994). The varieties of emotional experience: A meditation on James-Lange theory. *Psychological Review, 101*, 211–221.

Lazarus, R. S. (1991). Cognition and motivation in emotion. *American Psychologist, 46*, 352–367. https://psycnet.apa.org/record/1991-23402-001

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press.

LeDoux, J. E. (1996). *The Emotional Brain: The Mysterious Underpinnings of Emotional Life.* Simon & Schuster.

LeDoux, J. E. (2002). *The synaptic self.* Macmillan.

Leonard, G. (1982). The failure of self-actualization theory: A critique of Carl Rogers and Abraham Maslow. *Journal of Humanistic Psychology, 22*, 56–73.

LeVay, S. (1991). A difference in the hypothalamic structure between heterosexual and homosexual men. *Science, 253*, 1034–1037.

LeVay, S. (1996). *Queer science: The use and abuse of research into homosexuality.* The MIT Press.

Levenson, R. W., Carstensen, L. L., Friesen, W. V., & Ekman, P. (1991). Emotion, physiology, and expression in old age. *Psychology and Aging, 6*, 28–35. https://psycnet.apa.org/record/1991-18170-001

Levy-Gigi, E., Szabó, C., Kelemen, O., & Kéri, S. (2013). Association among clinical response, hippocampal volume, and FKBP5 gene expression in individuals with posttraumatic stress

disorder receiving cognitive behavioral therapy. *Biological Psychiatry, 74*, 793–800.

Lippa, R. A. (2003). Handedness, sexual orientation, and gender-related personality traits in men and women. *Archives of Sexual Behavior, 32*, 103–114.

Loehlin, J. C., & McFadden, D. (2003). Otoacoustic emissions, auditory evoked potentials, and traits related to sex and sexual orientation. *Archives of Sexual Behavior, 32*, 115–127.

Macdonald, H., Rutter, M., Howlin, P., Rios, P., Conteur, A. L., Evered, C., & Folstein, S. (1989). Recognition and expression of emotional cues by autistic and normal adults. *Journal of Child Psychology and Psychiatry, 30*, 865–877.

Malatesta, C. Z., & Haviland, J. M. (1982). Learning display rules: The socialization of emotion expression in infancy. *Child Development, 53*, 991–1003.

Maren, S., Phan, K. L., & Liberzon, I. (2013). The contextual brain: Implications for fear conditioning, extinction and psychopathology. *Nature Reviews Neuroscience, 14*, 417–428.

Martin-Gronert, M. S., & Ozanne, S. E. (2013). Early life programming of obesity. *Developmental Period Medicine, 17*, 7–12.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*, 370–396.

Matsumoto, D. (1990). Cultural similarities and differences in display rules. *Motivation and Emotion, 14*, 195–214.

Matsumoto, D., Yoo, S. H., & Nakagawa, S. (2008). Culture, emotion regulation, and adjustment. *Journal of Personality and Social Psychology, 94*, 925–937.

Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition and Emotion, 23*, 209–237. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2756702/

Mauss, I. B., Bunge, S. A., & Gross, J. J. (2007). Automatic emotion regulation. *Social and Personality Psychology Compass, 1*, 146–167. https://www.ocf.berkeley.edu/~eerlab...Regulation.pdf

Mauss, I. B., Cook, C. L., & Gross, J. J. (2007). Automatic emotion regulation during anger provocation. *Journal of Experimental Social Psychology, 43*, 698–711. https://psycnet.apa.org/record/2007-12302-004

Mauss, I. B., Cook, C. L., Cheng, J. Y. J., & Gross, J. J. (2007). Individual differences in cognitive reappraisal: Experiential and physiological responses to an anger provocation. *International Journal of Psychophysiology, 66*, 116–124. https://www.ncbi.nlm.nih.gov/pubmed/17543404

Mauss, I. B., Levenson, R. W., McCarter, L., Wilhelm, F. H., & Gross, J. J. (2005). The tie that binds? Coherence among emotion experience, behavior, and physiology. *Emotion, 5*, 175–190. https://www.ncbi.nlm.nih.gov/pubmed/15982083

Mayo Clinic. (2012a). *Anorexia nervosa.* http://www.mayoclinic.com/health/anorexia/DS00606

Mayo Clinic. (2012b). *Bulimia nervosa.* http://www.mayoclinic.com/health/bulimia/DS00607

Mayo Clinic. (2013). *Gastric bypass surgery.* http://www.mayoclinic.com/health/gas...bypass/MY00825

McAdams, D. P., & Constantian, C. A. (1983). Intimacy and affiliation motives in daily living: An experience sampling analysis. *Journal of Personality and Social Psychology, 45*, 851–861.

McClelland, D. C., & Liberman, A. M. (1949). The effect of need for achievement on recognition of need-related words. *Journal of Personality, 18*, 236–251.

McFadden, D., & Champlin, C. A. (2000). Comparisons of auditory evoked potentials in heterosexual, homosexual, and bisexual males and females. *Journal of the Association for Research in Otolaryngology, 1*, 89–99.

McFadden, D., & Pasanen, E. G. (1998). Comparisons of the auditory systems of heterosexuals and homosexuals: Clicked-evoked otoacoustic emissions. *Proceedings of the National Academy of Sciences, USA, 95*, 2709–2713.

McRae, K., Ochsner, K. N., Mauss, I. B., Gabrieli, J. J. D., & Gross, J. J. (2008). Gender differences in emotion regulation: An fMRI study of cognitive reappraisal. *Group Processes and Intergroup Relations, 11*, 143–162.

Miguel-Hidalgo, J. J. (2013). Brain structural and functional changes in adolescents with psychiatric disorders. *International Journal of Adolescent Medicine and Health, 25*, 245–256.

Money, J. (1962). *Cytogenic and psychosexual incongruities with a note on space-form blindness.* Paper presented at the 118th meeting of the American Psychiatric Association, Toronto, Canada.

Money, J. (1975). Ablatio penis: Normal male infant sex-reassigned as a girl. *Archives of Sexual Behavior, 4*, 65–71.

Moriceau, S., & Sullivan, R. M. (2006). Maternal presence serves as a switch between learning fear and attraction in infancy. *Nature Neuroscience, 9*, 1004–1006.

Murray, H. A., Barrett, W. G., Homburger, E., Langer, W. C., Mekeel, H. S., Morgan, C. D., . . . Wolf, R. E.

(1938). *Explorations in personality: A clinical and experimental study of fifty men of college age*. Oxford University Press.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education, 7*, 133–144.

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*(2), 291–310. https://psycnet.apa.org/record/2001-17194-001

Novin, D., Robinson, K., Culbreth, L. A., & Tordoff, M. G. (1985). Is there a role for the liver in the control of food intake? *The American Journal of Clinical Nutrition, 42*, 1050–1062.

O'Connell, S. (Writer/Producer). (2004). Dr. Money and the boy with no penis. In *Horizon*. BBC.

Paramaguru, K. (2013, November). Boy, girl, or intersex? Germany adjusts to a third option at birth. *Time*. http://world.time.com/2013/11/12/boy...l-or-intersex/

Pedersen, E. R. (2016). Using the solid research base on pregaming to begin intervention development: An epilogue to the special issue on pregaming. *Substance Use & Misuse*, *51*(8), 1067–1073. https://www.tandfonline.com/doi/abs/...4.2016.1187533

Pessoa, L. (2010). Emotion and cognition and the amygdala: From "what is it?" to "what's to be done?" *Neuropsychologia*, *48*, 3416–3429.

PFLAG. (2021). PFLAG National Glossary of Terms. PGLAG.org. Retrieved January 3 2022. https://pflag.org/glossary

Pillard, R. C., & Bailey, M. J. (1995). A biologic perspective on sexual orientation. *The Psychiatric Clinics of North America*, *18*(1), 71–84.

Pillard, R. C., & Bailey, M. J. (1998). Sexual orientation has a heritable component. *Human Biology*, *70*, 347–365.

Ponseti, J., Bosinski, H. A., Wolff, S., Peller, M., Jansen, O., Mehdorn, H.M., . . . Siebner, H. R. (2006). A functional endophenotype for sexual orientation in humans. *Neuroimage*, *33*(3), 825–833.

Prader-Willi Syndrome Association. (2012). *What is Prader-Willi Syndrome?* http://www.pwsausa.org/syndrome/index.htm

Qin, S., Young, C. B., Duan, X., Chen, T., Supekar, K., & Menon, V. (2013). Amygdala subregional structure and intrinsic functional connectivity predicts individual differences in anxiety during early childhood. *Biological Psychiatry.* Advance online publication. doi:10.1016/j.biopsych.2013.10.006

Rahman, Q., & Wilson, G. D. (2003a). Large sexual-orientation-related differences in performance on mental rotation and judgment of line orientation tasks. *Neuropsychology*, *17*, 25–31.

Rahman, Q., & Wilson, G. D. (2003b). Sexual orientation and the 2nd to 4th finger length ratio: Evidence for organising effects of sex hormones or developmental instability? *Psychoneuroendocrinology*, *28*, 288–303.

Raineki, C., Cortés, M. R., Belnoue, L., & Sullivan, R. M. (2012). Effects of early-life abuse differ across development: Infant social behavior deficits are followed by adolescent depressive-like behaviors mediated by the amygdala. *The Journal of Neuroscience*, *32*, 7758–7765.

Rodriguez-Larralde, A., & Paradisi, I. (2009). Influence of genetic factors on human sexual orientation. *Investigacion Clinica*, *50*, 377–391.

Roseman, I. J., and Smith, C. A. (2001). Appraisal theory: Overview, assumptions, varieties, controversies. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion: Theory, methods, research*, (pp. 3–19). Oxford University Press.

Ross, M. W., & Arrindell, W. A. (1988). Perceived parental rearing patterns of homosexual and heterosexual men. *The Journal of Sex Research*, *24*, 275–281.

Saxe, L., & Ben-Shakhar, G. (1999). Admissibility of polygraph tests: The application of scientific standards post-Daubert. *Psychology, Public Policy, and Law, 5*, 203–223.

Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review, 69*, 379–399.

Shallcross, A. J., Troy, A. S., Boland, M., & Mauss, I. B. (2010). Let it be: Accepting negative emotional experiences predicts decreased negative affect and depressive symptoms. *Behaviour Research and Therapy*, *48*, 921–929. https://www.ncbi.nlm.nih.gov/pubmed/20566191

Sherwin, B. B. (1988). A comparative analysis of the role of androgen in human male and female sexual behavior: Behavioral specificity, critical thresholds, and sensitivity. *Psychobiology, 16*, 416–425.

Smink, F. R. E., van Hoeken, D., & Hoek, H. W. (2012). Epidemiology of eating disorders: Incidence, prevalence, and mortality rates. *Current Psychiatry Reports*, *14*, 406–414.

Soussignan, R. (2002). Duchenne smile, emotional experience, and autonomic reactivity: A test of the facial feedback hypothesis. *Emotion*, *2*, 52–74.

https://psycnet.apa.org/record/2002-18343-004

Speakman, J. R., Levitsky, D. A., Allison, D. B., Bray, M. S., de Castro, J. M., Clegg, D. J., . . . Westerterp-Plantenga, M. S. (2011). Set points, settling points and some alternative models: Theoretical options to understand how genes and environment combine to regulate body adiposity. *Disease Models & Mechanisms*, *4*, 733–745.

Swaab, D. F., & Hofman, M. A. (1990). An enlarged suprachiasmatic nucleus in homosexual men. *Brain Research*, *537*, 141–148.

Tamietto, M., Castelli, L., Vighetti, S., Perozzo, P., Geminiani, G., Weiskrantz, L., & de Gelder, B. (2009). Unseen facial and bodily expressions trigger fast emotional reactions. *Proceedings of the National Academy of Sciences,USA*, *106*, 17661–17666.

Troy, A. S., Shallcross, A. J., & Mauss, I. B. (2013). A person–by–situation approach to emotion regulation: Cognitive reappraisal can either hurt or help, depending on the context. *Psychological Science*, *12*, 2505–2514. https://www.ncbi.nlm.nih.gov/pubmed/24145331

Troy, A. S., Wilhelm, F. H., Shallcross, A. J., & Mauss, I. B. (2010). Seeing the silver lining: Cognitive reappraisal ability moderates the relationship between stress and depression. *Emotion*, *10*, 783–795. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3278301/

TSER. 2021. Definitions. Trans Student Educational Resources. Retrieved January 3 2022. https://transstudent.org/about/definitions/

UC Davis LGBTQIA Resource Center. (2020). LGBTQIA Resource Center Glossary. January 14 2020. https://lgbtqia.ucdavis.edu/educated/glossary

UCSF Transgender Care. 2019. Transition Roadmap. University of California San Francisco Transgender Care. Retrieved January 4 2022. https://transcare.ucsf.edu/transition-roadmap

Wang, Z., Neylan, T. C., Mueller, S. G., Lenoci, M., Truran, D., Marmar, C. R., . . . Schuff, N. (2010). Magnetic resonance imaging of hippocampal subfields in posttraumatic stress disorder. *Arch Gen Psychiatry*, *67*(3), 296–303. doi:10.1001/archgenpsychiatry.2009.205

Weinsier, R. L., Nagy, T. R., Hunter, G. R., Darnell, B. E., Hensrud, D. D., & Weiss, H. L. (2000). Do adaptive changes in metabolic rate favor weight regain in weight-reduced individuals? An examination of the set-point theory. *The American Journal of Clinical Nutrition*, *72*, 1088–1094.

Woods, S. C. (2004). Gastrointestinal satiety signals I. An overview of gastrointestinal signals that influence food intake. *American Journal of Physiology: Gastrointestinal and Liver Physiology*, *286*, G7–G13.

Woods, S. C., & D'Alessio, D. A. (2008). Central control of body weight and appetite. *Journal of Clinical Endocrinology and Metabolism*, *93*, S37–S50.

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology*, *18*, 459–482. doi:10.1002/cne.920180503

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, *35*(2), 151–175.

Zajonc, R. B. (1998). Emotions. In D. T. Gilbert & S. T. Fiske (Eds.), *Handbook of social psychology* (4th ed., Vol. 1, pp. 591–632). McGraw-Hill.

Personality

Adler, A. (1930). Individual psychology. In C. Murchison (Ed.), *Psychologies of 1930* (pp. 395–405). Clark University Press.

Adler, A. (1937). A school girl's exaggeration of her own importance. *International Journal of Individual Psychology*, *3*(1), 3–12.

Adler, A. (1956). *The individual psychology of Alfred Adler: A systematic presentation in selections from his writings*. (C. H. Ansbacher & R. Ansbacher, Eds.). Harper.

Adler, A. (1961). The practice and theory of individual psychology. In T. Shipley (Ed.), *Classics in psychology* (pp. 687–714). Philosophical Library

Adler, A. (1964). *Superiority and social interest*. Norton.

Akomolafe, M. J. (2013). Personality characteristics as predictors of academic performance of secondary school students. *Mediterranean Journal of Social Sciences*, *4*(2), 657–664.

Allport, G. W. & Odbert, H. S. (1936). Trait-names: A psycho-lexical study. Psychological Review Company.

Anglim, J., & O'Connor, P. (2018). Measurement and research using Big Five, HEXACO, and narrow traits: A primer for researchers and practitioners. *Australian Journal of Psychology*, *71*(1), 16–25. https://aps.onlinelibrary.wiley.com/...111/ajpy.12202

Aronow, E., Weiss, K. A., & Rezinkoff, M. (2001). *A practical guide to the Thematic Apperception Test*. Brunner Routledge.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive th eory*. Prentice Hall.

Bandura, A. (1995). *Self-efficacy in changing societies*. Cambridge University Press.

Benassi, V. A., Sweeney, P. D., & Dufour, C. L. (1988). Is there a relation between locus of control orientation and depression? *Journal of Abnormal Psychology, 97*(3), 357.

Ben-Porath, Y., & Tellegen, A. (2008). *Minnesota Multiphasic Personality Inventory-2-RF*. University of Minnesota Press.

Benet-Martínez, V. & Karakitapoglu-Aygun, Z. (2003). The interplay of cultural values and personality in predicting life-satisfaction: Comparing Asian- and European-Americans. *Journal of Cross-Cultural Psychology, 34*, 38–61.

Benet-Martínez, V., & Oishi, S. (2008). Culture and personality. In O. P. John, R.W. Robins, L. A. Pervin (Eds.), *Handbook of personality: Theory and research*. Guildford Press.

Beutler, L. E., Nussbaum, P. D., & Meredith, K. E. (1988). Changing personality patterns of police officers. *Professional Psychology: Research and Practice, 19*(5), 503–507.

Bouchard, T., Jr. (1994). Genes, environment, and personality. *Science, 264*, 1700–1701.

Bouchard, T., Jr., Lykken, D. T., McGue, M., Segal, N. L., & Tellegen, A. (1990). Sources of human psychological differences: The Minnesota Study of Twins Reared Apart. *Science, 250*, 223–228.

Burger, J. (2008). *Personality* (7th ed.). Thompson Higher Education.

Buss, D. M. (2009). How can evolutionary psychology successfully explain personality and individual differences? *Perspectives on Psychological Science, 4*(4), 359–366. https://labs.la.utexas.edu/buss/file...ences-2009.pdf

Carter, S., Champagne, F., Coates, S., Nercessian, E., Pfaff, D., Schecter, D., & Stern, N. B. (2008). *Development of temperament symposium*. Philoctetes Center, New York.

Cattell, R. B. (1946). *The description and measurement of personality*. Harcourt, Brace, & World.

Cattell, R. B. (1957). *Personality and motivation structure and measurement*. World Book.

Chamorro-Premuzic, T., & Furnham, A. (2008). Personality, intelligence, and approaches to learning as predictors of academic performance. *Personality and Individual Differences, 44*, 1596–1603.

Cheung, F. M., van de Vijver, F. J. R., & Leong, F. T. L. (2011). Toward a new approach to the study of personality in culture. *American Psychologist, 66*(7), 593–603.

Clark, A. L., & Watson, D. (2008). Temperament: An organizing paradigm for trait psychology. In O. P. John, R. W. Robins, & L. A. Previn (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 265–286). Guilford Press.

Conrad, N. & Party, M.W. (2012). Conscientiousness and academic performance: A Mediational Analysis. International *Journal for the Scholarship of Teaching and Learning, 6* (1), 1–14.

Costantino, G. (1982). TEMAS: A new technique for personality research assessment of Hispanic children. Hispanic Research Center, Fordham University *Research Bulletin, 5*, 3–7.

Cramer, P. (2004). *Storytelling, narrative, and the Thematic Apperception Test*. Guilford Press.

Dana, R. H. (1986). Personality assessment and Native Americans. *Journal of Personality Assessment, 50*(3), 480–500.

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the big five across the life span: Evidence from two national samples. *Psychology and Aging, 23*(3), 558–566.

Duzant, R. (2005). *Differences of emotional tone and story length of African American respondents when administered the Contemporized Themes Concerning Blacks test versus the Thematic Apperception Test*. Unpublished doctoral dissertation, The Chicago School of Professional Psychology, Chicago, IL.

Exner, J. E. (2002). *The Rorschach: Basic foundations and principles of interpretation* (Vol. 1). Wiley.

Eysenck, H. J. (1990). An improvement on personality inventory. *Current Contents: Social and Behavioral Sciences, 22*(18), 20.

Eysenck, H. J. (1992). Four ways five factors are *not* basic. *Personality and Individual Differences, 13*, 667–673.

Eysenck, H. J. (2009). *The biological basis of personality* (3rd ed.). Transaction Publishers.

Eysenck, S. B. G., & Eysenck, H. J. (1963). The validity of questionnaire and rating assessments of extroversion and neuroticism, and their factorial stability. *British Journal of Psychology, 54*, 51–62.

Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences: A natural science approach*. Plenum Press.

Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*(1), 21–29.

Fazeli, S. H. (2012). The exploring nature of the assessment instrument of five factors of personality traits in the current studies of personality. *Asian Social Science, 8*(2), 264–275.

Fancher, R. W. (1979). *Pioneers of psychology*. Norton.

Freud, S. (1920). Resistance and suppression. *A general introduction to psychoanalysis* (pp. 248–261). Horace Liveright.

Freud, S. (1923/1949). The ego and the id. Hogarth.

Freud, S. (1931/1968). Female sexuality. In J. Strachey (Ed. &Trans.), *The standard edition of the complete psychological works of Sigmund Freud* (Vol. 21). Hogarth Press.

Frewer, L., & Bleus A. V. (1991). Personality assessment in a collectivist culture. *South Pacific Journal of Psychology*, *4*, 1–5.

Funder, D. C. (2001). Personality. *Annual Review of Psychology*, *52*, 197–221.

Goldstein, M. L. "Projective personality assessment in child custody evaluations." n.d. https://www.drmarkgoldsteinphd.com/p...dy-evaluations

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Sage.

Holaday, D., Smith, D. A., & Sherry, Alissa. (2010). Sentence completion tests: A review of the literature and results of a survey of members of the society for personality assessment. *Journal of Personality Assessment*, *74*(3), 371–383.

Hothersall, D. (1995). *History of psychology*. McGraw-Hill.

Hoy, M. (1997). *Contemporizing of the Themes Concerning Blacks test (C-TCB)*. California School of Professional Psychology.

Hoy-Watkins, M., & Jenkins-Moore, V. (2008). The Contemporized-Themes Concerning Blacks Test (C-TCB). In S. R. Jenkins (Ed.), *A Handbook of Clinical Scoring Systems for Thematic Apperceptive Techniques* (pp. 659–698). Lawrence Erlbaum Associates.

Jang, K. L., Livesley, W. J., & Vernon, P. A. (1996). Heritability of the big five personality dimensions and their facts: A twin study. *Journal of Personality*, *64*(3), 577–591.

Jang, K. L., Livesley, W. J., Ando, J., Yamagata, S., Suzuki, A., Angleitner, A., et al. (2006). Behavioral genetics of the higher-order factors of the Big Five. *Personality and Individual Differences*, *41*, 261–272.

Judge, T. A., Livingston, B. A., & Hurst, C. (2012). Do nice guys-and gals- really finish last? The joint effects of sex and agreeableness on income. *Journal of Personality and Social Psychology*, *102*(2), 390–407.

Jung, C. G. (1923). *Psychological types.* Harcourt Brace.

Jung, C. G. (1928). *Contributions to analytical psychology*. Harcourt Brace Jovanovich.

Jung, C. G. (1964). *Man and his symbols.* Doubleday and Company.

Jung, C., & Kerenyi, C. (1963). Science of mythology. In R. F. C. Hull (Ed. & Trans.), *Essays on the myth of the divine child and the mysteries of Eleusis*. Harper & Row.

Launer, J. (2005). Anna O. and the 'talking cure.' *QJM: An International Journal of Medicine*, *98*(6), 465–466.

Lecci, L. B. & Magnavita, J. J. (2013). *Personality theories: A scientific approach*. Bridgepoint Education.

Lefcourt, H. M. (1982). *Locus of control: Current trends in theory and research* (2nd ed.). Erlbaum.

Lecci, L. B. & Magnavita, J. J. (2013). *Personality theories: A scientific approach*. Bridgepoint Education.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, *140*, 1–55.

Lilienfeld, S. O., Wood, J. M., & Garb, H. N. (2000). The scientific status of projective techniques. *Psychological Science in the Public Interest*, *1*(2), 27–66.

Maltby, J., Day, L., & Macaskill, A. (2007). *Personality, individual differences and intelligence* (3rd ed.). Pearson.

Maslow, A. H. (1970). *Motivation and personality*. Harper & Row.

Maslow, A. H. (1950). Self-actualizing people: A study of psychological health. In W. Wolff (Ed.), *Personality Symposia: Symposium 1 on Values* (pp. 11–34). Grune & Stratton.

McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist*, *52*(5), 509–516.

McCrae, R. R., et al. (2005). Universal features of personality traits from the observer's perspective: Data from 50 cultures. *Journal of Personality and Social Psychology*, *88*, 547–561.

Mischel, W. (1993). *Introduction to personality* (5th ed.). Harcourt Brace Jovanovich.

