

ECE: INFANT AND TODDLER DEVELOPMENT

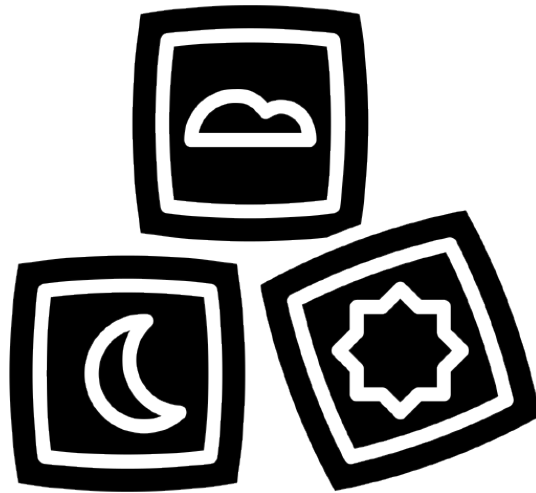


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ECE: Infant and Toddler Development



Adapted by Tracy Craker, Western Technical College, Fall 2022.

Updated May 2025

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Updated November 2024

Welcome to Infant and Toddler Development



Birth to Age 3

- This text is a presentation of how children grow, develop, and learn during the first 3 years of life.
- The stage is set before children are born and we will look at the influences of the prenatal environment, touching on genetics and heredity, as well as pregnancy and the birth process.
- We look at how children change physically beginning at conception and their growth progresses from birth through 3 years of age.
- We examine cognitive growth - the ability to think and remember - and how it develops over the first 3 years or so of life.
- We learn how children's emotions, their psychological states, and social relationships change from infancy to age 3.
- Finally we look at developmentally appropriate child-centered environments for infants and toddlers.

For further information or continued self-study, please refer to the links under Sources at the bottom of each page.

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1.1: Chapter 1- Introduction

Introduction to Infant and Toddler Development



After this chapter, you should be able to:

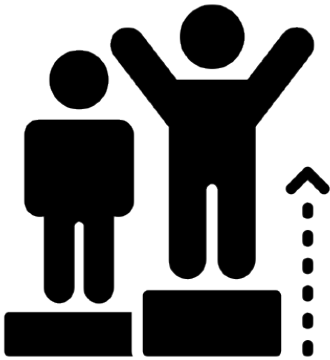
Learning Objectives

- describe the **principles** that underlie human development
- differentiate **periods** of human development
- evaluate **issues** in development
- explain what a **theory** is
- compare and contrast **key theories of child development**

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1.2: Principles of Development

Two Key Principles of Development



1. **growth** - refers to physical changes
2. **development** - refers to changes in complexity (cognitive, social-emotional, language and communication, learning styles).

Underlying Principles of Development



There are several underlying **principles of development** to keep in mind:

- Development is **lifelong** and change is apparent across the lifespan (this text covers children up to age 3)
 - early experiences affect later development
 - Development is **multidirectional**
 - we show gains in some areas of development, while showing loss in other areas
 - Development is **multidimensional**
 - change across **five general domains** and all five domains influence each other - a change in one domain may cascade and prompt changes in the other domains
1. **physical:** changes in height and weight, changes in gross and fine motor skills, sensory capabilities, the nervous system, as well as the propensity for disease and illness
 2. **social-emotional:** focuses on changes in emotion, self-concept, and interpersonal relationships with families, peers, and friends

3. **language and communication:** includes listening and understanding, speaking and communicating, and early literacy
4. **approaches to learning:** curiosity, engagement and persistence, creativity and imagination, and diversity in learning
5. **cognitive and general knowledge:** encompasses the changes in intelligence, exploration, discovery and problem-solving, memory, and mathematical and scientific thinking

Fig. 1.2: Five Domains of Infant and Toddler Growth and Development

PHYSICAL	SOCIAL-EMOTIONAL	LANGUAGE and COMMUNICATION	APPROACHES TO LEARNING	COGNITIVE and GENERAL KNOWLEDGE	
height and weight	emotion		listening	curiosity	intelligence
gross and fine motor skills	self-concept		understanding	engagement	exploration
sensory capabilities	interpersonal relationships with families, peers, and friends		speaking	persistence	discovery
nervous system			communicating	creativity	problem-solving
propensity for illness and disease			early literacy	imagination	memory
				diversity in learning	mathematical and scientific thinking

- Development is characterized by **plasticity** - our ability to change and that many of our characteristics are malleable
 - early experiences are important, but children are remarkably resilient (able to overcome adversity)
- Development is multi-contextual
 - we are influenced by both nature (genetics) and nurture (the environment) - when and where we live and our actions, beliefs, and values are a response to circumstances surrounding us.

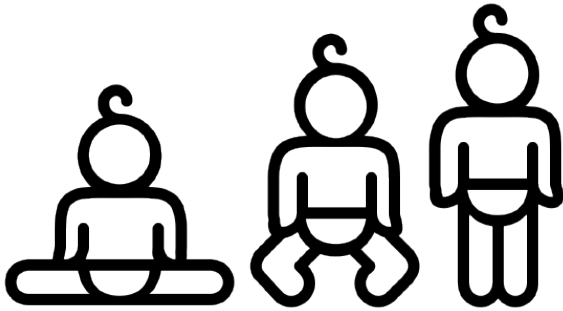
Our actions, beliefs, and values are a response to circumstances surrounding us. It is important to understand that behaviors, motivations, emotions, and choices are all part of a bigger picture.

Sources

- Lally, Martha and Suzanne Valentine-French *Lifespan Development: A Psychological Perspective*. Licensed under CC BY-NC-SA 3.0 (modified by Jennifer Paris)
- *Introduction to Lifespan, Growth and Development* by Lumen Learning is licensed under CC BY 4.0

1.3: Periods of Development

Periods of Development



Early Childhood: Birth - Age 8.

Those who study development divide the life span into these stages as follows:

- **prenatal development** (conception through birth)
- **infant** (birth through first birthday)
- **toddler** (one through third birthday)
- **preschool** (3 to 5 years)
- **school-age** (6 to 8 years)

This list reflects unique aspects of the various stages of early childhood. So, while both a three-month-old and a three-year-old are considered children, they have very different motor abilities, social relationships, and cognitive skills. Their nutritional needs are different, and their primary psychological concerns are also distinctive.



Figure 1.2 - A tiny embryo depicting some development of arms and legs, as well as facial features that are starting to show.

Image Source: Image by [lunar caustic](#) on Flickr.

Prenatal Development (Conception - Birth)

Conception occurs and development begins. All the major structures of the body are forming.

The health of the mother is of primary concern:

- her nutrition and lifestyle
- teratogens (or environmental factors that can lead to birth defects)
- labor and delivery



Figure 1.2.1 - A swaddled newborn.

Image by [Han Myo Htwe](#) on Unsplash

Infancy (Birth-Age 1)

The first year of life is one of dramatic growth and change. A newborn has a very keen sense of hearing and very poor vision, but within months is transformed into a babbling, crawling infant.

Caregivers are also transformed from someone who manages feeding and sleep schedules to a constantly moving guide and safety inspector for a mobile, energetic child.



Fig 1.2.2. Toddler guided by mother as they are learning to walk.

Photo by [OPPO Find X5 Pro on Unsplash](#)

Toddler (Ages 1-3)

Around age one, most children begin to walk. These initial steps comprise the “toddle.” Children from age one to their 3rd birthday are typically considered to be toddlers. This period of growth sees very rapid brain development which can be seen in expanded language skills. This period also transforms the infant into a small child with a unique personality. This period can be challenging for caregivers as the child tests limits and demands independence.



Fig 1.2.3. Preschool-aged boy playing with car.

Photo by [Segun Osunoyi](#) on [Unsplash](#)

Preschool (Ages 4-5)

The preschool years consist of the years which follow toddlerhood and precede formal schooling. As a three to five-year-old, the child is busy learning language, is gaining a sense of self and greater independence, and is beginning to learn the workings of the physical world. This knowledge does not come quickly, however, and preschoolers may initially have interesting conceptions of size, time, space and distance such as fearing that they may go down the drain if they sit at the front of the bathtub or by demonstrating how long something will take by holding out their two index fingers several inches apart. A toddler's fierce determination to do something may give way to a four-year-old's sense of guilt for action that brings the disapproval of others.



Fig 1.2.4. Children with colorful clothes and backpacks walking towards school. P

Image Source: [note thanun](#) on [Unsplash](#)

School Age (Ages 6-8)

The ages of six through eight comprise schoolagers as much of what children experience at this age is connected to their involvement in the early grades of school. Now the world becomes one of learning and testing new academic skills and by assessing one's abilities and accomplishments by making comparisons between self and others. Schools compare students and make these comparisons public through team sports, test scores, and other forms of recognition. Growth rates slow down and children can refine their motor skills at this point in life. And children begin to learn about social relationships beyond the family through interaction with friends and fellow students.

Sources

- Lally, Martha and Suzanne Valentine-French *Lifespan Development: A Psychological Perspective*. Licensed under CC BY-NC-SA 3.0 (modified by Jennifer Paris)
- *Introduction to Lifespan, Growth and Development* by Lumen Learning is licensed under CC BY 4.0

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1.4: Topics in Development

Topics in Development



Image Source: Mother's Love. Photo by [Mark Colomb](#), CC BY 2.0. Wikimedia Commons

Nature and Nurture

Why are people the way they are? Are features such as height, weight, personality, being diabetic, etc. the result of heredity or environmental factors, or both?

This question has puzzled philosophers, psychologists and educators for hundreds of years. This is frequently referred to as the **nature vs. nurture** debate -- are we the result of **nature (our genetic background)** or **nurture (our environment)**? Today, most researchers agree that child development involves a complex interaction of both nature and nurture. It is difficult to isolate the root of any single behavior as a result solely of either nature or nurture.

- **Nature** refers to all the genes and hereditary factors that influence who we are:
 - our physical appearance
 - our personality characteristics
- **Nurture** refers to all the environmental variables that impact who we are,;
 - our early childhood experiences
 - how we were raised
 - our social relationships
 - our surrounding culture



Image Source: Different colored Lego building blocks. Photo by [Mourizal Zativa](#) on [Unsplash](#)

Building Blocks

Think of the **influences** listed below as building blocks.

- genetics
- parents and parenting
- friends, family, and other relationships
- experiences
- education

While most people tend to have the same basic building blocks, the components can be combined in an infinite number of ways. Consider your own overall personality...

- How much of who you are today was shaped by your genes?
- How much of who you are today is a result of your lifetime of experiences?

From the earliest moments of life, the interaction of heredity and the environment works to shape who children are and who they will become. While the genetic instructions a child inherits from his parents may set out a road map for development, the environment can impact how these directions are expressed, shaped or even silenced.

The complex interaction of nature and nurture does not just occur at certain moments or at certain periods of time; it is persistent and lifelong.

A Closer Look at the Nature vs. Nurture Debate



Nature

Some philosophers such as Plato and Descartes suggested that certain things are **inborn**, or that they occur naturally regardless of environmental influences. **Nativists** take the position that all or most behaviors and characteristics are the result of inheritance. Advocates of this point of view believe that all our characteristics and behaviors are the result of evolution. **Genetic traits** handed down from parents influence the individual differences that make each person unique.

Nurture

Other well-known thinkers such as John Locke believed in what is known as **tabula rasa**, which suggests that the mind begins as a blank slate. According to this notion, everything that we are, and all our knowledge is determined by our experience.

Empiricists take the position that all or most behaviors and characteristics result from learning. **Behaviorism** is a good example of a theory rooted in empiricism. The **behaviorists** believe that all actions and behaviors are the results of conditioning. Theorists such as John B. Watson believed that people could be trained to do and become anything, regardless of their genetic background.

Consider...

- When a person achieves tremendous academic success, did they do so because they are genetically predisposed to be successful or is it a result of an enriched environment?
- If a man abuses his wife and kids, is it because he was born with violent tendencies or is it something he learned by observing his parent's behavior?

Examples of biologically determined characteristics (**nature**) are generally observable:

- eye, hair, and skin color
- blood type
- dimples and freckles
- curly hair
- tongue rolling
- earlobe attachment

However, genetic diseases which may or may not be observable are also biologically determined. Something like life expectancy and height have a strong biological component, but they are also influenced by environmental factors, for example nutrition and lifestyle.

Some characteristics are tied to environmental influences (**nurture**):

- a child's behavior can be linked to influences good and bad:
 - observing parents treating others with respect (good)
 - observing older children engage in violent behavior on the playground (bad)

Kevin Davies of PBS's Nova described one fascinating example of this phenomenon:

- Perfect pitch is the ability to detect the pitch of a musical tone without any reference:
 - Researchers have found that this ability tends to run in families and believe that it might be tied to a single gene.
 - They've also discovered that possessing the gene alone is not enough to develop this ability. Instead, musical training during early childhood is necessary to allow this inherited ability to manifest itself.
- Height is another example of a trait that is influenced the interaction of nature and nurture.
 - A child might come from a family where everyone is tall, and he may have inherited these genes for height
 - if he grows up in a deprived environment where he does not receive proper nourishment, he might never attain the height he might have he had grown up in a healthier environment.

What researchers do know is that the **interaction between heredity and environment is often the most important influence** of behavior and development -- it's not **either nature or nurture**, but some combination of **both**.

- genetic factors interact with one another
- environmental interact with one another
 - family circumstances
 - social experiences
 - overall culture
- both genetic and environmental influences interact with one another

Continuity versus Discontinuity

Is human development best characterized as a slow, gradual process, or is it best viewed as one of more abrupt changes? The answer to that question often depends on which developmental theorist you ask and what topic is being studied.

The theories of **Eric Erikson** and **Jean Piaget** are called **stage theories**. Stage theories or **discontinuous development** assume that developmental change often occurs in separate and distinct stages that are qualitatively different from each other, and in a set, universal sequence. At each stage of development, children and adults have different qualities and characteristics. Thus, stage theorists assume development is more discontinuous.

Others, such as the **behaviorists** and **Lev Vygotsky**, assume development is a more slow and gradual process known as **continuous development**. For instance, they would see the adult as not possessing new skills, but more advanced skills that were already present in some form in the child. Brain development and environmental experiences contribute to the acquisition of more developed skills.

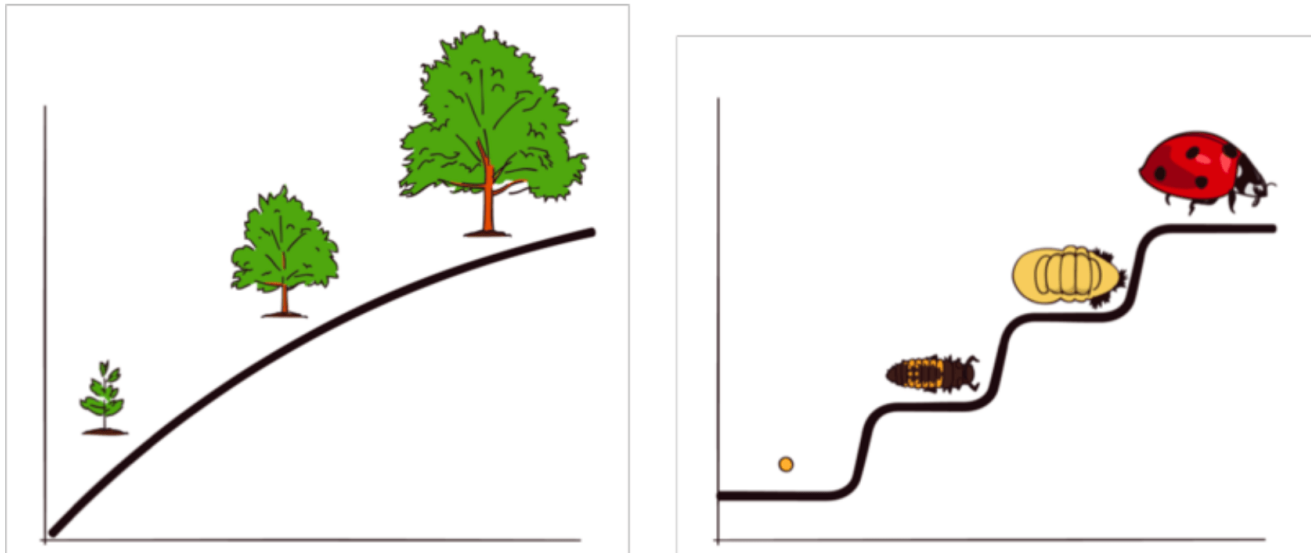


Figure 1.3. – The graph to the left shows three phases in the **continuous growth** of a tree. The graph to the right shows four distinct stages of development in the **discontinuous growth** cycle of a ladybug.

Image Source: Siegler, Robert. [Cognitive Development in Childhood NOBA Project](#). Carnegie-Mellon University. Licensed under CC BY-NC-SA 4.0

Active versus Passive

How much do you play a role in your own developmental path? Are you at the whim of your genetic inheritance or the environment that surrounds you?

Some theorists see humans as playing a much more active role in their own development. **Piaget**, for instance believed that **children actively explore their world** and construct new ways of thinking to explain the things they experience. In contrast, many **behaviorists** view humans as being playing a more passive role and their behaviors are acquired through conditioning via consequences or reward, or influenced by stimuli their environment.

Developmental Screening Tools

Children tend to develop in similar patterns and in similar stages. We will learn more about this development though out the course. These patterns allow us to look for **developmental milestones** - behaviors or physical skills seen in infants and children as they grow and develop. Milestones are sets of functional skills or age-specific tasks that most children can do at a certain age range.

Although each milestone has an age level, the actual age when a normally developing child reaches that milestone can vary quite a bit. Every child is unique! There are many different tools that a pediatrician or a teacher can use to examine how a child is developing. It is important to look closely at the tool being used to see what areas of development are being looked at and that the tool is current and researched based.

One screening tool that is often used is the **ASQ- Ages and Staged Questionnaire**. Many pediatricians and childcare sites will ask families to fill out this tool. This can help everyone understand the development of the child and is often used in goal setting. In some cases, this tool may highlight some concerns in the child's development that may need a closer look.

Sources

- Cherry, Kendra. ["How Genes Influence Child Development."](#) *VeryWell Mind* . Updated. April 5, 2023By [Kendra Cherry, MSEd](#) Updated on
- Cherry, Kendra. ["How Nature vs. Nurture Shapes Who We Become: Are we born or made this way? Short answer: It's both."](#)

VeryWell Mind . Updated January 27, 2025.

- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#) by Martha Lally and is licensed under CC BY-NC-SA 3.0
- Siegler, Robert. [Cognitive Development in Childhood](#) NOBA Project. Carneige-Mellon University. Licensed under CC BY-NC-SA 4.0

1.5: Developmental Theories and Theorists

What is a theory?

Students sometimes feel intimidated when they see or hear the word **theory** and fear learning about theories will be too complex or difficult to grasp, but basically all that is necessary to understand is that theories are simply **a system of ideas or possible explanations** for something. In early childhood education theories are simply different "hows" and "whys" of child development.

Definition: Theory

A simple definition of theory is a well-supported explanation or an organized set of ideas that helps explain facts or events. In science, a theory is a robust explanation, not a guess, that has been repeatedly tested and confirmed.



Theories are valuable tools for understanding human behavior. Have you ever wondered,

- “Why is this 3-year-old so inquisitive?”
- “Why are some fifth graders rejected by their classmates?”

Theories can help explain these and other occurrences.

Why are theories important?

Developmental theories offer explanations about how we develop, why we change over time and the kinds of influences that impact development.

A theory guides and helps us interpret research findings as well. It provides the researcher with a blueprint or model to be used to help piece together various studies. Think of **theories as guidelines or a set of instructions** that help you accomplish a task rather than being left to a process of trial and error.

Theories may be developed using **induction** -- a method of drawing conclusions from specific observations where patterns or similarities that are noted. Theorists develop ideas based on these patterns. Theories are used in science and everyday life to make predictions about the future based on past experiences.

Many theories are tested through research and scientific investigation, but theories that are difficult to test through scientific methodologies are still useful in stimulating debate or providing concepts that have practical everyday applications.

Keep in mind that **theories are not facts; they are simply guidelines for investigation and practice**, and they gain credibility through research that fails to disprove them.

On the following pages we will look at some of the **key theories in child development** and the different theorists who developed them.

Child Developmental Theories and Theorists

Child development theories explore the how and why children change over time - from infancy through adolescence. They cover growth and development in areas such as

- cognitive development
- social learning theory
- emotional growth

Key Child Development Theories and Theorists

Child development theorists have different perspectives on how children develop and contribute to a deeper understanding of human development.

Learning theories focus on how we respond to events or stimuli rather than emphasizing what motivates our actions. These theories provide an explanation of how experience can change what we are capable of doing or feeling.

- [Erik Erikson's Psychosocial Theory](#)
- [Albert Bandura's Social Learning Theory](#)
- [Jean Piaget's Theory of Cognitive Development](#)
- [Lev Vygotsky's Sociocultural Theory](#)
- [Urie Bronfenbrenner's Ecological Systems Model](#)
- [Gesell's Maturationist Theory](#)
- [Bowlby's Attachment Theory](#)
- [Greenspan's Social-Emotional Theory](#)
- [Gerber's Educator Theory](#)

Today, many popular child development theories include a combination of factors:

- psychological
- social
- environmental

Understanding how these factors influence children is key to both understanding their growth and providing appropriate support at each stage of development.

Source

- [Introduction to Developmental Theories](#) by Lumen Learning is licensed under CC BY 4.0

1.6: Erik Erikson's Psychosocial Theory

Erik Erikson's Psychosocial Theory

Erik Erickson (1902-1994) was a German-American psychoanalyst and considered the father of **developmental psychology** because his model gives us a guideline for the entire lifespan and suggests certain primary psychological and social concerns throughout life.

He believed that we are aware of what motivates us throughout life and the ego has an important role in guiding our actions. We make conscious choices in life and these choices focus on meeting certain social and cultural needs rather than purely biological ones.



Figure 1.4.2 - Erik Erikson

Image Source: [Erik Erikson](#). Wikipedia.com

Erikson expanded on his theory by emphasizing the importance of culture in parenting practices and motivations. He noted humans make conscious choices in life and that these choices focus on meeting certain social and cultural needs rather than purely biological ones.

He theorized that we are motivated by **psychosocial problems**, which means we have the need to feel

- the world is a trustworthy place
- that we are capable individuals
- that we can contribute to society
- that we have lived a meaningful life

Erikson Divided the Lifespan into Eight Stages:

In each stage, we have a major **psychosocial task** to accomplish or crisis to overcome. Erikson believed that our personality continues to take shape throughout our lifespan as we face these challenges in living. Although we will concentrate on his first two stages, here is a brief overview of the eight stages:

Fig. 1.6. Erickson's Eight Stages of the Lifespan

Ages	Name of Stage	Description of Stage
Birth - 1 year	Trust vs. Mistrust	The infant must have basic needs met in a consistent way in order to feel that the world is a trustworthy place.
1-3 years	Autonomy vs. Shame and Doubt	Mobile toddlers have newfound freedom they like to exercise and by being allowed to do so, they learn some basic independence. They strive for a sense of accomplishment.
3-5 years	Initiative vs. Guilt	Preschoolers like to initiate activities and emphasize doing things “all by myself.”
6-11 years	Industry vs. Inferiority	School aged children focus on accomplishments and begin making comparisons between themselves and their classmates
Adolescence	Identity vs. Role Confusion	Teenagers are trying to gain a sense of identity as they experiment with various roles, beliefs, and ideas
Young Adulthood	Intimacy vs. Isolation	In our 20s and 30s we are making some of our first long-term commitments in intimate relationships.
Middle Adulthood	Generativity vs. Stagnation	The 40s through the early 60s we focus on being productive at work and home and are motivated by wanting to feel that we’ve contributed to society.
Late Adulthood	Integrity vs. Despair	We look back on our lives and hope to like what we see—that we have lived well and have a sense of integrity because we lived according to our beliefs.

Table 1.4.2. - Erik Erikson’s Psychosocial Theory

These **eight stages form a foundation for discussions on emotional and social development** during the lifespan. Keep in mind, however, that these stages or crises can occur more than once. For instance, a person may struggle with a lack of trust beyond infancy under certain circumstances.

Criticism of Erickson

Erikson’s theory has been *criticized for focusing so heavily on stages and assuming that the completion of one stage is prerequisite for the next crisis of development*. His theory also focuses on the social expectations that are found in certain cultures, but not in all. For instance, the idea that adolescence is a time of searching for identity might translate well in the middle-class culture of the United States, but not as well in cultures where the transition into adulthood coincides with puberty through rites of passage and also where adult roles offer fewer choices than can be seen in Western culture.

Key Points to Remember - Erikson’s Psychosocial Theory

- Erikson focused on conscious thought.
- His stages of psychosocial development address the entire **lifespan** and suggest primary psychosocial crisis in some cultures that adults can use to understand how to support children’s social and emotional development.

- Erikson's **8 stages of the lifespan** include:
 - trust vs. mistrust
 - autonomy vs. shame and doubt
 - initiative vs. guilt
 - industry vs. inferiority
 - identity vs. role confusion
 - intimacy vs. isolation
 - generativity vs. stagnation
 - integrity vs. despair

Source

- [Psychosocial Theory](#). Developmental Theories. *Lifespan Development*. Lumen Learning. Licensed under CC BY 4.0.

1.7: Albert Bandura's Social Learning Theory



Figure 1.4.3 - Albert Bandura

Image Source: [Alberta Bandura](#). Wikipedia

Social Learning Theory

Albert Bandura (1925-2021) was a Canadian-American psychologist and professor of social science in psychology at Stanford University. He was a leading contributor to the field of education, in particular, **social learning theory**. He expanded the concept of social learning theory which became known as **social cognitive theory**. This particular type of learning happens when someone observes another person engaged in a certain behavior witness the outcome of that behavior, they tend to remember their observations and use this information to guide their own subsequent behaviors. In other words, when someone doesn't know what to do, they look to someone else and learn by modeling or copying their behavior.

Examples:

- A kindergartner on their first day of school might eagerly look at how others are acting and try to act the same way to fit in more quickly.
- Adolescents struggling with their identity rely heavily on their peers actions and use them to guide their own behaviors in order to fit in.
- Adults will do things because they've seen it pay off for someone else.

These actions are referred to as **vicarious learning** or **vicarious reinforcement**.

Bandura's social cognitive theories have been applied to education, mainly focusing on

- **self-efficacy** - the belief in one's capacity to act in such a way as to achieve goals);
- **self-regulation** - the ability to monitor and regulate actions toward a goal
- **observational learning** - learning by observing the behavior of others

Badura's key research findings showed that models are an important means for learning new behaviors.

Our Environment Creates Us, and We Create our Environment

Bandura also suggests that there is interplay between the environment and the individual. We are not just the product of our surroundings, rather we influence our surroundings. Parents not only influence their child's environment, perhaps intentionally using reinforcement, etc., but children influence parents as well. Parents may respond differently with their first child than with their fourth. Perhaps they try to be the perfect parents with their firstborn, but by the time their last child comes along they have very different expectations both of themselves and their child.

Source

- [Exploring Behavior](#), Developmental Theories. *Lifespan Development*. Lumen Learning. Licensed under CC BY 4.0.

1.8: Jean Piaget's Theory of Cognitive Development

Jean Piaget's Theory of Cognitive Development

Jean Piaget (1896-1980) was a Swiss psychologist and is one of the most influential **cognitive theorists**. Piaget was inspired to explore children's ability to think and reason by watching his own children's development. He was one of the first to recognize and map out the ways in which children's thought differs from that of adults. His interest in this area began when he was asked to test the IQ of children and noticed that there was a pattern in their wrong answers.

Piaget observed:

- children's intellectual skills change over time through maturation.
- children of differing ages interpret the world differently. Because
- children are creating their own meaning



Image Source: Jean Piaget [Wikimedia Commons](#)

Definition: Schema

A **schema** or schemes are **categories of knowledge**. They are like mental boxes of concepts. **Schema theory's** primary claim is that our mind has mental frameworks (or schemas) that help organize information. These schemas help us to save our cognitive energy when processing the millions of pieces of information we encounter every day.

A child must learn many concepts. They may have a schema for "under" and "soft" or "running" and "sour.". Our efforts to understand the world around us lead us to develop new schema and to modify old ones.

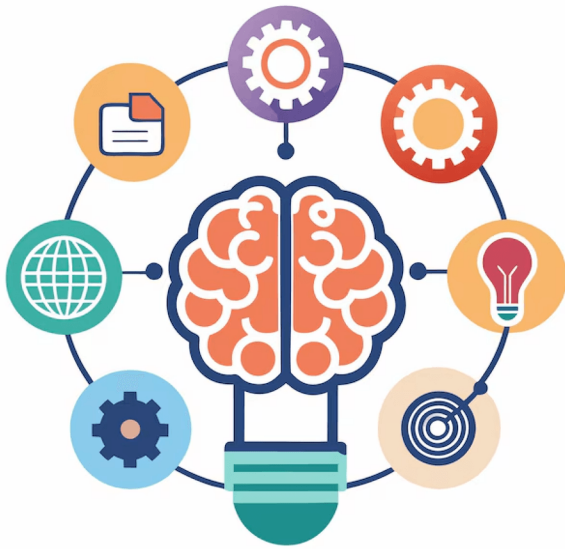


Fig 1.8. Visualization of schemas - mental frameworks or knowledge categories to help organize information.

Image source: [Brain connected to categories](#). Freepik

Piaget is often called a **constructivist**. Constructivism, particularly cognitive constructivism, emphasizes that learners actively build their own understanding of the world through experiences and interactions rather than just passively take in information. Knowledge is built on past experiences and interactions with the other people and the learner's environment. Constructivism in psychology explores how individuals actively construct their own meaning and understanding of the world

Piaget believed our desire to understand the world comes from a need for **cognitive equilibrium**, which represents a state of balance between a learner's existing knowledge and the need to adjust that knowledge to accommodate new information. When new information conflicts with our existing knowledge or understanding, it can create **cognitive disequilibrium**, a feeling of imbalance or discomfort.

- Restoring equilibrium involves **assimilation and accommodation**, allowing individuals to continuously refine their understanding and develop more sophisticated **cognitive structures**. One way to make sense of new experiences is to focus on how they are like what we already know. This is **assimilation**.
- Another way to make sense of the world is to change our mind. This is **accommodation**. We can make a **cognitive accommodation** to this new experience by adding new schema. This food is unlike anything I've tasted before. I now have a new category of foods that are bitter-sweet in flavor, for instance.

Do you accommodate or assimilate more frequently? Children accommodate more frequently as they build new schema. Adults tend to look for similarity in their experience and assimilate. They may be less inclined to think "outside the box."

Piaget's Theory of Cognitive Development suggests there are different ways of understanding that are associated with a child's maturation. The infant and toddler stages are described in Piaget's first two stages.

Fig. 1.8. Jean Piaget's Theory of Cognitive Development

Name of Stage	Description of Stage
Sensorimotor	During the sensorimotor stage children rely on use of the senses and motor skills . From birth until about age 2 , the infant knows by tasting, smelling, touching, hearing, and moving objects around. This is a real hands on type of knowledge.

Preoperational	In the preoperational stage , children from ages 2 to 7 , become able to think about the world using symbols. A symbol is something that stands for something else. The use of language , whether it is in the form of words or gestures, facilitates knowing and communicating about the world. This is the hallmark of preoperational intelligence and occurs in early childhood. However, these children are preoperational or pre-logical . They still do not understand how the physical world operates. They may, for instance, fear that they will go down the drain if they sit at the front of the bathtub, even though they are too big.
Concrete Operational	Children in the concrete operational stage , ages 7 to 11 , develop the ability to think logically about the physical world. Middle childhood is a time of understanding concepts such as size, distance, and constancy of matter, and cause and effect relationships. A child knows that a scrambled egg is still an egg and that 8 ounces of water is still 8 ounces no matter what shape of glass contains it.
Formal Operational	During the formal operational stage children, at about age 12 , acquire the ability to think logically about concrete and abstract events. The teenager who has reached this stage is able to consider possibilities and to contemplate ideas about situations that have never been directly encountered. More abstract understanding of religious ideas or morals or ethics and abstract principles such as freedom and dignity can be considered.

Criticisms of Piaget's Theory

Piaget has been criticized for overemphasizing the role that physical maturation plays in cognitive development and in underestimating the role that culture and interaction (or experience) plays in cognitive development. Looking across cultures reveals considerable variation in what children can do at various ages. Piaget may have underestimated what children are capable of given the right circumstances.

Key Points to Remember - Piaget's Theory of Cognitive Development

- Understanding is motivated by trying to balance what we sense in the world and what we know in our minds.
- Understanding is organized through creating categories of knowledge. When presented with new knowledge we may add new schema or modify existing ones.
- Children's understanding of the world of the world changes as their cognitive skills mature through 4 stages:
 - **sensorimotor stage (Birth-2 years)**
 - **preoperational stage (Ages 2-7)**
 - concrete operational stage (Ages 7-11)
 - formal operational stage (Begins around age 12)

Sources

- [Lecture Transcript: Developmental Theories](#). *Lifespan Development*. Lumen Learning is licensed under CC BY 4.0 (modified by Jennifer Paris)
- [Exploring Cognition](#). *Lifespan Development*. Lumen Learning is licensed under CC BY 4.0 by Lumen Learning is licensed under CC BY 4.0

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1.9: Lev Vygotsky's Sociocultural Theory

Lev Vygotsky's Sociocultural Theory



Image Source: [Lev Vygotsky](#). Wikimedia Commons. This file is licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported](#) license.

Lev Vygotsky (1896-1934) was a Russian psychologist whose work was discovered in the United States in the 1960s but became more widely known in the 1980s.

Vygotsky differed with Piaget in that he believed that a person not only has a set of **abilities**, but also a set of **potential abilities** that can be realized if given the proper guidance from others. Vygotsky concentrated on the child's interactions with peers and adults. He believed that the child was an apprentice, learning through sensitive social interactions with more skilled peers and adults.

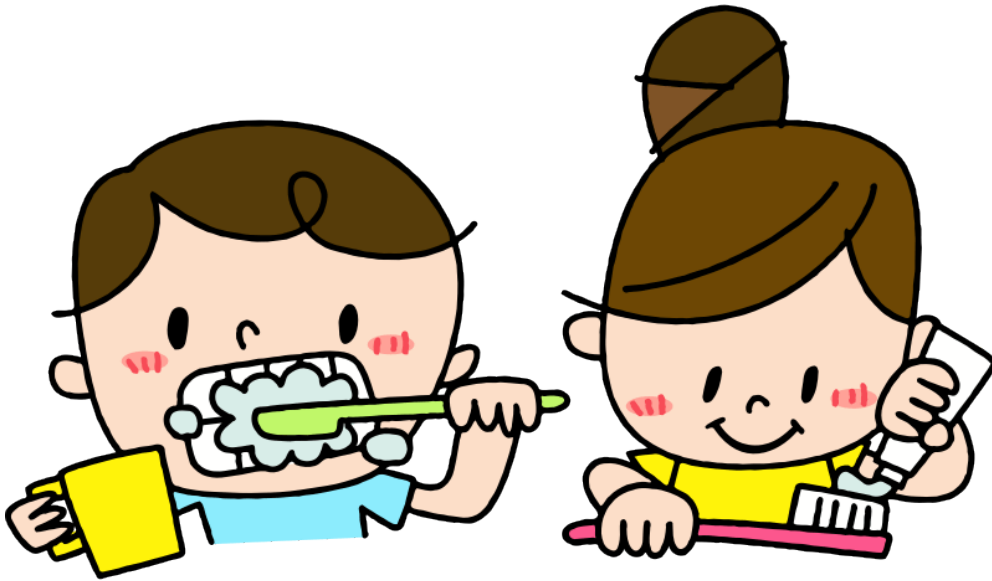
His sociocultural theory emphasizes the importance of culture influences and social interaction in the development of cognitive abilities.

Scaffolding: "I Do" - "We Do" - "You Do"

Vygotsky believed that through *guided participation* known as **scaffolding**, with a teacher or capable peer, a child can learn cognitive skills within a certain range level.

Definition: Scaffolding

Scaffolding is a core concept in early childhood education, where children's learning is fostered through intentional guidance and encouragement. Caregivers offer a temporary level of support to a child that is tailored to the child's developmental level to help them accomplish tasks or acquire new skills. This support is gradually removed as the child gains independence.



Teaching a Child to Brush Their Teeth

- Caregiver starts by brushing their teeth and demonstrating good brushing technique and describing what they are doing in an upbeat and positive tone. ("I do.")
- When the child can hold a toothbrush properly they can brush their teeth alongside the caregiver in front of a mirror. ("We do.")
- Let the child brush their own teeth. ("You do.")

The term **scaffolding** originated from the Vygotsky's concept of the **zone of proximal development (ZPD)**. This zone represents the range of tasks a child can perform with help but cannot yet achieve independently. Scaffolding bridges this gap by providing the right level of assistance to advance a child's learning.

Zone of Proximal Development

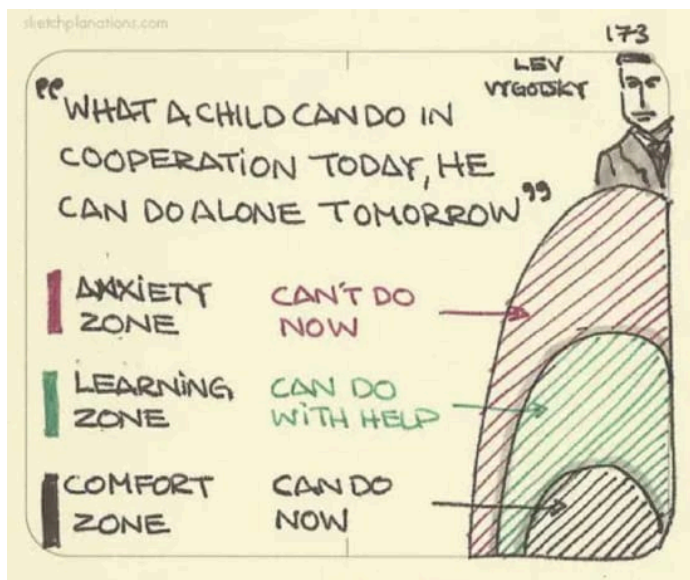


Image Source: [Zone of Proximal Development](https://www.sketchplanations.com/zone-of-proximal-development). Sketchplanations.com. The images and associated explanatory text on this website are licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/)

The **zone of proximal development** is the space between what a learner can do without help and what a learner can do with

adult guidance or help from a peer who has already mastered the skill needed for the task.

The area of **extended learning** describes the ability of a child may complete tasks slightly beyond their developmental level if they are guided by the supportive adult. This is the area of **extended learning** is what we wish to strive for in working with challenging but achievable goals. Vygotsky's belief was that development occurred first through children's immediate social interactions, and then, as the child begins to internalize their learning, move to the individual level.

Comparing Piaget and Vygotsky

- Piaget saw the child as actively discovering the world through their **individual interactions** with it.
- Vygotsky saw the child as an apprentice and focused on the child's immediate social and cultural environment and their **interactions with adults and peers**.

Sources

- [Exploring Cognition](#) by Lumen Learning is licensed under CC BY 4.0
- Ana R. [Children's Development](#) by is licensed under CC BY 4.0
- Hutchinson, Maddie. [What is scaffolding in early childhood education?](#) *Building Blocks*. Lillio.com. Updated January 2025.

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1.10: Urie Bronfenbrenner's Ecological Systems Model

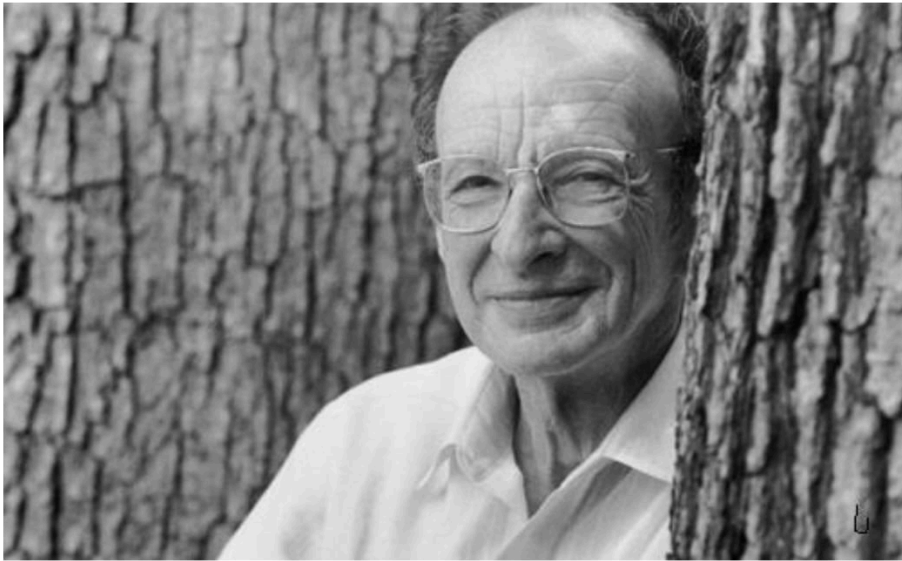


Image Source: [Child Development Theories: Urie Bronfenbrenner](#). *First Discoverers*.

Urie Bronfenbrenner's Ecological Systems Model

Urie Bronfenbrenner (1917-2005) was a Russian-born American psychologist who offers us one of the most comprehensive theories of human development. Bronfenbrenner studied the works of Freud, Erikson, Piaget, and other learning theorists. He believed all of their theories could be enhanced by adding the dimension of **context**. Context describes the circumstances that form the meaning of something so that it can be fully understood and assessed.

Like Vygotsky's, Bronfenbrenner looked at the social influences on learning and development, noting that growth depends not only on individual traits but on how people interact with family, schools, communities, and the larger society, in other words, the complete context in which these interactions take place. It helps to clarify meaning and interpretation by looking at the *who*, *what*, *where*, *when*, *why*, and *how* of a situation. Essentially, context, is the background information needed to fully understand something.

Bronfenbrenner observed that a child's growth and development is shaped by the **context** of *who* is involved in the life of the child and on *when* and *where* the child lives. The multi-layered interconnected systems that exist within the child's immediate environment (microsystem) as well broader societal structures like (mesosystem, exosystem, macrosystem, chronosystem) form the foundation of Bronfenbrenner's **ecological systems theory**.

Each of these systems plays a unique role in shaping the child's growth and development over time. In addition, Bronfenbrenner's **ecological systems model** challenges us to go beyond the individual if we want to understand human development and promote improvements in society as a whole.

Fig. 1.10. Urie Bronfenbrenner's Ecological Systems Model

Name of System	Description of System
----------------	-----------------------

Microsystems	Microsystems impact a child directly. These are the people with whom the child interacts such as parents, peers, and teachers. The relationship between individuals and those around them need to be considered. For example, to appreciate what is going on with a student in math, the relationship between the student and teacher should be known.
Mesosystems	Mesosystems are interactions between those surrounding the individual. The relationship between parents and schools, for example will indirectly affect the child.
Exosystem	Exosystems are larger institutions such as the mass media or the healthcare system. These have an impact on families and peers and schools who operate under policies and regulations found in these institutions.
Macrosystems	Macrosystems exist at the level at which we cultural values and beliefs. These larger ideals and expectations inform institutions that will ultimately impact the individual.
Chronosystem	Chronosystems exist in an historical context. Cultural values change over time, as do policies of educational institutions or governments in certain political climates. Development occurs within the context of these specific historical points in time.

Ecological Systems Model



Image Source: Yan Kkrkau. [A girl pointing at the number 6](#). Pexels.com

A child learning math:

- we can't simply look at that individual and what challenges they face directly with the **subject** (microsystem)
- we also must look at the interactions that occur between **teacher and child** (mesosystem)
 - maybe the teacher needs to make modifications

- maybe the teacher is responding to regulations made by the **school** (exosystem) that interferes with the teacher's ability to instruct .
 - the new regulations may be a response to **national efforts** (macrosystem) to promote math and science deemed important by political leaders in response to relations with **other countries at a time in history** (chronosystem)

All of these **interconnected systems** impact the individual child's learning, growth, and development.

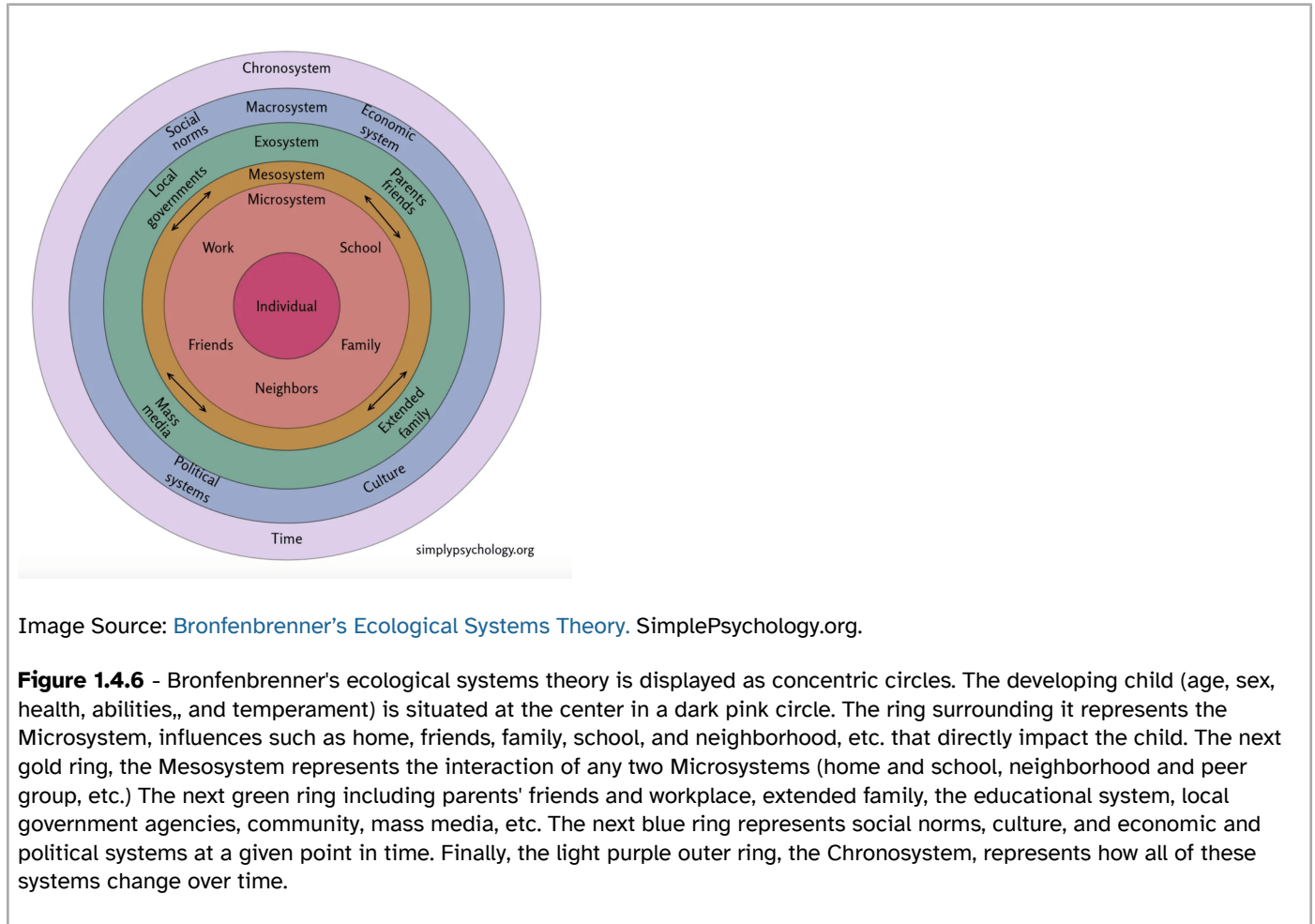


Image Source: [Bronfenbrenner's Ecological Systems Theory](https://www.simplypsychology.org/bronfenbrenners-ecological-systems-theory.html). SimplePsychology.org.