Mischel, W., Ayduk, O., Berman, M. G., Casey, B. J., Gotlib, I. H., Jonides, J., et al. (2010). 'Willpower' over the life span: Decomposing self-regulation. *Social Cognitive and Affective Neuroscience*, *6*(2), 252–256.

Mischel, W., Ebbesen, E. B., & Raskoff Zeiss, A. (1972). Cognitive and attentional mechanisms of delay in gratification. *Journal of Personality and Social Psychology*, *21*(2), 204–218.

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*(2), 246–268.

Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989, May 26). Delay of gratification in children. *Science*, *244*, 933-938.

Motley, M. T. (2002). Theory of slips. In E. Erwin (Ed.), *The Freud encyclopedia: Theory, therapy, and culture* (pp. 530–534). Routledge.

Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big Five correlates of GPA and SAT scores. *Personality Processes and Individual Differences, 93*, 116–130.

Noga, A. (2007). *Passions and tempers: A history of the humors*. Harper Collins.

Oyserman, D., Coon, H., & Kemmelmier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128*, 3–72.

Piotrowski, Z. A. (1987). *Perceptanalysis: The Rorschach method fundamentally reworked, expanded and systematized*. Routledge.

Rentfrow, P. J., Gosling, S. D., Jokela, M., Stillwell, D. J., Kosinski, M., & Potter, J. (2013, October 14). Divided we stand: Three psychological regions of the United States and their political, economic, social, and health correlates. *Journal of Personality and Social Psychology*, *105*(6), 996–1012.

Rentfrow, P. J., Jost, J. T., Gosling, S. D., & Potter, J. (2009). Statewide differences in personality predict voting patterns in 1996–2004 U.S. Presidential elections. In J. T. Jost, A. C. Kay, & H. Thorisdottir (Eds.), *Series in political psychology: Social and psychological bases of ideology and system justification* (pp. 314–347). Oxford University Press.

Roesler, C. (2012). Are archetypes transmitted more by culture than biology? Questions arising from conceptualizations of the archetype. *Journal of Analytical Psychology*, *57*(2), 223–246.

Rogers, C. (1980). *A way of being*. Houghton Mifflin.

Rothbart, M. K. (2011). *Becoming who we are: Temperament and personality in development.* Guilford Press.

Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology, 78*(1), 122–135.

Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M. E. Lamb & A. L. Brown (Eds.), *Advances in developmental psychology* (Vol. 1, pp. 37–86). Erlbaum.

Rothbart, M. K., Sheese, B. E., Rueda, M. R., & Posner, M. I. (2011). Developing mechanisms of self-regulation in early life. *Emotion Review, 3*(2), 207–213.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcements. *Psychological Monographs*, *80*, 609.

Rotter, J. B., & Rafferty, J. E. (1950). *Manual the Rotter Incomplete Sentences Blank College Form*. The Psychological Corporation.

Schmitt, D. P., Allik, J., McCrae, R. R., & Benet-Martinez, V. (2007). The geographic distribution of Big Five personality traits: Patterns and profiles of human self-description across 56 nations. *Journal of Cross-Cultural Psychology*, *38*, 173–212.

Scott, J. (2005). *Electra after Freud: Myth and culture*. Cornell University Press.

Segal, N. L. (2012). *Born together-reared apart: The landmark Minnesota Twin Study*. Harvard University Press.

Skinner, B. F. (1953). *Science and human behavior*. The Free Press.

Sotirova-Kohli, M., Opwis, K., Roesler, C., Smith, S. M., Rosen, D. H., Vaid, J., & Djnov, V. (2013). Symbol/meaning paired-associate recall: An "archetypal memory" advantage? *Behavioral Sciences*, *3*, 541–561. http://www2.cnr.edu/home/araia/Myth_%20Body.pdf

Stelmack, R. M., & Stalikas, A. (1991). Galen and the humour theory of temperament. *Personal Individual Difference*, *12*(3), 255–263.

Terracciano A., McCrae R. R., Brant L. J., Costa P. T., Jr. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging*, *20*, 493–506.

Thomas, A., & Chess, S. (1977). *Temperament and development*. Brunner/Mazel.

Tok, S. (2011). The big five personality traits and risky sport participation. *Social Behavior and Personality: An International Journal*, *39*(8), 1105–1111.

Triandis, H. C. (1995). *Individualism and collectivism*. Westview.

Triandis, H. C., & Suh, E. M. (2002). Cultural influences on personality. *Annual Review of Psychology*, *53*, 133–160.

Wagerman, S. A., & Funder, D. C. (2007). Acquaintance reports of personality and academic achievement: A case for conscientiousness. *Journal of Research in Personality*, *41*, 221–229.

Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96*, 465–490.

Watts, T. W., Duncan, G. J., & Quan, H. (2018). Revisiting the marshmallow test: A conceptual replication investigating links between early delay of gratification and later outcomes. *Psychological Science 29*(7), 1159–1177. https://doi.org/10.1177/0956797618761661

Weiner, I. B. (2003). *Principles of Rorschach interpretation*. Lawrence Erlbaum.

Whyte, C. (1980). An integrated counseling and learning center. In K. V. Lauridsen (Ed.), *Examining the scope of learning centers* (pp. 33–43). Jossey-Bass.

Whyte, C. (1978). Effective counseling methods for high-risk college freshmen. *Measurement and Evaluation in Guidance*, *6*(4), 198–200.

Whyte, C. B. (1977). High-risk college freshman and locus of control. *The Humanist Educator, 16*(1), 2–5.

Williams, R. L. (1972). Themes Concerning Blacks: Manual. Williams.

Wundt, W. (1874/1886). *Elements du psychologie, physiologique* (2ieme tome). [Elements of physiological psychology, Vol. 2]. (E. Rouvier, Trans.). Paris: Ancienne Librairie Germer Bailliere et Cie.

Yang, K. S. (2006). Indigenous personality research: The Chinese case. In U. Kim, K.-S. Yang, & K.-K. Hwang (Eds.), *Indigenous and cultural psychology: Understanding people in context* (pp. 285–314). Springer.

Young-Eisendrath, P. (1995). *Myth and body: Pandora's legacy in a post-modern world.* http://www2.cnr.edu/home/araia/Myth_%20Body.pdf

Social Psychology

Adams, H. E., Wright, L. W., Jr., & Lohr, B.A. (1996). Is homophobia associated with homosexual arousal? *Journal of Abnormal Psychology, 105*, 440–445.

Albarracín, D., & Wyer, R. S. (2001). Elaborative and nonelaborative processing of a behavior-related communication. *Personality and Social Psychology Bulletin, 27*, 691–705.

Allport, G. W. (1954). *The Nature of Human Prejudice*. Addison-Wesley.

American Psychological Association. (n.d.) Social psychology studies human interactions. https://www.apa.org/action/science/social/

American Psychological Association. (2010). Bullying: What parents, teachers can do to stop it. http://www.apa.org/news/press/releas.../bullying.aspx.

Anderson, M. (2018). A majority of teens have experienced some form of cyberbullying. Pew Research Center. https://www.pewresearch.org/internet...cyberbullying/

Aronson, E., & Mills, J. (1959). The effect of severity of initiation on liking for a group, *Journal of Abnormal and Social Psychology, 59*, 177–181.

Asch, S. E. (1955). Opinions and social pressure. *Scientific American, 193*, 31–35.

Bandura, A. (1999). Moral disengagement in the perpetration of inhumanities. *Personality and Social Psychology Review, 3*(3), 193–209. doi:10.1207/s15327957pspr0303_3.

Bartels, J. (2019). Revisiting the Stanford prison experiment, again: Examining demand characteristics in the guard orientation. *The Journal of Social Psychology, 159*(6), 780–790.

Bartels, J. M., Milovich, M. M., & Moussier, S. (2016). Coverage of the Stanford prison experiment in introductory psychology courses: A survey of introductory psychology instructors. *Teaching of Psychology, 43*(2), 136–141.

Batson, C. D. (1991). *The altruism question: Toward a social-psychological answer*. Erlbaum.

Berkowitz, A. D. (2004). *The social norms approach: Theory, research and annotated bibliography.* http://www.alanberkowitz.com/article...cial_norms.pdf.

Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. McGraw-Hill.

Betz, N. E. (2008). Women's career development. In F. Denmark & M. Paludi (Eds.), *Psychology of women: Handbook of issues and theories* (2nd ed., pp. 717–752). Praeger.

Blau, F. D., Ferber, M. A., & Winkler, A. E. (2010). *The economics of women, men, and work* (6th ed.). Prentice Hall.

Bond, C. F., & Titus, L. J. (1983). Social facilitation: A meta-analysis of 241 studies. *Psychological Bulletin, 94*, 265–292.

Bond, R., & Smith, P. B. (1996). Culture and conformity: A meta-analysis of studies using Asch's (1952b, 1956) line judgment task. *Psychological Bulletin, 119*(1), 111–137.

Bowen, L. (2011). Bullying may contribute to lower test scores. *Monitor on Psychology, 42*(9), 19.

Brown, R. (2010). *Prejudice: Its social psychology* (2nd ed.). Wiley-Blackwell.

Burger, J. (2009). Replicating Milgram: Would people still obey today? *American Psychologist, 64*, 1–11. https://www.ncbi.nlm.nih.gov/pubmed/19209958

Buss, D. M. (2004). *Evolutionary psychology: The new science of the mind* (2nd ed.). Allyn and Bacon.

Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences, 12*, 1–49.

Carnahan, T., & McFarland, S. (2007). Revisiting the Stanford Prison Experiment: Could participant self-selection have led to the

cruelty? *Personality and Social Psychology Bulletin*, *33*(5), 603–614.

Ceci, S. J., & Williams, W. M. (2011). Understanding current causes of women's underrepresentation in science. *Proceedings of the National Academy of Sciences*, *108*, 3157–3162.

Chang, E., Kannoth, S., Levy, S., Wang, S., Lee, J., & Levy, B. (2020). Global reach of ageism on older persons' health: A systematic review. *PLoS ONE*, *15*, 1–24.

Choi, I., & Nisbett R. E. (1998). Situational salience and cultural differences in the correspondence bias and actor-observer bias. *Personality and Social Psychology Bulletin*, *24*(9), 949–960. doi:10.1177/0146167298249003.

Cialdini, R. B. (2001). Harnessing the science of persuasion. *Harvard Business Review*, *79*, 72–81.

Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*, 481–494.

Colin Powell regrets Iraq war intelligence. (2011). http://www.aljazeera.com/news/americ...916873488.html.

Cozby, P. C. (1973). Self-disclosure: A literature review. *Psychological Bulletin*, *79*, 73–91.

Crisp, R. J., & Turner, R. N. (2009). Can imagined interactions produce positive perceptions? Reducing prejudice through simulated social contact. *American Psychologist*, *64*, 231–240.

Crowley, A. E., & Hoyer, W. D. (1994). An integrative framework for understanding two-sided persuasion. *Journal of Consumer Research*, *20*(4), 561–574.

Croyle, R. T., & Cooper, J. (1983). Dissonance arousal: Physiological evidence. *Journal of Personality and Social Psychology*, *45*, 782–791.

Cuddy, A. J., Norton, M. I., & Fiske, S. T. (2005). This old stereotype: The pervasiveness and persistence of the elderly stereotype. *Journal of Social Issues*, *61*, 267–285.

Deutsch, M., & Gerard, H. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, *51*, 629–636.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*, 5–18.

Devine, P. G., & Elliot, A. J. (1995). Are racial stereotypes really fading? The Princeton trilogy revisited. *Personality and Social Psychology Bulletin*, *21*, 1139–1150.

Dixon, T. L., & Linz D. (2000). Overrepresentation and underrepresentation of African Americans and Latinos as lawbreakers on television news. *Journal of Communication*, *50*(2), 131–154.

Dodge, K. A., & Schwartz, D. (1997). Social information processing mechanisms in aggressive behavior. In D. M. Stoff and J. Breiling (Eds.), *Handbook of Antisocial Behavior* (pp. 171–180). John Wiley and Sons.

Doliński, D., Grzyb, T., Folwarczny, M., Grzybała, P., Krzyszycha, K., Martynowska, K., & Trojanowski, J. (2017). Would you deliver an electric shock in 2015? Obedience in the experimental paradigm developed by Stanley Milgram in the 50 years following the original studies. *Social Psychological and Personality Science*, *8*(8), 927–933.

Dollard, J., Miller, N. E., Doob, L. W., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and aggression*. Yale University Press.

Dovidio, J. F., & Gaertner, S. L. (2004). On the nature of contemporary prejudice. In P. S. Rothenberg, (Ed.), *Race, class, and gender in the United States: An integrated study* (6th ed., pp. 132–142). Worth.

Dovidio, J. F., Gluszek, A., John, M. S., Ditlmann, R., & Lagunes, P. (2010). Understanding bias toward Latinos: Discrimination, dimensions of difference, and experience of exclusion. *Journal of Social Issues*, *66*, 59–78.

Eagly, A. H., & Chaiken, S. (1975). An attribution analysis of the effect of communicator characteristics on opinion change: The case of communicator attractiveness. *Journal of Personality and Social Psychology*, *32*, 136–144.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College.

East Haven mayor suggests "he might have tacos" to repair relations with Latinos. (2012). https://www.youtube.com/watch?v=PCUwtfqF4wU.

Ehrlinger, J., Gilovich, T., & Ross, L. (2005). Peering into the bias blind spot: People's assessments of bias in themselves and others. *Personality and Social Psychology Bulletin*, *31*, 680–692.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Festinger, L., & Maccoby, N. (1964). On resistance to persuasive communications. *The Journal of Abnormal and Social Psychology*, *68*, 359–366.

Festinger, L., Schachler, S., & Back, K. W. (1950). *Social pressures in informal groups: A study of human factors in housing*. Harper.

Fink, B., Neave, N., Manning, J. T., & Grammer, K. (2006). Facial symmetry and judgments of attractiveness, health

and personality. *Personality and Individual Differences, 41*, 491–499.

Fiske, S. T., Cuddy, A. J., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology, 82*(6), 878–902.

Fiske, S. T., Gilbert, D. T., & Lindzey, G. (2010). *Handbook of social psychology* (5th ed.). Wiley.

Freedman, J. L., & Fraser, S. C. (1966). Compliance without pressure: The foot-in-the-door technique. *Journal of Personality and Social Psychology, 4*, 195–202.

Gaertner, S., Dovidio, J., Banker, B., Houlette, M., Johnson, K., & McGlynn, E. (2000). Reducing intergroup conflict: From superordinate goals to decategorization, recategorization, and mutual differentiation. *Group Dynamics: Theory, Research, and Practice*, *4*, 98–114. https://psycnet.apa.org/doiLanding?d...89-2699.4.1.98

Geen, R. G. (1989). Alternative conceptions of social facilitation. In P. B. Paulus (Ed.), *Psychology of group influence* (2nd ed., pp. 15–51). Lawrence Erlbaum.

Granström, K., Guvå, G., Hylander, I., & Rosander, M. (2009). *Riots and disturbances: How riots start and how order is secured*. Linköping University Electronic Press.

Greenberg, J., Schimel, J., & Martens, A. (2002). Ageism: Denying the face of the future. In T. D. Nelson (Ed.), *Ageism: Stereotyping and prejudice against older persons* (pp. 27–48). MIT Press.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*, 1464–1480.

Greenwald, A. G., & Ronis, D. L. (1978). Twenty years of cognitive dissonance: Case study of the evolution of a theory. *Psychological Review, 85*, 53–57.

Griggs, R. A. (2014). Coverage of the Stanford Prison Experiment in introductory psychology textbooks. *Teaching of Psychology, 41*(3), 195–203.

Grove, J. R., Hanrahan, S. J., & McInman, A. (1991). Success/failure bias in attributions across involvement categories in sport. *Personality and Social Psychology Bulletin*, *17*(1), 93–97.

Gupta, P. B., & Lord, K. R. (1998). Product placement in movies: The effect of prominence and mode on recall. *Journal of Current Issues and Research in Advertising*, *20*, 47–59.

Harding, L. (2018). Students of a feather "flocked" together: A group assignment method for reducing free-riding and improving group and individual learning outcomes. *Journal of Marketing Education*, *40*, 117–127. https://journals.sagepub.com/doi/10....73475317708588

Hare, A. P. (2003). Roles, relationships, and groups in organizations: Some conclusions and recommendations. *Small Group Research*, *34*, 123–154.

Harvard University, Department of Psychology. (2019). *Mary Whiton Calkins*. https://psychology.fas.harvard.edu/p...whiton-calkins

Haugtvedt, C. P., & Wegener, D. T. (1994). Message order effects in persuasion: An attitude strength perspective. *Journal of Consumer Research*, *21*, 205–218.

Hebl, M. R., Foster, J. B., Mannix, L. M., & Dovidio, J. F. (2002). Formal and interpersonal discrimination: A field study of bias toward homosexual applicants. *Personality and Social Psychology Bulletin*, *28*(6), 815–825.

Heckert, T. M., Latier, A., Ringwald-Burton, A., & Drazen, C. (2006). Relations among student effort, perceived class difficulty appropriateness, and student evaluations of teaching: Is it possible to "buy" better evaluations through lenient grading? *College Student Journal*, *40*(3), 588.

Herek, G. M., & McLemore, K. A. (2013). Sexual prejudice. *Annual Review of Psychology, 64*, 309–33. doi:10.1146/annurev-psych-113011-143826.

Heider, F. (1958). *The psychology of interpersonal relations*. Wiley.

Hinduja, S. & Patchin, J. W. (2011). Cyberbullying research summary: Bullying, cyberbullying, and sexual orientation. Cyberbullying Research Center. http://www.cyberbullying.us/cyberbul...fact_sheet.pdf.

Hinduja, S. & Patchin, J. W. (2019). 2019 Cyberbullying Data. Cyberbullying Research Center. https://cyberbullying.org/2019-cyberbullying-data

Hinduja, S. & Patchin, J. W. (2020). Bullying, Cyberbullying, and Sexual Orientation/Gender Identity. Cyberbullying Research Center. https://cyberbullying.org/bullying-c...bullying-lgbtq

Hodge, S. R., Burden, J. W., Jr., Robinson, L. E., & Bennett, R. A., III. (2008). Theorizing on the stereotyping of Black male student-athletes. *Journal for the Study of Sports and Athletes in Education*, *2*, 203–226.

Hoff, D. L., & Mitchell, S. N. (2009). Cyberbullying: Causes, effects, and remedies. *Journal of Education*, *47*, 652–665.

Hovland, C. I., Janis, I. L. and Kelley, H. H. (1953). *Communications and persuasion: Psychological studies in opinion change.* Yale University Press.

Hovland, C.I., Weiss, W. (1951, Winter). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly*, *15*(4), 635–650.

Igou, E. R., & Bless, H. (2003). Inferring the importance of arguments: Order effects and conversational rules. *Journal of Experimental Social Psychology*, *39*, 91–99.

Ito, T. A., & Urland, G. R., (2003). Race and gender on the brain: Electrocortical measures of attention to race and gender of multiply categorizable individuals. *Journal of Personality & Social Psychology*, *85*, 616–626.

Iyengar, S., & Westwood, S. J. (2015). Fear and loathing across party lines: New evidence on group polarization. *American Journal of Political Science*, *59*(3), 690–707.

Jackson, J. M., & Williams, K. D. (1985). Social loafing on difficult tasks: Working collectively can improve performance. *Journal of Personality and Social Psychology*, *49*, 937–942.

Janis, I. L. (1972). *Victims of groupthink.* Houghton Mifflin.

John, Ann. (2019). Self-Harm, Suicidal Behaviours, and Cyberbullying in Children and Young People: Systematic Review. *Journal of Medical Internet Research.* https://www.jmir.org/2018/4/e129/

Jones, E. E., & Nisbett, R. E. (1971). *The actor and the observer: Divergent perceptions of the causes of behavior*. General Learning Press.

Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A decade of system justification theory: Accumulated evidence of conscious and unconscious bolstering of the status quo. *Political Psychology*, *25*, 881–919.

Jost, J. T., & Major, B. (Eds.). (2001). *The psychology of legitimacy: Emerging perspectives on ideology, justice, and intergroup relations*. Cambridge University Press.

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, *65*, 681–706.

Kassin, S. (2017). The killing of Kitty Genovese: What else does this case tell us? *Perspectives on Psychological Science*, *12*, 374–381. https://journals.sagepub.com/doi/abs...4591616679465

Krosnick, J. A., & Alwin, D. F. (1989). Aging and susceptibility to attitude change. *Journal of Personality and Social Psychology*, *57*, 416–425.

Kumkale, G. T., & Albarracín, D. (2004). The sleeper effect in persuasion: A meta-analytic review. *Psychological Bulletin*, *130*(1), 143–172. doi:10.1037/0033-2909.130.1.143.

Larsen, K. S. (1990). The Asch conformity experiment: Replication and transhistorical comparisons. *Journal of Social Behavior & Personality*, *5*(4), 163–168.

Latané, B., & Darley, J. M. (1968). Group inhibition of bystander intervention in emergencies. *Journal of Personality and Social Psychology*, *10*, 215–221.

Latané, B., Williams, K. and Harkins, S. G. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, *37*, 822–832.

Laurenceau, J.-P., Barrett, L. F., & Pietromonaco, P. R. (1998). Intimacy as an interpersonal process: The importance of self-disclosure, partner disclosure, and perceived partner responsiveness in interpersonal exchanges. *Journal of Personality and Social Psychology*, *74*(5), 1238–1251. doi:10.1037/0022-3514.74.5.1238.

Le Texier, T. (2019). Debunking the Stanford Prison Experiment. *American Psychologist. 74*(7), 823–839.

Lerner, M. J., & Miller, D. T. (1978). Just world research and the attribution process: Looking back and ahead. *Psychological Bulletin*, *85*, 1030–1051.

Lumsdaine, A. A., & Janis, I. L. (1953). Resistance to "counterpropaganda" produced by one-sided and two-sided "propaganda" presentations. *Public Opinion Quarterly*, *17*, 311–318.

Malle, B. F. (2006). The actor–observer asymmetry in attribution: A (surprising) meta-analysis. *Psychological Bulletin*, *132*(6), 895–919. doi:10.1037/0033-2909.132.6.895.

Malloy, T. E., Albright, L., Kenny, D. A., Agatstein, F., & Winquist, L. (1997). Interpersonal perception and metaperception in non-overlapping social groups. *Journal of Personality and Social Psychology*, *72*, 390–398.

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253.

Martin, C. H., & Bull, P. (2008). Obedience and conformity in clinical practice. *British Journal of Midwifery*, *16*(8), 504–509.

Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, *81*(5), 922–934. https://psycnet.apa.org/doiLanding?d...-3514.81.5.922

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, *27*, pp. 415–444. doi:10.1146/annurev.soc.27.1.415.

Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal and Social Psychology*, *67*, 371–378.

Milgram, S. (1965). Some conditions of obedience and disobedience to authority. *Human Relations*, *18*, 57–76.

Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin*, *82*, 213–225.

Miller, N., & Campbell, D. T. (1959). Recency and primacy in persuasion as a function of the timing of speeches and measurements. *The Journal of Abnormal and Social Psychology*, *59*, 1–9.

Mischel, W. (1977). The interaction of person and situation. *Personality at the crossroads: Current issues in interactional psychology*, *333*, 352.

Mitchell, D. H., & Eckstein, D. (2009). Jury dynamics and decision-making: A prescription for groupthink. *International Journal of Academic Research*, *1*(1), 163–169.

Nelson, T. (Ed.). (2004). *Ageism: Stereotyping and prejudice against older persons*. The MIT Press.

Nisbett, R. E., Caputo, C., Legant, P., & Marecek, J. (1973). Behavior as seen by the actor and as seen by the observer. *Journal of Personality and Social Psychology*, *27*, 154–164.

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310.

Nosek, B. A. (2005). Moderators of the relationship between implicit and explicit evaluation. *Journal of Experimental Psychology: General*, *134*(4), 565–584.

O'Keeffe, G. S., & Clarke-Pearson, K. (2011). The impact of social media on children, adolescents, and families. *Pediatrics*, *(127)*4, 800–4. doi:10.1542/peds.2011-0054.

Olson, M. A., & Fazio, R. H. (2003). Relations between implicit measures of prejudice what are we measuring? *Psychological Science*, *14*, 636–639.

Olweus, D. (1993). *Bullying at school: What we know and what we can do*. Wiley-Blackwell.

Penton-Voak, I. S., Jones, B. C., Little, A. C., Baker, S., Tiddeman, B., Burt, D. M., & Perrett, D. I. (2001). Symmetry, sexual dimorphism in facial proportions and male facial attractiveness. *Proceedings of the Royal Society B: Biological Sciences*, *268*, 1617–1623.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In *Communication and persuasion: Central and peripheral routes to attitude change* (pp. 1–24). Springer. doi:10.1007/978-1-4612-4964-1.

Petty, R. E., Wegener, D. T., & Fabrigar, L. R. (1997). Attitudes and attitude change. *Annual Review of Psychology*, *48*, 609–647.

Pliner, P., Hart, H., Kohl, J., & Saari, D. (1974). Compliance without pressure: Some further data on the foot-in-the-door technique. *Journal of Experimental Social Psychology*, *10*, 17–22.

Plant, E. A., & Devine, P. G. (1998). Internal and external motivation to respond without prejudice. *Journal of Personality and Social Psychology*, *75*, 811–832.

Ramesh, A., & Gelfand, M. J. (2010). Will they stay or will they go? The role of job embeddedness in predicting turnover in individualistic and collectivistic cultures. *Journal of Applied Psychology*, *95*(5), 807.

Raymer, M., Reid, M., Spiegel, M., & Purvanova, R. (2017). An examination of generational stereotypes as a path towards reverse ageism. *The Psychologist-Manager Journal*, *20*, 148–175.

Regan, P. C., & Berscheid, E. (1997). Gender differences in characteristics desired in a potential sexual and marriage partner. *Journal of Psychology & Human Sexuality*, *9*, 25–37.

Reicher, S., & Haslam, S. A. (2006). Rethinking the psychology of tyranny: The BBC prison study. *British Journal of Social Psychology*, *45*(1), 1–40.

Rhodes, N., & Wood, W. (1992). Self-esteem and intelligence affect influenceability: The mediating role of message reception. *Psychological Bulletin*, *111*, 156–171.

Richard, F. D., Bond, C. F., Jr., & Stokes-Zoota, J. J. (2003). One hundred years of social psychology quantitatively described. *Review of General Psychology*, *7*(4), 331–363. doi:10.1037/1089-2680.7.4.331.

Riggio, H. R., & Garcia, A. L. (2009). The power of situations: Jonestown and the fundamental attribution error. *Teaching of Psychology*, *36*(2), 108–112. doi:10.1080/00986280902739636.

Rikowski, A., & Grammer, K. (1999). Human body odour, symmetry and attractiveness. *Proceedings of the Royal Society B: Biological Sciences*, *266*(1422), 869–874. doi:10.1098/rspb.1999.0717.

Roesch, S. C., & Amirkham, J. H. (1997). Boundary conditions for self-serving attributions: Another look at the sports pages. *Journal of Applied Social Psychology*, *27*, 245–261.

Rojek, J., Rosenfeld, R., & Decker, S. (2012). Policing race: The racial stratification of searches in police traffic stops. *Criminology*, *50*, 993–1024.

Rosenberg, M. J., & Hovland, C. I. (1960). Cognitive, affective and behavioral components of attitudes. In *Attitude organization and change: An analysis of consistency among attitude*

components (pp. 1–14). Yale University Press.

Rosenthal, R., & Jacobson, L. F. (1968). Teacher expectations for the disadvantaged. *Scientific American, 218*, 19–23.

Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. *Advances in Experimental Social Psychology, 10*, 173–220.

Ross, L., Amabile, T. M., & Steinmetz, J. L. (1977). Social roles, social control, and biases in social-perception processes. *Journal of Personality and Social Psychology, 35*, 485–494.

Ross, L., & Nisbett, R. E. (1991). *The person and the situation: Perspectives of social psychology*. McGraw-Hill.

Rudman, L. A. (1998). Self-promotion as a risk factor for women: The costs and benefits of counterstereotypical impression management. *Journal of Personality and Social Psychology, 74*(3), 629–645.

Rusbult, C. E., & Van Lange, P. A. (2003). Interdependence, interaction, and relationships. *Annual Review of Psychology, 54*, 351–575.

Schank, R. C., Abelson, R. (1977). *Scripts, plans, goals, and understanding: An inquiry into human knowledge.* Lawrence Erlbaum Associates.

Shepperd, J. A., & Taylor, K. M. (1999). Social loafing and expectancy-value theory. *Personality and Social Psychology Bulletin, 25*, 1147–1158.

Sherif, M., Harvey, O. J., White, B. J., Hood, W. R., & Sherif, C. W. (1961). *Intergroup conflict and cooperation: The Robbers Cave experiment.* The University Book Exchange.
http://livros01.livrosgratis.com.br/ps000162.pdf

Simms, A., & Nichols, T. (2014). Social loafing: A review of the literature. *Journal of Management Policy and Practice, 15*, 58–67.

Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology, 65*, 293–307.

Sommers, S. R., & Ellsworth, P. C. (2000). Race in the courtroom: Perceptions of guilt and dispositional attributions. *Personality and Social Psychology Bulletin, 26*, 1367–1379.

Spears, B., Slee, P., Owens, L., & Johnson, B. (2009). Behind the scenes and screens: Insights into the human dimension of covert and cyberbullying. *Journal of Psychology, 217*(4), 189–196. doi:10.1027/0044-3409.217.4.189.

Sternberg, R. J. (1986). A triangular theory of love. *Psychological Review, 93*, 119–135.

Stewart, J. B. (2002). *Heart of a soldier*. Simon and Schuster.

Sutton, R.M. and Douglas, K.M. (2005). Justice for all, or just for me? More support for self-other differences in just world beliefs. Personality and Individual Differences, 9(3). pp. 637-645. ISSN 0191-8869.

Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information, 13*(2), 65–93.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–48). Brooks-Cole.

Tavris, C., & Aronson, E. (2008). *Mistakes were made (but not by me): Why we justify foolish beliefs, bad decisions, and hurtful acts*. Houghton Mifflin Harcourt.

Taylor, L. S., Fiore, A. T., Mendelsohn, G. A., & Cheshire, C. (2011). "Out of my league": A real-world test of the matching hypothesis. *Personality and Social Psychology Bulletin, 37*(7), 942–954. doi:10.1177/0146167211409947.

Teger, A. I., & Pruitt, D. G. (1967). Components of group risk taking. *Journal of Experimental Social Psychology, 3*, 189–205.

Triandis, H. C. (2001). Individualism-collectivism and personality. *Journal of Personality, 69*, 907–924.

van Veen, V., Krug, M. K., Schooler, J. W., & Carter, C. S. (2009). Neural activity predicts attitude change in cognitive dissonance. *Nature Neuroscience, 12*, 1469–1474.

Vandebosch, H., & Van Cleemput, K. (2009). Cyberbullying among youngsters: Profiles of bullies and victims. *New media & Society, 11*(8), 1349–1371. doi:10.1177/1461444809341263.

Walker, I., & Crogan, M. (1998). Academic performance, prejudice, and the jigsaw classroom: New pieces to the puzzle. *Journal of Community and Applied Social Psychology, 8*, 381–393.

Walker, M. B., & Andrade, M. G. (1996). Conformity in the Asch task as a function of age. *The Journal of Social Psychology, 136*, 367–372.

Walster, E., & Festinger, L. (1962). The effectiveness of "overheard" persuasive communications. *Journal of Abnormal and Social Psychology, 65*, 395–402.

Wason, P. C., & Johnson-Laird, P. N. (1972). *The psychology of deduction: Structure and content*. Harvard University Press.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71*(1), 3–25.

Wilson, M., & Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Sociobiology, 6*, 59–73.

Wilson, T. D., Lindsey, S., & Schooler, T. Y. (2000). A model of dual attitudes. *Psychological Review, 107*, 101–126.

Zajonc, R. B. (1965). Social facilitation. *Science, 149*(3681), 269–274. doi:10.1126/science.149.3681.269

Zhang, X., Fung, H. H., Stanley, J. T., Isaacowitz, D. M., & Zhang, Qi. (2014). Thinking more holistically as we grow older? Results from different tasks in two cultures. *Culture and Brain*, *2*, 109–121. https://link.springer.com/article/10...167-014-0018-4

Zimbardo, P. G. (1969). The human choice: Individuation, reason, and order versus deindividuation, impulse, and chaos. In *Nebraska symposium on motivation*. University of Nebraska press.

Zimbardo, P. G. (2007). *The Lucifer effect: Understanding how good people turn evil*. Random House.

Zimbardo, P. G. (2013). An end to the experiment. http://www.prisonexp.org/psychology/37.

Industrial-Organizational Psychology

ABC News. (2000, September 8). *Court OKs barring high IQs for Cops*. http://abcnews.go.com/US/court-oks-b...story?id=95836

Agerström, J., & Rooth, D.-O. (2011). The role of automatic obesity stereotypes in real hiring discrimination. *Journal of Applied Psychology, 96*, 790–805.

Allen, T. D., Eby, L. T., Poteet, M. L., Lentz, E., & Lima, L. (2004). Career benefits associated with mentoring for protégés: A meta-analysis. *Journal of Applied Psychology, 89*, 127–136.

Allen, T. D., Lentz, E., & Day, R. (2006). Career success outcomes associated with mentoring others: A comparison of mentors and nonmentors. *Journal of Career Development, 32*, 272–285.

American Civil Liberties Union. (n.d.). *Non-Discrimination Laws: State by State Information—Map*. https://www.aclu.org/maps/non-discri...nformation-map

American National Standards Institute. (2000). *Control center ergonomic standards*. http://webstore.ansi.org/ergonomics/...rgonomics.aspx

American Psychological Association. (2016). Humanitarian work psychology. *Monitor on Psychology, 47*(4). https://www.apa.org/monitor/2016/04/humanitarian

Amiot, C. E., Terry, D. J., Jimmieson, N. L., & Callan, V. J. (2006). A longitudinal investigation of coping processes during a merger: Implications for job satisfaction and organizational identification. *Journal of Management, 32*, 552–574.

Arthur, W., Bennett, W., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology, 88*, 234–245.

Arthur, W., Woehr, D. J., & Graziano, W. G. (2001). Personality testing in employment settings: Problems and issues in the application of typical selection practices. *Personnel Review, 30*, 657–676.

Atkins, P. W. B., & Wood, R. E. (2002). Self-versus others' ratings as predictors of assessment center ratings: Validation evidence for 360-degree feedback programs. *Personnel Psychology, 55*, 871–904.

Badgett, M. V. L., Sears, B., Lau, H., & Ho, D. (2009). Bias in the workplace: Consistent evidence of sexual orientation and gender identity discrimination 1998–2008. *Chicago-Kent Law Review, 84*, 559–595.

Barrick, M. R., Swider, B. W., & Stewart, G. L. (2010). Initial evaluations in the interview: Relationships with subsequent interviewer evaluations and employment offers. *Journal of Applied Psychology, 95*, 1163–1172.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. Free Press.

Bass, B. M., Avolio, B. J., & Atwater, L. (1996). The transformational and transactional leadership of men and women. *Applied Psychology: An International Review, 45*, 5–34.

Bauer, T. N., Erdogan, B., Liden, R. C., & Wayne, S. J. (2006). A longitudinal study of the moderating role of extraversion: Leader-member exchange, performance, and turnover during new executive development, *Journal of Applied Psychology, 91*(2), 298–310.

Bruno, T., & Abrahão, J. (2012). False alarms and incorrect rejections in an information security center: Correlation with the frequency of incidents. *Work, 41*, 2902–2907.

Buckingham, M., & Clifton, D. O. (2001). *Now, discover your strengths*. Free Press.

Bureau of Labor Statistics—U.S. Department of Labor. (2019). American time use survey—2018 results [Press release: USDL-19-1003]. https://www.bls.gov/news.release/pdf/atus.pdf

Bye, H. H., Horverak, J. G., Sandal, G. M., Sam, D. L., & Vijver, F. J. R. van de (2014). Cultural fit and ethnic background in the job interview. *International Journal of Cross Cultural Management, 14*, 7–26.

Carlson, D. S., Kacmar, K. M., & Williams, L. J. (2000). Construction and initial validation of a multidimensional measure of work–family conflict. *Journal of Vocational Behavior, 56*, 249–276.

Colligan, T. W., & Higgins, E. M. (2005). Workplace stress: Etiology and consequences. *Journal of Workplace Behavioral Health, 21*, 89–97.

Corbett, C., & Hill, C. (2012) *Graduating to a pay gap: The earnings of women and men one year after college graduation*. American Association of University Women.

DeGroot, T., & Gooty, J. (2009). Can nonverbal cues be used to make meaningful personality attributions in employment interviews? *Journal of Business Psychology, 24*, 179–192.

DeNisi, A. S., & Kluger, A. N. (2000). Feedback effectiveness: Can 360-degree appraisals be improved? *Academy of Management Executive, 14*, 129–139.

Dierdorff, E. C., & Wilson, M. A. (2003). A meta-analysis of job analysis reliability. *Journal of Applied Psychology, 88*, 635–646.

Eagly, A. H., Johannesen-Schmidt, M. C., & van Engen, M. L. (2003). Transformational, transactional, and laissez-faire leadership styles: A meta-analysis comparing women and men. *Psychological Bulletin, 129*, 569–591.

Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin, 108*, 233–256.

Eby, L. T., Allen, T. D., Evans, S. C., Ng, T., & DuBois, D. (2008). Does mentoring matter? A multidisciplinary meta-analysis comparing mentored and non-mentored individuals. *Journal of Vocational Behavior, 72*, 254–267.

Eby, L. T., Durley, J. R., Evans, S. C., & Ragins, B. R. (2006). The relationship between short-term mentoring benefits and long-term mentor outcomes. *Journal of Vocational Behavior, 69*, 424–444.

Elmore, L. (2010, June). The workplace generation gaps. *Women in Business, 62*(2), 8–11.

Felfe, J., & Schyns, B. (2006). Personality and the perception of transformational leadership: The impact of extraversion, neuroticism, personal need for structure, and occupational self-efficacy. *Journal of Applied Social Psychology, 36*(3), 708–41.

Fletcher, C. (2001). Performance appraisal and management: The developing research agenda. *Journal of Occupational and Organizational Psychology, 74*, 473–487.

Gentry, W. A., Weber, T. J., & Sadri, G. (2008). Examining career-related mentoring and managerial performance across cultures: A multilevel analysis. *Journal of Vocational Behavior, 72*, 241–253.

Gibson, J. W., Greenwood, R. A., & Murphy, E. F. (2009). Generational differences in the workplace: Personal values, behaviors, and popular beliefs. *Journal of Diversity Management, 4*, 1–7.

Gilbreth, L. M. (1914). *The psychology of management: The function of the mind in determining, teaching, and installing methods of least waste*. Sturgis and Walton.

Gilbreth, L. M. (1998). *As I remember: An autobiography of Lillian Gilbreth*. Industrial Engineering and Management Press.

Gilmore, D. C., & Ferris, G. R. (1989). The effects of applicant impression management tactics on interviewer judgments. *Journal of Management,15*, 557–564.

Greenberg, J. (1993). Stealing in the name of justice: Informational and interpersonal moderators of theft reactions to underpayment inequity. *Organizational Behavior and Human Decision Processes, 54*, 81–103.

Greenberg, L., & Barling, J. (1999). Predicting employee agression against coworkers, subordinates and supervisors: The roles of person behaviors and perceived workplace factors. *Journal of Organizational Behavior, 20*, 897–913.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review, 10*, 76–88.

Gyllensten, K., & Palmer, S. (2005). The role of gender in workplace stress: A critical literature review. *Health Education Journal, 64*, 271–288.

Hoogendoorn, S., Oosterbeek, H., & van Praag, M. (2013). The impact of gender diversity on the performance of business teams: Evidence from a field experiment. *Management Science, 59*, 1514–1528.

Hosoda, M., Stone-Romero, E., & Coats, G. (2003). The effects of physical attractiveness on job-related outcomes: A meta-analysis of experimental studies. *Personnel Psychology, 56*, 431–462.

Howard, J. L., & Ferris, G. R. (1996). The employment interview context: Social and situational influences on interviewer decisions. *Journal of Applied Social Psychology, 26*, 112–136.

Howell, W. C. (2003). Human factors and ergonomics. In W. C. Borman, D. R. Ilgen, R. J. Limoski, & I. B. Weiner (Eds.), *Handbook of psychology: Vol. 12: Industrial and organizational psychology* (pp. 565–593). Wiley.

Human Rights Campaign. (2013a). *Cities and counties with non-discrimination ordinances that include gender identity*. http://www.hrc.org/resources/entry/c...include-gender

Human Rights Campaign. (2013b). *Corporate equality index 2014: Rating American workplaces on lesbian, gay, bisexual and transgender equality*.

http://www.hrc.org/campaigns/corporate-equality-index

Jordan v. New London, No. 99-9188, 2000 U.S. App. LEXIS 22195 (2d Cir. 2000) (unpublished). http://www.aele.org/apa/jordan-newlondon.html

Judge, T. A., & Kammeyer-Mueller, J. D. (2012). Job attitudes. *Annual Reviews of Psychology, 63*, 341–367.

Judge, T. A., Piccolo, R. F., Podsakoff, N. P., Shaw, J. C., & Rich, B. (2010). The relationship between pay and job satisfaction: A meta-analysis of the literature. *Journal of Vocational Behavior, 77*, 157–167.

Judge, T. A., & Watanabe, S. (1993). Another look at the job satisfaction–life satisfaction relationship. *Journal of Applied Psychology, 78*, 939–948.

Kaiser, R. B., & Overfield, D. V. (2011). Strengths, strengths overused, and lopsided leadership. *Consulting Psychology, 63*, 89–109.

Katzell, R. A., & Austin, J. T. (1992). From then to now: The development of industrial–organizational psychology in the United States. *Journal of Applied Psychology*, *77*, 803–835.

Khanna, C., Medsker, G. J., & Ginter, R. (2012). 2012 income and employment survey results for the Society for Industrial and Organizational Psychology. http://www.siop.org/2012SIOPIncomeSurvey.pdf

Koberg, C. S., Boss, R. W., & Goodman, E. (1998). Factors and outcomes associated with mentoring among health-care professionals. *Journal of Vocational Behavior, 53*, 58–72.

Koppes, L. L. (1997). American female pioneers of industrial and organizational psychology during the early years. *Journal of Applied Psychology*, *82*, 500–515.

Lancaster, J. (2004). *Making time: Lillian Moller Gilbreth—A life beyond "Cheaper by the Dozen."* Northeastern University Press.

Lapierre, L. M., & Allen, T. D. (2006). Work-supportive family, family-supportive supervision, use of organizational benefits, and problem-focused coping: Implications for work–family conflict and employee well-being. *Journal of Occupational Health Psychology, 11*, 169–181.

Larson, C., & LaFasto, F. (1989). *Teamwork: What must go right / What can go wrong*. Sage.

Levine, S. P., & Feldman, R. S. (2002). Women and men's nonverbal behavior and self-monitoring in a job interview setting. *Applied Human Resources Management Research, 7*, 1–14.

Lewin, K., Lippitt, R., & White, R. K. (1939). Patterns of aggressive behavior in experimentally created "social climates." *Journal of Social Psychology, 10*, 271–301.

Liden, R. C., Martin, C. L., & Parsons, C. K. (1993). Interviewer and applicant behaviors in employment interviews. *Academy of Management Journal*, *36*, 373–386.

Lips, H. (2013). The gender pay gap: Challenging the rationalizations. Perceived equity, discrimination, and the limits of human capital models. *Sex Roles*, *68*, 169–185.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297–1349). Rand McNally.

Manley, K. (2009). The BFOQ defense: Title VII's concession to gender discrimination. *Duke Journal of Gender Law & Policy, 16*, 169–210.

McCarney, R., Warner, J., Iliffe, S., van Haselen, R., Griffin, M., & Fisher, P. (2007). The Hawthorne effect: A randomised, controlled trial. *BMC Medical Research Methodology, 7*, 30.

McDaniel, M. A., Whetzel, D. L., Schmidt, F. L., & Maurer, S. D. (1994). The validity of employment interviews: A comprehensive review and meta-analysis. *Journal of Applied Psychology, 79*, 599–616.

McGregor, D. (1960). *The human side of enterprise*. McGraw Hill.

McKeen, C., & Bujaki, M. (2007). Gender and mentoring. In B. R. Ragins & K. E. Kram (Eds.), *The handbook of mentoring at work: Theory, research and practice* (pp. 197–222). Sage Publications.

McMillan, S. K., Stevens, S., & Kelloway, E. K. (2009). History and development of industrial/organizational psychology in the Canadian forces personnel selection branch: 1938–2009. *Canadian Psychology, 50*, 283–291.

Meister, J. C., & Willyerd, K. (2010, May). Mentoring millennials. *Harvard Business Review*, 1–4.

MLDC. (2010). Mentoring relationships and demographic diversity. Military Leadership Diversity Commission. Issue Paper 25.

Münsterberg, H. (1913). *Psychology and industrial efficiency*. Houghton Mifflin Company.

Myers, K. K., & Sadaghiani, K. (2010). Millennials in the workplace: A communication pespective on millennials organizational relationships and performance. *Journal of Business Psychology, 25*, 225–238.

Naquin, C., & Tynan, R. (2003). The team halo effect: Why teams are not blamed for their failures. *Journal of Applied Psychology, 88*, 332–340.

Occupational Safety & Health Administration. (2014). *Workplace*

violence. United States Department of Labor. https://www.osha.gov/SLTC/workplaceviolence/

O'Keefe, J., & Bruyere, S. (1994). *Implications of the Americans with Disabilities Act for psychology*. Springer.

Ostroff, C., Kinicki, A. J., & Tamkins, M. M. (2003). Organizational culture and climate. In W. C. Borman, D. R. Ilgen, R. J. Klimoski, & I. B. Weiner (Eds.), *Handbook of psychology: Vol. 12: Industrial and organizational psychology* (pp. 145–158). Wiley.

Parks-Yancy, R. (2012). Interactions into opportunities: Career management for low-income, first-generation African American college students. *Journal of College Student Development*, *53*, 510–523.

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, *90*, 751–783.

Phillips, A. S., & Bedeian, A. G. (1994). Leader-follower exchange quality: The role of personal and interpersonal attributes. *Academy of Management Journal*, *37*(4), 990–1001.

Posig, M., & Kickul, J. (2004). Work-role expectation and work family conflict: Gender differences in emotional exhaustion. *Women in Management Review*, *19*, 373–386.

Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A review of current literature and directions for future research. *The DATA BASE for Advances in Information Systems*, *35*, 6–36.

Ragins, B. R., & Cotton, J. L. (1999). Mentor functions and outcomes: A comparison of men and women in formal and informal mentoring relationships. *Journal of Applied Psychology*, *84*, 529–550.

Rakić, T., Steffens, M. C., & Mummendey, A. (2011). When it matters how you pronounce it: The influence of regional accents on job interview outcome. *British Journal of Psychology*, *102*, 868–883.

Riley, M., Elgin, B., Lawrence, D., & Matlack, C. (2014, March 13). Missed alarms and 40 million stolen credit card numbers: How Target blew it. *Bloomberg Businessweek*. http://www.businessweek.com/articles...edit-card-data

Roethlisberg, F., & Dickson, W. (1939). *Management and the worker*. Harvard University Press.

Saad, L. (2012). U.S. workers least happy with their work stress and pay: Satisfaction is highest for safety conditions and relations with coworkers. *Gallup Economy*. http://www.gallup.com/poll/158723/wo...tress-pay.aspx

Saari, L. M., & Judge, T. A. (2004). Employee attitudes and job satisfaction. *Human Resouce Management*, *43*, 395–407.

Schraeder, M., Becton, J. B., & Portis, R. (2007). A critical examination of performance appraisals: An organization's friend or foe? *The Journal for Quality and Participation*, *30*, 20–25.