Figure 1.4.6 - Bronfenbrenner's ecological systems theory is displayed as concentric circles. The developing child (age, sex, health, abilities, and temperament) is situated at the center in a dark pink circle. The ring surrounding it represents the Microsystem, influences such as home, friends, family, school, and neighborhood, etc. that directly impact the child. The next gold ring, the Mesosystem represents the interaction of any two Microsystems (home and school, neighborhood and peer group, etc.) The next green ring including parents' friends and workplace, extended family, the educational system, local government agencies, community, mass media, etc. The next blue ring represents social norms, culture, and economic and political systems at a given point in time. Finally, the light purple outer ring, the Chronosystem, represents how all of these systems change over time.

Source

- [Bronfenbrenner's Ecological Systems Theory](https://www.simplypsychology.org/bronfenbrenners-ecological-systems-theory.html). SimplePsychology.org.
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1.11: Bowlby's Attachment Theory (Ainsworth)

Attachment Theory

Attachment theory is a **lifespan model of human development** emphasizing the central role of caregivers, or **attachment figures**, who provide the child with a sense of trust, safety and security. **Attachment theory** hypothesizes that early caregiver relationships establish social-emotional developmental foundations, but change remains possible across the lifespan due to interpersonal relationships during childhood, adolescence, and adulthood.

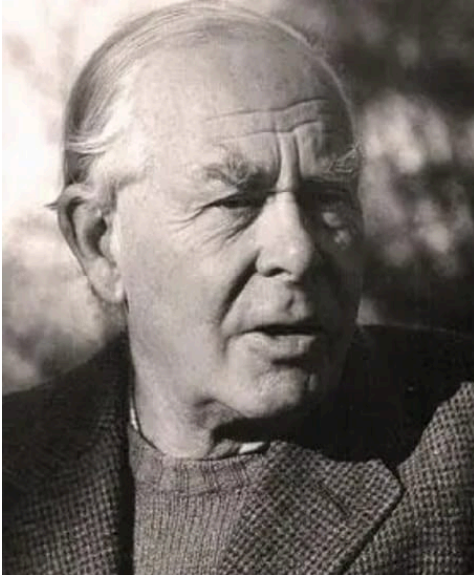


Image Source: [John Bowlby](#). British Psychological Society.

John Bowlby

John Bowlby (1907-1990) British psychiatrist and psychoanalyst believed that children want to form attachments with others. During the 1930s, Bowlby worked at a Child Guidance Clinic in London, treating numerous emotionally troubled children. Based on his experiences with these children, he noted the significance of a child's relationship with their mother in shaping their social, emotional, and cognitive development. His understanding of the connection between early separations from the mother and subsequent maladjustment, lead him to develop his **attachment theory**, which emphasizes the importance of early emotional bonds between a child and their caregiver. He proposed that these bonds are vital for survival and emotional development, and serve as the foundation for future relationships.

Attachment Theory

Based on the style of a child's **attachment** to parents and other adults, Bowlby posited that young children develop pictures in their minds of what relationships look and feel like, and carry this picture into their other and future relationships. A child's specific attachment style will also impact learning.

Bowlby's **evolutionary theory of attachment** suggests that children come into the world biologically pre-programmed to form attachments with others, because this will help them to survive.

- Bowlby argued that a child forms many attachments, but one of these is qualitatively different, the **primary attachment**
- Bowlby suggests that there is a critical period for developing attachment (2.5 years).
 - if an attachment has not developed during this time period, then it may not happen at all
 - Bowlby later proposed a **sensitive period** of up to 5 years

- Bowlby's **maternal deprivation hypothesis** suggests that continual **attachment disruption** between the infant and primary caregiver could result in long-term cognitive, social, and emotional difficulties for that infant.
- Bowlby notes that an **internal working model** exists as a mental representation or a cognitive framework that
 - guides a person's expectations and behaviors in relationships
 - is an internalized script based on past experiences, particularly those with primary caregivers during early childhood, that
 - influences how we understand ourselves, others, and relationships
 - becomes a prototype for all future social relationships and allows individuals to predict, control, and manipulate interactions with others

Definition: Internal Working Model

A key factor of attachment theory is the internal working model, a thinking process built on past experiences and helps the individual consider responses and actions.



Image Source: Photo: JHU Sheridan Libraries/Gado/Getty Images. [WSJ website](#).

Mary Ainsworth

Mary Ainsworth (1913-1999), was a developmental psychologist from Canada, and a student of John Bowlby. She is predominantly known for her contributions to attachment theory, including the **Strange Situation** experiment, an assessment that measured the bond between mothers and their children – the Strange Situation. During this assessment, a researcher (the “stranger”) observes a child’s response to when their mother leaves them alone in a room.

We will learn more about attachment theories including the Strange Situation in a [later chapter](#).

Sources

- McLeod, Saul. [John Bowlby's Attachment Theory](#). *SimplyPsychology.org*. Updated April, 2025.
- [The Attachment Project](#). © 2020-2025 MindOnly Pty Ltd

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1.12: Gesell's Maturationalist Theory

Arnold Gesell's Maturationalist Theory



Image Source: [Arnold Lucius Gesell: Child Development](#). *ClarkNOW*. Clark University. October. 17, 2024

Arnold Gesell (1880-1961) was an American pediatrician and psychologist born in Alma, Wisconsin. His theory is known as a **maturation-developmental theory** and is the foundation of nearly every other theory of human development that came after him. Gesell's maturation theory has impacted the understanding of both the education and psychology of young children. The **maturation theory** is considered the foundation for assessing the development of children, and it can be used to identify delays in development.

Early in the 20th-century, Dr. Gesell observed and documented patterns in the way children develop, showing that all children automatically go through similar and predictable sequences and develop through **age typical milestones** (which he also called **norms**). This development is related to information in our genes. Many of the checklists, ages/stages, and growth charts that we use today are based on his work.

Gesell's theory believes body growth enables new skills. The body, muscles and brain must be developed enough to allow the new skill to happen. This is where **maturationalist** comes from.

Example:

For a child to learn to use the toilet the brain must understand the concept, and interpret the senses, language must develop for the child to tell the adult and the muscles must be able to control the bladder.

The Cyclical Spiral

Gesell emphasized that growth always progresses in a pattern through predictable stages or sequences. Sequential development begins within the embryo and continues after birth. While an individual progresses through these stages at his or her own pace, the sequence remains the same. According to Gesell, growth can be thought of as a **cyclical spiral**. Each cycle of the spiral encompassing the time it takes to move through six stages, or half-year increments. The time to complete a cycle of the six stages is quite rapid in early life and slows down with age.

Gesell was the first theorist to systematically study these **stages of development**, and the first researcher to demonstrate that a child's developmental age (or stage of development) may be different from his or her chronological age. The child's sequential development begins within the embryo and continues after birth. While an individual progresses through these stages at his or her own pace, the sequence remains the same.

Sequential development encompasses both internal and external factors

Internal (intrinsic) factors

- genetics
- temperament
- personality
- learning styles, as well as
- physical and mental growth

External factors

- environment
- family background
- parenting style
- cultural influences
- health conditions
- early experiences with peers and adults.

Source

- [Gesell Theory](#). *Gesell at Yale*. [Gesell Program in Early Childhood 2025](#).

1.13: Greenspan's Social-Emotional Theory

Stanley Greenspan's Social-Emotional Theory

Stanley Greenspan (June 1, 1941 – April 27, 2010) was an American child psychiatrist and clinical professor of Psychiatry, Behavioral Science, and Pediatrics at George Washington University Medical School, whose work focused on the social-emotional development of the infant and toddler. He was best known for developing the **floortime** approach for attempting to treat children with autistic spectrum disorders and developmental disabilities and the **floortime concept** was quickly applied for all children.

He is also noted for being a founding member of the group now known as **ZERO to THREE**. His pioneering work on diagnosis, early intervention and treatment of mental and developmental problems among infants and young children has guided countless researchers, clinicians, and parents across the country and around the world. This is notable as most previous theorists did not focus specifically on the very young child or emotional development.

Greenspan Floortime Approach

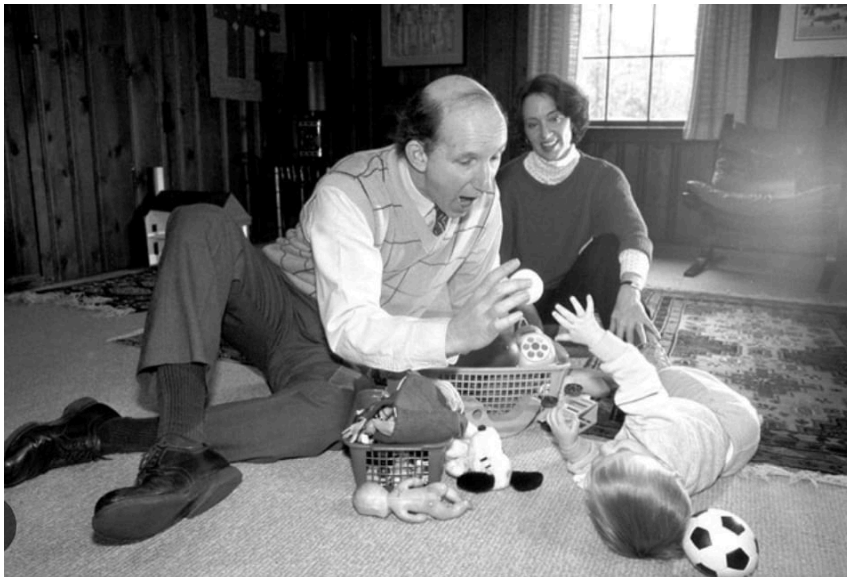


Image Source: [Greenspan Floortime Training](#). The Greenspan Floortime Approach. Copyright © 2023 Stanley Greenspan MD Inc.

In the **floortime** approach the caregiver gets down on the floor with the child, at their level, to excite interest in the child, foster emotional bonds, and challenge the child to be creative, curious, and spontaneous. During this time, the caregiver follows the child's lead and expands on the actions and interactions to make the most of sensory and motor skills as well as drawing attention to emotions.

Source

- Stanley Greenspan. [The Greenspan Floortime Approach](#). Copyright © 2023 Stanley Greenspan MD Inc.

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1.14: Gerber's Educarer Theory (Pikler)

Gerber's Educarer Theory



Image Source: [Magda Gerber's Video Library](https://magdagerber.org). magdagerber.org

Magda Gerber (1910-2007) believed that infants develop based on mindful interactions of their **“educarers.”** Her approach to infant care was inspired during her very first meeting with Dr. Emmi Pikler, a pediatrician in Magda's native Budapest, who visited Magda's home when their 2 year-old daughter was sick. Dr. Pikler spoke so honestly and directly with this very young child and Dr. Pikler's respectful manner so uniquely impressive and deeply compassionate, that it convinced Magda to raise all of her children, in particular her infant son, following Pikler's ideas. Inspired by this experience Gerber went on to get a Master's degree in Early Childhood Education. Her research furthered the work of Emmi Pikler.

The **educarer** develops the whole child through responsive, respectful care. Gerber believes the child should take the lead and that adults should not rush their development or interrupt the child with adult goals. The daily routines of feeding, napping, and diaper changes are the opportunities to be fully present with the infant and engage in meaningful conversations and responses. This is known as using caregiving routines as curriculum.

Gerber does not believe in using “containers” with children or in using devices that might stimulate skills the child does not have on their own (jumpers or exersaucers).

In 1978, Gerber and Forrest co-founded a non-profit organization in Los Angeles [Resources for Infant Educarers](https://resourcesforinfanteducarers.org) (RIE - pronounced ‘rye’) to further their work with families and child care professionals. At , Gerber taught parents and professional caregivers the Educaring approach to caring for infants and toddlers.

Resources for Infant Educarers (RIE) ®

Respect is the basis of the RIE philosophy.

Respect is shown to babies every time we interact with them. Respecting a child means treating even the youngest infant as a unique human being, not as an object.

RIE: Our Goal: The Authentic Child

An authentic child is one who feels secure, autonomous, and competent. When we help a child to feel secure, feel appreciated, feel that “somebody is deeply, truly interested in me,” by the way we just look, the way we just listen, we influence that child’s whole personality, the way that child sees life.

Trust in the Infant's Competence

We have basic trust in the infant to be an initiator, to be an explorer eager to learn what he is ready for. Because of this trust, we provide the infant with only enough help necessary to allow the child to enjoy mastery of her own actions.

Sensitive Observation

The RIE method, guided by respect for the infant’s competence, is **observation**. We observe carefully to understand the infant’s communications and his needs. The more we observe, the more we understand and appreciate the enormous amount and speed of learning that happens during the first two or three years of life. We become humbler, we teach less, and we provide an environment for learning instead.

Caregiving Times: Involving the Child

During care activities (diapering, feeding, bathing, dressing, etc.), encourage even the tiniest infant to become an active participant rather than a passive recipient of the activities. Parents create opportunities for interaction, cooperation, intimacy and mutual enjoyment by being wholeheartedly with the infant during the time they spend together anyway. “Refueled” by such unhurried, pleasurable caring experiences, infants are ready to explore their environment with only minimal intervention by adults.

A Safe, Challenging, Predictable Environment

Our role is to create an environment in which the child can best do all the things that the child would do naturally. The more predictable an environment is, the easier it is for babies to learn.

As infants become more mobile, they need safe, appropriate space in which to move. Their natural, inborn desire to move should not be handicapped by the environment.

Time for Uninterrupted Play and Freedom to Explore

Provide the infant with plenty of time for uninterrupted play. Instead of trying to teach babies new skills, appreciate and admire what babies are doing.

Consistency

Establish clearly defined limits and communicate our expectations to develop discipline.

Source

- [Educaring](#) Approach. *Educaring*. © 2025 Resources for Infant Educators® (RIE®)
- [Our Founder, Magda Gerber](#). *Educaring*. © 2025 Resources for Infant Educators® (RIE®)

1.15: Chapter 1- Review

Chapter 1: Review

As educators of very young children it's important to understand the history of child development theory because it informs and impacts our work as early childhood educators. Caregiver knowledge and awareness is crucial for supporting a child's healthy development and well-being.

In this chapter we looked at:

- underlying **principles** of development
- the **periods** of development
- **topics** in development
- important **theories** that help us understand development

Erikson - **Psychosocial Theory**

Bandura - **Social Learning Theory**

Piaget - **Theory of Cognitive Development**

Vygotsky - **Sociocultural Theory**

Bronfenbrenner - **Ecological Systems Model**

Gesell - **Maturationist Theory**

Bowlby - **Attachment Theory**

Greenspan - **Social-Emotional Theory**

Gerber - **Educator Theory**

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CHAPTER 2: HEREDITY, CONCEPTION, AND PRENATAL DEVELOPMENT

2.1: Chapter 2- Introduction

2.2: Heredity

2.3: Environment Correlations

2.4: Genes and Chromosomes

2.4.1: Genetic Disorders

2.5: Prenatal Development

2.6: Prenatal Assessment

2.7: Teratogens

2.8: Maternal Factors

2.9: Paternal Impact

2.10: Monozygotic and Dizygotic Twins

2.11: Infertility and Complications of Pregnancy

2.12: Chapter 2- Review

2.1: Chapter 2- Introduction

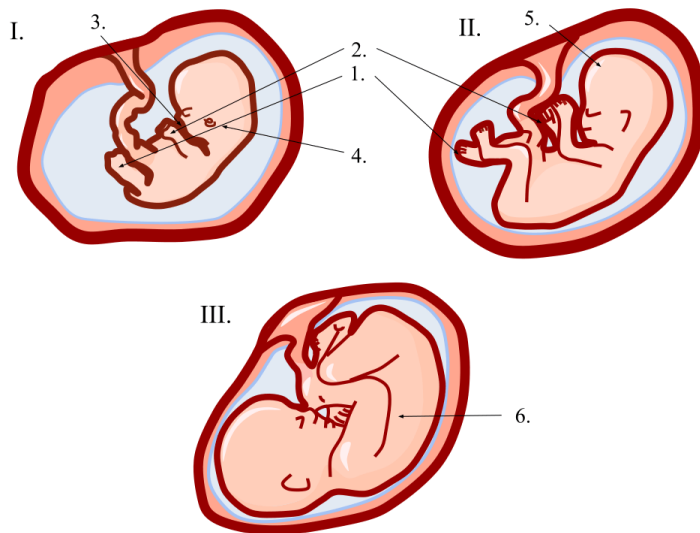


Image Source: [Three Trimesters of Fetal Development](#). WikimediaCommons. Licensed under the Creative Commons Attribution-Share Alike 4.0 International license.

Introduction: Heredity, Conception, and Prenatal Development

In this chapter, we will begin by examining some of the ways in which **heredity** helps to shape the way we are. We will look at what happens genetically during conception and describe some known **genetic** and **chromosomal disorders**. Next, we will consider what happens during **prenatal development**, including the impact of **teratogens**. We will also discuss the impact that both the mother and father have on the developing fetus.

After this chapter, you should be able to:

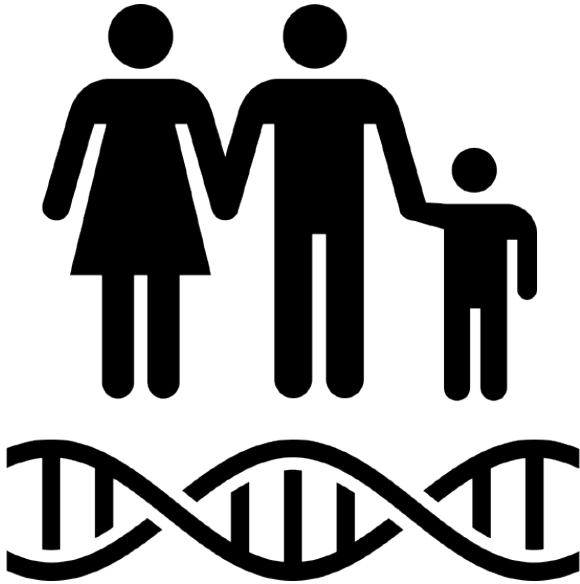
Learning Objectives

- evaluate **roles of nature and nurture** in development
- define **genes and chromosomes**
- differentiate **mitosis and meiosis**
- explain **dominant and recessive gene patterns** on inheritance
- list common **genetic disorders** and **chromosomal abnormalities**
- describe changes that occur within each of the three periods of **prenatal development**
- recognize the risks to prenatal development posed by exposure to **teratogens**
- evaluate different **types of prenatal assessment**

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2.2: Heredity

Heredity



Nature and Nurture

Most scholars agree that there is a constant interplay between **nature (heredity)** and **nurture (the environment)**.

It is difficult to isolate the root of any single characteristic as a result solely of nature or nurture, and most scholars believe that even determining the extent to which nature or nurture impacts a human feature is difficult to answer. In fact, almost all human features are **polygenic** (a result of many genes) and **multifactorial** (a result of many factors, both genetic and environmental).

It's as if one's genetic make-up sets up a range of possibilities, which may or may not be realized depending upon one's environmental experiences. For instance, a person might be genetically predisposed to develop diabetes, but the person's lifestyle may determine whether they develop the disease.

This **bidirectional interplay** between nature and nurture is the **epigenetic framework**, which suggests that the environment can affect the expression of genes, actual changes in our DNA, just as **genetic predispositions** can impact a person's potentials. And environmental circumstances can trigger symptoms of a **genetic disorder**.

There is new research into this field of **epigenetics** that indicates historical trauma may impact the genetics for generations. For instance, the impact of the historical negative treatment of Native Americans tribes and Jewish people during the Holocaust may continue to alter the genes of the bloodlines.

So, how does this hidden pain travel through time?

There are a few paths it takes, and it manifests in many different ways. The diagram below shows how trauma is transmitted through generation. Sometimes, it's through **learned behavior**. Children who grow up witnessing fear, chronic stress, or dealing with abuse may unintentionally repeat the cycle later in life, demonstrating the impact of adverse childhood experiences (ACES). Some researchers point to studies show that experiences can affect how our genes work, and how **actual changes in DNA can be passed down to future generations (epigenetics)**. As early childhood educators **recognizing symptoms** in children such as constantly being on edge (anxiety), trouble trusting other people, feeling like they are not good enough, deeply worried or fearful may be signs a child has been impacted by generational trauma.

Transmission of Trauma Through Generations

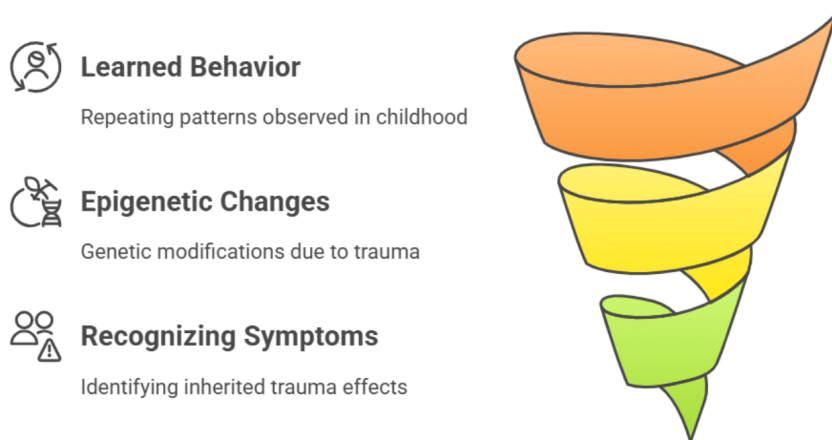


Fig.2.2. Transmission of Trauma Through Generations Diagram: learned behavior (repeating patterns observed in childhood); epigenetic changes (gene modifications due to trauma); and recognizing symptoms or identifying inherited trauma effect.

Image Source: Emily Schupmann. [Transmission of Trauma Through Generations](#).

Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective* (page 34). Licensed under CC BY-NC-SA 3.0
- Leve LD, Neiderhiser JM, Ganiban JM, Natsuaki MN, Shaw DS, Reiss D. *The Early Growth and Development Study: A Dual-Family Adoption Study from Birth Through Adolescence* *Twin Res Hum Genet*. 2019 Dec;22(6):716-727. doi: 10.1017/thg.2019.66. Epub 2019 Sep 17. PMID: 31526412; PMCID: PMC7056588.
- Overstreet, Laura, *Lifespan Development Module 3: Prenatal Development*. *Lifespan Psychology*. Licensed under CC BY 4.0
- Schupmann, Emily. *Breaking Generational Trauma: A Path to Healing and Growth*. *Emily (Rodriguez) Schupmann and Associates*. EmilySchupmann.com/blog.

2.3: Environment Correlations

Environment Correlations

Environment Correlations refer to the processes by which genetic factors contribute to variations in the environment.

There are three types of **genotype-environment correlations**:

- **Passive genotype-environment correlation** occurs when children passively inherit the genes and the environments their family provides. Certain behavioral characteristics, such as being athletically inclined, may run in families. The children have inherited both the genes that would enable success at these activities and given the environmental encouragement to engage in these actions.
- **Evocative genotype-environment correlation** refers to how the social environment reacts to individuals based on their inherited characteristics. For example, whether one has a more outgoing or shy temperament will affect how he or she is treated by others.
- **Active genotype-environment correlation** occurs when individuals seek out environments that support their genetic tendencies. This is also referred to as niche picking. For example, children who are musically inclined seek out music instruction and opportunities that facilitate their natural musical ability.