Schyns, B., Kroon, B., & Moors, G. (2008). Follower characteristics and the perception of leader-member exchange. *Journal of Managerial Psychology*, *23*(7), 772–788. https://www.emerald.com/insight/cont...6330/full/html

Society for Industrial and Organizational Psychology (SIOP). (2014). What value does SIOP membership provide? http://www.siop.org/benefits/

Society for Occupational Health. (2020). History of OHP. http://sohp-online.org/field-of-ohp/history-of-ohp/

Taylor, F. W. (1911). *The principles of scientific management*. Harper & Brothers.

The New York Times. (1999, Sept. 9). *Metro news briefs: Connecticut—Judge rules that police can bar high IQ scores*. http://www.nytimes.com/1999/09/09/ny...iq-scores.html

Tornow, W. W. (1993a). Editor's note: Introduction to special issue on 360-degree feedback. *Human Resource Management*, *32*, 211–219.

Tornow, W. W. (1993b). Perceptions or reality: Is multi-perspective measurement a means or an end? *Human Resource Management*, *32*, 221–229.

Toyota Motor Manufacturing. (2013). *Toyota production system terms*. http://www.toyotageorgetown.com/terms.asp

Ugboro, I. O. (2006). Organizational commitment, job redesign, employee empowerment and intent to quit among survivors of restructuring and downsizing. *Journal of Behavioral and Applied Management*, *7*, 232–257.

United States Nuclear Regulatory Commission. (2013). *Backgrounder on the Three Mile Island accident*. http://www.nrc.gov/reading-rm/doc-co...mile-isle.html

U.S. Equal Employment Opportunity Commission. (2014). *EEOC charge receipts by state (includes U.S. territories) and basis for 2013*. http://www1.eeoc.gov/eeoc/statistics...t/state_13.cfm

U.S. Equal Employment Opportunity Commission. (n.d.). *Facts about sexual harassment*. http://www.eeoc.gov/eeoc/publications/fs-sex.cfm

Van De Water, T. (1997). Psychology's entrepreneurs and the marketing of

industrial psychology. *Journal of Applied Psychology, 82*, 486–499.

van Knippenberg, D., van Knippenberg, B., Monden, L., & de Lima, F. (2002). Organizational identification after a merger: A social identity perspective. *British Journal of Social Psychology, 41*, 233–252.

Vinchur, A. J., & Koppes, L. L. (2014). Early contributors to the science and practice of industrial psychology. In L. L. Koppes, (Ed.), *Historical perspectives in industrial and organizational psychology* (pp. 37–58). Erlbaum.

Wagner, E. (2019a). Impasses Panel guts telework, official time for employees at Social Security Administration. *Government Executive*. https://www.govexec.com/management/2...ration/157448/

Wagner, E. (2019b). Social Security ends telework program for 12,000 employees. *Government Executive*. https://www.govexec.com/pay-benefits...loyees/160954/

Weiss, H. M. (2002). Deconstructing job satisfaction: Separating evaluations, beliefs and affective experiences. *Human Resouces Management Review, 12*, 173–194.

Stress, Lifestyle, and Health

Aboa-Éboulé, C., Brisson, C., Maunsell, E., Mâsse, B., Bourbonnais, R., Vézina, M., . . . Dagenais, G. R. (2007). Job strain and risk for acute recurrent coronary heart disease events. *Journal of the American Medical Association, 298*, 1652–1660.

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49–74.

Ader, R. & Cohen, N. (2001). Conditioning and immunity. In R. Ader, D. L. Felten & N. Cohen (Eds.), *Psychoneuroimmunology* (3rd ed., pp. 3–34). Academic Press.

Ader, R., & Cohen, N. (1975). Behaviorally conditioned immunosuppression. *Psychosomatic Medicine, 37*, 333–340.

Ahola, K., Honkonen, T., Isometsä, E., Kalimo, R., Nykyri, E., Aromaa, A., & Lönnqvist, J. (2005). The relationship between job-related burnout and depressive disorders—Results from the Finnish Health 2000 study. *Journal of Affective Disorders, 88*, 55–62.

Ahola, K., Honkonen, T., Kivamäki, M., Virtanen, M., Isometsä, E., Aromaa, A., & Lönnqvist, J. (2006). Contribution of burnout to the association between job strain and depression: The Health 2000 study. *Journal of Occupational and Environmental Medicine, 48*, 1023–1030.

Ajrouch, K. J., Reisine, S., Lim, S., Sohn, W., & Ismail, A. (2010). Perceived everyday discrimination and psychological distress: Does social support matter? *Ethnicity & Health, 15*(4), 417–434. https://www.tandfonline.com/doi/abs/...58.2010.484050

American Academy of Neurology. (2014). *Headache*. https://patients.aan.com/disorders/i...isorder_id=936

American Heart Association. (2012a). *What is angina?* http://www.heart.org/idc/groups/hear...ucm_300287.pdf

American Heart Association. (2012b). *Why blood pressure matters*. http://www.heart.org/HEARTORG/Condit...BloodPressure/WhyBloodPressureMatters/Why-Blood-Pressure-Matters_UCM_002051_Article.jsp

American Heart Association. (2014, February 24). Depression as a risk factor for poor prognosis among patients with acute coronary syndrome: Systematic review and recommendations: A scientific statement from the American Heart Association. *Circulation*. http://circ.ahajournals.org/content/....full.pdf+html

American Lung Association. (2010). *Asthma*. http://www.lung.org/assets/documents...ers/asthma.pdf

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Author.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachandran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). Academic Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31*, 143–164.

Barefoot, J. C., & Schroll, M. S. (1996). Symptoms of depression, acute myocardial infarction, and total mortality in a community sample. *Circulation, 93*, 1976–1980.

Baron, R. S., & Kerr, N. L. (2003). *Group process, group decision, group action* (2nd ed.). Open University Press.

Baron, R. S., Cutrona, C. E., Hicklin, D., Russell, D. W., & Lubaroff, D. M. (1990). Social support and immune function among spouses of cancer patients. *Journal of Personality and Social Psychology, 59*, 344–352.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497–529.

Benson, H., & Proctor, W. (1994). *Beyond the relaxation response: How to harness the healing power of your personal beliefs*. Berkley Publishing Group.

Berkman, L. F., & Syme, L. (1979). Social networks, host resistance, and mortality: A nine-year follow-up study of Alameda County residents. *American Journal of Epidemiology, 109*, 186–204.

Blackburn, E. H., & Epel, E. S. (2012). Telomeres and adversity: Too toxic to ignore. *Nature, 490*(7419), 169–171.

Boehm, J. K., & Kubzansky, L. D. (2012). The heart's content: The association between positive psychological well-being and cardiovascular health. *Psychological Bulletin, 138*, 655–691.

Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology, 57*, 808–818.

Boyle, S. H., Michalek, J. E., & Suarez, E. C. (2006). Covariation of psychological attributes and incident coronary heart disease in U.S. Air Force veterans of the Vietnam War. *Psychosomatic Medicine, 68*, 844–850.

Brickman, P., & Campbell, D. T. (1971). Hedonic relativism and planning the good society. In M. H. Appley (Ed.), *Adaptation level theory: A symposium* (pp. 287–302). Academic Press.

Brickman, P., Coats, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? *Journal of Personality and Social Psychology, 36*, 917–927.

Brummett, B. H., Barefoot, J. C., Siegler, I. C., Clapp-Channing, N. E., Lytle, B. L., Bosworth, H. B., . . . Mark, D. B. (2001). Characteristics of socially isolated patients with coronary artery disease who are at elevated risk for mortality. *Psychosomatic Medicine, 63*, 267–272.

Caceres, C., & Burns, J. W. (1997). Cardiovascular reactivity to psychological stress may enhance subsequent pain sensitivity. *Pain, 69*, 237–244.

Campeau, S., Nyhuis, T. J., Sasse, S. K., Kryskow, E. M., Herlihy, L., Masini, C. V., . . . Day, H. E. W. (2010). Hypothalamic pituitary adrenal axis responses to low-intensity stressors are reduced after voluntary wheel running in rats. *Journal of Neuroendocrinology, 22*, 872–888.

Cannon, W. B. (1932). *The wisdom of the body*. W. W. Norton.

Carroll, J. (2007). *Most Americans "very satisfied" with their personal lives*. Gallup. http://www.gallup.com/poll/103483/Mo...nal-Lives.aspx

Cathcart, S., Petkov, J., & Pritchard, D. (2008). Effects of induced stress on experimental pain sensitivity in chronic tension-type headache sufferers. *European Journal of Neurology, 15*, 552–558.

Centers for Disease Control and Prevention (CDC). (2006). *You can control your asthma: A guide to understanding asthma and its triggers*. http://www.cdc.gov/asthma/pdfs/asthma_brochure.pdf

Centers for Disease Control and Prevention (CDC). (2011). Million hearts: Strategies to reduce the prevalence of leading cardiovascular disease risk factors —United States, 2011. *Morbidity and Mortality Weekly Report [MMWR], 60*(36), 1248–1251. http://www.cdc.gov/mmwr/pdf/wk/mm6036.pdf

Centers for Disease Control and Prevention (CDC). (2013a). *Asthma's impact on the nation: Data from the CDC National Asthma Control Program*. http://www.cdc.gov/asthma/impacts_na...aFactSheet.pdf

Centers for Disease Control and Prevention (CDC). (2013b). *Breathing easier*. http://www.cdc.gov/asthma/pdfs/breat...r_brochure.pdf

Center for Investigating Health Minds. (2013). *About.* http://www.investigatinghealthyminds...ihmCenter.html

Chandola, T., Britton, A., Brunner, E., Hemingway, H., Malik, M., Kumari, M., . . . Marmot, M. (2008). Work stress and coronary heart disease: What are the mechanisms? *European Heart Journal, 29*, 640–648.

Chang, E. C. (2001). Introduction: Optimism and pessimism and moving beyond the most fundamental questions. In E. C. Chang (Ed.), *Optimism and pessimism: Implications for theory, research, and practice* (pp. 3–12). American Psychological Association.

Chang, P. P., Ford, D. E., Meoni, L. A., Wang, N. Y., & Klag, M. J. (2002). Anger in young and subsequent premature cardiovascular disease. *Archives of Internal Medicine, 162*, 901–906.

Chida, Y., & Steptoe, A. (2009). The association of anger and hostility with future coronary heart disease: A meta-analytic review or prospective evidence. *Journal of the American College of Cardiology, 53*, 936–946.

Cohen, S., Frank, E., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. M. J. (1998). Types of stressors that increase susceptibility to the common cold in healthy adults. *Health Psychology, 17*, 214–223.

Cohen, S., & Herbert, T. B. (1996). Health psychology: Psychological factors and physical disease from the perspective of human psychoneuroimmunology. *Annual Review of Psychology, 47*, 113–142.

Cohen, S., & Janicki-Deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples in 1993, 2006, and 2009. *Journal of Applied Social Psychology, 42*, 1320–1334.

Cohen, S., Janicki-Deverts, D., & Miller, G. E. (2007). Psychological distress and disease. *Journal of the American Medical Association, 98*, 1685–1687.

Cohen, S., Doyle, W. J., Turner, R., Alper, C. M., & Skoner, D. P. (2003). Sociability and susceptibility to the common cold. *Psychological Science, 14*, 389–395.

Cohrs, J. C., Christie, D. J., White, M. P., & Das, C. (2013). Contributions of positive psychology to peace: Toward global well-being and resilience. *American Psychologist, 68*, 590–600.

Compton, W. C. (2005). *An introduction to positive psychology*. Thomson Wadsworth.

Cotton, D. H. G. (1990). *Stress management: An integrated approach to therapy*. Brunner/Mazel.

Craft, L. L., VanIterson, E. H., Helenowski, I. B., Rademaker, A. W., & Courneya, K. S. (2012). Exercise effects on depressive symptoms in cancer survivors: A systematic review and meta-analysis. *Cancer Epidemiology, Biomarkers & Prevention, 21*, 3–19.

Csikszentmihalyi, M. (1997). *Finding flow.* Basic Books.

Csikszentmihalyi, M. (1999). If we are so rich, why aren't we happy? *American Psychologist, 54*, 821–827.

D'Amato, G., Liccardi, G., Cecchi, L., Pellegrino, F., & D'Amato, M. (2010). Facebook: A new trigger for asthma? *The Lancet, 376*, 1740.

Davidson, K. W., Mostofsky, E., & Whang, W. (2010). Don't worry: be happy: Positive affect and reduced 10-year incident coronary heart disease: The Canadian Nova Scotia Health Survey. *European Heart Journal, 31*, 1065–1070.

de Kluizenaar, Y., Gansevoort, R. T., Miedema, H. M. E., & de Jong, P. E. (2007). Hypertension and road traffic noise exposure. *Journal of Occupational and Environmental Medicine, 49*, 484–492.

De Vogli, R., Chandola, T., & Marmot, M. G. (2007). Negative aspects of close relationships and heart disease. *Archives of Internal Medicine, 167*, 1951–1957.

DeLongis, A., Coyne, J. C., Dakof, G., Folkman, S., & Lazarus, R. S. (1982). Relationship of daily hassles, uplifts, and major life events to health status. *Health Psychology, 1*, 119–136.

Derogatis, L. R., & Coons, H. L. (1993). Self-report measures of stress. In L. Goldberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspec*ts (2nd ed., pp. 200–233). Free Press.

Diehl, M., & Hay, E. L. (2010). Risk and resilience factors in coping with daily stress in adulthood: The role of age, self-concept incoherence, and personal control. *Developmental Psychology, 46*, 1132–1146.

Diener, E. (2012). New findings and future directions for subjective well-being research. *American Psychologist, 67*, 590–597.

Diener, E. (2013). The remarkable changes in the science of subjective well-being. *Perspectives on Psychological Science, 8*, 663–666.

Diener, E., & Biswas-Diener, R. (2002). Will money increase subjective well-being? A literature review and guide to needed research. *Social Indicators Research, 57*, 119–169.

Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology, 69*, 851–864.

Diener, E., Lucas, R., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist, 61*, 305–314.

Diener, E., Ng, W., Harter, J., & Arora, R. (2010). Wealth and happiness across the world: Material prosperity predicts life evaluation, whereas psychosocial prosperity predicts positive feelings. *Journal of Personality and Social Psychology, 99*, 52–61.

Diener, E., Oishi, S., & Ryan, K. L. (2013). Universals and cultural differences in the causes and structure of happiness: A multilevel review. In *Mental Well-Being* (pp. 153–176). Springer Netherlands.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*, 276–302.

Diener, E., Tay, L., & Myers, D. (2011). The religion paradox: If religion makes people happy, why are so many dropping out? *Journal of Personality and Social Psychology, 101*, 1278–1290.

Diener, E., Tay, L., & Oishi, S. (2013). Rising income and the subjective well-being of nations. *Journal of Personality and Social Psychology, 104*, 267–276.

Diener, E., Wolsic, B., & Fujita, F. (1995). Physical attractiveness and subjective well-being. *Journal of Personality and Social Psychology, 69*, 120–129.

Dohrenwend, B. P. (2006). Inventorying stressful life events as risk factors for psychopathology: Toward resolution of the problem of intracategory variability. *Psychological Bulletin, 132*, 477–495.

Entringer, S., Epel, E. S., Kumsta, R., Lin, J., Hellhammer, D. H., Blackburn, E., Wüst, S., & Wadhwa, P. D. (2011). Stress exposure in intrauterine life is associated with shorter telomere length in young adulthood. *Proceedings of the National Academy of Sciences, USA, 108*, E513–E518.

Epel, E. S., Blackburn, E. H., Lin, J., Dhabhar, F. S., Adler, N. E., Morrow, J. D., & Cawthon, R. M. (2004). Accelerated telomere shortening in response to life stress. *Proceedings of the National Academy of Sciences, USA, 101*, 17312–17315.

Everly, G. S., & Lating, J. M. (2002). *A clinical guide to the treatment of the human stress response* (2nd ed.). Kluwer Academic/Plenum Publishing.

Falagas, M. E., Zarkadoulia, E. A., Ioannidou, E. N., Peppas, G., Christodoulou, C., & Rafailidis, P. I. (2007). The effect of psychosocial factors on breast cancer outcome: A systematic review. *Breast Cancer Research, 9:R44*. http://breast-cancer-research.com/co...df/bcr1744.pdf

Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*, 219–239.

Fontana, A. M., Diegnan, T., Villeneuve, A., & Lepore, S. J. (1999). Nonevaluative social support reduces cardiovascular reactivity in young women during acutely stressful performance situations. *Journal of Behavioral Medicine, 22*, 75–91.

Friedman, H. S., & Booth-Kewley, S. (1987). The "disease-prone personality": A meta-analytic view of the construct. *American Psychologist, 42*, 539–555.

Friedman, M. (1977). Type A behavior pattern: Some of its pathophysiological components. *Bulletin of the New York Academy of Medicine, 53*, 593–604.

Friedman, M., & Rosenman, R. (1974). *Type A behavior and your heart*. Alfred A. Knopf.

Friedman, M., & Rosenman, R. H. (1959). Association of specific overt behavior pattern with blood and cardiovascular findings blood cholesterol level, blood clotting time, incidence of arcus senilis, and clinical coronary artery disease. *Journal of the American Medical Association, 169*(12), 1286–1296.

Fujita, F., & Diener, E. (2005). Life satisfaction set point: Stability and change. *Journal of Personality and Social Psychology, 88*, 158–164.

Fulmer, C. A., Gelfand, M. J., Kruglanski, A., Kim-Prieto, C., Diener, E., Pierro, A., & Higgins, E. T. (2010). On "feeling right" in cultural contexts: How person-culture match affects self-esteem and subjective well-being. *Psychological Science, 21*, 1563–1569.

Geoffroy, M. C., Hertzman, C., Li, L., & Power, C. (2013). Prospective association of morning salivary cortisol with depressive symptoms in mid-life: A life-course study. *PLoS ONE, 8*(11), 1–9.

Gerber, M., Kellman, M., Hartman, T., & Pühse, U. (2010). Do exercise and fitness buffer against stress among Swiss police and emergency response service officers? *Psychology of Sport and Exercise, 11*, 286–294.

Glaser, R., & Kiecolt-Glaser, J. K. (2005). Stress-induced immune dysfunction: Implications for health. *Nature Reviews Immunology, 5*, 243–251.

Glaser, R., Kiecolt-Glaser, J. K., Marucha, P. T., MacCallum, R. C., Laskowski, B. F., & Malarkey, W. B. (1999). Stress-related changes in proinflammatory cytokine production in wounds. *Archives of General Psychiatry, 56*, 450–456.

Glassman, A. H. (2007). Depression and cardiovascular comorbidity. *Dialogues in Clinical Neuroscience, 9*, 9–17.

Glassman, A. H., & Shapiro, P. A. (1998). Depression and the course of coronary artery disease. *American Journal of Psychiatry, 155*, 4–11.

Greenberg, J. S. (2006). *Comprehensive stress management* (9th ed.). McGraw-Hill.

Hackney, C. H., & Sanders, G. S. (2003). Religiosity and mental health: A meta-analysis of recent studies. *Journal for the Scientific Study of Religion, 42*, 43–55.

Hafeez, H., Zeshan, M., Tahir, M. A., Jahan, N., & Naveed, S. (2017). Health care disparities among lesbian, gay, bisexual, and transgender youth: A literature review. *Cureus, 9*(4). https://www.ncbi.nlm.nih.gov/pubmed/28638747

Hansen, T. (2012). Parenthood and happiness: A review of folk theories versus empirical evidence. *Social Indicators Research, 108*, 29–64.

Hare, D. L., Toukhsati, S. R., Johansson, P., & Jaarsma, T. (2013). Depression and cardiovascular disease: A clinical review. *European Heart Journal*. Advance online publication. doi:10.1093/eurheartj/eht462

Hatch, S. L., & Dohrenwend, B. P. (2007). Distribution of traumatic and other stressful life events by race/ethnicity, gender, SES, and age: A review of the research. *American Journal of Community Psychology, 40*, 313–332.

Haynes, S. G., Feinleib, M., & Kannel, W. B. (1980). The relationship of psychosocial factors to coronary disease in the Framingham study: III. Eight-year incidence of coronary heart disease. *American Journal of Epidemiology, 111*, 37–58.

Head, D., Singh, T., & Bugg, J. M. (2012). The moderating role of exercise on stress-related effects on the hippocampus and memory in later adulthood. *Neuropsychology, 26*, 133–143.

Helliwell, J., Layard, R., & Sachs, J. (Eds.). (2013). *World happiness report 2013*. United Nations Sustainable Development Solutions Network: http://unsdsn.org/wp-content/uploads...013_online.pdf

Helson, H. (1964). Current trends and issues in adaptation-level theory. *American Psychologist*, *19*, 26–38.

Holmes, T. H., & Masuda, M. (1974). Life change and illness susceptibility. In B. S. Dohrenwend & B. P. Dohrenwend (Eds.), *Stressful life events: Their nature and effects* (pp. 45–72). John Wiley & Sons.

Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research*, *11*, 213–218.

Holmes, T. S., & Holmes, T. H. (1970). Short-term intrusions into the life style routine. *Journal of Psychosomatic Research*, *14*, 121–132.

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, *7*(7), e1000316.

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. *Journal and Social and Clinical Psychology*, *37*(10), 751–768. https://guilfordjournals.com/doi/abs...2018.37.10.751

Hupbach, A., & Fieman, R. (2012). Moderate stress enhances immediate and delayed retrieval of educationally relevant material in healthy young men. *Behavioral Neuroscience*, *126*, 819–825.

Infurna, F. J., & Gerstorf, D. (2014). Perceived control relates to better functional health and lower cardio-metabolic risk: The mediating role of physical activity. *Health Psychology*, *33*, 85–94.

Infurna, F. J., Gerstorf, D., Ram, N., Schupp, J., & Wagner, G. G. (2011). Long-term antecedents and outcomes of perceived control. *Psychology and Aging*, *26*, 559–575.

Johnson, W., & Krueger, R. F. (2006). How money buys happiness: Genetic and environmental processes linking finances and life satisfaction. *Journal of Personality and Social Psychology*, *90*, 680–691.

Jonas, B. S., & Lando, J. F. (2000). Negative affect as a prospective risk factor for hypertension. *Psychosomatic Medicine*, *62*, 188–196.

Jordan, H. T., Miller-Archie, S. A., Cone, J. E., Morabia, A., & Stellman, S. D. (2011). Heart disease among those exposed to the September 11, 2001 World Trade Center disaster: Results from the World Trade Center Health Registry. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, *53*, 370–376.

Kahneman, D. (2011). *Thinking fast and slow*. Farrar, Straus, & Giroux.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life, but not emotional well-being. *Proceedings of the National Academy of Sciences, USA*, *107*, 16489–16493.

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine*, *4*, 1–39.

Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. Basic Books.

Kiecolt-Glaser, J. K. (2009). Psychoneuroimmunology: Psychology's gateway to the biomedical future. *Perspectives on Psychological Science*, *4*, 367–369.

Kiecolt-Glaser, J. K., Glaser, R., Gravenstein, S., Malarkey, W. B., & Sheridan, J., (1996). Chronic stress alters the immune response to influenza virus vaccine in older adults. *Proceedings of the National Academy of Sciences, USA*, *93*, 3043–3047.

Kiecolt-Glaser, J. K., McGuire, L., Robles, T. F., & Glaser, R. (2002). Psychoneuroimmunology and psychosomatic medicine: Back to the future. *Psychosomatic Medicine*, *64*, 15–28.

Kiecolt-Glaser, J. K., McGuire, L., Robles, T. F., & Glaser, R. (2002).Psychoneuroimmunology: Psychological influences on immune function and health. *Journal of Consulting and Clinical Psychology*, *70*, 537–547.

Kilpeläinen, M., Koskenvuo, M., Helenius, H., & Terho, E. O. (2002). Stressful life events promote the manifestation of asthma and atopic diseases. *Clinical and Experimental Allergy*, *32*, 256–263.

Kivimäki, M., Head, J., Ferrie, J. E., Shipley, M. J., Brunner, E., Vahtera, J., & Marmot, M. G. (2006). Work stress, weight gain and weight loss. Evidence for bidirectional effects of body mass index in the Whitehall II study. *International Journal of Obesity*, *30*, 982–987.

Klinnert, M. D., Nelson, H. S., Price, M. R., Adinoff, A. D., Leung, M., & Mrazek, D. A. (2001). Onset and persistence of childhood asthma: Predictors from infancy. *Pediatrics*, *108*, E69.

Konnikova, M. (2015, January 14). Trying to cure depression, but inspiring torture. *The New Yorker*. https://www.newyorker.com/science/ma...ure?verso=true

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the

rich are different from the poor. *Psychological Review, 119*, 546–572.

Krosnick, J. A. (1990). *Thinking about politics: Comparisons of experts and novices*. Guilford.

Krumboltz, M. (2014, February 18). Just like us? Elephants comfort each other when they're stressed out. *Yahoo News*. http://news.yahoo.com/elephants-know...202224477.html

Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology, 74*, 763–773.

Lavner, J. A., Karney, B. R., & Bradbury, T. N. (2013). Newlyweds' optimistic forecasts of their marriage: For better or for worse? *Journal of Family Psychology, 27*, 531–540.

Lazarus, R. P., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

Lee, M., & Rotheram-Borus, M. J. (2001). Challenges associated with increased survival among parents living with HIV. *American Journal of Public Health, 91*, 1303–1309.

Lehrer, P. M., Isenberg, S., & Hochron, S. M. (1993). Asthma and emotion: A review. *Journal of Asthma, 30*, 5–21.

Lepore, S. J. (1998). Problems and prospects for the social support-reactivity hypothesis. *Annals of Behavioral Medicine, 20*, 257–269.

Lichtman, J. H., Bigger, T., Blumenthal, J. A., Frasure-Smith, N., Kaufmann, P. G., Lespérance, F., . . . Froelicher, E. S. (2008). Depression and coronary heart disease: Recommendations for screening, referral, and treatment: A science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research. *Circulation, 118*, 1768–1775.

Loerbroks, A., Apfelbacher, C. J., Thayer, J. F., Debling, D., & Stürmer, T. (2009). Neuroticism, extraversion, stressful life events and asthma: A cohort study of middle-aged adults. *Allergy, 64*, 1444–1450.

Logan H., Lutgendorf, S., Rainville, P., Sheffield, D., Iverson, K., & Lubaroff, D. (2001). Effects of stress and relaxation on capsaicin-induced pain. *The Journal of Pain, 2*, 160–170.

Lutter, M. (2007). Book review: Winning a lottery brings no happiness. *Journal of Happiness Studies, 8*, 155–160.

Lyon, B. L. (2012). Stress, coping, and health. In V. H. Rice (Ed.), *Handbook of stress, coping, and health: Implications for nursing research, theory, and practice* (2nd ed., pp. 2–20). Sage.

Lyubomirsky, S. (2001). Why are some people happier than others? The role of cognitive and motivational processes in well-being. *American Psychologist, 56*, 239–249.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131*, 803–855.

Maier, S. F., Watkins, L. R., & Fleshner, M. (1994). Psychoneuroimmunology: The interface between behavior, brain, and immunity. *American Journal of Psychology 49*(12), 1004–1017.

Malzberg, B. (1937). Mortality among patients with involution melancholia. *American Journal of Psychiatry, 93*, 1231–1238.

Manuel, J. I. (2018). Racial/ethnic and gender disparities in health care use and access. *Health Services Research 53*(3), 1407–1429. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5980371/

Marmot, M. G., Bosma, H., Hemingway, H., & Stansfeld, S. (1997). Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *The Lancet, 350*, 235–239.

Marmot, M. G. & Sapolsky, R. (2014). Of baboons and men: Social circumstances, biology, and the social gradient in health. In M. Weinstein, & M. A. Lane (Eds.), *Sociality, hierarchy, health: comparative biodemography, A collection of papers* (pp. 365–388). National Academies Press (US).

Martin, M. W. (2012). *Happiness and the good life*. Oxford University Press.

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behavior, 2*, 99–113.

McCarthy, J. (2020, January 10). Happiness not quite as widespread as usual in the U.S. *Gallup*. https://news.gallup.com/poll/276503/...ead-usual.aspx

McEwan, B. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338*(3), 171–179.

McIntosh, J. (2014, July 28) What are headaches? What causes headaches? *Medical News Today*. http://www.medicalnewstoday.com/articles/73936.php

MedicineNet. (2013). *Headaches*. http://www.medicinenet.com/tension_h...sion_headaches

Monat, A., & Lazarus, R. S. (1991). *Stress and coping: An anthology* (3rd ed.). Columbia University Press.

Myers, D. G. (2000). The funds, friends, and faith of happy people. *American Psychologist, 55*, 56–67.

Myers, T. C., Wittrock, D. A., & Foreman, G. W., (1998). Appraisal of subjective stress in individuals with tension-type headache: The influence of baseline measures. *Journal of Behavioral Medicine, 21*, 469–484.

Mykletun, A., Bjerkeset, O., Dewey, M., Prince, M., Overland, S., & Stewart, R. (2007). Anxiety, depression, and cause-specific mortality: The HUNT study. *Psychosomatic Medicine, 69*, 323–331.

Myrtek, M. (2001). Meta-analyses of prospective studies on coronary heart disease, type A personality, and hostility. *International Journal of Cardiology, 79*, 245–251.

Nabi, H., Kivimaki, M., De Vogli, R., Marmot, M. G., & Singh-Manoux, A. (2008). Positive and negative affect and risk of coronary heart disease: Whitehall II prospective cohort study. *British Medical Journal, 337*, a118.

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS). (2012). *Understanding autoimmune diseases*. http://www.niams.nih.gov/Health_Info...autoimmune.pdf

Nealey-Moore, J. B., Smith, T. W., Uchino, B. N., Hawkins, M. W., & Olson-Cerny, C. (2007). Cardiovascular reactivity during positive and negative marital interactions. *Journal of Behavioral Medicine, 30*, 505–519.

Neelakantan, S. (2013). Mind over myocardium. *Nature, 493*, S16–S17.

Neupert, S. D., Almeida, D. M., & Charles, S. T. (2007). Age differences in reactivity to daily stressors: The role of personal control. *Journal of Gerontology: Psychological Sciences, 62B*, P216–P225.

Nusair, M., Al-dadah, A., & Kumar, A. (2012). The tale of mind and heart: Psychiatric disorders and coronary heart disease. *Missouri Medicine, 109*, 199–203.

Office on Women's Health, U.S. Department of Health and Human Services. (2009). *Heart disease: Frequently asked questions*. http://www.womenshealth.gov/publicat...rt-disease.pdf

Ong, A. D., Bergeman, C. S., & Bisconti, T. L. (2005). Unique effects of daily perceived control on anxiety symptomatology during conjugal bereavement. *Personality and Individual Differences, 38*, 1057–1067.

Ösby, U., Brandt, L., Correia, N., Ekbom, A., & Sparén, P. (2001). Excess mortality in bipolar and unipolar depression in Sweden. *Archives of General Psychiatry, 58*, 844–850.

Park, S. G., Kim, H. C., Min, J. Y., Hwang, S. H., Park, Y. S., & Min, K. B. (2011). A prospective study of work stressors and the common cold. *Occupational Medicine, 61*, 53–56.

Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin, 135*(4), 531–554. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2747726/

Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review, 91*, 347–374.

Peterson, C., & Steen, T. A. (2002). Optimistic explanatory style. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 244–256). Oxford University Press.

Phillips, A. C. (2011). Blunted as well as exaggerated cardiovascular reactivity to stress is associated with negative health outcomes. *Japanese Psychological Research, 53*, 177–192.

Phillips, A. C., Gallagher, S., & Carroll, D. (2009). Social support, social intimacy, and cardiovascular reactions to acute psychological stress. *Annals of Behavioral Medicine, 37*, 38–45.

Pinquart, M., & Sörensen, S. (2000). Influence of socioeconomic status, social network, and competence on subjective well-being in later life. A meta-analysis. *Psychology and Aging, 15*, 187–224.

Ploubidis, G. B., & Grundy, E. (2009). Personality and all cause mortality: Evidence for indirect links. *Personality and Individual differences, 47*, 203–208.

Powell, J. (1996). *AIDS and HIV-related diseases: An educational guide for professionals and the public*. Insight Books.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin, 131*, 925–971.

Puterman, E., Lin, J., Blackburn, E., O'Donovan, A., Adler, N., & Epel, E. (2010). The power of exercise: Buffering the effect of chronic stress on telomere length. *PLoS ONE, 5*(5), e10837.

Quoidbach, J., Dunn, E. W., Petrides, K. V., & Mikolajczak, M. (2010). Money giveth, money taketh away: The dual effect of wealth on happiness. *Psychological Science, 21*, 759–763.

Rahe, R. H. (1974). The pathway between subjects' recent life changes and their near-future illness reports: Representative results and methodological issues. In B. S. Dohrenwend & B. P. Dohrenwend (Eds.), *Stressful life events: Their nature and effects* (pp. 73–86). Wiley & Sons.

Rahe, R. H., McKeen, J. D., & Arthur, R. J. (1967). A longitudinal study of life change and illness patterns. *Journal of Psychosomatic Research, 10*, 355–366.

Raney, J. D., & Troop-Gordon, W. (2012). Computer-mediated communication with distant friends: Relations with adjustment during students' first semester in

college. *Journal of Educational Psychology*, *104*, 848–861.

Rasmussen, H. N., & Wallio, S. C. (2008). The health benefits of optimism. In S. J. Lopez (Ed.), *Positive psychology: Exploring the best in people* (pp. 131–149). Praeger Publishers.

Rasmussen, H. N., Scheier, M. F., & Greenhouse, J. B. (2009). Optimism and physical health: A meta-analytic review. *Annals of Behavioral Medicine*, *37*, 239–256.

Raymond, J. M., & Sheppard, K. (2018). Effects of peer mentoring on nursing students' perceived stress, sense of belonging, self-efficacy and loneliness. *Journal of Nursing Education and Practice*, *8*(1), 16–23. https://pdfs.semanticscholar.org/ce6...5014dd2cb7.pdf

Ritz, T., Steptoe, A., Bobb, C., Harris, A. H. S., & Edwards, M. (2006). The asthma trigger inventory: Validation of a questionnaire for perceived triggers of asthma. *Psychosomatic Medicine*, *68*, 956–965.

Rosengren, A., Hawken, S., Ounpuu, S., Sliwa, K., Zubaid, M., Almahmeed, W. A., . . . Yusuf, S. (2004). Association of psychosocial risk factors with risk of acute myocardial infarction in 11,119 cases and 13,648 controls from 52 countries (the INTERHEART study): Case-control study. *The Lancet*, *364*, 953–962.

Rosenman, R. H., Brand, R. J., Jenkins, C. D., Friedman, M., Straus, R., & Wurm, M. (1975). Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8.5 years. *Journal of the American Medical Association*, *223*, 872–877.

Rottenberg, J., Yaroslavsky, I., Carney, R. M., Freedland, K. E., George, C. J., Baki, I., Kovacs, M. (2014). The association between major depressive disorder and risk factors for cardiovascular disease in adolescence. *Psychosomatic Medicine*, *76*, 122–127.

Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: A unifying theory. *Clinical Psychology Review*, *21*, 33–61.

Saito, K., Kim, J. I., Maekawa, K., Ikeda, Y., & Yokoyama, M. (1997). The great Hanshin-Awaji earthquake aggravates blood pressure control in treated hypertensive patients. *American Journal of Hypertension*, *10*, 217–221.

Salonen, P., Arola, H., Nygård, C., & Huhtala, H. (2008). Long-term associations of stress and chronic diseases in ageing and retired employees. *Psychology, Health, and Medicine*, *13*, 55–62.

Sapolsky, R. M. (1998). *Why zebras don't get ulcers: An updated guide to stress, stress-related disease, and coping*. Freeman.

Sapolsky, R. M. (2004). Organismal stress and telomeric aging. An unexpected connection. *Proceedings of the National Academy of Sciences, USA*, *101*, 17323–17324.

Schnall, P. L., & Landsbergis, P. A. (1994). Job strain and cardiovascular disease. *Annual Review of Public Health*, *15*, 381–411.

Schwartz, B. S., Stewart, W. F., Simon, D., & Lipton, R. B. (1998). Epidemiology of tension-type headache. *Journal of the American Medical Association*, *279*, 381–383.

Schwartz, N. M., & Schwartz, M. S. (1995). Definitions of biofeedback and applied physiology. In M. S. Schwartz & F. Andrasik (Eds.), *Biofeedback: A practitioners guide* (pp. 32–42). Guilford.

Scully, J. A., Tosi, H., & Banning, K. (2000). Life event checklists: Revisiting the Social Readjustment Rating Scale after 30 years. *Educational and Psychological Measurement*, *60*, 864–876.

Segerstrom, S. C., & Miller, G. E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin*, *130*, 601–630.

Seligman, M. E., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology*, *74*, 1–9.

Seligman, M. E., Maier, S. F., & Geer, J. H. (1968). Alleviation of learned helplessness in the dog. *Journal of Abnormal Psychology*, *3*, 256–262.

Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. Free Press.

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410–421.

Seligman, M. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5–14.

Selye, H. (1936). A syndrome produced by diverse nocuous agents. *Nature*, *138*, 32–33.

Selye, H. (1974). *Stress without distress*. Lippencott.

Selye, H. (1976). *The stress of life* (Rev. ed.). McGraw-Hill.

Shalev, I., Moffitt, T. E., Sugden, K., Williams, B., Houts, R. M., Danese, A., . . . Caspi, A. (2013). Exposure to violence during childhood is associated with telomere erosion from 5 to 10 years of age: A longitudinal study. *Molecular Psychiatry*, *18*, 576–581.

Shapiro, P. A. (2005). Heart disease. In J. L. Levenson (Ed.), *Textbook of*

psychosomatic medicine (pp. 423–444). American Psychiatric Publishing.

Sims, M., Diez-Roux, A. V., Dudley, A., Gebreab, S., Wyatt, S. B., Bruce, M. A., . . . Taylor, H. A. (2012). Perceived discrimination and hypertension among African Americans in the Jackson Heart Study. *American Journal of Public Health*, *102*(2 Suppl.), S258–S265.

Smyth, J. M., Soefer, M. H., Hurewitz, A., Kliment, A., & Stone, A. A. (1999). Daily psychosocial factors predict levels and diurnal cycles of asthma symptomatology and peak flow. *Journal of Behavioral Medicine*, *22*, 179–193.

Sodergren, S. C., & Hyland, M. H. (1999). Expectancy and asthma. In I. Kirsch (Ed.), *How expectancies shape experience* (pp. 197–212). American Psychological Association.

Speck, R. M., Courneya, K. S., Masse, L. C., Duval, S., & Schmitz, K. H. (2010). An update of controlled physical activity trials in cancer survivors: A systematic review and meta-analysis. *Journal of Cancer Survivorship*, *4*, 87–100.

Stansfeld, S. A., Shipley, M. J., Head, J., & Fuhrer, R. (2012). Repeated job strain and the risk of depression: Longitudinal analyses from the Whitehall II study. *American Journal of Public Health*, *102*, 2360–2366.

Stein, F. (2001). Occupational stress, relaxation therapies, exercise, and biofeedback. *Work: Journal of Prevention, Assessment, and Rehabilitation*, *17*, 235–246.

Steptoe, A., O'Donnell, K., Marmot, M., & Wardle, J. (2008). Positive affect and psychosocial processes related to health. *British Journal of Psychology*, *99*, 211–227.

Stovner, L. J., Hagen, K., Jensen, R., Katsarava, Z., Lipson, R., Scher, A., . . . Zwart, J. (2007). The global burden of headache: A documentation of headache prevalence and disability worldwide. *Cephalalgia*, *27*, 193–210.

Straub, R. O. (2007). *Health psychology: A biopsychosocial approach* (2nd ed.). Worth.

Stroebe, W., & Stroebe, M. (1996). The social psychology of social support. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 597–621). Guilford.

Stürmer, T., Hasselbach, P., & Amelang, M. (2006). Personality, lifestyle, and risk of cardiovascular disease and cancer: Follow-up of population based cohort. *British Medical Journal*, *332*, 1359–1362.

Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of overlapping affective dispositions. *Psychological Bulletin*, *131*, 260–300.

Sulsky, L., & Smith, C. (2005). *Work stress*. Thomson Wadsworth.

Surtees, P. G., Wainwright, N. W. J., Luben, R., Wareham, N. J., Bingham, S. A., & Khaw, K.-T. (2010). Mastery is associated with cardiovascular disease mortality in men and women at apparently low risk. *Health Psychology*, *29*, 412–420.

Tatris, T. W., Peeters, M. C. W., Le Blanc, P. M., Schreurs, P. J. G., & Schaufeli, W. B. (2001). From inequity to burnout: The role of job stress. *Journal of Occupational Health Psychology*, *6*, 303–323.

Taylor, S. E. (1999). *Health psychology* (4th ed.). McGraw-Hill.

Theorell, T., Tsutsumi, A., Hallquist, J., Reuterwall, C., Hogstedt, C., Fredlund, P., . . . Johnson, J. V. (1998). Decision latitude, job strain, and myocardial infarction: A study of working men in Stockholm. *American Journal of Public Health*, *88*, 382–388.

Thoits, P. A. (2010). Stress and health: Major findings and policy implications. *Journal of Health and Social Behavior*, *51*(1 Suppl.), S41–S53.

Trudel, X., Brisson, C., & Milot, A. (2010). Job strain and masked hypertension. *Psychosomatic Medicine*, *72*, 786–793.

Trueba, A. F., & Ritz, T. (2013). Stress, asthma, and respiratory infections: Pathways involving airway immunology and microbal endocrinology. *Brain, Behavior and Immunity*, *29*, 11–27.

Uchino, B. N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and received support. *Perspectives on Psychological Science*, *4*, 236–255.

Uchino, B. N., Vaughn, A. A., Carlisle, M., & Birmingham, W. (2012). Social support and immunity. In S. C. Segerstrom (Ed.), *The Oxford handbook of psychoneuroimmunology* (pp. 214–233). Oxford University Press.

Ukestad, L. K., and Wittrock, D. A. (1996). Pain perception and coping in recurrent headache. *Health Psychology*, *15*, 65–68.

van der Schurr, W. A., Baumgartner, S. E., & Sumter, S. R. (2018). Social media use, social media stress, and sleep: Examining cross-sectional and longitudinal relationships in adolescents. *Health Communication*, *34*(5), 552–559. https://www.tandfonline.com/doi/full...6.2017.1422101

Vella, E. J., Kamarck, T. W., Flory, J. D., & Manuck, S. (2012). Hostile mood and social strain during daily life: A test of the transactional model. *Annals of Behavioral Medicine*, *44*, 341–352.

Vines, A., Ward, J. B., Cordoba, E., & Black, K. Z. (2017). Perceived racial/ethnic discrimination and mental health: A review and future directions for

social epidemiology. *Current Epidemiology Reports*, *4*(2), 156–165. https://www.ncbi.nlm.nih.gov/pubmed/28920011

von Leupoldt, A., Ehnes, F., & Dahme, B. (2006). Emotions and respiratory function in asthma: A comparison of findings in everyday life and laboratory. *British Journal of Health Psychology*, *11*, 185–198.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070.

Weeke, A. (1979). Causes of death in manic-depressive. In M. Shou & M. Stromgren (Eds.), *Origin, prevention, and treatment of affective disorders* (pp. 289–299). Academic Press.

Whang, W., Kubzansky, L. D., Kawachi, I., Rexrod, K. M., Kroenke, C. H., Glynn, R. J., . . . Albert, C. M. (2009). Depression and risk of sudden cardiac death and coronary heart disease in women: Results from the Nurses' Health Study. *Journal of the American College of Cardiology*, *53*, 950–958.

Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. *Advances in Experimental Social Psychology*, *35*, 345–411.

World Health Organization (WHO). (2013). *A global brief on hypertension: Silent killer, global public health crisis*. http://apps.who.int/iris/bitstream/1...2_eng.pdf?ua=1

Wright, R. J., Rodriguez, M., & Cohen, S. (1998). Review of psychosocial stress and asthma: An integrated biopsychosocial approach. *Thorax*, *53*, 1066–1074.

Wulsin, L. R., & Singal, B. M. (2003). Do depressive symptoms increase the risk for the onset of coronary disease? A systematic quantitative review. *Psychosomatic Medicine*, *65*, 201–210.

Zacharie, R. (2009). Psychoneuroimmunology: A bio-psycho-social approach to health and disease. *Scandinavian Journal of Psychology*, *50*, 645–651.

Psychological Disorders

Abela, J. R., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology*, *120*, 259–271.

Abramowitz, J. S., & Siqueland, L. (2013). Obsessive-compulsive disorder. In L. G. Castonguay & T. F. Oltmanns (Eds.), *Psychopathology: From science to clinical practice* (pp. 143–171). Guilford Press.

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory- based subtype of depression. *Psychological Review*, *96*, 358–372.

Afifi, T. O., Mather, A., Boman, J., Fleisher, W., Enns, M. W., MacMillan, H., & Sareen, J. (2010). Childhood adversity and personality disorder: Results from a nationally representative population-based survey. *Journal of Psychiatric Research*, *45*, 814–822.

Agerbo, E., Nordentoft, M., & Mortensen, P. B. (2002). Familial, psychiatric, and socioeconomic risk factors for suicide in young people: Nested case-control study. *British Medical Journal*, *325*, 74–77.

Aghukwa, C. N. (2012). Care seeking and beliefs about the cause of mental illness among Nigerian psychiatric patients and their families. *Psychiatric Services*, *63*, 616–618.

Aikins, D. E., & Craske, M. G. (2001). Cognitive theories of generalized anxiety disorder. *Psychiatric Clinics of North America*, *24*, 57–74.

Akinbami, L. J., Liu, X., Pastor, P., & Reuben, C. A. (2011, August). Attention deficit hyperactivity disorder among children aged 5–17 years in the United States, 1998–2009 (NCHS data brief No. 70). National Center for Health Statistics. http://www.cdc.gov/nchs/data/databriefs/db70.pdf

Al-Asadi, A. M., Klein, B., & Meyer, D. (2015). Multiple comorbidities of 21 psychological disorders and relationships with psychosocial variables: A study of the online assessment and diagnostic system within a web-based population. *Journal of Medical Internet Research*, *17*(2), e55. https://www.ncbi.nlm.nih.gov/pubmed/25803420

Alden, L. E., & Bieling, P. (1998). Interpersonal consequences in the pursuit of safety. *Behaviour Research and Therapy*, *36*, 53–64.

Alegria, A. A., Blanco, C., Petry, N. M., Skodol, A. E., Liu, S. M., & Grant, B. (2013). Sex differences in antisocial personality disorder: Results from the National Epidemiological Survey on Alcohol and Related Conditions. *Personality Disorders: Theory, Research, and Treatment*, *4*, 214–222.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Author.

American Psychological Association. (n.d.) *Forensic psychology*. https://www.apa.org/ed/graduate/specialize/forensic

Andreasen, N. C. (1987). The diagnosis of schizophrenia. *Schizophrenia Bulletin*, *13*, 9–22.

Andréasson, S., Allbeck, P., Engström, A., & Rydberg, U. (1987). Cannabis and

schizophrenia: A longitudinal study of Swedish conscripts. *Lancet*, *330*, 1483–1486.

Arnold L.E., Hodgkins, P., Caci, H., Kahle, J., Young, S. (2015) Effect of Treatment Modality on Long-Term Outcomes in Attention-Deficit/Hyperactivity Disorder: A Systematic Review. PLOS ONE 10(2): e0116407. https://doi.org/10.1371/journal.pone.0116407

Asberg, M., Thorén, P., Träskman, L., Bertilsson, L., & Ringberger, V. (1976). "Serotonin depression"—a biochemical subgroup within the affective disorders? *Science*, *191*(4226), 478–480. doi:10.1126/science.1246632

Asperger's syndrome dropped from psychiatrists' handbook the DSM: DSM-5, latest revision of Diagnostic and Statistical Manual, merges Asperger's with autism and widens dyslexia category. (2012, December 1). *The Guardian*. http://www.theguardian.com/society/2...sychiatric-dsm

Autism Genome Project Consortium. (2007). Mapping autism risk loci using genetic linkage and chromosomal rearrangements. *Nature Genetics*, *39*, 319–328.