Fig 2.2a. Genetics combined with opportunity may enable athletic success as seen as this girl kicking a soccer ball.

Image Source: Bhong Bahala. [Young Girl Kicking a Soccer Ball](#). *Unsplash*. Free to use under the Unsplash License

Genotype-Environment Interactions

Genotype-environment interactions involve genetic susceptibility to the environment. Adoption studies provide evidence for genotype-environment interactions. For example, "The Early Growth and Development Study: A Dual-Family Adoption Study from Birth Through Adolescence" followed 360 adopted children and their adopted and biological parents in a longitudinal study. Results have shown that children whose biological parents exhibited psychopathology, exhibited significantly fewer behavior problems when their adoptive parents used more structured parenting than unstructured. Additionally, elevated psychopathology in adoptive parents increased the risk for the children's development of behavior problems, but only when the biological parents' psychopathology was high. Consequently, the results show how environmental effects on behavior differ based on the genotype, especially stressful environments on genetically at-risk children.

Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective* (page 34)). Licensed under CC BY-NC-SA 3.0
- Leve LD, Neiderhiser JM, Ganiban JM, Natsuaki MN, Shaw DS, Reiss D. [The Early Growth and Development Study: A Dual-Family Adoption Study from Birth Through Adolescence](#) Twin Res Hum Genet. 2019 Dec;22(6):716-727. doi: 10.1017/thg.2019.66. Epub 2019 Sep 17. PMID: 31526412; PMCID: PMC7056588.
- Overstreet, Laura, [Lifespan Development Module 3: Prenatal Development](#). *Lifespan Psychology*. Licensed under CC BY 4.0

2.4: Genes and Chromosomes

Genes and Chromosomes

Now, let's look more closely at just nature. **Nature refers to the contribution of genetics to one's development.**

- **Genes** - the basic building block of the nature perspective and are the recipes for making proteins
- **Proteins** - influence the structure and functions of cells.
- **Chromosomes** - a package of DNA containing part or all of the genetic material of an organism. an estimated 20,500 genes for humans

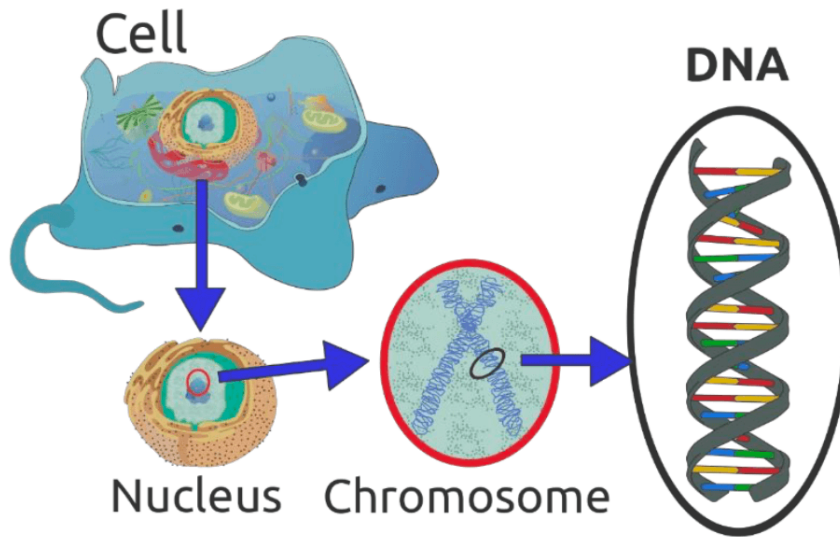


Figure 2.4 – DNA's location within a cell.

Image Source: [Eukaryote DNA](#). Wikimedia Commons. This file is licensed under the Creative Commons Attribution-Share Alike 3.0 license.

Human Chromosomes

Chromosomes are string-like structures located inside the nucleus of animal and plant cells. Scientists gave this name to chromosomes because the structures become strongly stained when colorful dyes are applied to them.

Normal human cells contain 46 **chromosomes** (or 23 pairs; one from each parent) in the nucleus of the cells. After **conception**, most cells of the body are created by a process called **mitosis**. Mitosis is defined as the cell's nucleus making an exact copy of all the chromosomes and splitting into two new cells.

However, the cells used in sexual reproduction, called the **gametes** (sperm or ova), are formed in a process called **meiosis**. In meiosis, the gamete's chromosomes duplicate, and then divide twice resulting in four cells containing only half the genetic material of the original gamete.

Fig. 2.4.1. Types of Cell Division: Mitosis and Meiosis

Type of Cell Division	Explanation	Steps
-----------------------	-------------	-------

Mitosis	All cells, EXCEPT those used in sexual reproduction, are created by mitosis .	Step 1. Chromosomes make a duplicate copy Step 2. Two identical cells are created
Meiosis	Cells used in sexual reproduction are created by meiosis .	Step 1. Exchange of gene between the chromosomes (crossing over) Step 2. Chromosomes make a duplicate Step 3. First cell division Step 4. Second cell division

The diagram shows the replication of parent cells replication, and then how the cells replicate via **mitosis** and **meiosis**.

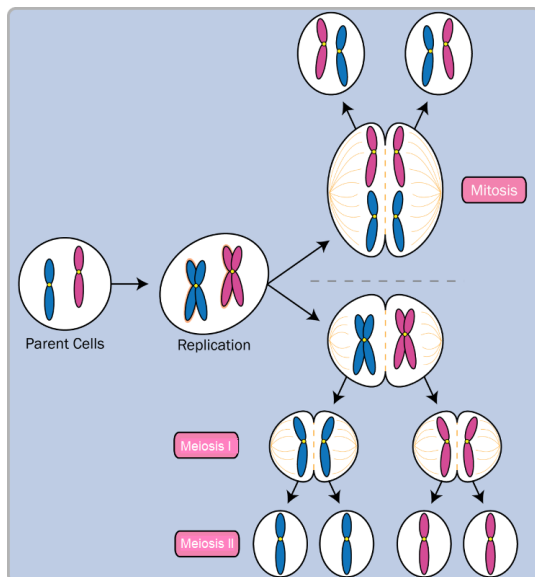


Fig. 2.4.2. Diagram showing parent cells, replication, then how the cells replicate via mitosis, then meiosis.

Image Source: Community College Consortium for Bioscience Credentials. [Mitosis v. Meiosis](#). Wikimedia.com. This file is licensed under the Creative Commons Attribution 3.0 license.

Two Types of Chromosomes

Chromosomes in humans can be divided into two types:

- **autosomes** - body chromosomes
- **allosomes** - sex chromosomes

Human cells have 23 pairs of chromosomes (22 pairs of autosomes and one pair of sex chromosomes), a total of 46 per cell. Given the number of genes present and the unpredictability of the **meiosis process**, the likelihood of having offspring that are genetically identical (and not twins) is one in trillions

Of the 23 pairs of chromosomes created at conception, 22 pairs are similar in length. These are called **autosomes** (body chromosomes). The remaining pair, are called **allosomes** (sex chromosomes), may differ in length. If a child receives the combination of XY, the child will be genetically male. If the child receives the combination XX, the child will be genetically female.

Below is an image of what the 23 pairs of chromosomes look like. Notice the differences between the sex chromosomes in **female (XX)** and **male (XY)**

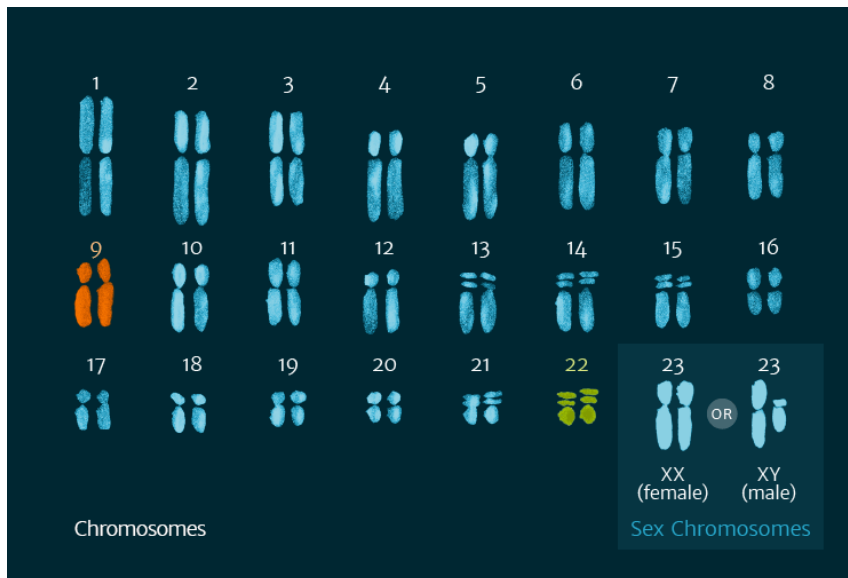


Fig.2.3.3. Chromosome Chart showing 22 autosomes which vary in length, the longest being the first chromosome and gradually shortening. The 23rd chromosome is represented by an example of XX female chromosome of identical lengths, and the XY male chromosome with the Y chromosome being approximately half the height of the X chromosome.

Image Source: [Inside the Cell](#). CML Support Group. Open Access. July 2021.

Genotypes and Phenotypes & Patterns on Inheritance

The word **genotype** refers to the total of all the genes a person inherits. The word **phenotype** refers to the features that are expressed. Look in the mirror. What do you see, your genotype or your phenotype? What determines whether genes are expressed?

Because genes are inherited in pairs on the chromosomes, we may receive either the same version of a gene from our mother and father, that is, be **homozygous** for that characteristic the gene influences. In this situation we will display that characteristic (eye or hair color for example).. If we receive a different version of the gene from each parent, that is referred to as **heterozygous**. It is in the heterozygous condition that it becomes clear that not all genes are created equal. Some genes are **dominant**, meaning they express themselves in the phenotype even when paired with a different version of the gene, while their silent partner is called **recessive**. Recessive genes express themselves only when paired with a similar version gene. Geneticists refer to different versions of a gene as **alleles**.

Ex: dominant (alleles)

- curly hair, dark hair
- normal vision
- ability to roll the tongue
- right-handedness
- freckles

Ex: recessive (alleles)

- red hair, straight hair

- nearsightedness
- Type O blood
- blue eyes
- left-handedness

Most characteristics are not the result of a single gene; they are **polygenic**, meaning they are the result of several genes. In addition, the dominant and recessive patterns described above are usually not that simple either. Sometimes the dominant gene does not completely suppress the recessive gene; this is called **incomplete dominance**.

Sources

- Lally, Martha a and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#) (page 34-35) Licensed under CC BY-NC-SA 3.0.

2.4.1: Genetic Disorders

Genetic Disorders

Most of the known genetic disorders are **dominant gene-linked**; however, most dominant gene linked disorders are not serious or debilitating. For example, the majority of those with Tourette's Syndrome suffer only minor tics from time to time and can easily control their symptoms. When dominant gene linked diseases are serious, they do not tend to become symptomatic until later in life. Huntington's Disease is a dominant gene linked disorder that affects the nervous system and is fatal but does not appear until midlife.

Recessive gene disorders, such as cystic fibrosis and sickle-cell anemia, are less common but may claim more lives because they are less likely to be detected as people are unaware that they are carriers of the disease.

Some genetic disorders are sex-linked; the defective gene is found on the X-chromosome.

- Males have only one X chromosome so are at greater risk for sex-linked disorders due to a recessive gene such as hemophilia, color-blindness, and baldness.
- Females are affected by recessive genetic defects, when they inherit the recessive gene on both X-chromosomes. If the defective gene is dominant, females are equally at risk.

Recessive Disorders (Homozygous): The individual inherits a gene change from both parents. If the gene is inherited from just one parent, the person is a carrier and does not have the condition.

Fig. 2.4.1. Recessive Disorders (Homozygous)

Disorder	Description	Cases per Birth
Sickle Cell Disease (SCD)	A condition in which the red blood cells in the body are shaped like a sickle (like the letter C) and affect the ability of the blood to transport oxygen.	1 in 500 Black births 1 in 36,000 Hispanic births
Cystic Fibrosis (CF)	A condition that affects breathing and digestion due to thick mucus building up in the body, especially the lungs and digestive system. In CF, the mucus is thicker than normal and sticky.	1 in 3500
Phenylketonuria (PKU)	A metabolic disorder in which the individual cannot metabolize phenylalanine, an amino acid. Left untreated, intellectual deficits occur. PKU is easily detected and is treated with a special diet.	1 in 10,000
Tay Sachs Disease	Caused by an enzyme deficiency resulting in the accumulation of lipids in the nerves cells of the brain. This accumulation results in progressive damage to the cells and a decrease in cognitive and physical development. Death typically occurs by age five.	1 in 4000, however, 1 in 30 American Jews is a carrier and 1 in 20 French Canadians is a carrier.
Albinism	When the individual lacks melanin and processes little to no pigment in the skin, hair, and eyes. Vision problems can also occur.	Fewer than 20,000 US cases per year.

Fig. 2.4.1.1. Autosomal Dominant Disorders (Heterozygous)

Disorder	Description	Cases per Birth
Huntington's Disease	A condition that affects the individual's nervous system. Nerve cells become damaged, causing various parts of the brain to deteriorate. The disease affects movement, behavior and cognition. It is fatal and occurs at midlife.	1 in 10,000
Tourette Syndrome	A tic disorder which results in uncontrollable motor and vocal tics as well as body jerking	1 in 250
Achondroplasia	The most common form of disproportionate short stature. The individual has abnormal bone growth resulting in short stature, disproportionately short arms and legs, short fingers, a large head, and specific facial features.	1 in 15,000-40,000

Fig. 2.4.1.2. Sex-Linked Disorders

Disorder	Description	Cases per Birth
Fragile X Syndrome	Occurs when the body cannot make enough of a protein it needs for the brain to grow and problems with learning and behavior can occur. Fragile X syndrome is caused from an abnormality in the X chromosome, which then breaks. If a female has a fragile X, her second X chromosome usually is healthy, but males with fragile X don't have a second healthy X chromosome. Therefore, symptoms of Fragile X usually are more serious in males	1 in 4000 males 1 in 8000 females
Hemophilia	Occurs when there are problems in blood clotting causing both internal and external bleeding.	1 in 10,000 males
Duchenne Muscular Dystrophy	A weakening of the muscles resulting in an inability to move, wasting away, and possible death.	1 in 3500 males

Chromosomal Abnormalities

A **chromosomal abnormality** occurs when a child inherits too many or too few chromosomes. The most common cause of chromosomal abnormalities is the age of the mother. As the mother ages, the ovum is more likely to suffer abnormalities due to longer term exposure to environmental factors. Consequently, some gametes do not divide evenly when they are forming. Therefore, some cells have more than 46 chromosomes. In fact, it is believed that close to half of all zygotes have an odd number of chromosomes. Most of these **zygotes** fail to develop and are spontaneously aborted by the mother's body (miscarriage).

Autosomal Chromosome Disorders: The individual inherits too many or too few chromosomes.

Fig. 2.4.1.3. Autosomal Chromosomal Disorders

Disorder	Description
Down Syndrome/ Trisomy 21	Caused by an extra chromosome 21 and includes a combination of birth defects. Affected individuals have some degree of intellectual disability, characteristic facial features, often heart defects, and other health problems. The severity varies greatly among affected individuals.
Trisomy 9 Mosaicism	Caused by having an extra chromosome 9 in some cells. The severity of effects relates to the proportion of cells with extra chromosomes. The effects include fetal growth restriction resulting in low birth weight and multiple anomalies, including facial, cardiac, musculoskeletal, genital, kidney, and respiratory abnormalities.
Trisomy 13	Caused by an extra chromosome 13. Affected individuals have multiple birth defects and generally die in the first weeks or months of life.
Trisomy 18	Caused by an extra chromosome 18 and the affected individual also has multiple birth defects and early death.



Image Source: Rich Johnson. [The Down Syndrome Association of Central Florida's Step Up for Down Syndrome](#). Flickr.

When the abnormality is on 23rd pair, the result is a sex-linked chromosomal abnormality. This happens when a person has less than or more than two sex chromosomes.

Fig. 2.4.1.4. Sex-Linked Chromosomal Disorders

Disorder	Description
Turner Syndrome (XO)	Caused when all or part of one of the X chromosomes is lost before or soon after conception due to a random event. The resulting zygote has an XO composition. Turner Syndrome affects cognitive functioning and sexual maturation in girls. Infertility and a short stature may be noted.

Klinefelter Syndrome (XXY)	Caused when an extra X chromosome is present in the cells of a male due to a random event. The Y chromosome stimulates the growth of male genitalia, but the additional X chromosome inhibits this development. The male can have some breast development, infertility, and low levels of testosterone.
XYY Syndrome	Caused when an extra Y chromosome is present in the cells of a male. There are few symptoms. They may include being taller than average, acne, and an increased risk of learning problems. The person is generally otherwise normal, including normal fertility.
Triple X Syndrome (XXX)	Caused when an extra X chromosome is present in the cells of a female. It may result in being taller than average, learning difficulties, decreased muscle tone, seizures, and kidney problems.

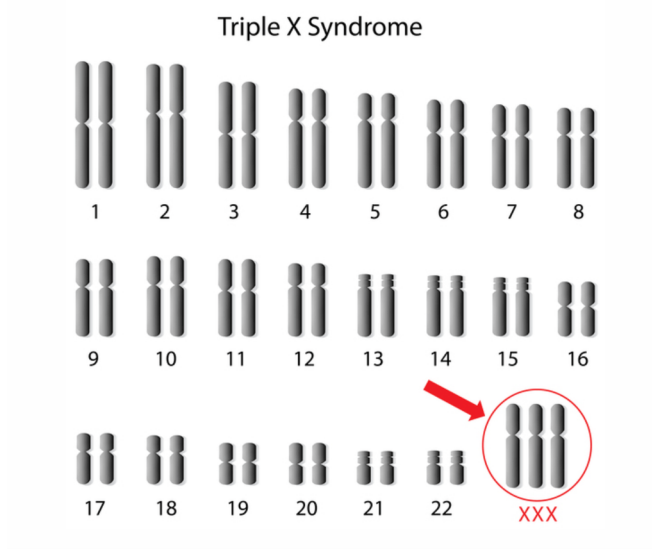


Fig. 2.4.1.5. Depiction of an extra copy of the X chromosome (XXX) on the 23rd pair of chromosomes.

Image Source: [Trisomy X. Medline Plus.](#)

Source

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective* (page 38, 39). Licensed under CC BY-NC-SA 3.0

2.5: Prenatal Development

Prenatal Development

Prenatal development is divided into three periods:

- germinal period
- embryonic period
- fetal period

The Germinal Period

The **germinal period** (about 14 days in length) lasts from **conception** (the moment the egg and sperm join) to **implantation** of the fertilized egg in the **lining of the uterus**. At ejaculation millions of sperm are released into the vagina, but only a few reaches the egg and typically only one **fertilizes** the egg. Once a single sperm has entered the wall of the egg, the wall becomes hard and prevents other sperm from entering. After the sperm has entered the egg, the tail of the sperm breaks off and the head of the sperm, containing the **genetic information** from the father, unites with the **nucleus of the egg**. It is typically fertilized in the top section of the **fallopian tube** and continues its journey to the uterus. As a result, a new cell is formed. This cell, containing the combined genetic information from both parents, is referred to as a **zygote**.

During this time, the organism begins cell division through **mitosis**. After five days of mitosis there are 100 cells, which is now called a **blastocyst**. The blastocyst consists of both an inner and outer group of cells. The inner group of cells, or **embryonic disk** will become the embryo, while the outer group of cells, or **trophoblast**, becomes the support system which nourishes the developing organism. *This stage ends when the blastocyst fully implants into the uterine wall.*

- **Mitosis** is a fragile process and fewer than one half of all zygotes survive beyond the first two weeks. Some of the reasons for this include: the egg and sperm do not join properly, thus their genetic material does not combine, there is too little or damaged genetic material, the zygote does not replicate, or the blastocyst does not implant into the uterine wall. The failure rate is higher for in vitro conceptions. The figure below illustrates the journey of the ova from its release to its fertilization, cell duplication, and implantation into the uterine lining.

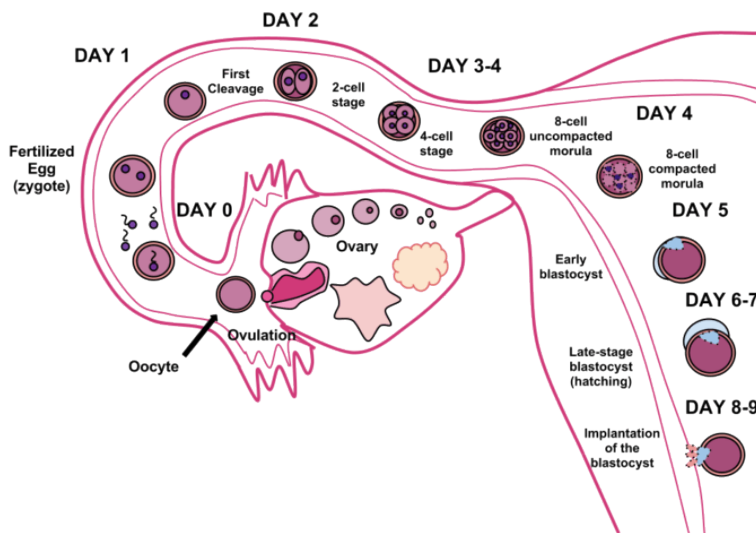


Fig. 2.5 Human fertilization: The sperm and ovum unite through fertilization, creating a zygote that (over the course of 8–9 days) will implant in the uterine wall, where it will reside over the course of 9 months.

Image Source: "[First Week of Development](#)." Boundless Anatomy and Physiology.

The Embryonic Period

Starting the third week, the **blastocyst** has implanted in the uterine wall. Upon implantation this multi-cellular organism is called an embryo. Now blood vessels grow forming the placenta. The **placenta** is a structure connected to the uterus that provides nourishment and oxygen from the mother to the developing embryo via the **umbilical cord**.

During this period, cells continue to **differentiate**. Growth during prenatal development occurs in two major directions:

- from head to tail called **cephalocaudal development**
 - structures nearest the head develop before those nearest the feet
- from the midline outward referred to as **proximodistal** development
 - structures nearest the torso develop before those away from the center of the body (such as hands and fingers)

You will see that this pattern continues after birth.

The head develops in the fourth week and the precursor to the heart begins to pulse. In the early stages of the embryonic period, gills and a tail are apparent. However, by the end of this stage they disappear, and the organism takes on a more human appearance.

About 20 percent of organisms fail during the embryonic period, usually due to **gross chromosomal abnormalities**, often before the mother even knows she is pregnant. It is during this stage that the major structures of the body are taking form, making the **embryonic period** the time when the organism is most vulnerable to the greatest amount of damage if exposed to harmful substances. Prospective mothers are not often aware of the risks they introduce to the developing embryo during this time. The embryo is approximately 1 inch in length and weighs about 4 grams (.14 oz) at the end of eight weeks. The embryo can move and respond to touch at this time.



Fig 2.5.1. Human embryo at seven weeks: An embryo from an ectopic pregnancy, still in the oviduct. This embryo is about five weeks old (or from the seventh week of menstrual age). The heart is the dark spot at the center of the image, bulging out of the embryo.

Image Source: "[Fifth Through Eighth Weeks of Development](#)" *Boundless Anatomy and Physiology*.

The Fetal Period

From the ninth week until birth (which is forty weeks for a full-term pregnancy), the organism is referred to as a **fetus**. During this stage, the major structures are continuing to develop. By the third month, the fetus has all its body parts including external genitalia. The fetus is about 3 inches long and weighs about 28 grams (just under 1 oz). In the following weeks, the fetus will develop hair, nails, teeth and the excretory and digestive systems will continue to develop.

During the 4th - 6th months, the eyes become more sensitive to light and hearing develops. The respiratory system continues to develop, and reflexes such as sucking, swallowing and hiccupping, develop during the 5th month. Cycles of sleep and wakefulness are present at this time as well. The first chance of survival outside the womb, known as the **age of viability**, is reached at about 24 weeks. Many practitioners hesitate to resuscitate before 24 weeks. Most of the neurons in the brain have developed by 24 weeks, although they are still rudimentary, and the **glial or nurse cells** that support neurons continue to grow. At 24 weeks the fetus can feel pain.

Between the 7th - 9th months, the fetus is primarily preparing for birth. It is exercising its muscles and its lungs begin to expand and contract. The fetus gains about 5 pounds and 7 inches during this last **trimester** of pregnancy, and during the 8th month a layer of fat develops under the skin. This layer of fat serves as insulation and helps the baby regulate body temperature after birth.

At around 36 weeks the fetus is almost ready for birth. It weighs about 6 pounds and is about 18.5 inches long. By week 37 all the fetus's organ systems are developed enough that it could survive outside the mother's uterus without many of the risks associated with premature birth.

The fetus continues to gain weight and grow in length until approximately 40 weeks. By then the fetus has very little room to move around and birth becomes imminent. The progression through the stages is shown in the following figure.



Figure 2.5.2. During the fetal stage, the baby's brain develops and the body adds size and weight until the fetus reaches full-term development.

Image Source: "Stages of Prenatal Development." *Lifespan Development*. Lumen Learning.

Source

- "First Week of Development." *Boundless Anatomy and Physiology*. Lumen Learning is licensed under a Creative Commons Attribution 4.0 International License, except where otherwise noted.

2.6: Prenatal Assessment

Prenatal Assessments

Several assessments are suggested to women as part of their routine prenatal care to find conditions that may increase the risk of complications for the mother and fetus. These can include blood and urine analyses and screening and diagnostic tests for birth defects.

Ultrasound

Ultrasound is one of the main screening tests done in combination with blood tests. Ultrasound is a test in which sound waves are used to examine the fetus. There are two general types. **Transvaginal ultrasounds** are used in early pregnancy, while **transabdominal ultrasounds** are more common and used after 10 weeks of pregnancy (typically, 16 to 20 weeks).

Ultrasounds are used to check the fetus for defects or problems. It can also find out the age of the fetus, location of the placenta, fetal position, movement, breathing and heart rate, amount of amniotic fluid in the uterus, and number of fetuses. Most women have at least one ultrasound during pregnancy, but if problems are noted, additional ultrasounds may be recommended.

When diagnosis of a birth defect is necessary, ultrasounds help guide the more invasive diagnostic tests of amniocentesis and chorionic villus sampling. Amniocentesis is a procedure in which a needle is used to withdraw a small amount of amniotic fluid and cells from the sac surrounding the fetus and later tested.



Image Source: [Transvaginal Ultrasound Overview](#). Advanced OBDYN Institute. TopLine MD Alliance,

Amniocentesis

When diagnosis of a birth defect is necessary, ultrasounds help guide the more invasive diagnostic test of **amniocentesis**. Amniocentesis is a procedure in which a needle is used to withdraw a small amount of amniotic fluid and cells from the sac surrounding the fetus and later tested.

Amniocentesis can be used to diagnose many different gene and chromosome problems in the baby, including:

- Anencephaly (when the baby is missing a large portion of the brain)
- Down syndrome

- Rare metabolic disorders that are passed down through families
- Other genetic problems, like trisomy 18 (also known as Edwards syndrome)
- Infections in the amniotic fluid

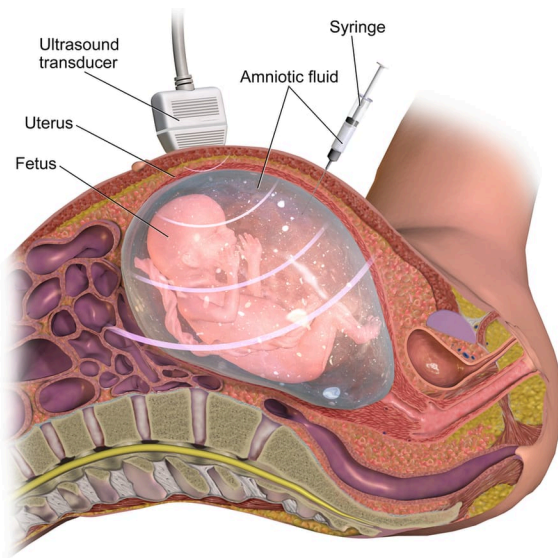


Image Source: [Amniotic fluid test \(AFT\)](#). *Amneotesis*. Wikipedia.com.

Chorionic Villus Sampling

Ultrasounds help guide the diagnostic test **Chorionic Villus Sampling**, a procedure entails sampling of the **chorionic villus** (placental tissue) and testing it for chromosomal abnormalities. **CVS** usually takes place at 10–12 weeks' gestation, earlier than amniocentesis or another procedure, percutaneous umbilical cord blood sampling, and is the preferred technique before 15 weeks. Both amniocentesis and chorionic villus sampling have a risk of miscarriage, and consequently they are not done routinely.

Sources

- "[Amniocentesis](#)." MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated Jun 2024; cited 2020 Jul 1].
- Lally, Martha and Suzanne Valentine-French. *[Lifespan Development: A Psychological Perspective](#)*. Licensed under CC BY-NC-SA 3.0

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2.7: Teratogens

Teratogens - Environmental Factors and Birth Defects

Good **prenatal care** is essential to protect against **maternal and fetal/infant mortality** and **birth complications**. The **embryo** and **fetus** are most at risk for some of the most severe problems during the first three months of development. Unfortunately, this is a time at which many mothers are unaware that they are pregnant. Today, we know many of the factors that can jeopardize the health of the developing child. The study of factors that contribute to birth defects is called **teratology**.

Factors influencing prenatal risks:

- **Timing of the exposure:** structures in the body are vulnerable to the most severe damage when they are in the process of forming. If a substance is introduced during a structure's critical period (time of development), the damage to that structure may be greater. For example, the ears and arms reach their critical periods at about 6 weeks after conception. If a mother exposes the embryo to certain substances during this period, the arms and ears may be malformed.
- **Amount of exposure:** some substances are not harmful unless the amounts reach a certain level. The critical level depends in part on the size and metabolism of the mother.
- **Number of teratogens:** Fetuses exposed to multiple teratogens typically have more problems than those exposed to only one.
- **Genetics:** genetic makeup also plays a role on the impact a teratogen might have on the child. This is suggested by fraternal twins exposed to the same prenatal environment, but they do not experience the same teratogenic effects. The genetic makeup of the mother can also have an effect; some mothers may be more resistant to teratogenic effects than others.
- **Being male or female:** Males are more likely to experience damage due to teratogens than are females. It is believed that the Y chromosome, which contains fewer genes than the X, may have an impact.

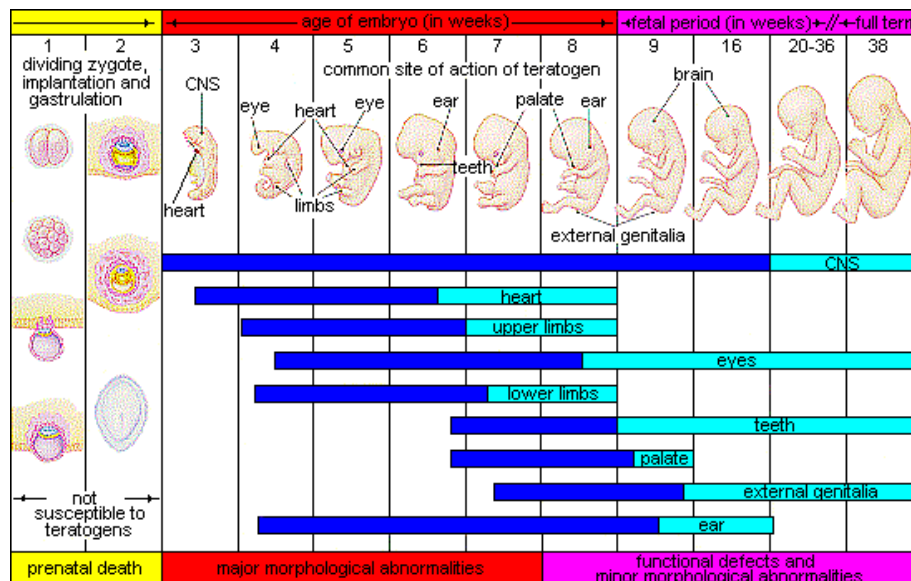


Fig. 2.7. Development of embryo into a fetus and stages at which it is vulnerable to developing major morphological abnormalities (first 8 weeks) and development of functional defect and minor morphological abnormalities, (8 weeks-birth).

Image Source: [Heredity, Prenatal Development, and Birth: Teratogens](#). *Lifespan Development*. License: CC BY-NC-SA: Attribution-NonCommercial-ShareAlike.

Categories of Teratogens

Be aware of these common teratogens that can contribute to issues with embryonic and fetal development as well as birth defects and abnormalities.

Physical Teratogens

High temperatures are associated with neural tube defects (birth defects of the brain, spine or spinal cord), spontaneous abortions (miscarriage), various cardiovascular abnormalities (congenital heart disease, arrhythmias). Examples of causes of high temperatures include:

- saunas, hot tubs
- intense exercise
- radiation - x-rays, gamma rays
- infections that raise a pregnant woman's body temperature to 102 degrees Fahrenheit or higher.

Metabolic Conditions

Metabolic conditions are abnormalities in the chemical process of producing energy from food, and thereby affect the development and function of the body. For example, if a pregnant woman is malnourished then her fetus likely lacks the nutrients essential for its proper development which can result in anything from small birth weight to malformation of critical organs like the lungs, heart, or kidneys; and neurological issues like developmental delays, seizures, and intellectual disabilities. Examples of metabolic conditions are:

- malnutrition
- uncontrolled diabetes
- thyroid disorders

Infections

Maternal infections can cause congenital abnormalities and birth defects along with conditions such as hearing loss, visual impairment, and intellectual disabilities.

- rubella (measles) virus
- autoimmune diseases
- herpes simplex virus
- syphilis

Alcohol

One of the most commonly used teratogens is alcohol. Alcohol use during pregnancy is the leading preventable cause of intellectual disabilities in children in the United States. Alcohol consumption, particularly during the second month of prenatal development but at any point during pregnancy, may lead to neurocognitive and behavioral difficulties that can last a lifetime. Risks of drinking alcohol while pregnant include:

- miscarriage
- pre-term birth
- sudden infant death syndrome (SIDS)
- fetal alcohol syndrome (FASD)

Drugs and Chemicals

When pregnant females ingest or absorb these, they may cause a variety of different effects based on specific agent, amount of exposure, and timing. This category includes

- heavy metals (including lead)

- insecticides and herbicides
- prescription and over the counter drugs (OTCs), including some vitamins
- illicit and recreational drugs
- cigarettes/nicotine
- caffeine

While there are many, many potential teratogens, the following tables look at the effects of some different types of teratogens. The risks of exposure vary based on lifestyle and health.

Fig. 2.7.1. – Drugs as Teratogens

Teratogen	Potential Effects
Caffeine	Moderate amounts of caffeine (200 mg or around 12 ounces of coffee) appear to be safe during pregnancy. Some studies have shown a link between higher amounts of caffeine and miscarriage and preterm birth.
Tobacco	Tobacco use has been associated with low birth weight, placenta previa, preterm delivery, fetal growth restriction, sudden infant death syndrome, cleft lip or palate, and later health problems (such as high blood pressure and diabetes).
Alcohol	There is no safe amount of alcohol a woman can drink while pregnant. Alcohol can slow down the baby's growth, affect the baby's brain, and cause birth defects, and may results in fetal alcohol spectrum disorder (FASD). The effects can be mild to severe. Children born with a severe form of FASD can have abnormal facial features, severe learning disabilities, behavioral problems, and other problems.
Cocaine	Cocaine use has connected with low birth weight, stillbirths, spontaneous abortion, placental abruption, premature birth, miscarriage, and neonatal abstinence syndrome (fetal addiction leads the newborn to experience withdrawal).
Marijuana	No amount of marijuana has been proven safe to use during pregnancy. Heavy use has been associated with brain damage, premature birth, and stillbirth
Heroin	Using heroin during pregnancy can cause birth defects, placental abruption, premature birth, low birthweight, neonatal abstinence syndrome, still birth, and sudden infant death syndrome (SIDS).
Over the Counter (OTC) medication	Some OTC medications are safe to use during pregnancy and others may cause health problems during pregnancy. Pregnant women should consult their health care provider before using OTC medications.
Prescription drugs	Some prescription drugs can cause birth defects that change the shape or function of one or more parts of the body that can affect overall health. Pregnant women should consult their health care provider before discontinuing or starting new medications

Herbal or dietary supplements	Except for some vitamins, little is known about using herbal or dietary supplements while pregnant. Most often there are no good studies to show if the herb can cause harm to you or your baby. Also, some herbs that are safe when used in small amounts as food might be harmful when used in large amounts as medicines
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Fig. 2.7.2. – Environmental Teratogens

Teratogen	Potential Effects
Lead	Exposure to high levels of lead before and during pregnancy can lead to high blood pressure, problems with fetal brain and nervous system development, premature birth, low birthweight, and miscarriage.
Mercury	Exposure to mercury in utero can cause brain damage and hearing and vision problems.
Radiation	Exposure to radiation during pregnancy (especially between 2 and 18 weeks of pregnancy) can slow growth, cause birth defects, affect brain development, cause cancer, and cause miscarriage.
Solvents	These chemicals include de-greasers, paint thinners, stain and varnish removers, paints, and more Maternal inhalation of solvents can cause fetal exposure than may cause miscarriage, slow fetal growth, premature birth, and birth defects.

Fig. 2.7.3 – Maternal Infections as Teratogens

Teratogen	Potential Effects
Rubella (measles)	Congenital infection (becoming infected in the uterus) can damage the development of the eyes, ears, heart, and brain and result in deafness.
Zika	Congenital infection can cause microcephaly and other severe brain abnormalities.
Varicella (chicken pox)	Congenital infection can cause a severe form of the infection affecting the eyes, limbs, skin, and central nervous system.
Sexually transmitted infections	Infections such as HIV, gonorrhea, syphilis, and chlamydia can be passed from the mother during pregnancy and/or delivery.
Listeria	Pregnant women are more susceptible to this food-borne illness. Congenital infection can cause miscarriage, stillbirth, premature labor, and neonatal sepsis.

Fig. 2.7.4 – Pet/Animal Teratogens

Teratogen	Potential Effects
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Toxoplasmosis	This parasite can be passed through cat feces and undercooked meat (especially pork, lamb, or deer meat). If the fetus is infected it can cause miscarriage, stillbirth, hydrocephalus, macro or microcephalus, vision issues, and damage to the nervous system.
Lymphocytic choriomeningitis	This virus carried by rodents including mice, hamsters, and guinea pigs. If an infected mother passes it to her fetus it can cause issues with brain development, long-term neurological and/or visual impairment, and higher mortality rates after birth

Sources

- Overstreet,, Laura. [Chapter 3: Prenatal Development – Environmental Risks:Teratogens](#). *Lifespan Psychology*. Licensed under CC BY 4.0.
- [Prescription drugs, over-the-counter drugs, supplements and herbal products](#) (n.d.). Retrieved from: March of Dimes.org.
- Tantibanchachai, Chanapa, [Teratogens](#). *Embryo Project Encyclopedia* (2014-01-22). Licensed under CC BY-NC-SA 3.0.

2.8: Maternal Factors



Image Source: Petar Milošević. [Pregnant Woman, Third Trimester](#). Wikimedia Commons. Licensed under the Creative Commons Attribution-Share Alike 4.0 International license.

Maternal Factors and the Outcome of Pregnancy

Maternal factors significantly impact prenatal development, including age, health conditions, lifestyle choices, and environmental exposures which can affect fetal growth, development, and overall health outcomes for both mother and child.

Mothers over 35

Most women over 35 who become pregnant are in good health and have healthy pregnancies. However, women over age 35 may have an increased risk of:

- fertility problems
- high blood pressure
- diabetes
- miscarriages
- placenta previa (placenta completely or partially covers the opening of the uterus/cervix)
- Cesarean section
- premature birth
- stillbirth
- baby has a genetic disorder or other birth defects

Because a woman is born with all her eggs, environmental teratogens can affect the quality of the eggs as women get older. Also, a woman's reproductive system ages which can adversely affect the pregnancy. Some women over 35 choose special prenatal screening tests, such as a maternal blood screening, to determine if there are any health risks for the baby.

Although there are medical concerns associated with having a child later in life, there are also many positive consequences to being an "older" parent. Mature parents tend to be less stressed, more stable, demonstrate a strong family focus, possess greater self-confidence, and have more income. Having a child later in one's working life means overall higher wages. As a result, their children perform better on math and reading tests, and may be less prone to injuries or emotional troubles.

Teenage Pregnancy

A teenage mother is at a greater risk for having pregnancy complications including anemia, and high blood pressure. These risks are even greater for those under age 15. Infants born to teenage mothers have a higher risk for being premature and having low birthweight or other serious health problems. Premature and low birthweight babies may have organs that are not fully developed which can result in breathing problems, bleeding in the brain, vision loss, serious intestinal problems, and higher likelihood of dying.

Risks for teenage issues are due to the fact that teens

- are the most unlikely of all age groups not to early and regular prenatal care
- engage in negative behaviors including
 - eating unhealthy food
 - smoking or vaping
 - drinking alcohol
 - taking drugs

Gestational Diabetes

Gestational diabetes (GD or GDM) is a type of diabetes that develops exclusively in pregnancy when blood sugar levels get too high (hyperglycemia). It happens when the hormones from the placenta block your ability to use or make insulin. Insulin helps your body maintain the right amount of glucose in your blood. Too much glucose in your blood can lead to pregnancy complications. GD usually appears during the middle of pregnancy, between 24 and 28 weeks. Your pregnancy care provider will order a blood test to check for gestational diabetes.

If untreated, gestational diabetes can cause premature birth, stillbirth, the baby having breathing problems at birth, jaundice, or low blood sugar. Babies born to mothers with gestational diabetes can also be considerably heavier (more than 9 pounds) making the labor and birth process more difficult. For expectant mothers, untreated gestational diabetes can cause **preeclampsia** (high blood pressure and signs that the liver and kidneys may not be working properly).

Risk factors for gestational diabetes include age (being over age 25), being overweight or gaining too much weight during pregnancy, family history of diabetes, having had gestational diabetes with a prior pregnancy, and race and ethnicity (African-American, Native American, Hispanic, Asian, or Pacific Islander have a higher risk).

Eating healthy and maintaining a healthy weight during pregnancy can reduce the chance of gestational diabetes. Women who already have diabetes and become pregnant need to attend all their prenatal care visits and follow the same advice as those for women with gestational diabetes as the risk of preeclampsia, premature birth, birth defects, and stillbirth are the same.

High Blood Pressure (Hypertension)

Hypertension is a condition in which the pressure against the wall of the arteries becomes too high. There are two types of high blood pressure during pregnancy, gestational and chronic. Gestational hypertension only occurs during pregnancy and goes away after birth. Chronic high blood pressure refers to women who already had hypertension before the pregnancy or to those who developed it during pregnancy, and it did not go away after birth.

High blood pressure during pregnancy can cause premature birth and low birth weight (under five and a half pounds), placental abruption, and mothers can develop preeclampsia.

Rh Disease

Rh disease, also known as **hemolytic disease of the fetus and newborn (HDFN)**.

Rh is a protein found in the blood. Most people are **Rh-positive**, meaning they have this protein. Some people are **Rh-negative**, meaning this protein is absent. Mothers who are Rh-negative are at risk of having a baby with a form of anemia called **Rh disease**.

- A **father who is Rh-positive** and **mother who is Rh-negative** can conceive a **baby who is Rh-positive**. Some of the fetus's Rh positive blood cells may get into the mother's Rh negative bloodstream and her immune system is unable to recognize

the positive **Rh factor**. The mother's immune system then begins to produce antibodies to fight off what it thinks is a foreign invader. When her body produces immunity, the antibodies can cross the placenta and start to destroy the red blood cells of the developing fetus.

Often the first Rh positive baby is not harmed, because the process of developing antibodies takes time, but since the mother's body will continue to produce antibodies to the Rh factor across her lifetime, subsequent pregnancies can pose greater risk for a Rh-positive baby. Rh disease can lead to jaundice, anemia, heart failure, brain damage or death to the newborn.

Weight Gain during Pregnancy

During pregnancy most women need only an additional 300 calories per day to aid in the growth of the fetus. Gaining too little or too much weight during pregnancy can be harmful. Women who gain too little may have a baby who is low-birth weight, while those who gain too much are likely to have a premature or large baby. There is also a greater risk for the mother developing preeclampsia and diabetes, which can cause further problems during the pregnancy.

Putting on the weight slowly is best. Healthy food choices will help:

- Fresh fruits and vegetables make good snacks. They are full of vitamins and low in calories and fat.
- Eat breads, crackers, and cereals made with whole grains.
- Choose reduced-fat dairy products. You need at least 4 servings of milk products every day. However, using skim, 1%, or 2% milk will greatly reduce the amount of calories and fat you eat. Also choose low-fat or fat-free cheese or yogurt.

Stress

Some stress can be normal during pregnancy, but ongoing stress may create health issues for both the mother and infant. High levels of stress can cause complications including premature birth or a having a low-birthweight baby which places them an increased risk for health problems. Stress hormones released into the mother's system may cause complications by impacting a woman's immune systems resulting in an infection, and studies show findings consistent with theories that suggest that exposure to stress hormones in utero can affect children's brain development, immune system functioning, and childhood problems such as ADHD and anxiety.

Symptoms of stress in pregnancy can differ but may include:

- sleeping difficulties
- headaches or GI problems
- increased heart rate, fast or shallow breathing, feeling faint
- persistent worry, anxiety, or anger
- panic attacks
- obsessive or unpleasant thoughts
- repetition of certain actions, such as counting or checking
- eating too much or too little, or eating unhealthy foods
- difficulty unwinding or relaxing

Dealing with stress by smoking, drinking alcohol, or taking drugs, which can lead to problems in the pregnancy. There are no firm guidelines for how much stress is too much during pregnancy, but mothers-to-be should reach out to a healthcare professional if they find themselves struggling and unable to cope. Prompt treatment can improve the outcomes for both the pregnant woman and the developing fetus.

Depression

It is normal to feel a mix of emotions during pregnancy and about being pregnant. In addition pregnant women have a higher risk of depression due to increased stress, physical and hormonal changes in the body, as well as other life factors.

Depression is a significant medical condition in which feelings of sadness, worthlessness, guilt, and fatigue interfere with one's ability to function in daily life. It can occur before, during, or after pregnancy. Many women are treated for depression sometime between the year before pregnancy and year after pregnancy. Women who have experienced depression previously are more likely to have depression during pregnancy.