Baes, C. V. W., Tofoli, S. M. C., Martins, C. M. S., & Juruena, M. F. (2012). Assessment of the hypothalamic–pituitary–adrenal axis activity: Glucocorticoid receptor and mineralocorticoid receptor function in depression with early life stress—a systematic review. *Acta Neuropsychiatrica*, *24*, 4–15.

Baio, J., Wiggins, L., Christensen, D. L., et al. (2018). Prevalence of Autism Spectrum Disorder among children aged 8 years — Autism and Developmental Disabilities Monitoring Network, 11 sites, United States, 2014. *Surveillance Summaries*, *67*(6), 1–23. https://www.cdc.gov/mmwr/volumes/67/...gestedcitation

Baker, L. A., Bezdjian, S., & Raine, A. (2006). Behavioral genetics: The science of antisocial behavior. *Law and Contemporary Problems*, *69*, 7–46.

Barbaresi, W. J., Colligan, R. C., Weaver, A. L., Voigt, R. G., Killian, J. M., & Katusic, S. K. (2013). Mortality, ADHD, and psychosocial adversity in adults with childhood ADHD: A prospective study. *Pediatrics*, *131*, 637–644.

Barker, P. (2010). *The legacy of Thomas Szasz*. http://www.centerforindependentthoug...aszLegacy.html

Barkley, R. A. (2006). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment*. Guilford Press.

Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2002). The persistence of attention-deficit/hyperactivity disorder into young adulthood as a function of reporting source and definition of disorder. *Journal of Abnormal Psychology*, *111*, 279–289.

Battista, S. R., & Kocovski, N. L. (2010). Exploring the effect of alcohol on post-event processing specific to a social event. *Cognitive Behaviour Therapy*, *39*, 1–10.

Baumeister, A. A., & Hawkins, M. F. (2004). The serotonin hypothesis of schizophrenia: A historical case study on the heuristic value of theory in clinical neuroscience. *Journal of the History of the Neurosciences*, *13*, 277–291.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. International Universities Press.

Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *American Journal of Psychiatry*, *165*, 969–977.

Berman, A. L. (2009). School-based suicide prevention: Research advances and practice implications. *School Psychology Review*, *38*, 233–238.

Bettelheim, B. (1967). *The empty fortress: Infantile autism and the birth of the self*. Free Press.

Beucke, J. C., Sepulcre, J., Talukdar, T., Linnman, C., Zschenderlein, K., Endrass, T., . . . Kathman, N. (2013). Abnormally high degree connectivity of the orbitofrontal cortex in obsessive-compulsive disorder. *JAMA Psychiatry*, *70*, 619–629.

Biederman, J., Faraone, S. V., Hirshfeld-Becker, D. R., Friedman, D., Robin, J. A., & Rosenbaum, J. F. (2001). Patterns of psychopathology and dysfunction in high-risk children of parents with panic disorder and major depression. *American Journal of Psychiatry*, *158*, 49–57.

Boland, R. J., & Keller, M. B. (2009). Course and outcome of depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 23–43). Guilford Press.

Bolton, D., Rijsdijk, F., O'Connor, T. G., Perrin, S., & Eley, T. C. (2007). Obsessive-compulsive disorder, tics and anxiety in 6-year-old twins. *Psychological Medicine*, *37*, 39–48.

Bourguignon, E. (1970). Hallucinations and trance: An anthropologist's perspective. In W. Keup (Ed.), *Origins and mechanisms of hallucination* (pp. 183–190). Plenum Press.

Bouton, M. E., Mineka, S., & Barlow, D. H. (2001). A modern learning theory perspective on the etiology of panic disorder. *Psychological Review*, *108*, 4–32.

Bramsen, I., Dirkzwager, A. J. E., & van der Ploeg, H. M. (2000). Predeployment personality traits and exposure to trauma as predictors of posttraumatic stress symptoms: A prospective study of former peacekeepers. *American Journal of Psychiatry*, *157*, 1115–1119.

Bregman, J. D. (2005). Definitions and characteristics of the spectrum. In D. Zager (Ed.), *Autism spectrum disorders: Identification, education, and treatment* (3rd ed., pp. 3–46). Erlbaum.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–756.

Bremner, J. D., Krystal, J. H., Southwick, S. M., & Charney, D. S. (1996). Noradrenergic mechanisms in stress and anxiety: I. preclinical studies. *Synapse, 23*, 28–38.

Brown, A. S., Begg, M. D., Gravenstein, S., Schaefer, C. A., Wyatt, R. J., Breshnahan, M., . . . Susser, E. S. (2004). Serologic evidence of prenatal influenza in the etiology of schizophrenia. *Archives of General Psychiatry, 61*, 774–780.

Brent, D. A., & Bridge, J. (2003). Firearms availability and suicide: A review of the literature. *American Behavioral Scientist, 46*, 1192–1210.

Brown, G. W., & Harris, T. O. (1989). Depression. In G. W. Brown and T. O. Harris (Eds.), *Life events and illness* (pp. 49–93). Guilford Press.

Brown, G. W., Ban, M., Craig, T. J. K., Harris, T. O., Herbert, J., & Uher, R. (2013). Serotonin transporter length polymorphism, childhood maltreatment, and chronic depression: A specific gene-environment interaction. *Depression and Anxiety, 30*, 5–13.

Buchanan-Barker, P., Barker, P. (2009, February). The convenient myth of Thomas Szasz. *Journal of Psychiatric and Mental Health Nursing, 16*(1): 87–95. doi:10.1111/j.1365-2850.2008.01310.x

Buchsbaum, M. S., Nuechterlein, K. H., Haier, R. J., Wu, J., Sicotte, N., Hazlett, E., . . . Guich, S. (1990). Glucose metabolic rate in normal and schizophrenics during the continuous performance test assessed by positron emission tomography. *British Journal of Psychiatry, 156*, 216–227.

Burt, S. A. (2009). Rethinking environmental contributions to child and adolescent psychopathology: A meta-analysis of shared environmental influences. *Psychological Bulletin, 135*, 608–637.

Butler, L. D., & Nolen-Hoeksema, S. (1994). Gender differences in responses to depressed mood in a college sample. *Sex Roles, 30*, 331–346.

Byrd, R. (2002, October 17). Report to the legislature on the principal findings from the epidemiology of autism in California: A comprehensive pilot study. http://www.dds.ca.gov/Autism/MindReport.cfm

Cadoret, R., Yates, W., Ed., T., Woodworth, G., & Stewart, M. (1995). Genetic environmental interactions in the genesis of aggressivity and conduct disorders. *Archives of General Psychiatry, 52*, 916–924.

Cannon, M., Jones, P. B., & Murray, R. M. (2002). Obstetric complications and schizophrenia: Historical and meta-analytic review. *American Journal of Psychiatry, 159*, 1080–1092.

Casadio, P., Fernandes, C., Murray, R. M., & Di Forti, M. (2011). Cannabis use in young people: The risk for schizophrenia. *Neuroscience and Biobehavioral Reviews, 35*, 1779–1787.

Cardeña, E., & Gleaves, D. H. (2006). Dissociative disorders. In M. Hersen, S. M. Turner, & D. C. Beidel (Eds.), *Adult psychopathology and diagnosis* (pp. 473–503). John Wiley & Sons.

Caspi, A., Sugden, K., Moffitt, T. E., Taylor, A., Craig, I. W., Harrington, H., Poulton, R. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science, 301*(5631), 386–389.

Centers for Disease Control and Prevention. (2010, November 12). Increasing prevalence of parent-reported attention-deficit/hyperactivity disorder among children, United States, 2003–2007. *Morbidity and Mortality Weekly Report, 59*(44), 1439–1443.

Centers for Disease Control and Prevention. (2012). Suicide: Facts at a glance. http://www.cdc.gov/ViolencePreventio...aSheet-a.pdf

Centers for Disease Control and Prevention. (2012, March 30). Prevalence of autism spectrum disorders—autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity and Mortality Weekly Report: Surveillance Summaries, 61*(3), 1–19. http://www.cdc.gov/mmwr/pdf/ss/ss6103.pdf

Centers for Disease Control and Prevention. (2013a). *Definitions: Self-directed violence*. http://www.cdc.gov/violencepreventio...finitions.html.

Centers for Disease Control and Prevention. (2013b). *National suicide statistics at a glance: Trends in suicide rates among both sexes, by age group, United States, 1991–2009*. http://www.cdc.gov/violencepreventio.../trends02.html

Charney, D. S., Woods, S. W., Nagy, L. M., Southwick, S. M., Krystal, J. H., & Heninger, G. R. (1990). Noradrenergic function in panic disorder. *Journal of Clinical Psychiatry, 51*, 5–11.

Clark, D. M. (1996). Panic disorder: From theory to therapy. In R. M. Rapee (Ed.), *Current controversies in the anxiety disorders* (pp. 318–344). Guilford Press.

Clauss, J. A., & Blackford, J. U. (2012). Behavioral inhibition and risk for developing social anxiety disorder: A meta-analytic study. *Journal of the*

American Academy of Child and Adolescent Psychiatry, *51*(10), 1066–1075.

Clegg, J. W. (2012). Teaching about mental health and illness through the history of the DSM. *History of Psychology*, *15*, 364–370.

Compton, W. M., Conway, K. P., Stinson, F. S., Colliver, J. D., & Grant, B. F. (2005). Prevalence, correlates, and comorbidity of DSM-IV antisocial personality syndromes and alcohol and specific drug use disorders in the United States: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*, *66*, 677–685.

Cook, M., & Mineka, S. (1989). Observational conditioning of fear to fear-relevant versus fear-irrelevant stimuli in rhesus monkeys. *Journal of Abnormal Psychology*, *98*, 448–459.

Craske, M. G. (1999). *Anxiety disorders: Psychological approaches to theory and treatment*. Westview Press.

Crego, C., & Widiger, T. A. (2014). Psychopathy and the DSM. *Journal of Personality*. http://www.sakkyndig.com/psykologi/a.../crego2014.pdf

Crosby, A. E., Ortega, L., & Melanson, C. (2011). *Self-directed violence surveillance: Uniform definitions and recommended data elements, version 1.0*. http://www.cdc.gov/violencepreventio...violence-a.pdf

Dalenberg, C. J., Brand, B. L., Gleaves, D. H., Dorahy, M. J., Loewenstein, R. J., Cardeña, E., . . . Spiegel, D. (2012). Evaluation of the evidence for the trauma and fantasy models of dissociation. *Psychological Bulletin*, *138*, 550–588.

Dancing mania. (2011, July 2). *Sometimes interesting: Weird, forgotten, and sometimes interesting things*. https://sometimes-interesting.com/20...dancing-mania/

Danielson, M. L., Bitsko, R. H., Ghandour, R. M., Holbrook, J. R., Kogan, M. D., & Blumberg, S. J. (2018). Prevalence of Parent-Reported ADHD Diagnosis and Associated Treatment Among U.S. Children and Adolescents, 2016. *Journal of Clinical Child and Adolescent Psychology: the Official Journal for the Society of Clinical Child and Adolescent Psychology*, American Psychological Association, Division 53, 47(2), 199–212. https://doi.org/10.1080/15374416.2017.1417860

Davidson, R. J., Pizzagalli, D. A., & Nitschke, J. B. (2009). Representation and regulation of emotional depression: Perspectives from cognitive neuroscience. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 218–248). Guilford Press.

Davis, K. L., Kahn, R. S., Ko., G., & Davidson, M. (1991). Dopamine in schizophrenia: A review and reconceptualization. *American Journal of Psychiatry*, *148*, 1474–1486.

Demos, J. (1983). *Entertaining Satan: Witchcraft and the culture of early New England*. Oxford University Press.

Dempsey, A. F., Schaffer, S., Singer, D., Butchart, A., Davis, M., & Freed, G. L. (2011). Alternative vaccination schedule preferences among parents of young children. *Pediatrics*, *128*, 848–856.

DeStefano, F., Price, C. S., & Weintraub, E. S. (2013). Increasing exposures to antibody-stimulating proteins and polysaccharides in vaccines is not associated with risk of autism. *The Journal of Pediatrics*, *163*, 561–567.

DiGrande, L., Perrin, M. A., Thorpe, L. E., Thalji, L., Murphy, J., Wu, D., . . . Brackbill, R. M. (2008). Posttraumatic stress symptoms, PTSD, and risk factors among lower Manhattan residents 2–3 years after the September 11, 2001 terrorist attacks. *Journal of Traumatic Stress*, *21*, 264–273.

DNA project aims to count Scots redheads. (2012, November 7). *British Broadcast Corporation [BBC]*. http://www.bbc.com/news/uk-scotland-20237511

Downs, M. (2008, March 31). Autism-vaccine link: Evidence doesn't dispel doubts. www.webmd.com/brain/autism/searching-for-answers/vaccines-autism

Dozois, D. J. A., & Beck, A. T. (2008). Cognitive schemas, beliefs and assumptions. In K. S. Dobson & D. J. A. Dozois (Eds.), *Risk factors in depression* (pp. 121–143). Academic Press.

Drevets, W. C., Bogers, W. U., & Raichle, M. E. (2002). Functional anatomical correlates of antidepressant drug treatment assessed using PET measures of regional glucose metabolism. *European Neuropsychopharmacology*, *12*, 527–544.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*, 319–345.

Etzersdorfer, E., Voracek, M., & Sonneck, G. (2004). A dose-response relationship between imitational suicides and newspaper distribution. *Archives of Suicide Research*, *8*, 137– 145.

Fabrega, H. (2007). How psychiatric conditions were made. *Psychiatry*, *70*, 130–153.

Facer-Irwin, E., Blackwood, N. J., Bird, A., Dickson, H., McGlade, D., Alves-Costa, F., & MacManus, D. (2019, Sept 26). PTSD in prison settings: A systematic review and meta-analysis of comorbid mental disorders and problematic behaviours. *PLOS ONE*, *14*(9). https://journals.plos.org/plosone/ar...l.pone.0222407

Fitzgerald, P. B., Laird, A. R., Maller, J., & Daskalakis, Z. J. (2008). A meta-analytic study of changes in brain activation in depression. *Human Brain Mapping, 29*, 683–695.

Fields, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior and Development, 33*, 1–6.

Fisher, C. (2010, February 11). DSM-5 development process included emphasis on gender and cultural sensitivity. http://www.bmedreport.com/archives/9359

Fleischman, A., Bertolote, J. M., Belfer, M., & Beautrais, A. (2005). Completed suicide and psychiatric diagnoses in young people: A critical examination of the evidence. *American Journal of Orthopsychiatry, 75*, 676–683.

Foote, B., Smolin, Y., Kaplan, M., Legatt, M. E., & Lipschitz, D. (2006). Prevalence of dissociative disorders in psychiatric outpatients. *American Journal of Psychiatry, 163*, 623–629.

Fox, N. A., Henderson, H. A., Marshall, P. J., Nichols, K. E., & Ghera, M. M. (2005). Behavioral inhibition: Linking biology and behavior within a developmental framework. *Annual Review of Psychology, 56*, 235–262.

Frances, A. (2012, December 2). DSM 5 is guide not bible—ignore its ten worst changes. http://www.psychologytoday.com/blog/...-worst-changes

Freeman, A., Stone, M., Martin, D., & Reinecke, M. (2005). A review of borderline personality disorder. In A. Freeman, M. Stone, D. Martin, & M. Reinecke (Eds.), *Comparative treatments for borderline personality disorder* (pp. 1–20). Springer.

Fung, M. T., Raine, A., Loeber, R., Lynam, D. R., Steinhauer, S. R., Venables, P. H., & Stouthamer-Loeber, M. (2005). Reduced electrodermal activity in psychopathy-prone adolescents. *Journal of Abnormal Psychology, 114*, 187–196.

Fusar-Poli, P., Borgwardt, S., Bechdolf, A., Addington, J., Riecher-Rössler, A., Schultze-Lutter, F., . . . Yung, A. (2013). The psychosis high-risk state: A comprehensive state-of-the-art review. *Archives of General Psychiatry, 70*, 107–120.

Gauthier, J., Siddiqui, T. J., Huashan, P., Yokomaku, D., Hamdan, F. F., Champagne, N., . . . Rouleau, G.A. (2011). Truncating mutations in NRXN2 and NRXN1 in autism spectrum disorders and schizophrenia. *Human Genetics, 130*, 563–573.

Gizer, I. R., Ficks, C., & Waldman, I. D. (2009). Candidate gene studies of ADHD: A meta-analytic review. *Human Genetics, 126*, 51–90.

Goldstein, A. J., & Chambless, D. L. (1978). A reanalysis of agoraphobia. *Behavior Therapy, 9*, 47–59.

Goldstein, J. M., Buka, S. L., Seidman, L. J., & Tsuang, M. T. (2010). Specificity of familial transmission of schizophrenia psychosis spectrum and affective psychoses in the New England family study's high-risk design. *Archives of General Psychiatry, 67*, 458–467.

Good, B. J., & Hinton, D. E. (2009). Panic disorder in cross-cultural and historical perspective. In D. E. Hinton & B. J. Good (Eds.), *Culture and panic disorder* (pp. 1–28). Stanford University Press.

Goodman, S. H., & Brand, S. R. (2009). Depression and early adverse experiences. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 249–274). Guilford Press.

Gotlib, I. H., & Joormann, J. (2010). Cognition and depression: Current status and future directions. *Annual Review of Clinical Psychology, 6*, 285–312.

Gottesman, I. I. (2001). Psychopathology through a life span-genetic prism. *American Psychologist, 56*, 867–878.

Graybiel, A. N., & Rauch, S. L. (2000). Toward a neurobiology of obsessive-compulsive disorder. *Neuron, 28*, 343–347.

Green, M. F. (2001). *Schizophrenia revealed: From neurons to social interactions*. W. W. Norton.

Hackmann, A., Clark, D. M., & McManus, F. (2000). Recurrent images and early memories in social phobia. *Behaviour Research and Therapy, 38*, 601–610.

Halligan, S. L., Herbert, J., Goodyer, I., & Murray, L. (2007). Disturbances in morning cortisol secretion in association with maternal postnatal depression predict subsequent depressive symptomatology in adolescents. *Biological Psychiatry, 62*, 40–46.

Hare, R. D. (1965). Temporal gradient of fear arousal in psychopaths. *Journal of Abnormal Psychology, 70*, 442–445.

Harpin, V., Mazzone, L., Raynaud, J. P., Kahle, J., & Hodgkins, P. (2016). Long-Term Outcomes of ADHD: A Systematic Review of Self-Esteem and Social Function. *Journal of Attention Disorders, 20*(4), 295–305. https://doi.org/10.1177/1087054713486516

Hasin, D. S., Fenton, M. C., & Weissman, M. M. (2011). Epidemiology of depressive disorders. In M. T. Tsuang, M. Tohen, & P. Jones (Eds.), *Textbook of psychiatric epidemiology* (pp. 289–309). John Wiley & Sons.

Herek, G. M. (2012). *Facts about homosexuality and mental health*. Sexual orientation: Science, education, and policy. https://psychology.ucdavis.edu/rainb...al_health.html

Herman, J. (1997). *Trauma and recovery: The aftermath of violence—from domestic abuse to political terror*. Basic Books.

Herrenkohl, T. I., Maguin, E., Hill, K. G., Hawkins, J. D., Abbott, R. D., & Catalano, R. (2000). Developmental risk factors for youth violence. *Journal of Adolescent Health*, *26*, 176–186.

Heston, L. L. (1966). Psychiatric disorders in foster home reared children of schizophrenic mothers. *British Journal of Psychiatry*, *112*, 819–825.

Hettema, J. M., Neale, M. C., & Kendler, K. S. (2001). A review and meta-analysis of the genetic epidemiology of anxiety disorders. *The American Journal of Psychiatry*, *158*, 1568–1578.

Holsboer, F., & Ising, M. (2010). Stress hormone regulation: Biological role and translation into therapy. *Annual Review of Psychology*, *61*, 81–109.

Hopwood, C. J., Schade, N., Krueger, R. F., Wright, A. G. C., & Markon, K. E. (2012). Connecting DSM-5 personality traits and pathological beliefs: Toward a unifying model. *Journal of Psychopathology and Behavioral Assessment*, *35*(2). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3833658/

Howes, O. D., & Kapur, S. (2009). The dopamine hypothesis of schizophrenia: Version III—The final common pathway. *Schizophrenia Bulletin*, *35*, 549–562.

Hoza, B., Mrug, S., Gerdes, A. C., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., . . . Arnold, L. E. (2005). What aspects of peer relationships are impaired in children with ADHD? *Journal of Consulting and Clinical Psychology*, *73*, 411–423.

Hughes, V. (2007). Mercury rising. *Nature Medicine*, *13*, 896–897.

Jaegers, L. A., Matthieu, M. M., Vaughn, M. G., Werth, P., Katz I. M., & Ahmad, S. O. (2019, June). Posttraumatic stress disorder and job burnout among jail officers. *Journal of Occupational and Environmental Medicine*, *61*(6), 505–510. https://journals.lww.com/joem/Citati...Burnout.9.aspx

Jellinek, M. S., & Herzog, D. B. (1999). The child. In A. M. Nicholi, Jr. (Ed.), *The Harvard guide to psychiatry* (pp. 585–610). The Belknap Press of Harvard University.

Johnson, J. G., Cohen, P., Kasen, S., & Brook, J. S. (2006). Dissociative disorders among adults in the community, impaired functioning, and axis I and II comorbidity. *Journal of Psychiatric Research*, *40*, 131–140.

Joormann, J. (2009). Cognitive aspects of depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 298–321). Guilford Press.

Joyce, P. R., McKenzie, J. M., Luty, S. E., Mulder, R. T., Carter, J. D., Sullivan, P. F., & Cloninger, C. R. (2003). Temperament, childhood environment, and psychopathology as risk factors for avoidant and borderline personality disorders. *Australian and New Zealand Journal of Psychiatry*, *37*, 756–764.

Judd, L. L. (2012). Dimensional paradigm of the long-term course of unipolar major depressive disorder. *Depression and Anxiety*, *29*, 167–171.

Kagan, J., Reznick, J. S., & Snidman, N. (1988). Biological bases of childhood shyness. *Science*, *240*, 167–171.

Katzelnick, D. J., Kobak, K. A., DeLeire, T., Henk, H. J., Greist, J. H., Davidson, J. R. T., . . . Helstad, C. P. (2001). Impact of generalized social anxiety disorder in managed care. *The American Journal of Psychiatry*, *158*, 1999–2007.

Kendler, K. S., Hettema, J. M., Butera, F., Gardner, C. O., & Prescott, C. A. (2003). Life event dimensions of loss, humiliation, entrapment, and danger in the prediction of onsets of major depression and generalized anxiety. *Archives of General Psychiatry*, *60*, 789–796.

Kennedy, A., LaVail, K., Nowak, G., Basket, M., & Landry, S. (2011). Confidence about vaccines in the United States: Understanding parents' perceptions. *Health Affairs*, *30*, 1151–1159.

Kessler, R. C. (1997). The effects of stressful life events on depression. *Annual Review of Psychology*, *48*, 191–214.

Kessler, R. C. (2003). Epidemiology of women and depression. *Journal of Affective Disorders*, *74*, 5–13.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. P., & Walters, E. F. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 593–602.

Kessler, R. C., Chiu, W. T., Jin, R., Ruscio, A. M., Shear, K., & Walters, E. (2006). The epidemiology of panic attacks, panic disorder, and agoraphobia in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *63*, 415–424.

Kessler, R. C., Galea, S., Gruber, M. J., Sampson, N. A., Ursano, R. J., & Wessely, S. (2008). Trends in mental illness and suicidality after Hurricane Katrina. *Molecular Psychiatry*, *13*, 374–384.

Kessler, R. C., Ruscio, A. M., Shear, K., & Wittchen, H. U. (2009). Epidemiology of anxiety disorders. In M. B. Stein & T. Steckler (Eds.), *Behavioral neurobiology of anxiety and its treatment* (pp. 21–35). Springer.