Signs of depression include:

- sadness, frequent crying, or unexplained anger
- new or worsening feelings of self-esteem, worthlessness, or hopelessness
 - difficulty following prenatal health recommendations because of feelings of helplessness or hopelessness
- not enjoying activities that were once fun or meaningful
- withdrawing from friends, family, school, work, or hobbies
- new physical health symptoms, such as headaches or stomach aches
- changes in eating/sleeping habits - eating/sleeping more or less than usual
- relationship stress
- difficulty feeling excited about the pregnancy or bonding with the baby after childbirth
- thoughts of death or suicide

Many women who experience depression during pregnancy have healthy pregnancies. Depression does not mean the baby will be unhealthy or make any particular pregnancy outcome inevitable. However, studies show that depression during pregnancy may raise the risk of:

- postpartum depression
- depression in the baby's father
- premature birth or low birth weight
- behavior problems or a difficult temperament in the baby
- changes in the baby's brain development

It's important to know that **depression during pregnancy is treatable**. Mothers-to-be should reach out to a healthcare professional if they find themselves struggling with depression. Prompt treatment can improve the outcomes for both the pregnant woman and the developing fetus.

Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*(pages 52-55). Licensed under CC BY-NC-SA 3.0
- Villines, Dawn. [Depression during pregnancy: Symptoms, treatment, and more](#). *Medical News Today*. December 2019.
- [What is gestational diabetes?](#) Gestational Diabetes. *Cleveland Clinic Health Library*. August 2024.

2.9: Paternal Impact

Paternal Impact



Image Source: Amina Filkins. [Pregnant couple sitting on sofa](#). Pexels.com. All photos and videos on Pexels are free to use.

A Father's Genes

A father's genes, along with the mother's, determine a child's genetic makeup which can influence the development of the fetus. A father's health, his lifestyle choices (diet, exercise, use of tobacco, alcohol, and drugs), and his exposure to environmental factors can impact sperm quality and, potentially, the health of the developing fetus.

The age of fathers at the time of conception is also an important factor. Preterm birth (PTB), low birthweight (LBW) and small-for-gestational age (SGA) are the major causes of infant mortality. Like women who are older, studies show that the children of men over 40 face an increased risk of autism, birth defects, achondroplasia (bone growth disorder) and schizophrenia. These are thought to be due to accumulated chromosomal aberrations and mutations during the maturation of sperm cells in older men.

In addition, men are more likely than women to work in occupations where hazardous chemicals are used, many of which have teratogenic effects or may cause genetic mutations - petrochemicals, lead, and pesticides that can cause abnormal sperm and lead to miscarriages or diseases. Men are also more likely to be a source of secondhand smoke for their developing offspring. It is known that smoking by the mother or around the mother can hinder prenatal development.

Source

- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#)(pages 52-55). Licensed under CC BY-NC-SA 3.0

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2.10: Monozygotic and Dizygotic Twins

Monozygotic and Dizygotic Twins

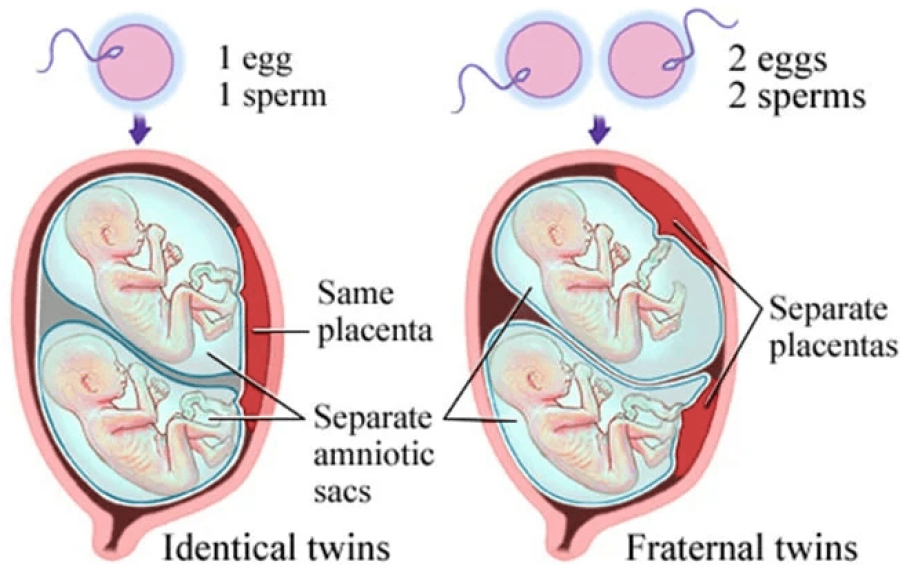


Fig. 2.10. Identical Twins : 1 egg and sperm; same placenta, separate amniotic sacs. Fraternal twins: 2 eggs and 3 sperms separate placentas and separate amniotic sacs.

Image Source: Aryal, Sagar. [Twins- Types, Causes and Significance](#). Microbe Notes. August 2023.

Identical Twins

Monozygotic twins (identical twins) occur when a fertilized egg splits apart in the first two weeks of development. The result is the creation of two separate, but genetically identical offspring. They possess the *same genotype and often the same phenotype*. About 1/3 of twins are monozygotic twins.



Image Source: Renee Mendonca77. [Twins Renee and Rhea](#). Wikimedia Commons.

Fraternal Twins

Dizygotic twins (fraternal twins) occur when two eggs or ova are released and fertilized by two separate sperm. These two individuals share the same amount of genetic material as would any two non-twin children from the same mother and father. In other words, *they possess a different genotype and phenotype*.

- Older mothers are more likely to have dizygotic twins than are younger mothers, and couples who use fertility drugs are also more likely to give birth to dizygotic twins.



Image Source: Mherf36. [Twin Brothers Alike](#). Wikimedia Commons. Image Source: Dpultzer. [Red Hair Twins](#). Wikimedia Commons

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2.11: Infertility and Complications of Pregnancy

Infertility and Building Families



When a couple has failed to conceive a child in a year, they receive the diagnosis of **infertility**. Infertility affects about 10-15 % of couples in the United States.

- **Male factors** create infertility in about 1/3 of the cases. For men, the most common cause is a **lack of sperm production** or **low sperm production**.
- **Female factors** cause infertility in another 1/3 of the cases. One of the most common causes of infertility is the **failure to ovulate**. Another cause of infertility in women is **Pelvic Inflammatory Disease (PID)**, which is an infection of a woman's reproductive organs.

Combined male and female factors contribute to the remainder of cases of infertility.

Options for Building Families

There are numerous options to pursue parenthood and building families.

- **Assisted Reproductive Technology (ART)**

The technology used to achieve pregnancy in procedures such as fertility medication (to stimulate ovulation), surgical procedures, artificial insemination IUI), in vitro fertilization (IVF) and surrogacy. These options are available for people who are experiencing infertility or cannot conceive children naturally (which also includes single parents, and *gay/lesbian couples*).

- **Intrauterine Insemination (IUI)**

A type of artificial insemination involves the placement of sperm directly into the uterus at the time of ovulation, either in a natural menstrual cycle or following ovarian stimulation.

- **In vitro fertilization (IVF)**

IVF generally starts with stimulating the ovaries to increase egg production. Most **fertility medications** are agents that stimulate

the development of follicles in the ovary. Examples are gonadotropins and gonadotropin releasing hormone. After stimulation, the physician surgically extracts one or more eggs from the ovary, and unites them with sperm in a laboratory setting, with the intent of producing one or more embryos. Fertilization takes place outside the body, and the fertilized egg is reinserted into the woman's reproductive tract, in a procedure called **embryo transfer**.

• Donor Gametes & Embryos

People can also use sperm, ova (eggs), and embryos from donors in conjunction with ART. These donations take place through agencies and donor banks or between private individuals. In the U.S., donors can be compensated for their donations.

• Surrogacy

In surrogacy, one woman (surrogate mother) carries a child for another person/s (commissioning person/couple), based on a legal agreement before conception requiring the child to be relinquished to the commissioning person/couple following birth. There are different types of surrogacy which relate to whether the ova used to conceive the child are her own (traditional surrogacy) or not (gestational surrogacy).

• Adoption

People can also choose to pursue adoption to build their families (with or without experiencing infertility). Adoption can take place through the foster care system, privately, or through agencies. Adoptions can be domestic (within the U.S.) or international. And they can be open (with differing amounts of contact between biological/birth families and adoptive families) or closed.

Complications of Pregnancy

Health problems that occur during pregnancy are referred to as **complications of pregnancy**. Some women bring existing health issues into pregnancy that could lead to complications while others experience health issues while they are pregnant. Some health issues are common and minor, while others are more serious.



Fig. 2.11. 12 Common Complications of pregnancy: miscarriage, gestational diabetes, preeclampsia, preterm labor, infections, depression and anxiety, vaginal bleeding, congenital disorders, issues with the placenta, anemia, gestational hypertension, amniotic fluid complications.

Image Source: [12 Common Pregnancy Complications](#). *ParentingStyles*.

Common Complications (Side Effects)

There are several common side effects of pregnancy. Not everyone experiences all of these, nor to the same degree. And although they are considered "minor", this is not to say that these problems are not potentially very uncomfortable. These side effects include

- nausea (usually during the first 3-4 months of pregnancy as a result of higher levels of estrogen in the system)
- heartburn, gas, constipation
- backache, leg cramps, varicose veins, varicose veins (as a result of carrying a heavy load on the abdomen)
- insomnia
- shortness of breath

Less Common Complications

- gestational diabetes (high blood sugar levels that resolve after childbirth)
- infections
- depression and anxiety
- vaginal bleeding
- anemia
- gestational hypertension (high blood pressure)
- amniotic fluid complications (too little or too much fluid)

Serious Complications

Serious complications of pregnancy can pose health risks to mother and child and that often require hospitalization. These include:

- **Hyperemesis gravidarum**

Characterized by severe nausea, vomiting, weight loss, and possibly dehydration. Signs and symptoms may also include vomiting many times a day and feeling faint. The exact causes of **hyperemesis gravidarum** are unknown.

Risk factors include the first pregnancy or a multiple pregnancy (twins, triplets, etc.); obesity; prior or family history of HG; trophoblastic disorder - a group of tumors that develop in the uterus (womb) during or after pregnancy, originating from the **trophoblastic tissue** which normally forms the placenta; and a history of eating disorders

Treatment includes drinking fluids and a bland diet, medication, and intravenous fluids. Hospitalization may be required. Hyperemesis gravidarum is estimated to affect 0.3–2.0% of pregnant women. Those affected have a low risk of miscarriage but a higher risk of premature birth.

- **Ectopic pregnancy**

Pregnancy begins with a fertilized egg. Normally, the fertilized egg attaches to the lining of the uterus. In a healthy pregnancy, the fertilized egg attaches itself to the lining of the uterus. In an ectopic pregnancy, the egg attaches itself somewhere outside the uterus usually to the inside of a fallopian tube. This type of ectopic pregnancy is called a **tubal pregnancy**. Sometimes, an ectopic pregnancy occurs in other areas of the body, such as the ovary, abdominal cavity or the lower part of the uterus (cervix), which connects to the vagina. About 1 in 50 pregnancies in the United States are tubal pregnancies and this number has been increasing because of the higher rates of pelvic inflammatory disease and the STI, Chlamydia.

There may be no unusual symptoms at first. A pregnancy test, the result will be positive. As the fertilized egg grows in the improper place, signs and symptoms become more noticeable. An ectopic pregnancy can't continue as normal. The fertilized egg cannot survive. Often, the first warning signs of an ectopic pregnancy are light vaginal bleeding and pelvic pain. If blood leaks from the fallopian tube, the pregnant woman may feel shoulder pain or an urge to have a bowel movement. Specific symptoms depend on where the blood collects and which nerves are irritated. If the fertilized egg continues to grow in the fallopian tube, the growing tissue may cause life-threatening bleeding and can cause the tube to rupture. Symptoms of bleeding include extreme lightheadedness, fainting and shock.

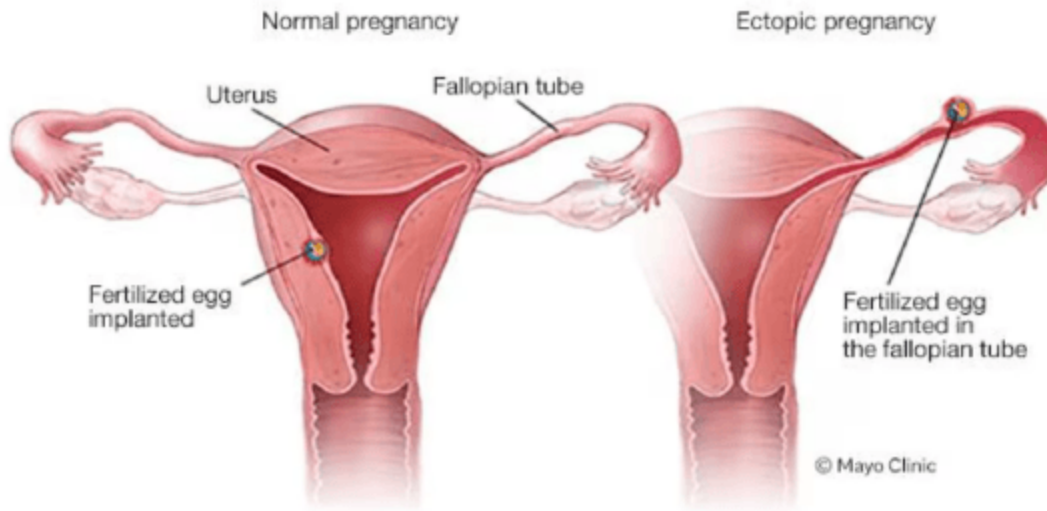


Fig. 2.11. Illustration of a normal pregnancy where the fertilized egg (zygote) implants in the uterus, compared to an ectopic pregnancy with the fertilized egg (zygote) implants in the fallopian tube.

Image Source: [Ectopic Pregnancy](#). ©Mayo Clinic.

• Spontaneous abortion (miscarriage)

A **spontaneous abortion**, or **miscarriage**, is the loss of a pregnancy before the 20th week. Spontaneous abortion is experienced in an estimated 20-40 percent of undiagnosed pregnancies and in another 10 percent of diagnosed pregnancies.

Spontaneous abortions can occur due to a variety of factors: chromosomal abnormalities in the fetus (50-60%), maternal age (increased risk after age 35); infections, hormonal imbalances, uterine abnormalities, or trauma. When a miscarriage is due to chromosomal abnormalities, typically happens before the 12th week of pregnancy.

Symptoms of miscarriage may include cramping and bleeding, passing of tissue or clots result, decreased pregnancy symptoms and normal periods return after several months. Some women are more likely to have repeated miscarriages due to chromosomal, amniotic, or hormonal problems, but miscarriage can also be a result of defective sperm.

• Preeclampsia (toxemia)

Preeclampsia, also known as **toxemia** is characterized by a sharp rise in blood pressure, a leakage of protein into the urine as a result of kidney problems, and swelling of the hands, feet, and face during the **third trimester of pregnancy**.

Preeclampsia is the most common complication of pregnancy. When preeclampsia causes seizures, the condition is known as **eclampsia**, which is the second leading cause of maternal death in the United States.

Preeclampsia is also a leading cause of fetal complications, which include low birth weight, premature birth, and stillbirth. Treatment is typically bed rest and sometimes medication. If this treatment is ineffective, labor may be induced.

Maternal Mortality

Maternal mortality refers to the death of a woman during or within 42 days of the end of pregnancy, regardless of the duration or nature of the pregnancy itself.

Maternal mortality is unacceptably high. Poor women in remote areas are the least likely to receive adequate health care. This is especially true for regions with relatively low numbers of skilled health care providers, such as sub-Saharan Africa and southern Asia.

About 260 000 women world-wide died during and following pregnancy and childbirth in 2023. Approximately 92% of all maternal deaths occurred in low- and lower-middle-income countries and most could have been prevented.

The United States continues to have the highest rate of maternal deaths of any high-income nation and the rate is the highest for Black women. Over 80% of these deaths are preventable. Research has found Black people receive worse-quality care than white people and demonstrates that racial disparities and inequities in access to care and patients' experience of care are often rooted in discrimination and health care provider bias.

All women need access to high quality care in pregnancy, and during and after childbirth. Maternal health and newborn health are closely linked. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death for the women as well as for the newborns. Access to high quality care in pregnancy, and during and after childbirth prevents the major complications that account for around 75% of all maternal deaths:

- **severe bleeding** (mostly bleeding after childbirth)
 - can kill a healthy woman within hours if she is unattended
 - injecting oxytocics immediately after childbirth effectively reduces the risk of bleeding
- **infections** (usually after childbirth)
 - can be eliminated if good hygiene is practiced and if early signs of infection are recognized and treated in a timely manner
- **hypertension or high blood pressure during pregnancy** (pre-eclampsia and eclampsia)
 - pre-eclampsia should be detected and appropriately managed before the onset of convulsions (eclampsia) and other life-threatening complications.
 - Administering drugs such as magnesium sulfate for pre-eclampsia can lower a woman's risk of developing eclampsia
- **complications from delivery**

Sources

- [Ectopic Pregnancy](#). Mayo Clinic
- Gunja, Munira Z. et al. [Insights into the U.S. Maternal Mortality Crisis: An International Comparison](#). *The Commonwealth Fund*. June 2024.
- [Hyperemesis Gravidarum](#) by Wikipedia is licensed under CC BY-SA 3.0
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). Licensed under CC BY-NC-SA 3.0
- [Maternal Mortality](#). *World Health Organization (WHO)*.

2.12: Chapter 2- Review

Chapter 2: Review

As educators of very young children it's important to understand the different aspects of pregnancy because it is a critical early period and impacts the development of the child. Caregiver knowledge and awareness is crucial for supporting a child's healthy development and well-being.

In this chapter we looked at:

- **heredity**, including **genetic disorders** and **chromosomal abnormalities**
- **conception**
- **germinal, embryonic, and fetal stages** of prenatal development
- influences on **prenatal development** including **teratogens** and **maternal and paternal factors**
- **infertility** and options for building families
- **complications of pregnancy**

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CHAPTER 3: BIRTH AND THE NEWBORN

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3.1: Chapter 3- Introduction

The Birth Process



After around 266 days 40 weeks or 9 ½ months of developing inside the womb (for a full-term pregnancy), comes the arduous process of childbirth. After birth, newborns must regulate their own body temperature, breathe for themselves, and take in all their nutrition through feeding.

At the end of this chapter, you should be able to:

Learning Objectives

- compare and contrast different **methods of childbirth preparation**
- describe the stages of **vaginal delivery**
- explain why induction or **Caesarean section** may be necessary
- differentiate the common **procedures for assessing the condition of the newborn**
- examine **problems newborns experience before, during, and after birth**

3.2: Preparing for Childbirth

Preparing for Childbirth

Prepared childbirth refers to being not only in good physical condition to help provide a healthy environment for the baby to develop, but also helping individuals to prepare to accept their new roles as parents. Additionally, parents can receive information and training that will assist them for delivery and life with the baby. The more future parents can learn about childbirth and the newborn, the better prepared they will be for the adjustment they must make to a new life.

Approaches to Childbirth

There are many different approaches to childbirth that influence how expectant parents prepare. The following table describes a few of these:

Fig. 3.2 Approaches to Childbirth

Method	Description
Lamaze Method	The emphasis of this method is on teaching the woman to be in control in the process of delivery. It includes learning muscle relaxation, breathing through contractions, having a focal point (usually a picture to look at) during contractions and having a support person who goes through the training process with the mother and serves as a coach during delivery.
Leboyer Method	This method involves giving birth in a quiet, dimly lit room and allowing the newborn to lie on the mother's stomach with the umbilical cord intact for several minutes while being given a warm bath.
Dick-Read Method / Mongan Method / Hypnobirthing	This method comes from the suggestion that the fear of childbirth increases tension and makes the process of childbearing more painful. It emphasizes the use of relaxation and proper breathing with contractions as well as family support and education.
Bradley Method	This method focuses on preparing the mother for a natural childbirth coached by her partner. They learn techniques to reduce the perception of pain and stay relaxed. The emphasis is on being prepared for an unassisted vaginal birth without medication.
Alexander Technique	This is a technique that can be used during childbirth that involves training to stop habitual reactions to pain, such as tensing muscles and increase conscious awareness and control over posture and movement. This involves being able to move freely and stay upright during labor and using body positioning that is beneficial to the labor process.
Waterbirth	Involves immersion in warm water. Proponents believe this method is safe and provides many benefits for both mother and infant, including pain relief and a less traumatic birth experience for the Waterbirth baby. However, critics argue that the procedure introduces unnecessary risks to the infant such as infection and water inhalation.

Lotus Birth (umbilical cord nonseverance - UCNS)	The practice of leaving the umbilical cord uncut after childbirth so that the baby is left attached to the placenta until the cord naturally separates at the umbilicus. This usually occurs within 3–10 days after birth. The practice is performed mainly for spiritual purposes of the parents, including for the perceived spiritual connection between placenta and newborn.
Medicated Childbirth	Health care providers can provide pain relief during labor with different types of medication, including epidurals, spinal blocks, combined spinal-epidurals, and systemic and local analgesia. There are benefits and side effects of each.

Choosing Location of Childbirth & Who Will Deliver

Most births occur in a hospital setting. However, 1% of women choose to deliver at home. Women who are at low risk for birth complications can successfully deliver at home. More than half (67%) of home deliveries are by **certified nurse midwives**. Midwives are trained and licensed to assist in delivery and are far less expensive than the cost of a hospital delivery. However, because of the potential for complications during the birth process, most medical professionals recommend that delivery take place in a hospital.

In addition to home births, 1/3 of out-of-hospital births occur in freestanding clinics, birthing centers, in physician's offices, or other locations.

Many mothers also seek a **doula** (doo-luh). A doula is not a medical professional but provides an extra service like a coach. The doula offers support, helps with pain management and provides educational and emotional support.

Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*. Licensed under CC BY-NC-SA 3.0
- Machover, Ilana. *The Alexander Technique in Natural Childbirth*. *AlexanderTechnique.com*.
- Oberg, Erica. *Childbirth Delivery Methods and Types*. *Medicine.net*.

3.3: Stages of Birth for Vaginal Delivery

Onset of Labor

Childbirth typically occurs within a week of a woman's due date, unless the woman is pregnant with more than one fetus, which usually causes her to go into labor early.

As a pregnancy progresses into its final weeks, several physiological changes occur in response to the hormones that trigger labor. One common sign that labor is beginning is the so-called "bloody show." During pregnancy, a plug of mucus accumulates in the cervical canal, blocking the entrance to the uterus. Approximately 1–2 days prior to the onset of true labor, this plug loosens and is expelled, along with a small amount of blood.

As labor nears, the **mothers' pituitary gland** produces **oxytocin**. This begins to stimulate stronger, more painful **uterine contractions**, which—in a positive feedback loop—stimulate the secretion of **prostaglandins** from **fetal membranes**. Like oxytocin, prostaglandins also enhance uterine contractile strength. The **fetal pituitary gland** also secretes oxytocin, which increases prostaglandins even further.

And the stretching of the cervix by a full-term fetus in the head-down position is regarded as a stimulant to uterine contractions. Combined, these stimulate true labor.

Stages of Birth for Vaginal Delivery

• The First Stage

Uterine contractions signify that the first stage of labor has begun. These contractions may initially last about 30 seconds and be spaced 15 to 20 minutes apart. These increase in duration and frequency to more than a minute in length and about 3 to 4 minutes apart. Typically, when contractions are coming about every 5 minutes, the doctor is called.

Some women experience **false labor** or **Braxton-Hicks Contractions**, especially with the first child. These may come and go. They tend to diminish when the mother begins walking around. Real labor pains tend to increase with walking.

In one out of 8 pregnancies, the **amniotic sac** or **water** in which the fetus is suspended may break before labor begins. In such cases, the physician may induce labor with the use of medication if it does not begin on its own in order to reduce the risk of infection. Normally this sac does not rupture until the later stages of labor.

The first stage of labor is typically the longest. During this stage the cervix or opening to the uterus dilates to 10 centimeters or just under 4 inches. This may take around 12–16 hours for first children or about 6–9 hours for women who have previously given birth. Labor may also begin with a discharge of blood or amniotic fluid.