Kessler, R. C. Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, *52*, 1048–1060.

Kessler, R. C., & Wang, P. S. (2009). Epidemiology of depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 5–22). Guilford Press.

Khashan, A. S., Abel, K. M., McNamee, R., Pedersen, M. G., Webb, R., Baker, P., . . . Mortensen, P. B. (2008). Higher risk of offspring schizophrenia following antenatal maternal exposure to severe adverse life events. *Archives of General Psychiatry, 65*, 146–152.

Kilpatrick, D. G., Badour, C. L., & Resnick, H. S. (2017). Trauma and posttraumatic stress disorder prevalence and sociodemographic characteristics. In S. N. Gold (Ed.), *APA handbook of trauma psychology: Foundations in knowledge: Volume 1* (pp. 63–85). American Psychological Association.

Kinney, D. K., Barch, D. H., Chayka, B., Napoleon, S., & Munir, K. M. (2009). Environmental risk factors for autism: Do they help or cause de novo genetic mutations that contribute to the disorder? *Medical Hypotheses, 74*, 102–106.

Kleim, B., Gonzalo, D., & Ehlers, A. (2011). The Depressive Attributions Questionnaire (DAQ): Development of a short self-report measure of depressogenic attributions. *Journal of Psychopathology and Behavioral Assessment, 33*, 375–385.

Klein, R. G., Mannuzza, S., Olazagasti, M. A. R., Roizen, E., Hutchison, J. A., Lashua, E. C., & Castellanos, F. X. (2012). Clinical and functional outcome of childhood attention-deficit/hyperactivity disorder 33 years later. *Archives of General Psychiatry, 69*, 1295–1303.

Koenen, K. C., Stellman, J. M., Stellman, S. D., & Sommer, J. F. (2003). Risk factors for course of posttraumatic stress disorder among Vietnam veterans: A 14-year follow-up of American Legionnaires. *Journal of Consulting and Clinical Psychology, 71*, 980–986.

Kopell, B. H., & Greenberg, B. D. (2008). Anatomy and physiology of the basal ganglia: Implications for DBS in psychiatry. *Neuroscience and Biobehavioral Reviews, 32*, 408–422.

Large, M., Sharma, S., Compton, M. T., Slade, T., & Nielssen, O. (2011). Cannabis use and earlier onset of psychosis: A systematic meta-analysis. *Archives of General Psychiatry, 68*, 555–561.

Lasalvia, A., Zoppei, S., Van Bortel, T., Bonetto, C., Cristofalo, D., Wahlbeck, K., Thornicroft, G. (2013). Global pattern of experienced and anticipated discrimination reported by people with major depressive disorder: A cross-sectional survey. *The Lancet, 381*, 55–62.

Lawrie, S. M., & Abukmeil, S. S. (1998). Brain abnormality in schizophrenia: A systematic and quantitative review of volumetric magnetic resonance imaging studies. *British Journal of Psychiatry, 172*, 110–120.

LeMoult, J., Castonguay, L. G., Joormann, J., & McAleavey, A. (2013). Depression. In L. G. Castonguay & T. F. Oltmanns (Eds.), *Psychopathology: From science to clinical practice* (pp. 17–61). Guilford Press.

Lezenweger, M. F., Lane, M. C., Loranger, A. W., & Kessler, R. C. (2007). DSM-IV personality disorders in the National Comorbidity Survey Replication. *Biological Psychiatry, 62*, 553–564.

Lilienfeld, S. O., & Marino, L. (1999). Essentialism revisited: Evolutionary theory and the concept of mental disorder. *Journal of Abnormal Psychology, 108*, 400–411.

Linnet, K. M., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T. B., Rodriquez, A., . . . Jarvelin, M. R. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: A review of current evidence. *The American Journal of Psychiatry, 160*, 1028–1040.

Livesley, J. (2008). Toward a genetically-informed model of borderline personality disorder. *Journal of Personality Disorders, 22*, 42–71.

Livesley, J., & Jang, K. L. (2008). The behavioral genetics of personality disorders. *Annual Review of Clinical Psychology, 4*, 247–274.

Loe, I. M., & Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Journal of Pediatric Psychology, 32*, 643–654.

Luxton, D. D., June, J. D., & Fairall, J. M. (2012, May). Social media and suicide: A public health perspective. *American Journal of Public Health, 102*(S2), S195–S200. doi:10.2105/AJPH.2011.300608

Mackin, P., & Young, A. H. (2004, May 1). The role of cortisol and depression: Exploring new opportunities for treatments. *Psychiatric Times*. http://www.psychiatrictimes.com/arti...ies-treatments

Maher, W. B., & Maher, B. A. (1985). Psychopathology: I. from ancient times to the eighteenth century. In G. A. Kimble & K. Schlesinger (Eds.), *Topics in the history of psychology: Volume 2* (pp. 251–294). Erlbaum.

Mann, J. J., (2003). Neurobiology of suicidal behavior. *Nature Reviews Neuroscience, 4*, 819–828.

Marker, C. D. (2013, March 3). Safety behaviors in social anxiety: Playing it safe in social anxiety. http://www.psychologytoday.com/blog/...social-anxiety

Martens, E. J., de Jonge, P., Na, B., Cohen, B. E., Lett, H., & Whooley, M. A. (2010). Scared to death? Generalized anxiety disorder and cardiovascular

events in patients with stable coronary heart disease. *Archives of General Psychiatry, 67*, 750–758.

Mataix-Cols, D., Frost, R. O., Pertusa, A., Clark, L. A., Saxena, S., Leckman, J. F., . . . Wilhelm, S. (2010). Hoarding disorder: A new diagnosis for DSM-V? *Depression and Anxiety, 27*, 556–572.

Mayes, R., & Horowitz, A. V. (2005). DSM-III and the revolution in the classification of mental illness. *Journal of the History of the Behavioral Sciences, 41*, 249–267.

Mazure, C. M. (1998). Life stressors as risk factors in depression. *Clinical Psychology: Science and Practice, 5*, 291–313.

Marshal, M. P., & Molina, B. S. G. (2006). Antisocial behaviors moderate the deviant peer pathway to substance use in children with ADHD. *Journal of Clinical Child and Adolescent Psychology, 35*, 216–226.

McCabe, K. (2010, January 24). Teen's suicide prompts a look at bullying. *Boston Globe*. http://www.boston.com

McCabe, R. E., Antony, M. M., Summerfeldt, L. J., Liss, A., & Swinson, R. P. (2003). Preliminary examination of the relationship between anxiety disorders in adults and self-reported history of teasing or bullying experiences. *Cognitive Behaviour Therapy, 32*, 187–193.

McCann, D., Barrett, A., Cooper, A., Crumpler, D., Dalen, L., Grimshaw, K., . . . Stevenson, J. (2007). Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: A randomised, double-blinded, placebo-controlled trial. *The Lancet, 370*(9598), 1560–1567.

McEwen, B. S. (2005). Glucocorticoids, depression, and mood disorders: Structural remodeling in the brain. *Metabolism: Clinical and Experimental, 54*, 20–23.

McNally, R. J. (2003). *Remembering trauma*. Harvard University Press.

Meek, S. E., Lemery-Chalfant, K., Jahromi, L. D., & Valiente, C. (2013). A review of gene-environment correlations and their implications for autism: A conceptual model. *Psychological Review, 120*, 497–521.

Mental health myths and facts. (2017, August 29). MentalHealth.gov. https://www.mentalhealth.gov/basics/...th-myths-facts

Merikangas, K. R., & Tohen, M. (2011). Epidemiology of bipolar disorder in adults and children. In M. T. Tsuang, M. Tohen, & P. Jones (Eds.), *Textbook of psychiatric epidemiology* (pp. 329–342). John Wiley & Sons.

Merikangas, K. R., Jin, R., He, J. P., Kessler, R. C., Lee, S., Sampson, N. A., Zarkov, Z. (2011). Prevalence and correlates of bipolar spectrum disorder in the World Mental Health Survey Initiative. *Archives of General Psychiatry, 68*, 241–251.

Mezzich, J. E. (2002). International surveys on the use of ICD-10 and related diagnostic systems. *Psychopathology, 35*, 72–75.

Michaud, K., Matheson, K., Kelly, O., & Anisman, H. (2008). Impact of stressors in a natural context on release of cortisol in healthy adult humans: A meta-analysis. *Stress, 11*, 177–197.

Mineka, S., & Cook, M. (1993). Mechanisms involved in the observational conditioning of fear. *Journal of Experimental Psychology: General, 122*, 23–38.

Moffitt, T. E., Caspi, A., Harrington, H., Milne, B. J., Melchior, M., Goldberg, D., & Poulton, R. (2007). Generalized anxiety disorder and depression: Childhood risk factors in a birth cohort followed to age 32. *Psychological Medicine, 37*, 441–452.

Moitra, E., Beard, C., Weisberg, R. B., & Keller, M. B. (2011). Occupational impairment and social anxiety disorder in a sample of primary care patients. *Journal of Affective Disorders, 130*, 209–212.

Molina, B. S. G., & Pelham, W. E. (2003). Childhood predictors of adolescent substance abuse in a longitudinal study of children with ADHD. *Journal of Abnormal Psychology, 112*, 497–507.

Moore, T. H., Zammit, S., Lingford-Hughes, A., Barnes, T. R., Jones, P. B., Burke, M., & Lewis, G. (2007). Cannabis use and risk of psychotic or affective mental health outcomes. *Lancet, 370*, 319–328.

Morris, E. P., Stewart, S. H., & Ham, L. S. (2005). The relationship between social anxiety disorder and alcohol use disorders: A critical review. *Clinical Psychology Review, 25*, 734–760.

Mowrer, O. H. (1960). *Learning theory and behavior*. John Wiley & Sons.

Nader, K. (2001). Treatment methods for childhood trauma. In J. P. Wilson, M. J. Friedman, & J. D. Lindy (Eds.), *Treating psychological trauma and PTSD* (pp. 278–334). Guilford Press.

Nanni, V., Uher, R., & Danese, A. (2012). Childhood maltreatment predicts unfavorable course of illness and treatment outcome in depression: A meta-analysis. *American Journal of Psychiatry, 169*, 141–151.

Nathan, D. (2011). *Sybil exposed: The extraordinary story behind the famous multiple personality case*. Free Press.

National Comorbidity Survey. (2007). *NCS-R lifetime prevalence estimates*. http://www.hcp.med.harvard.edu/ncs/index.php

National Institute on Drug Abuse (NIDA). (2007, October). *Comorbid drug use and mental illness: A research update*

from the National Institute on Drug Abuse. http://www.drugabuse.gov/sites/defau...s/comorbid.pdf

National Institute on Drug Abuse (NIDA). (2018, February). *Common comorbidities with substance use disorders*. https://www.drugabuse.gov/node/pdf/1...-use-disorders

Nelson, A. J. (2014, Nov. 8). Teen was insane when he killed child, judge rules. *Omaha World-Herald*. https://www.omaha.com/eedition/sunri...a28e60bf8.html

Nestadt, G., Samuels, J., Riddle, M., Bienvenu, J., Liang, K. Y., LaBuda, M., . . . Hoehn-Saric, R. (2000). A family study of obsessive-compulsive disorder. *Archives of General Psychiatry, 57*, 358–363.

Newman, C. F. (2004). Suicidality. In S. L. Johnson & R. L. Leahy (Eds.), *Psychological treatment of bipolar disorder* (pp. 265–285). Guilford Press.

Nikolas, M. A., & Burt, S. A. (2010). Genetic and environmental influences on ADHD symptom dimensions of inattention and hyperactivity: A meta-analysis. *Journal of Abnormal Psychology, 119*, 1–17.

Nolen-Hoeksema, S. (1987). Sex differences in unipolar depression: Evidence and theory. *Psychological Bulletin, 101*, 259–282.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569–582.

Nolen-Hoeksema, S. & Hilt, L. M. (2009). Gender differences in depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 386–404). Guilford Press.

Nolen-Hoeksema, S., Larson, J., & Grayson, C. (1999). Explaining the gender difference in depressive symptoms. *Journal of Personality and Social Psychology, 77*, 1061–1072.

Norberg, M. M., Calamari, J. E., Cohen, R. J., & Riemann, B. C. (2008). Quality of life in obsessive-compulsive disorder: An evaluation of impairment and a preliminary analysis of the ameliorating effects of treatment. *Depression and Anxiety, 25*, 248–259.

Novella, S. (2008, April 16). The increase in autism diagnoses: Two hypotheses. http://www.sciencebasedmedicine.org/...wo-hypotheses/

Novick, D. M., Swartz, H. A., & Frank, E. (2010). Suicide attempts in bipolar I and bipolar II disorder: A review and meta-analysis of the evidence. *Bipolar Disorders, 12*, 1–9.

Noyes, R. (2001). Comorbidity in generalized anxiety disorder. *Psychiatric Clinics of North America, 24*, 41–55.

O'Connor, R. C., Smyth, R., Ferguson, E., Ryan, C., & Williams, J. M. G. (2013). Psychological processes and repeat suicidal behavior: A four-year prospective study. *Journal of Consulting and Clinical Psychology*. Advance online publication. doi:10.1037/a0033751

Öhman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review, 108*, 483–552.

Oliver, J. (2006, Summer). The myth of Thomas Szasz. *The New Atlantis, 13*. http://www.thenewatlantis.com/docLib/TNA13-Oliver.pdf

Olsson, A., & Phelps, E. A. (2007). Social learning of fear. *Nature Neuroscience, 10*, 1095–1102.

Oltmanns, T. F., & Castonguay, L. G. (2013). General issues in understanding and treating psychopathology. In L. G. Castonguay & T. F. Oltmanns (Eds.), *Psychopathology: From science to clinical practice* (pp. 1–16). Guilford Press.

Orr, S. P., Metzger, L. J., Lasko, N. B., Macklin, M. L., Peri, T., & Pitman, R. K. (2000). De novo conditioning in trauma-exposed individuals with and without posttraumatic stress disorder. *Journal of Abnormal Psychology, 109*, 290–298.

Owens, D., Horrocks, J., & House, A. (2002). Fatal and non-fatal repetition of self-harm: Systematic review. *British Journal of Psychiatry, 181*, 193–199.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin, 129*, 52–73.

Parker-Pope, T. (2013, May 2). Suicide rates rise sharply in U.S. *The New York Times*. http://www.nytimes.com.

Patterson, M. L., Iizuka, Y., Tubbs, M. E., Ansel, J., Tsutsumi, M., & Anson, J. (2007). Passing encounters east and west: Comparing Japanese and American pedestrian interactions. *Journal of Nonverbal Behavior, 31*, 155–166.

Pauls, D. L. (2010). The genetics of obsessive-compulsive disorder: A review. *Dialogues in Clinical Neuroscience, 12*, 149–163.

Paykel, E. S. (2003). Life events and affective disorders. *Acta Psychiatrica Scandinavica, 108*(S418), 61–66.

Pazain, M. (2010, December 2). To look or not to look? Eye contact differences in different cultures. http://www.examiner.com/article/to-l...erent-cultures

Phan, K. L., Fitzgerald, D. A., Nathan, P. J., Moore, G. J., Uhde, T. W., & Tancer, M. E. (2005). Neural substrates for voluntary suppression of negative affect: A functional magnetic resonance imaging

study. *Biological Psychiatry, 57*, 210–219.

Phillips, D. P. (1974). The influence of suggestion on suicide: Substantive and theoretical implications of the Werther Effect. *American Sociological Review, 39*, 340–354.

Phillips, K. (2005). *The broken mirror: Understanding and treating body dysmorphic disorder*. Oxford University Press.

Piper, A., & Merskey, H. (2004). The persistence of folly: A critical examination of dissociative identity disorder: Part I: The excesses of an improbable concept. *Canadian Journal of Psychiatry*, *49*, 592–600.

Pittman, R. K. (1988). Post-traumatic stress disorder, conditioning, and network theory. *Psychiatric Annals*, *18*, 182–189.

Pompili, M., Serafini, G., Innamorati, M., Möller-Leimkühler, A. M., Guipponi, G., Girardi, P., Tatarelli, R., & Lester, D. (2010). The hypothalamic-pituitary-adrenal axis and serotonin abnormalities: A selective overview of the implications of suicide prevention. *European Archives of Psychiatry and Clinical Neuroscience*, *260*, 583–600.

Pope, H. G., Jr., Barry, S. B., Bodkin, A., & Hudson, J. I. (2006). Tracking scientific interest in the dissociative disorders: A study of scientific publication output 1984–2003. *Psychotherapy and Psychosomatics*, *75*, 19–24.

Pope, H. G., Jr., Hudson, J. I., Bodkin, J. A., & Oliva, P. S. (1998). Questionable validity of 'dissociative amnesia' in trauma victims: Evidence from prospective studies. *British Journal of Psychiatry, 172*, 210–215.

Pope, H. G., Jr., Poliakoff, M. B., Parker, M. P., Boynes, M., & Hudson, J. I. (2006). Is dissociative amnesia a culture-bound syndrome? Findings from a survey of historical literature. *Psychological Medicine*, *37*, 225–233.

Postolache, T. T., Mortensen, P. B., Tonelli, L. H., Jiao, X., Frangakis, C., Soriano, J. J., & Qin, P. (2010). Seasonal spring peaks of suicide in victims with and without prior history of hospitalization for mood disorders. *Journal of Affective Disorders*, *121*, 88–93.

Putnam, F.W., Guroff, J, J., Silberman, E. K., Barban, L., & Post, R. M. (1986). The clinical phenomenology of multiple personality disorder: A review of 100 recent cases. *Journal of Clinical Psychiatry, 47*, 285–293.

Rachman, S. (1977). The conditioning theory of fear acquisition: A critical examination. *Behaviour Theory and Research, 15*, 375–387.

Regier, D. A., Kuhl, E. A., & Kupfer, D. A. (2012). DSM-5: Classification and criteria changes. *World Psychiatry, 12*, 92–98.

Rhee, S. H., & Waldman, I. D. (2002). Genetic and environmental influences on antisocial behavior: A meta-analysis of twin and adoption studies. *Psychological Bulletin*, *128*, 490–529.

Robinson, M. S., & Alloy, L. B. (2003). Negative cognitive styles and stress-reactive rumination interact to predict depression: A prospective study. *Cognitive Therapy and Research, 27*, 275–292.

Roche, T. (2002, March 18). Andrea Yates: More to the story. *Time*. http://content.time.com/time/nation/...218445,00.html.

Root, B. A. (2000). *Understanding panic and other anxiety disorders*. University Press of Mississippi.

Ross, C. A., Miller, S. D., Reagor, P., Bjornson, L., Fraser, G. A., & Anderson, G. (1990). Structured interview data on 102 cases of multiple personality disorder from four centers. The *American Journal of Psychiatry, 147*, 596–601.

Rothschild, A. J. (1999). Mood disorders. In A. M. Nicholi, Jr. (Ed.), *The Harvard guide to psychiatry* (pp. 281–307). The Belknap Press of Harvard University.

Ruder, T. D., Hatch, G. M., Ampanozi, G., Thali, M. J., & Fischer, N. (2011). Suicide announcement on Facebook. *Crisis*, *35*, 280–282.

Ruscio, A. M., Stein, D. J., Chiu, W. T., & Kessler, R. C. (2010). The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. *Molecular Psychiatry, 15*, *53–63*.

Rushworth, M. F., Noonan, M. P., Boorman, E. D., Walton, M. E., & Behrens, T. E. (2011). Frontal cortex and reward-guided learning and decision-making. *Neuron, 70*, 1054–1069.

Rotge, J. Y., Guehl, D., Dilharreguy, B., Cuny, E., Tignol, J., Biolac, B., . . . Aouizerate, B. (2008). Provocation of obsessive-compulsive symptoms: A quantitative voxel-based meta-analysis of functional neuroimaging studies. *Journal of Psychiatry and Neuroscience*, *33*, 405–412.

Saxena, S., Bota, R. G., & Brody, A. L. (2001). Brain-behavior relationships in obsessive- compulsive disorder. *Seminars in Clinical Neuropsychiatry, 6*, 82–101.

Schwartz, T. (1981). *The hillside strangler: A murderer's mind*. New American Library.

Seligman, M. E. P. (1971). Phobias and preparedness. *Behavioral Therapy, 2*, 307–320.

Shih, R. A., Belmonte, P. L., & Zandi, P. P. (2004). A review of the evidence from family, twin, and adoption studies for a genetic contribution to adult psychiatric disorders. *International Review of Psychiatry, 16*, 260–283.

Sibley, M. H., Swanson, J. M., Arnold, L. E., Hechtman, L. T., Owens, E. B., Stehli, A., Abikoff, H., Hinshaw, S. P., Molina, B., Mitchell, J. T., Jensen, P. S., Howard, A. L., Lakes, K. D., Pelham, W. E., & MTA Cooperative Group (2017). Defining ADHD symptom persistence in adulthood: optimizing sensitivity and specificity. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *58*(6), 655–662. https://doi.org/10.1111/jcpp.12620

Siegle, G. J., Thompson, W., Carter, C. S., Steinhauer, S. R., & Thase, M. E. (2007). Increased amygdala and decreased dorsolateral prefrontal BOLD responses in unipolar depression: Related and independent features. *Biological Psychiatry*, *61*, 198–209.

Silverstein, C. (2009). The implications of removing homosexuality from the DSM as a mental disorder. *Archives of Sexual Behavior*, *38*, 161–163.

Simon, D., Kaufmann, C., Müsch, K., Kischkel, E., & Kathmann, N. (2010). Fronto-striato-limbic hyperactivation in obsessive-compulsive disorder during individually tailored symptom provocation. *Psychophysiology, 47(4)*, 728–738. doi:10.1111/j.1469-8986.2010.00980.x

Snyder, S. H. (1976). The dopamine hypothesis of schizophrenia: Focus on the dopamine receptor. *The American Journal of Psychiatry*, *133*, 197–202.

Spinaris, C. G., Denhof, M. D., & Kellaway, J. A. (2012). *Posttraumatic stress disorder in United States corrections professionals: Prevalence and impact on health and functioning*. Desert Waters Correctional Outreach. http://desertwaters.com/wp-content/u..._09-03-131.pdf

Stack, S. (2000). Media impacts on suicide: A quantitative review of 243 findings. *Social Science Quarterly*, *81*, 957–971.

Stanley, B., Molcho, A., Stanley, M., Winchel, R., Gameroff, M. J., Parson, B., & Mann, J. J. (2000). Association of aggressive behavior with altered serotonergic function in patients who are not suicidal. *American Journal of Psychiatry, 157*, 609–614.

Stein, M. B., & Kean, Y. M. (2000). Disability and quality of life in social phobia: Epidemiological findings. *The American Journal of Psychiatry, 157*, 1606–1613.

Steinmetz, J. E., Tracy, J. A., & Green, J. T. (2001). Classical eyeblink conditioning: Clinical models and applications. *Integrative Physiological and Behavioral Science*, *36*, 220–238.

Stuart, H. (2003). Violence and mental illness: an overview. *World Psychiatry*, 2(2), 121–124.

Stuppy-Sullivan, A., & Baskin-Sommers, A. (2019). Evaluating dysfunction in cognition and reward among offenders with antisocial personality disorder. *Personality Disorders Theory, Research, and Treatment*. https://modlab.yale.edu/sites/defaul...eward_2019.pdf

Surguladze, S., Brammer, M. J., Keedwell, P., Giampietro, V., Young, A. W., Travis, M. J., . . . Phillips, M. L. (2005). A differential pattern of neural response toward sad versus happy facial expressions in major depressive disorder. *Biological Psychiatry, 57*, 201–209.

Szasz, T. S. (1960). The myth of mental illness. *American Psychologist*, *15*, 113–118.

Szasz, T. S. (2010). *The myth of mental illness: Foundations of a theory of personal conduct*. HarperCollins (Original work published 1961)

Szasz, T. S. (1965). Legal and moral aspects of homosexuality. In J. Marmor (Ed.), *Sexual inversion: The multiple roots of homosexuality* (pp. 124–139). Basic Books.