Stage 1: Dilation

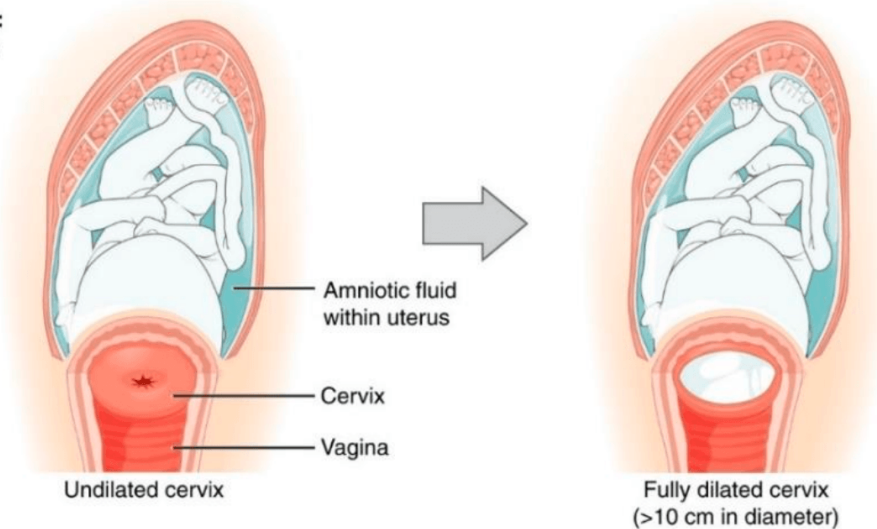


Figure 3.2 - Image #1 of the first stage of labor shows a closed or undilated cervix and image #2 shows an open or fully dilated cervix with the baby's head beginning to emerge.

Image Source: [Maternal Changes Through Pregnancy, Labor and Birth. Anatomy and Physiology. OpenStax.](#)

• The Second Stage

The passage of the baby through the birth canal is the second stage of labor. This stage takes about 10-40 minutes. Contractions usually come about every 2-3 minutes. The mother pushes and relaxes as directed by the medical staff. Normally the head is delivered first. The baby is then rotated so that one shoulder can come through and then the other shoulder. The rest of the baby quickly passes through. At this stage, an episiotomy, or incision made in the tissue between the vaginal opening and anus, may be performed to avoid tearing the tissue of the back of the vaginal opening. General practice is to try to avoid an episiotomy if possible. Tissues are stretched instead, through massage and warm compresses. The baby's mouth and nose are suctioned out. The umbilical cord is clamped and cut.

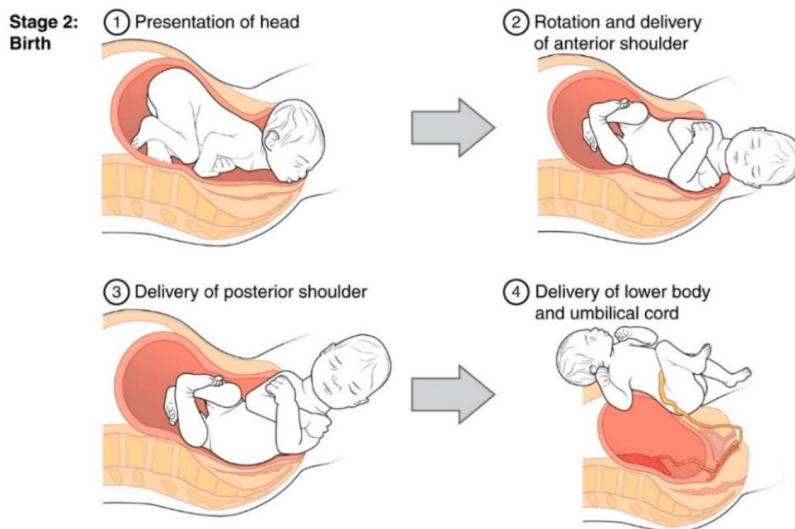


Figure 3.2.1. Image #1 shows the presentation of the baby's head' image #2 shows the rotation and delivery of the anterior shoulder, image #3 shows delivery of the posterior shoulder, and image #4 show the delivery of the lower body and umbilical cord.

Image Source: [Maternal Changes Through Pregnancy, Labor and Birth](#). *Anatomy and Physiology*. OpenStax.

• The Third Stage

The third and final stage of labor is relatively painless. During this stage, the placenta or afterbirth is delivered. This is typically within 20 minutes after delivery. If an episiotomy was performed it is stitched up during this stage.

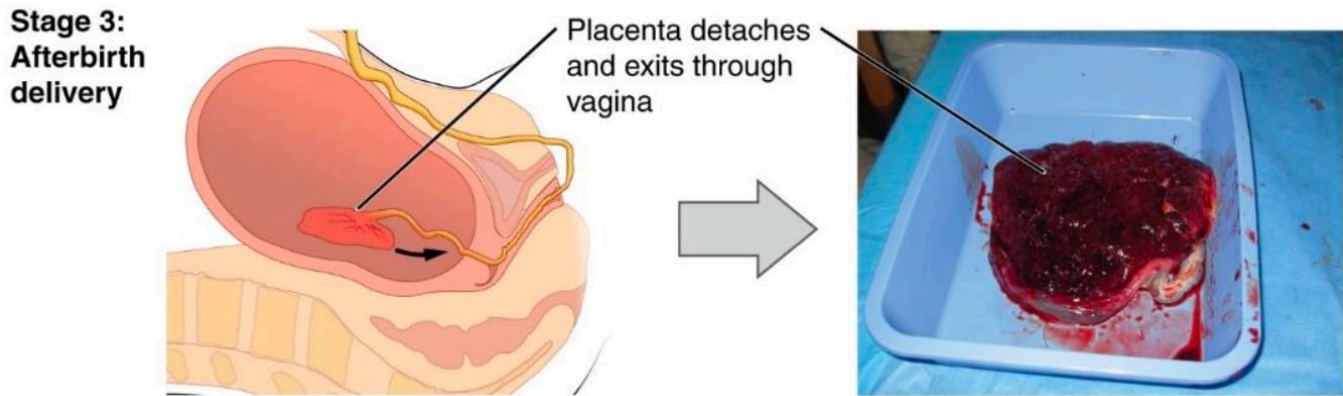


Figure 3.2.2. - Delivery of the placenta and associated fetal membranes.

Image Source: [Maternal Changes Through Pregnancy, Labor and Birth](#). *Anatomy and Physiology*. OpenStax.

Additional Considerations

More than 50% of women giving birth at hospitals use an **epidural anesthesia** during delivery. An **epidural block** is a regional analgesic that can be used during labor and alleviates most pain in the lower body without slowing labor. The epidural block can be used throughout labor and has little to no effect on the baby. Medication is injected into a small space outside the spinal cord in the lower back. It takes 10 to 20 minutes for the medication to take effect. An epidural block with stronger medications, such as anesthetics, can be used shortly before a Cesarean Section or if a vaginal birth requires the use of forceps or vacuum extraction.

Women giving birth can also receive other pain medications (although medications given through injection can have negative side effects on the baby). In emergency situations (such as the need for a C-section), women may be given general anesthesia. They can also choose not to utilize any pain medications. That is often referred to as **natural childbirth**.

Women can also use **alternate positions** (including standing, squatting, being on hands and knees, and using a birthing stool) and laboring, and even delivering in tubs of warm water to help relieve the pain of childbirth.

Sources

- Biga Lindsay M. et al. [Maternal Changes During Pregnancy, Labor, and Birth](#). *Anatomy & Physiology*. Oregon State University. 2019. Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License, except where otherwise noted.under CC BY-NC-SA 4.0
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). Licensed under CC BY-NC-SA 3.0
- [Maternal Changes Through Pregnancy, Labor and Birth](#). *Anatomy and Physiology*. OpenStax. Licensed under CC BY 4.0

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3.4: Medical Interventions in Childbirth

Medical Interventions in Childbirth

Sometimes women cannot go into labor on their own and/or deliver vaginally. In this case two procedures will be considered -

- Induction of labor
- Cesarean Section

Induction of Labor

Sometimes a baby's arrival may need to be induced before labor begins naturally. **Labor induction** means getting the uterus to contract before labor begins on its own. It's sometimes used for a vaginal birth. There are a number of ways to induce labor including the use of medication or physical intervention.

The main reason to induce labor is concern for the health of the baby or the health of the pregnant person. If a healthcare professional suggests labor induction, it's most often because the benefits are greater than the risks. If you're pregnant, knowing why and how labor induction is done can help you prepare.

Induction of labor may be recommended for a variety of reasons when there is concern for the health of the mother or the baby. For example:

- mother is approaching two weeks beyond her due date and labor has not started naturally
- mother's water has broken (premature rupture of the membranes), but contractions have not begun
- baby has stopped growing at the expected pace (fetal growth restriction)
- not enough amniotic fluid surrounding the baby (oligohydramnios)
- placenta peels away, either partially or completely, from the inner wall of the uterus before delivery (placental abruption)
- mother has a medical condition that might put her or her baby at risk
 - high blood pressure
 - diabetes
 - kidney disease
 - infection

Cesarean Section (C-section)

A **C-section** is surgery to deliver the baby by through surgical incisions made in the abdomen and uterus. Most C-sections are done when problems occur during delivery unexpectedly. These can include:

- health problems in the mother (heart, brain)
- changes baby's heart rate shows signs of distress in the baby
- prolonged labor (labor dystocia)
 - prolonged first stage (prolonged dilation or opening of the cervix)
 - prolonged second stage (prolonged time of pushing after complete cervical dilation)
- not enough room for the baby to go through the vagina
- baby is in a breech presentation where the feet or buttocks (instead of the head) enter the birth canal first
- placenta is covering the opening of the cervix (placenta previa)
- loop of umbilical cord slips through the cervix in front of the baby (prolapsed umbilical cord)
- a blockage
 - large fibroid blocking the birth canal, a
 - pelvic fracture
 - baby who has a condition that can cause the head to be unusually large (severe hydrocephalus) might be reasons for a C-section.

C-sections are also more common among women carrying more than one baby. Although the surgery is relatively safe for mother

and baby, it is considered major surgery and carries health risks. Additionally, it also takes longer to recover from a C-section than from vaginal birth. After healing, the incision may leave a weak spot in the wall of the uterus. This could cause problems with an attempted vaginal birth later. In the past, doctors were hesitant to allow a vaginal birth after a C-section. However, now more than half of women who have a C-section go on to have a vaginal birth later. This is referred to as a **Vaginal Birth After Cesarean (VBAC)**.

Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*. Licensed under CC BY-NC-SA 3.0
- Mayo Clinic Staff. [Labor Induction](#). *Mayo Clinic*.
- Mayo Clinic Staff. [C-Section](#). *Mayo Clinic*

3.5: The Newborn or Neonate

The Newborn or Neonate

During the first four weeks of life, the infant may be called a **neonate**.

Assessing the Newborn

Common assessments of newborns include:

- **birthweight:** average for full-term baby is about 7 lbs.
- **head circumference:** distance around the baby's head
- **abdominal circumference:** distance around the belly (abdomen)
- **length:** measurement from top of head to the heel
- **temperature:** stable body temperature in normal room
- **head and neck:** shape of head, the soft spots (fontanelles) on the baby's skull, and the bones across the upper chest (clavicles)
- **face:** eyes, ears, nose, and cheeks.
- **mouth:** roof of the mouth (palate), tongue, and throat.
- **lungs:** the sounds the baby makes when he or she breathes and the breathing pattern
- **heart sounds and pulses in the groin (femoral)**
- **abdomen:** masses or hernias.
- **genitals and anus:** checks that the baby has open passages for urine and stool.
- **arms and legs:** checks the baby's movement and development.

APGAR Score

The **Apgar assessment** is a very quick way to assess the newborn's overall condition. It is conducted at both one minute and five minutes after birth. The higher the score the better the baby is doing. A score of 7 or above is normal. A one-minute score below 7 indicates that the baby needs help adjusting to being out of the mother. This is often caused by a difficult birth, c-section, fluid in the airway, etc. The baby may need oxygen or the airway cleared, physical stimulation to regulate the heartbeat. The five-minute score should show improvement. If needed, additional testing will be done until the baby reaches a score of 7.

A score of 0 to 2 pts is given on each these five measures:

- appearance/color: is the baby blue all over (0), blue extremities (1), or not blue at all (2)?
- heart rate/pulse (normally 120 to 160 beats/min): does the baby have no pulse (0), a pulse less than 100 beats/min (1), or a pulse greater than 100 beats/min (2)?
- reflex response (grimace) to stimulation (usually a mild pinch): when stimulated does the baby show no response (0), grimace on stimulation (1), or cry on stimulation (2)?
- muscle tone (Babinski reflex): when the baby's foot is firmly stroked does the baby respond with no movement (0), little movement (1), or a lot of movement (2)?
- respiration/breathing (normally 40 to 60 breaths/min.): does the baby show no respiration (0), weak and irregular respiration (1), or a strong cry (2)?

APGAR SCORE

SCORE	APPEARANCE	PULSE	GRIMACE	ACTIVITY	RESPIRATION
0	 Blue all over	 No pulse	 No response to stimulation	 No movement	 No respiration
1	 Blue extremities	 <100 beats/min	 Grimace on stimulation	 Some flexion	 Weak, irregular, slow
2	 No blue colouration	 >100 beats/min	 Cry on stimulation	 Flexed limbs that resist extension	 Strong cry

≥7 NORMAL
4-6 LOW
≤3 CRITICAL

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Figure 3.5 – Graphical chart showing the Apgar assessment as described in the section above.

Image Source: Patient Assessment. [APGAR Assessment](#). Event Medicine Group.

Neonatal Behavioral Assessment Scale (NBAS)

Another way to assess the condition of the newborn is the **Neonatal Behavioral Assessment Scale (NBAS)**, a **neurobehavioral assessment**. It is a tool used to describe an infant's interaction with their extrauterine environment during the first two weeks of life. It highlights the emerging relationship between caregiver and infant, ultimately presenting a holistic picture of clinical conditions of both full-term and preterm infants.

The NBAS assesses the baby's motor development, muscle tone, and stress response. The NBAS does not simply detect abnormalities, but highlights an infant's strengths and individualities

Newborns are also routinely screened for different conditions. Within the first 24 to 48 hours after birth, babies born in hospitals undergo a simple heel stick and a few drops of blood are collected on a special paper card. Providers test those dried blood spots for a variety of different congenital disorders, or conditions that are present when the baby is born.

Sources

- [Assessments for Newborn Babies](#). Stanford Medicine Children's Health.
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). (Page 63). Licensed under CC BY-NC-SA 3.0

3.6: Problems of the Newborn

Problems of the Newborn

Birth injuries occur for many reasons and can result in a variety of outcomes for the infant and their family as they grow into the preschool years.



Image Source: [What is Anoxia/Lack of Oxygen?](#) *CPFamily Network Blog*. [CPFamilyNetwork.org](#)

Anoxia and Hypoxia

Anoxia and **hypoxia** are among the most dangerous and life-affecting causes of birth injuries.

Anoxia is a temporary lack of oxygen to the brain and **hypoxia** refers to low levels of oxygen. Any type of oxygen deprivation around the time of birth can be devastating to the baby's health and may cause brain damage and conditions like cerebral palsy and in severe cases, death may be the result.

Low Birth Weight

A child is considered low birth weight if he or she weighs less than 5 pounds 8 ounces or 2500 grams. Low birthweight births may be categorized into **moderately low birthweight** (1500-2499 grams or about 3 ½ - 5 ½ pounds) and very low birthweight (less than 1500 grams or 3 ⅓ pounds). About 1 in 12 babies in the United States are born with low birth weights. Premature or preterm births (before 37 weeks) are the main cause of low birth weight.

A baby with low birthweight has an underdeveloped body and may lack strength which makes it harder for them to eat, gain weight, and fight off infection. They also have trouble staying warm in normal temperatures.

Other complications include:

- low oxygen levels at birth
- breathing problems due to immature lungs (infant respiratory distress syndrome)
- neurologic problems, such as intraventricular hemorrhage (bleeding inside the brain)
- gastrointestinal problems, such as necrotizing enterocolitis (a serious disease of the intestine common in premature babies)
- sudden infant death syndrome (SIDS)

Very low birth weight babies (2 pounds or less) have an increased risk of developing cerebral palsy. Babies who suffer both **low birth weight** and **anoxia** are more likely to suffer learning disabilities later in life as well.

Preterm

A newborn might also have a low birth weight if it is born at less than 37 weeks gestation, which qualifies it as a preterm baby (CDC, 2015c). Early birth can be triggered by anything that disrupts the mother's system. For instance, vaginal infections can lead to premature birth because such infection causes the mother to release anti-inflammatory chemicals which, in turn, can trigger contractions. Smoking and the use of other teratogens can lead to preterm birth. A significant consequence of preterm birth includes respiratory distress syndrome, which is characterized by weak and irregular breathing (see the image below). Premature babies often cannot yet regulate their own temperature or feed by nursing or bottle. They may struggle to regulate their heart rate effectively and may experience jaundice. They often require care in the Neonatal Intensive Care Unit (NICU) until they are as healthy as a full-term baby.



Figure 3.11 - a premature baby on CPAP in the NICU.

Image Source: Jennifer Paris, used with permission.

Small-for-Date Infants

Infants that have birth weights that are below expectation based on their gestational age are referred to as **small-for-date**. These infants may be either full-term or preterm (see image below), but still weigh less than 90% of all babies of the same gestational age.

Most babies who are small for gestational age experienced a condition called **intrauterine growth restriction** that happen during pregnancy. This occurs when the unborn baby doesn't get the required nutrients and oxygen they needed for the growth and development of their organs and tissues. This can begin at any point during pregnancy.

Chromosome problems in the baby are the cause of **intrauterine growth restriction** when it occurs early in pregnancy. It can also happens because of sever problems with the placentas or disease in the mother, or severe problems with the placenta. Growth restriction is called late onset if it happens after week 32 of the pregnancy. It is usually related to other problems.

This is a very serious situation for newborns as their growth was adversely affected. Small-for- date infants died at rates more than four times higher than other infants.



Figure 3.12 - This baby was born at 32 weeks and only weighed 2 pounds and 15 ounces.

Image Source: Jennifer Paris, used with permission.

Postmature

When babies are not born by 42 weeks gestation, or two weeks after their due date, they are considered overdue or postmature. There are some concerns about how long the placenta can function and most doctors will consider induction for overdue babies.

Stillborn

When a fetus (unborn baby) dies while still inside the mother (after 20-24 weeks gestation) or dies during delivery (childbirth). It is said that the delivered baby is stillborn. The causes of many stillbirths are unknown, even when special tests are done to learn the cause. Possible causes include nicotine, alcohol, or drugs taken by the mother during pregnancy, physical trauma, radiation poisoning, Rh disease, and umbilical cord problems. The number of stillbirths in the United States is about 1 in 115 births, which is about 26,000 a year, or one every 20 minutes.

Source

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*. (Page 63). Licensed under CC BY-NC-SA 3.0

3.7: Characteristics of Newborns

Characteristics of Newborns

- **Size**

The average newborn in the United States weighs about 7.5 pounds and is about 20 inches in length. For the first few days of life, infants typically lose about 5 percent of their body weight as they eliminate waste and get used to feeding. This often goes unnoticed by most parents but can be cause for concern for those who have a smaller infant. This weight loss is temporary, however, and is followed by a rapid period of growth.



Figure 3.7 – A newborn being weighed. Image Source: Trei Brundrett is licensed under CC BY-SA 2.0. [Wikimedia Commons](#).

- **Body Proportions**

The head initially makes up about 50 percent of our entire length when we are developing in the womb. At birth, the head makes up about 25 percent of our length (think about how much of your length would be head if the proportions were still the same!).

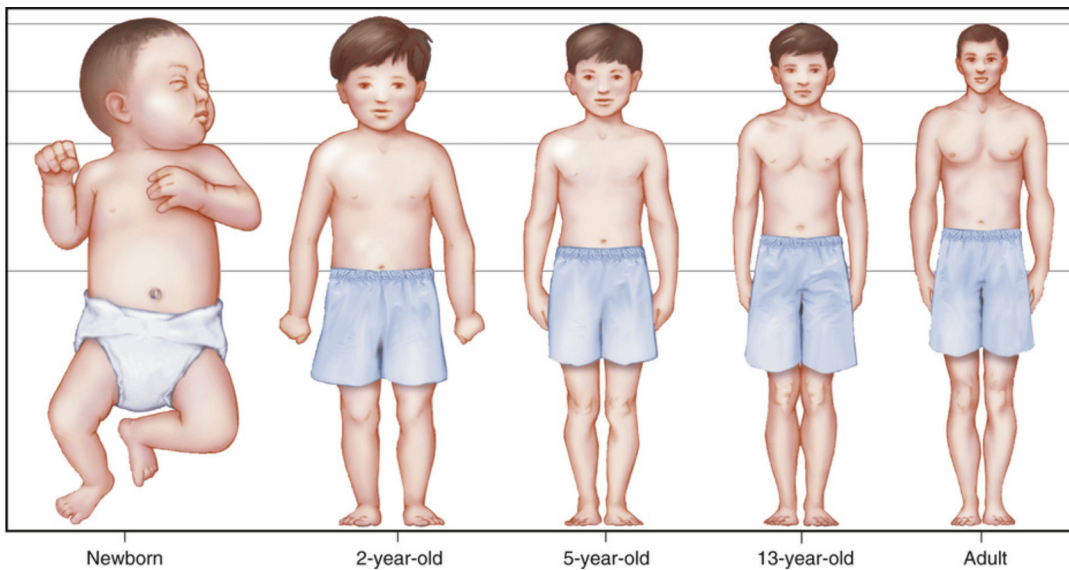


Figure 3.7.1 – Body proportions from infancy to adulthood.

Image Source: [Growth and Development](#). NurseKey. From Patton KT, Thibodeau GA: The human body in health and disease, ed 6, St Louis, 2014, Mosby.)

• Appearance at Birth

During labor and birth, the infant's skull changes shape to fit through the birth canal, sometimes causing the child to be born with a misshapen or elongated head. It will usually return to normal on its own within a few days or weeks.

Fontanels, or soft spots:

- soft membranous gaps (soft spots) between the bones on the top of the skull of the newborn
- allow for not only easier delivery but also rapid stretching as the brain develops. These areas of the skull
- will fuse together between the second and eighteenth months to form the harden skull.

Some newborns have a fine, downy body hair called **lanugo**. It may be particularly noticeable on the back, shoulders, forehead, ears and face of premature infants. Lanugo disappears within a few weeks.

Lanugo

- a fine, downy body hair the fetus develops while in the uterus
- protects the fetus and keeps it warm
- common in preterm newborns
- sheds within a few weeks



Figure 3.7.2. Newborn with languo.

Image Source: [What is Languo?](#) *Health Library Cleveland Clinic*.

Scalp Hair

Some infants are born with lush heads of hair, and some may be nearly bald. Other babies may have very fine, almost invisible hair. Amongst fair-skinned parents, this fine hair may be blond, even if the parents are not.

The hair follicles that grow while the fetus develops form a hair pattern they will have for the rest of their lives. Most of the hair a baby is born with is lost in their first 6 months of life. Even little ones born with an entire head of hair can go bald within the first weeks after birth as they are no longer receiving the hormones they get from the mother while in utero. The old hair falls out when the new growth cycle begins and it's normal for the baby to have patchy or bald spots as the new hair comes in. It's hard to predict what the baby's new hair will look like. Genes can interact in unexpected ways depending on the baby's family lineage. Parents who both have blonde hair can have babies with dark or red hair,. Likewise a baby born with straight hair may end up with curly hair.

The scalp may also be temporarily bruised or swollen, especially in hairless newborns.