Swanson, J. M., Kinsbourne, M., Nigg, J., Lanphear, B., Stephanatos, G., Volkow, N., . . . Wadhwa, P. D. (2007). Etiologic subtypes of attention-deficit/hyperactivity disorder: Brain imaging, molecular genetic and environmental factors and the dopamine hypothesis. *Neuropsychology Review*, 17, 39–59.

Thakur, G. A., Sengupta, S. M., Grizenko, N., Schmitz, N., Pagé, V., & Joober, R. (2013). Maternal smoking during pregnancy and ADHD: A comprehensive clinical and neurocognitive characterization. *Nicotine and Tobacco Research*, 15, 149–157.

Thase, M. E. (2009). Neurobiological aspects of depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 187–217). Guilford Press.

The Associated Press. (2013, May 15). New psychiatric manual, DSM-5, faces criticism for turning “normal” human problems into mental illness. http://www.nydailynews.com/life-styl...icle-1.1344935

Thompson, A., Molina, B. S. G., Pelham, W., & Gnagy, E. M. (2007). Risky driving in adolescents and young adults with childhood ADHD. *Journal of Pediatric Psychology*, 32, 745–759.

Thornicroft, G. (1990). Cannabis and psychosis: Is there epidemiological evidence for an association? *British Journal of Psychiatry, 157*, 25–33.

Tienari, P., Wynne, L. C., Sorri, A., Lahti, I., Lasky, K., Moring, J., . . . Wahlberg, K. (2004). Genotype-environment interaction in schizophrenia spectrum disorder. *British Journal of Psychiatry, 184*, 216–222.

Trezza V., Cuomo, V., & Vanderschuren, L. J. (2008). Cannabis and the developing brain: Insights from behavior. *European Journal of Pharmacology, 585*, 441–452.

Tsuang, M. T., Farone, S. V., & Green, A. I. (1999). Schizophrenia and other psychotic disorders. In A. M. Nicholi, Jr. (Ed.), *The Harvard guide to psychiatry* (pp. 240–280). The Belknap Press of Harvard University Press.

van Praag, H. M. (2005). Can stress cause depression?. *The World Journal of Biological Psychiatry*, *6*(S2), 5–22.

Victor, T. A., Furey, M. L., Fromm, S. J., Öhman, A., & Drevets, W. C. (2010). Relationship between amygdala responses to masked faces and mood state and treatment in major depressive disorder. *Archives of General Psychiatry*, *67*, 1128–1138.

Volkow N. D., Fowler J. S., Logan J., Alexoff D., Zhu W., Telang F., . . . Apelskog-Torres K. (2009). Effects of modafinil on dopamine and dopamine transporters in the male human brain: clinical implications. *Journal of the American Medical Association*, 301, 1148–1154.

Wakefield, J. C. (1992). The concept of mental disorder: On the boundary between biological facts and social values. *American Psychologist*, *47*, 373–388.

Waller, J. (2009a). Looking back: Dancing plagues and mass hysteria. *The Psychologist*, *22*(7), 644–647.

Waller, J. (2009b, February 21). A forgotten plague: Making sense of dancing mania. *The Lancet*, *373*(9664), 624– 625. doi:10.1016/S0140-6736(09)60386-X

Weiser, E. B. (2007). The prevalence of anxiety disorders among adults with Asthma: A meta-analytic review. *Journal of Clinical Psychology in Medical Settings*, *14*, 297–307.

White, C. N., Gunderson, J. G., Zanarani, M. C., & Hudson, J. I. (2003). Family studies of borderline personality disorder: A review. *Harvard Review of Psychiatry*, *11*, 8–19.

Whooley, M. A. (2006). Depression and cardiovascular disease: Healing the broken-hearted. *Journal of the American Medical Association*, *295*, 2874–2881.

Wilcox, H. C., Conner, K. R., & Caine, E. D. (2004). Association of alcohol and drug use disorders and completed suicide: An empirical review of cohort studies. *Drug and Alcohol Dependence*, *76*, S11–S19.

Wing, L., Gould, J., & Gillberg, C. (2011). Autism spectrum disorders in the DSM-V: Better or worse than the DSM IV? *Research in Developmental Disabilities*, 32, 768–773.

Wisner, K. L., Sit, D. K. Y., McShea, M. C., Rizzo, D. M., Zoretich, R. A., Hughes, C. L., Hanusa, B. H. (2013). Onset timing, thoughts of self-harm, and diagnoses in postpartum women with screen-positive depression findings. *JAMA Psychiatry*, *70*, 490–498.

Wolraich, M. L., Wilson, D. B., & White, J. W. (1995). The effect of sugar on behavior or cognition in children. *Journal of the American Medical Association*, 274, 1617–1621.

World Health Organization (WHO). (2013). *International classification of diseases (ICD)*. http://www.who.int/classifications/icd/en/

Wyatt, W. J., & Midkiff, D. M. (2006). Biological psychiatry: A practice in search of a science. *Behavior and Social Issues*, *15*, 132–151.

Xie, P., Kranzler, H. R., Poling, J., Stein, M. B., Anton, R. F., Brady, K., Gelernter, J. (2009). Interactive effect of stressful life events and the serotonin transporter *5-HTTLPR* genotype on posttraumatic stress disorder diagnosis in 2 independent populations. *Archives of General Psychology*, *66*, 1201–1209.

Zachar, P., & Kendler, K. S. (2007). Psychiatric disorders: A conceptual taxonomy. *The American Journal of Psychiatry*, *16*, 557–565.

Zuckerman, M. (1999). *Vulnerability to psychopathology: A biosocial model*. American Psychological Association.

Therapy and Treatment

Abbass, A., Kisely, S., & Kroenke, K. (2006). Short-term psychodynamic psychotherapy for somatic disorders: Systematic review and meta-analysis of clinical trials. *Psychotherapy and Psychosomatics*, *78*, 265–274.

Ahmed, S., Wilson, K. B., Henriksen, R. C., & Jones, J. W. (2011). What does it mean to be a culturally competent counselor? *Journal for Social Action in Counseling and Psychology*, 3(1), 17–28.

Alavi, A., Sharifi, B., Ghanizadeh, A., & Dehbozorgi, G. (2013). Effectiveness of cognitive-behavioral therapy in decreasing suicidal ideation and hopelessness of the adolescents with previous suicidal attempts. *Iranian Journal of Pediatrics*, *23*(4), 467–472.

Alegría, M., Chatterji, P., Wells, K., Cao, Z., Chen, C. N., Takeuchi, D., . . . Meng, X. L. (2008). Disparity in depression treatment among racial and ethnic minority populations in the United States. *Psychiatric Services*, *59*(11), 1264–1272.

American Psychological Association. (2005). *Policy statement on evidence-based practice in psychology*. http://www.apapracticecentral.org/ce...pstatement.pdf

American Psychological Association. (2014). *Can psychologists prescribe medications for their patients?* http://www.apa.org/news/press/releas...isiana-rx.aspx

American Psychological Association. (2014). *Psychotherapy: Understanding group therapy*. http://www.apa.org/helpcenter/group-therapy.aspx

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. The Guilford Press.

Beck Institute for Cognitive Behavior Therapy. (n.d.). *History of cognitive therapy*. http://www.beckinstitute.org/history-of-cbt/

Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond* (2nd ed.). The Guilford Press.

Belgrave, F., & Allison, K. (2010). *African-American psychology: From Africa to America* (2nd ed.). Sage Publications.

Bertrand, K., Richer, I., Brunelle, N., Beaudoin, I., Lemieux, A., & Ménard, J-M. (2013). Substance abuse treatment for adolescents: How are family factors related to substance use change? *Journal of Psychoactive Drugs*, *45*(1), 28–38.

Blank, M. B., Mahmood, M., Fox, J. C., & Guterbock, T. (2002). Alternative mental health services: The role of the Black church in the South. *American Journal of Public Health*, *92*, 1668–1672.

Blumberg, J. (2007, October 24). A brief history of the Salem witch trials. *Smithsonian.com*. http://www.smithsonianmag.com/histor...tml?c=y&page=2

Butlera, A. C., Chapmanb, J. E., Formanc, E. M., & Becka, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review*, *26*,17–31.

Center for Substance Abuse Treatment. (2005). *Substance Abuse Treatment: Group Therapy*. Treatment Improvement Protocol (TIP) Series 41. DHHS Publication No. (SMA) 05-3991. Substance Abuse and Mental Health Services Administration.

Centers for Disease Control and Prevention. (2014). *Suicide prevention: Youth suicide*. http://www.cdc.gov/violencepreventio...h_suicide.html

Chambless, D. L., & Ollendick, T. H. (2001). Empirically supported psychological interventions: Controversies and evidence. *Annual Review of Psychology*, *52*, 685–716.

Charman, D., & Barkham, M. (2005). Psychological treatments: Evidence-based practice and practice-based evidence. *InPsych Highlights*. www.psychology.org.au/publications/inpsych/treatments

Chorpita, B. F., Daleiden, E. L., Ebesutani, C., Young, J., Becker, K. D., Nakamura, B. J., . . . Starace, N. (2011), Evidence-based treatments for children and adolescents: An updated review of indicators of efficacy and effectiveness. *Clinical Psychology: Science and Practice*, *18*, 154–172.

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., . . . Thornicroft, G. (2014, February 25). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine*, l–17.

Cuijpers, P., Sijbrandij, M. Koole, S. L., Andersson, G., Beekman, A. T., & Reynolds, C. F. (2014). Adding psychotherapy to antidepressant medication in depression and anxiety disorders: a meta-analysis. *World Psychiatry*, *13*(1), 56–67.

Daniel, D. (n.d.). *Rational emotive in behavior therapy the context of modern psychlogical research*. albertellis.org/rebt-in-the-context-of-modern-psychological-research

Davidson, W. S. (1974). Studies of aversive conditioning for alcoholics: A critical review of theory and research methodology. *Psychological Bulletin*, *81*(9), 571–581.

DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., . . . Gallop, R. (2005). Cognitive Therapy vs medications in the treatment of moderate to severe depression. *Archives of General Psychiatry*, *62*(4), 409–416.

DeYoung, S. H. (2013, November 14). The woman who raised that monster. http://www.huffingtonpost.com/suzy-h...b_4266621.html

Dickerson, F. B., Tenhula, W. N., & Green-Paden, L. D. (2005). The token economy for schizophrenia: Review of the literature and recommendations for future research. *Schizophrenia Research*, *75*(2), 405–416.

Donahue, A. B. (2000). Electroconvulsive therapy and memory loss: A personal journey. *The Journal of ECT*, *162*, 133–143.

Edgemon, T. G., & Clay-Warner, J. (2019). Inmate Mental Health and the Pains of Imprisonment. *Society and Mental Health*, *9*(1), 33–50. https://doi.org/10.1177/2156869318785424

Elkins, R. L. (1991). An appraisal of chemical aversion (emetic therapy) approaches to alcoholism treatment. *Behavior Research and Therapy*, *29*(5), 387–413.

Gary, F. A. (2005). Stigma: Barrier to mental health care among ethnic minorities. *Issues in Mental Health Nursing*, *26*(10), 979–999.

Gerardi, M., Cukor, J., Difede, J., Rizzo, A., & Rothbaum, B. O. (2010). Virtual reality exposure therapy for post-traumatic stress disorder and other anxiety disorders. *Current Psychiatry Reports*, *12*(298), 299–305.

Harter, S. (1977). A cognitive-developmental approach to children's expression of conflicting feelings and a technique to facilitate such expression in

play therapy. *Journal of Consulting and Clinical Psychology, 45*(3), 417–432.

Hemphill, R. E. (1966). Historical witchcraft and psychiatric illness in Western Europe. *Proceedings of the Royal Society of Medicine, 59*(9), 891–902.

Ivey, S. L., Scheffler, R., & Zazzali, J. L. (1998). Supply dynamics of the mental health workforce: Implications for health policy. *Milbank Quarterly, 76*(1), 25–58.

Jang, Y., Chiriboga, D. A., & Okazaki, S. (2009). Attitudes toward mental health services: Age group differences in Korean American adults. *Aging & Mental Health, 13*(1), 127–134.

Jones, M. C. (1924). A laboratory study of fear: The case of Peter. *Pedagogical Seminary, 31*, 308–315.

Kalff, D. M. (1991). Introduction to sandplay therapy. *Journal of Sandplay Therapy, 1*(1), 9.

Leblanc, M., & Ritchie, M. (2001). A meta-analysis of play therapy outcomes. *Counselling Psychology Quarterly, 14*(2), 149–163.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting & Clinical Psychology, 55*, 3–9.

Lovaas, O. I. (2003). *Teaching individuals with developmental delays: Basic intervention techniques*. Pro-Ed.

Lowinger, R. J., & Rombom, H. (2012). The effectiveness of cognitive behavioral therapy for PTSD in New York City Transit Workers. *North American Journal of Psychology, 14*(3), 471–484.

Madanes, C. (1991). Strategic family therapy. In A. S. Gurman and D. P. Kniskern (Eds.), *Handbook of Family Therapy, Vol. 2.* (pp. 396–416). Brunner/Mazel.

Marques, L., Alegría, M., Becker, A. E., Chen, C. N., Fang, A., Chosak, A., & Diniz, J. B. (2011). Comparative prevalence, correlates of impairment, and service utilization for eating disorders across US ethnic groups: Implications for reducing ethnic disparities in health care access for eating disorders. *International Journal of Eating Disorders, 44*(5), 412–420.

Martin, B. (2007). *In-Depth: Cognitive behavioral therapy*. http://psychcentral.com/lib/in-depth...therapy/000907

Mayo Clinic. (2012). *Tests and procedures: Transcranial magnetic stimulation*. http://www.mayoclinic.org/tests-proc...n/PRC-20020555

McGovern, M. P., & Carroll, K. M. (2003). Evidence-based practices for substance use disorders. *Psychiatric Clinics of North America, 26*, 991–1010.

McGrath, R. J., Cumming, G. F., Burchard, B. L., Zeoli, S., & Ellerby, L. (2009). *Current practices and emerging trends insexual abuser management: The safer society North American survey*. The SaferSociety Press.

McLellan, A. T., Lewis, D. C., O'Brien, C. P., & Kleber, H. D. (2000). Drug dependence, a chronic medical illness: Implications for treatment, insurance, and outcomes evaluation. *JAMA, 284*(13), 1689–1695.

Minuchin, P. (1985). Families and individual development: Provocations from the field of family therapy. *Child Development, 56*(2), 289–302.

Mullen, E. J., & Streiner, D. L. (2004). The evidence for and against evidence-based practice. *Brief Treatment and Crisis Intervention, 4*(2), 111–121.

Muñoz-Cuevas, F. J., Athilingam, J., Piscopo, D., & Wilbrecht, L. (2013). Cocaine-induced structural plasticity in frontal cortex correlates with conditioned place preference. *Nature Neuroscience, 16*, 1367–1369.

National Association of Cognitive-Behavioral Therapists. (2009). History of cognitive behavioral therapy. http://nacbt.org/historyofcbt.htm.

National Institute of Mental Health. (2017). *Any disorder among children*. http://www.nimh.nih.gov/statistics/1...IS_CHILD.shtml

National Institute of Mental Health. (n.d.). *Use of mental health services and treatment among children*. http://www.nimh.nih.gov/statistics/1NHANES.shtml

National Institutes of Health. (2013, August 6). *Important events in NIMH history*. http://www.nih.gov/about/almanac/org...ation/NIMH.htm

National Institute on Drug Abuse. (2008). *Addiction science: From Molecules to managed care*. http://www.drugabuse.gov/publication...cience/relapse

National Institute on Drug Abuse. (2011). *Drug facts: Comorbidity: Addiction and other mental disorders*. http://www.drugabuse.gov/publication...ntal-disorders

National Institute on Drug Abuse. (2012). *Principles of drug addiction treatment: A research-based guide* (3rd ed.). http://www.drugabuse.gov/publication...tive-treatment

Nelson, P. (1993). Autobiography in Five Short Chapters. In *There's a Hole in my Sidewalk: The Romance of Self-Discovery*. Beyond Words Publishing.

O'Connor, K. J. (2000). *The play therapy primer* (2nd ed.). Wiley.

Page, R. C., & Berkow, D. N. (1994). *Unstructured group therapy: Creating contact, choosing relationship*. Jossey Bass.

Pagnin, D., de Queiroz, V., Pini, S., & Cassano, G. B. (2004). Efficacy of ECT

in depression: A meta-analytic review. *Journal of ECT, 20*, 13–20.

Prins, S. J., & Draper, L. (2009). *Improving outcomes for people with mental illnesses under community corrections supervision: A guide to research-informed policy and practice*. Council of State Governments Justice Center.

Prochaska, J. O., & Norcross, J. C. (2010). *Systems of psychotherapy* (7th ed.). Wadsworth.

Prudic, J., Peyser, S., & Sackeim, H. A. (2000). Subjective memory complaints: A review of patient self-assessment of memory after electroconvulsive therapy. *The Journal of ECT, 16*(2), 121–132.

Rathus, J. H., & Sanderson, W. C. (1999). *Marital distress: Cognitive behavioral treatments for couples*. Jason Aronson.

Reti, I. R. (n.d.). *Electroconvulsive therapy today*. Johns Hopkins Medicine. http://www.hopkinsmedicine.org/psych...CT_extract.pdf

Richman, L. S., Kohn-Wood, L. P., & Williams, D. R. (2007). The role of discrimination and racial identity for mental health service utilization. *Journal of Social and Clinical Psychology, 26*(8), 960–981.

Rizzo, A., Newman, B., Parsons, T., Difede, J., Reger, G., Holloway, K., . . . Bordnick, P. (2010). Development and clinical results from the Virtual Iraq exposure therapy application for PTSD. *Annals of the New York Academy of Sciences, 1208*, 114–125.

Rogers, C. (1951). *Client-centered psychotherapy*. Houghton-Mifflin.

Sackett, D. L., & Rosenberg, W. M. (1995). On the need for evidence-based medicine. *Journal of Public Health, 17*, 330–334.

Sallows, G. O., & Graupner, T. D. (2005). Intensive behavioral treatment for children with autism: Four-year outcome and predictors. *American Journal of Mental Retardation, 110*(6), 417–438.

Scott, L. D., McCoy, H., Munson, M. R., Snowden, L. R., & McMillen, J. C. (2011). Cultural mistrust of mental health professionals among Black males transitioning from foster care. *Journal of Child and Family Studies, 20*, 605–613.

Shechtman, Z. (2002). Child group psychotherapy in the school at the threshold of a new millennium. *Journal of Counseling and Development, 80*(3), 293–299.

Shedler, J. (2010). The efficacy of psychodynamic psychotherapy. *American Psychologist, 65*, 98–109.

Simpson D. D. (1981). Treatment for drug abuse. *Archives of General Psychiatry, 38*, 875–880.

Simpson D. D, Joe, G. W, & Bracy, S. A. (1982). Six-year follow-up of opioid addicts after admission to treatment. *Archives General Psychiatry, 39*, 1318–1323.

Snowden, L. R. (2001). Barriers to effective mental health services for African Americans. *Mental Health Services Research, 3*, 181–187.

Stensland, M., Watson, P. R., & Grazier, K. L. (2012). An examination of costs, charges, and payments for inpatient psychiatric treatment in community hospitals. *Psychiatric Services, 63*(7), 66–71.

Stewart, S. M., Simmons, A., & Habibpour, E. (2012). Treatment of culturally diverse children and adolescents with depression. *Journal of Child and Adolescent Psychopharmacology, 22*(1), 72–79.

Streeton, C., & Whelan, G. (2001). Naltrexone, a relapse prevention maintenance treatment of alcohol dependence: A meta-analysis of randomized controlled trials. *Alcohol and Alcoholism, 36*(6), 544–552.

Sue, D. W. (2001). Multidimensional facets of cultural competence. *Counseling Psychologist, 29*(6), 790–821.

Sue, D. W. (2004). Multicultural counseling and therapy (MCT). In J. A. Banks and C. Banks (Eds.), *Handbook of research on multicultural education* (2nd ed., pp. 813–827). Jossey-Bass.

Sue, D. W., & Sue, D. (2007). *Counseling the culturally different: Theory and practice* (5th ed.). Wiley.

Sussman, L. K., Robins, L. N., & Earls, F. (1987). Treatment–seeking for depression by Black and White Americans. *Social Science & Medicine, 24*, 187–196.

Szasz, T. S. (1960). The Myth of Mental Illness. *American Psychologist, 15*, 113–118.

Thomas, K. C., & Snowden, L. R. (2002). Minority response to health insurance coverage for mental health services. *Journal of Mental Health Policy and Economics, 4*, 35–41.

Tiffany, F. (2012/1891). *Life of Dorothea Lynde Dix* (7th ed.). Houghton, Mifflin.

Torrey, E. F. (1997). *Out of the shadows: Confronting America's mental illness crisis*. Wiley.

Torrey, E. F., Zdanowicz, M. T., Kennard, A. D., Lamb, H. R., Eslinger, D. F., Biasotti, M. C., & Fuller, D. A. (2014, April 8). *The treatment of persons with mental illness in prisons and jails: A state survey*. Treatment Advocacy Center. http://tacreports.org/storage/docume...ehind-bars.pdf

Townes D. L., Cunningham N. J., & Chavez-Korell, S. (2009). Reexaming the relationships between racial identity, cultural mistrust, help-seeking attitudes, and preference for a Black counselor. *Journal of Counseling Psychology, 56*(2), 330–336.

U.S. Department of Agriculture. (2013, December 10). USDA announces support for mental health facilities in rural areas [Press release No. 0234.13]. http://www.usda.gov/wps/portal/usda/...13/12/0234.xml

U.S. Department of Health and Human Services. (1999). *Mental health: A report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy. (2005). *Mental health and rural America: 1984-2005*. ftp://ftp.hrsa.gov/ruralhealth/RuralMentalHealth.pdf

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2017). *Results from the 2016 National Survey on Drug Use and Health: Mental Health Findings*. https://www.samhsa.gov/data/sites/de...tTabs-2016.pdf

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2011, September). *Results from the 2010 National Survey on Drug Use and Health: Summary of National Findings* (NSDUH Series H-41, HHS Publication No. [SMA] 11-4658). http://www.samhsa.gov/data/NSDUH/2k1...ltsRev2010.htm

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2013, September). *Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings* (NSDUH Series H-46, HHS Publication No. [SMA] 13-4795). http://www.samhsa.gov/data/NSDUH/201...2012.htm#ch2.2

U.S. Department of Housing and Urban Development, Office of Community Planning and Development. (2011). *The 2010 Annual Homeless Assessment Report to Congress*. http://www.hudhre.info/documents/201...mentReport.pdf

U.S. Department of Labor. (n.d.). *Mental health parity*. http://www.dol.gov/ebsa/mentalhealthparity/

U.S. Public Health Service. (2000). *Report of the Surgeon General's conference on children's mental health: A national action agenda*. Department of Health and Human Services.

Wagenfeld, M. O., Murray, J. D., Mohatt, D. F., & DeBruiynb, J. C. (Eds.). (1994). *Mental health and rural America: 1980–1993* (NIH Publication No. 94-3500). U.S. Government Printing Office.

Wampold, B. E. (2007). Psychotherapy: The humanistic (and effective) treatment. *American Psychologist, 62*, 857–873. doi:10.1037/0003-066X.62.8.857

Weil, E. (2012, March 2). Does couples therapy work? *The New York Times*. http://www.nytimes.com/2012/03/04/fa...anted=all&_r=0

Weiss, R. D., Jaffee, W. B., de Menil, V. P., & Cogley, C. B. (2004). Group therapy for substance abuse disorders: What do we know? *Harvard Review of Psychiatry, 12*(6), 339–350.

Whitney, D. G., Peterson, M.D. (2019). US National and State-Level Prevalence of Mental Health Disorders and Disparities of Mental Health Care Use in Children. *JAMA Pediatr*. 2019; 173(4): 389–391. doi:10.1001/jamapediatrics.2018.5399

Willard Psychiatric Center. (2009). *Echoes of Willard*. http://www.echoesofwillard.com/willa...iatric-centre/

Wolf, M., & Risley, T. (1967). Application of operant conditioning procedures to the behavior problems of an autistic child: A follow-up and extension. *Behavior Research and Therapy, 5*(2), 103–111.

Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Stanford University Press.

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