Skin and Body

Immediately after birth, a newborn's skin is often grayish to dusky blue in color. As soon as the newborn begins to breathe, usually within a minute or two, the skin's color returns to a normal tone.



Figure 3.7.3. Baby on mother's belly immediately after birth, skin covered in vernix and some blood.

Image Source. [Postpartum Baby](#). *Wikimedia Commons*. Licensed under the [Creative Commons Attribution-Share Alike 2.0 Generic](#)

Newborns are wet, covered in streaks of blood, and coated with a white substance known as **vernix**, which is thought to act as an antibacterial barrier.

The newborn may also have **Mongolian spots**, a blue- or blue-black birthmark on the lower back, various other birthmarks, or peeling skin, particularly on the wrists, hands, ankles, and feet.

A newborn's genitals are enlarged and reddened, with male infants having an unusually large scrotum. The baby's breasts may also be enlarged, even in male infants. This is caused by naturally occurring maternal hormones and is a temporary condition.

The **umbilical cord** of a newborn is bluish-white in color. After birth, the umbilical cord is normally cut, leaving a 1–2-inch stub. The umbilical stub will dry out, shrivel, darken, and spontaneously fall off within about 3 weeks.

Newborns will lose many of these physical characteristics quickly.

• Sleep

A newborn typically sleeps approximately 12–16 hours throughout a 24-hour period. At this stage they cannot distinguish between night and day, and their sleep cycles may be as brief as 20–50 minute at one time. They wake because they need to be fed or changed. This pattern alternating short bursts of wake and sleep cycles lasts about three months, when babies begin to recognize the difference between night and day.



Fig 3.7.4. Sleeping baby.

Image Source: [brytny.com](https://www.brytny.com). *Baby Laying on a Blanket*. *Unsplash*.

• Reflexes

Newborns are equipped with several reflexes, which are involuntary movements in response to stimulation

- **sucking reflex:** when a nipple is inserted into the baby's mouth they should begin sucking
 - the newborn has to figure out how to suck while breathing and swallowing at the same time
- **rooting reflex:** helps the baby find and latch onto a nipple to feed
- **grasping reflex (Palmar grasp):** the baby's hand closes around an object when their palm is touched or stroked
- **grasping reflex (Plantar grasp or Babinski reflex):** when a finger is placed below the baby's toes, they curl their toes around it
- **stepping reflex:** when a baby is held in a standing position and their soles touch a surface they will place one foot in front of the other in a "walking" motion

These reflexes disappear within the first 4-6 months. Other reflexes such as eye-blinking, swallowing, sneezing, gagging, and withdrawal reflex are lifelong and serve important function. It is important to monitor reflexes as this can provide insight to the proper development of the brain and its connections to the body.



Fig. 3.7.5. Baby sucking on pacifier.

Image Source: Beeki. [Baby Sucking on Pacifier](#). Pixabay.

• Sensory Capacities

Throughout much of history, the newborn was considered a passive, disorganized being who possessed minimal abilities. However, current research techniques have demonstrated just how developed the newborn is with especially organized sensory and perceptual abilities.

Vision

The womb is a dark environment void of visual stimulation. Consequently, vision is the most poorly developed sense at birth and time is needed to build those neural pathways between the eye and the brain. Newborns typically cannot see further than 8 to 16 inches away from their faces, and their visual acuity is about 20/400, which means that an infant can see something at 20 feet that an adult with normal vision could see at 400 feet. Thus, the world probably looks blurry to young infants.

Newborns are able to see light and dark but are not able to discern shapes and patterns, and will slowly develop the capacity to see bright colors. At 2 months, babies' eyes don't yet work well together and it may appear the baby's eyes are crossed or they wander. This is completely normal and will improve as the baby grows and develops. By 3 months, babies can follow a moving object with their eyes and recognize familiar faces.

Hearing

The infant's sense of hearing is very keen at birth, and the ability to hear is evidenced as soon as the 7th month of prenatal development. In fact, an infant can distinguish between very similar sounds as early as one month after birth and can distinguish between a familiar and unfamiliar voice even earlier. Infants are especially sensitive to the frequencies of sounds in human speech and prefer the exaggeration of infant-directed speech, which will be discussed later. Newborns also prefer their mother's voices over another female when speaking the same material. Additionally, they will register in utero specific information heard from their mother's voice.

• Early Hearing

Studies show that infants whose mothers had read to them before they were born, later showed a preference for the stories that their mothers read to them while in the womb. In one study the mothers read the first 28 paragraphs of Dr. Seuss's book *The Cat in the Hat*, beginning when they were 7 months pregnant. The fetuses had been exposed to this story an average 67 times for 3.5 hours. After they were born, tests show the infants were able to "choose" (how fast they sucked on their pacifiers) between recordings of two stories, one of which was *The Cat in the Hat*, the mothers had read to them while in the womb.

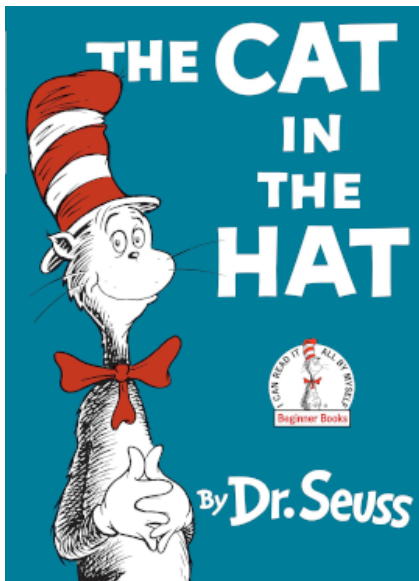


Fig. 3.7.6. Book Cover Dr. Suess. *The Cat in the Hat*.

Image Source: [Book Cover Dr. Suess. *The Cat in the Hat*](#).Wikipedia.com

Touch and Pain

Immediately after birth, a **newborn is sensitive to touch and temperature**, and is also **highly sensitive to pain**, responding with crying and cardiovascular responses. Newborn boys who are circumcised (the surgical removal of the foreskin of the penis) without anesthesia experience pain as demonstrated by increased blood pressure, increased heart rate, decreased oxygen in the blood, and a surge of stress hormones. Research has demonstrated that infants who were circumcised without anesthesia experienced more pain and fear during routine childhood vaccines. Fortunately, many circumcisions are now done with the use of local anesthetics.

Taste and Smell

Studies of taste and smell demonstrate that babies respond with different facial expressions, suggesting that **certain preferences are innate**. Newborns can distinguish between sour, bitter, sweet, and salty flavors and show a preference for sweet flavors. 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. Within hours of birth an infant also shows a preference for the face of its own mother.

Infants seem to be born with the ability to perceive the world in an **intermodal** (stimulation from more than one sensory modality). For example, infants who sucked on a pacifier with a smooth surface preferred looking at visual models of a pacifier with a smooth surface. In contrast, babies given a pacifier with a textured surface preferred to look at a visual model of a pacifier with a textured surface.

Source

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*. (Page 76-77). Licensed under CC BY-NC-SA 3.0

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3.8: Chapter 3- Review

Chapter 3: Review

As educators of very young children it's important to understand the different aspects of preparing for childbirth, the process of childbirth itself, and characteristics of infancy, because these critical influences that impact the development of the child. Caregiver knowledge and awareness is crucial for supporting a child's healthy development and well-being.

In this chapter we looked at:

- methods of **childbirth preparation**
- the process of childbirth (for both **vaginal and Cesarean deliveries**)
- **assessing newborn health**
- **problems for the newborn**
- **characteristics of newborns** (including appearance, reflexes, and perceptual abilities)

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CHAPTER 4: PHYSICAL DEVELOPMENT IN INFANCY AND TODDLERHOOD

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- 4.2: Rapid Physical Changes
- 4.3: Reflexes
- 4.4: Motor Skills
- 4.5: Sensory Capacities
- 4.6: Breastfeeding
- 4.7: Introducing Solid Foods to a Baby
- 4.8: Infant Health
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- 4.10: Protecting Health through Immunization
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4.1: Chapter 4- Introduction

Introduction to Physical Development in Infancy and Toddlerhood



Image Source: [Stages of a Baby](#). *Freepik.com*.

Welcome to the story of development from infancy through toddlerhood!

This period lasts from birth until about 3 years of age. Researchers have given this part of the life span more attention than any other period, because changes during this time are so dramatic and so noticeable and perhaps because we have assumed that what happens during these years provides a foundation for one's life to come. This is the period of life that contemporary educators, healthcare providers, and parents have focused on most heavily.

We will examine growth and nutrition during infancy, as well as other prominent physical changes that take place during this time.

After this chapter, you should be able to:

Learning Objectives

- describe the physical changes that occur during the first three years of life
- explore brain development in greater detail
- identify common **infant reflexes**
- discuss the sleep needs during the first three years of life
- summarize the sequence of both **fine and gross motor skills**
- recognize the developing **sensory capacities** of infants and toddlers
- explain how to meet the evolving nutritional needs of infants and toddlers.

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4.2: Rapid Physical Changes

Rapid Physical Changes

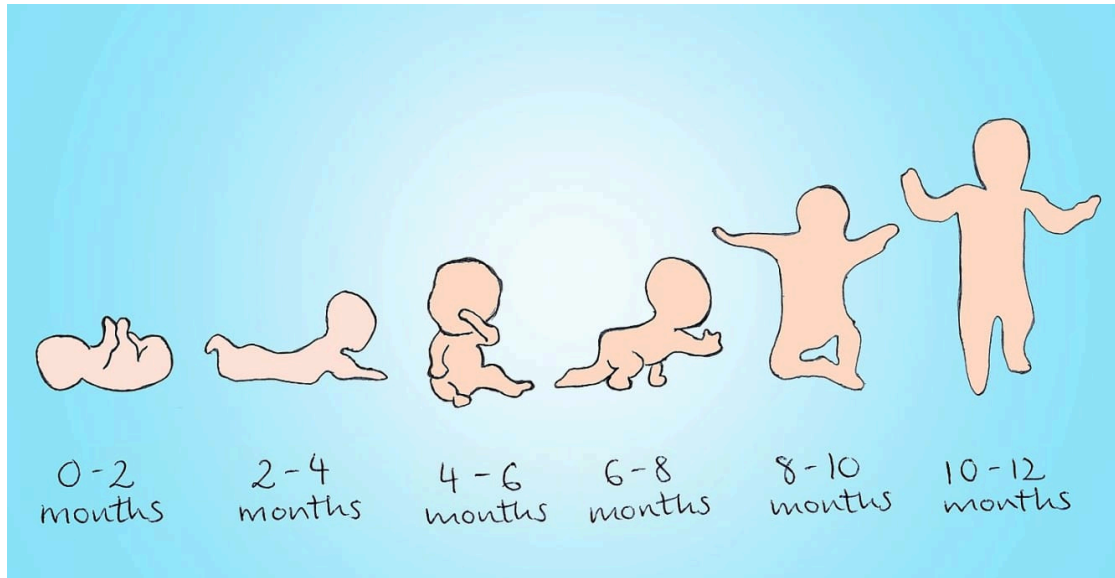


Fig. 4.2. Baby's growth from birth to one-year

Image Source: [Perpetual Fostering. Child Development Stages. Wikimedia Commons.](#)

As mentioned in the previous chapter, the average newborn in the United States weighs about 7.5 pounds and is about 20 inches in length at birth. In the following days they may experience a 5% weight loss. In the first few days is followed by a period of rapid growth.

- age 4 months: the infant will have doubled in weight
- age 12 months: the infant tripled its birth weight
- age 24 months: the infant's weight has quadrupled

The average length of the infant at one year is about 26-32 inches.

Hormones and Growth

Two hormones are very important to this growth process. The first is **Human Growth Hormone (HGH)** which influences all growth except that in the Central Nervous System (CNS). The hormone influencing growth in the Central Nervous System (CNS) is called **Thyroid Stimulating Hormone (TSH)**. Together these hormones influence the growth in early childhood.

These hormones are released as babies sleep each night and as a result, children need 11 to 14 hours of sleep from ages 2-6 years old. Because sleep is so important to the growth process, establishing rituals to signal to the baby that it's time to sleep helps them wind down and get the sleep they so desperately need. Examples of rituals, depending on the age of the child may be reading a story, taking a bath, brushing teeth, etc.

Proportions of the Body

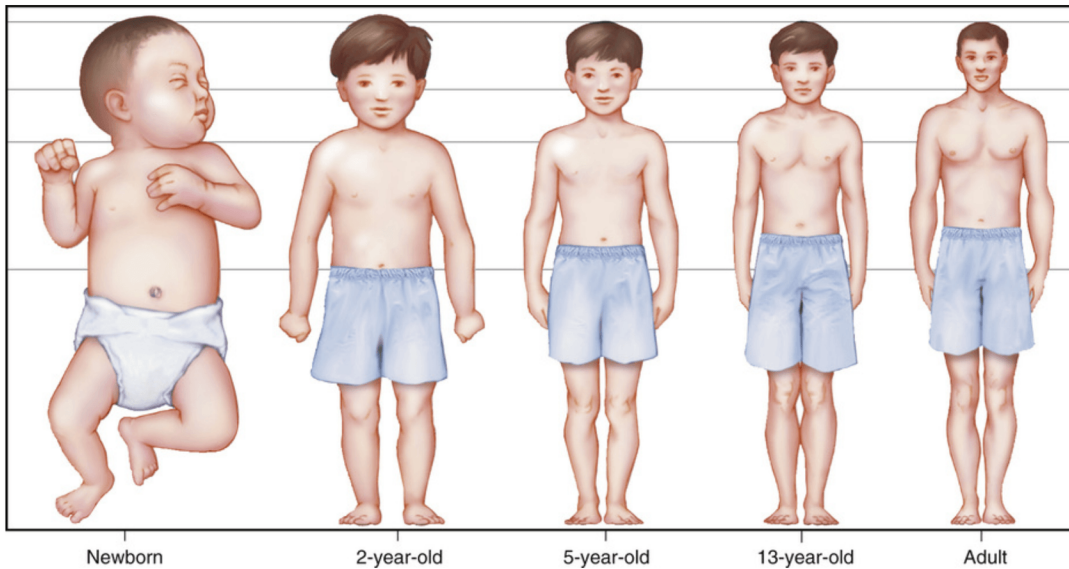


Figure 4.2.1 – Body proportions from infancy to adulthood.

Image Source: [Growth and Development. NurseKey](#). From Patton KT, Thibodeau GA: The human body in health and disease, ed 6, St Louis, 2014, Mosby.)

Another dramatic physical change that takes place in the first several years of life is the change in body proportions. The head initially makes up about 50 percent of our entire length when we are developing in the womb. At birth, the head is about 25% of our length. Imagine now how difficult it must be to raise one's head during the first year of life! If you have ever seen a 2 to 4-month-old infant lying on the stomach trying to raise the head, you know how much of a challenge this is.



Fig. 4.2.2. Baby laying on tummy holding her head up.

Image Source: Dean Wissing. [Molly and Lisa](#). *Wikimedia Commons*.

Brain Development

Some of the most dramatic physical change that occurs during this period is in the brain. At birth, the brain is about 25% of its

adult weight which is not true for any other part of the body. It **DOUBLES** in size during the first year of life. By age 2, it is at 75% its adult weight, and 95% by age 6 and finally 100% by age 7.

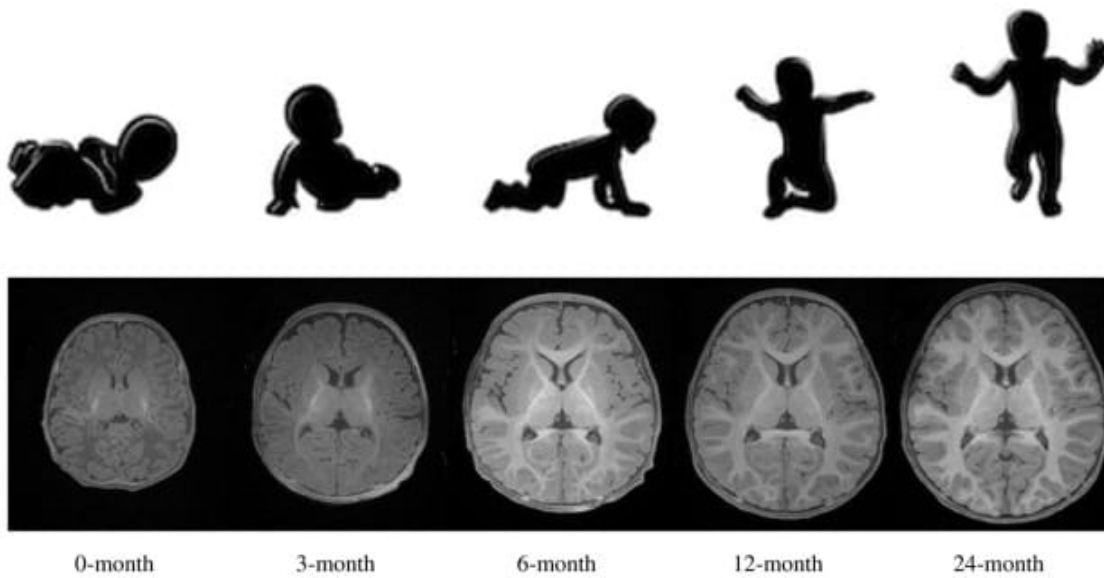


Fig. 4.2.3. MRI of baby's brain from birth to 2 years of age.

Image Source: Fetal, Infant, & Toddler Neuroimaging Group—FIT'NG [Mostapha & Styner 2019, Magnetic Resonance Imaging. @FIT_NGIn X.com](#). Feb. 2021.

MRI scans of a baby's brain over the first two years shows the first year of life represents the period of greatest brain volume growth in typical children, with slower growth during the second year of life.

While most of the brain's 100 to 200 billion neurons are present at birth, they are not fully mature and during the next several years **dendrites** or *connections between neurons* will undergo a period of temporary dramatic growth.

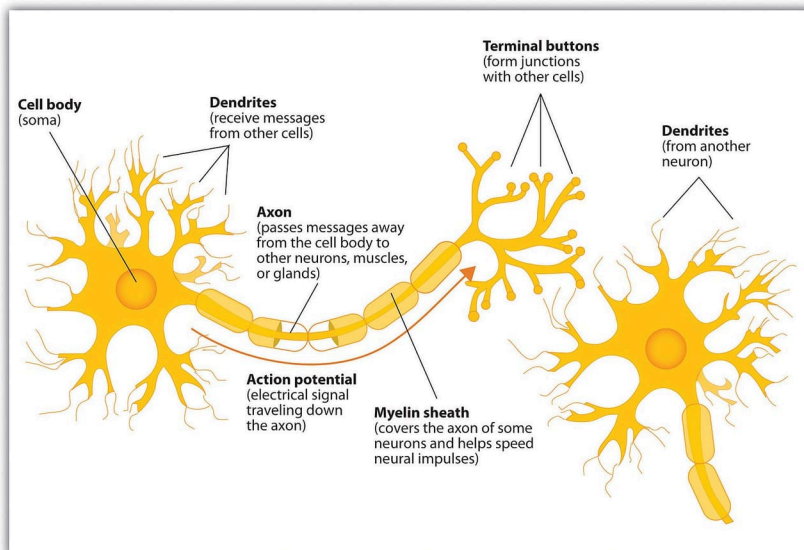


Fig. 4.2.4. Diagram of basic neuron and components.

Image Source: Jennifer Walinga. [Components of neuron](#). *Wikimedia Commons*.

As a person talks, sings and interacts with a baby, the baby reacts to these events, taking in information, processing it and storing

it. The **synapses** (connections) and the pathways formed actively create a web of learning in the brain. Therefore, early responsive experiences are so crucial. Those synapses that have been activated many times tend to become permanent to ensure optimal social-emotional, language and cognitive growth.

There is a proliferation of these dendrites during the first two years so that by age 2, a single neuron might have thousands of dendrites. After this dramatic increase, the neural pathways that are not used will be eliminated thereby making those that are used much stronger. Because of this proliferation of dendrites, by age 2 a single neuron might have thousands of dendrites.

Synaptogenesis, or the formation of connections between neurons, continues from the prenatal period forming thousands of new connections during infancy and toddlerhood. This period of rapid neural growth is referred to as **Synaptic Blooming**. This activity is occurring primarily in the **cortex** or the thin outer covering of the brain involved in voluntary activity and thinking.

The **prefrontal cortex** that is located behind our forehead continues to grow and mature throughout childhood and experiences an additional growth spurt during adolescence. It is the last part of the brain to mature and will eventually comprise 85% of the brain's weight. Experience will shape which of these connections are maintained and which of these are lost. Ultimately, about 40% of these connections will be lost. As the prefrontal cortex matures beyond infancy and toddlerhood throughout childhood and adolescence the child is increasingly able to regulate or control emotions, to plan activity, strategize, and have better judgment.

Another major change occurring in the **central nervous system** is the development of **myelin**, a coating of fatty tissues around the **axon of the neuron**. Myelin helps insulate the nerve cell and speed the rate of transmission of impulses from one cell to another. This enhances the building of **neural pathways** and improves coordination and control of movement and thought processes. The development of myelin continues into adolescence but is most dramatic during the first several years of life.

Brain Lobes

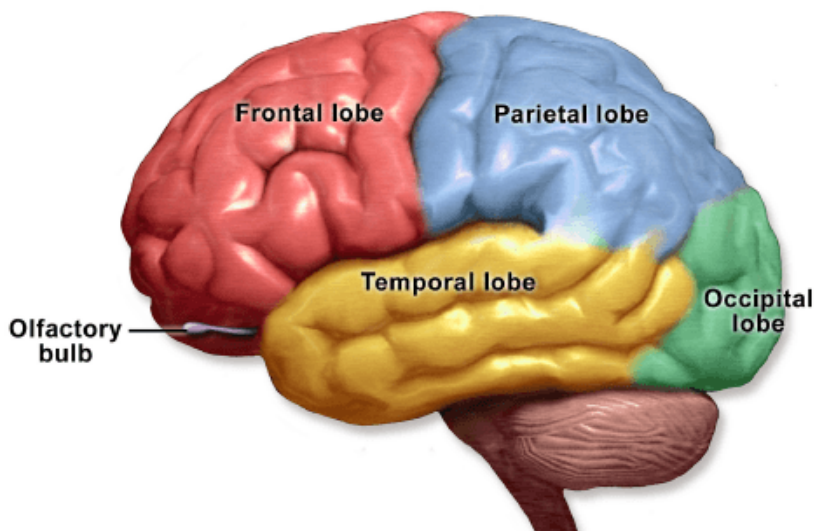


Fig. 4.2.5. Brain Lobes.

Image Source: *Blaussen.com staff (2014). "Medical gallery of Blaussen Medical 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.010. ISSN 2002-4436.*

Each side of your brain is comprised of **four lobes**:

- **occipital**
 - primarily responsible for vision.
- **temporal**
 - temporal lobe processes memories, integrating them with sensations of taste, sound, sight and touch
- **frontal**
 - important for cognitive functions and control of voluntary movement or activity

- **parietal**
 - processes information about temperature, taste, touch and movement

Strong **brain architecture** supports the development of integrated cognitive, social, and emotional skills called **executive function**. A good analogy is to think of this as an air traffic controller in a child's mental airspace.

Executive functions process

- what needs attention
- how to plan ahead,
- how to follow rules and
- how to manage conflicts

As you can imagine, until this is fully developed the child is “wired” to have many behavior challenges. It is important to help young children build these skills and form strong brains.

Optimal and Critical Periods of Brain Development

Our understanding of **windows of opportunities** has made a difference in how we view the importance of the early years. These are periods in the development of the brain when specific types of learning take place. The brain development in the first three years is a foundation for the child to build on for developing capacity for learning and loving. These windows are more difficult to open and use as the child ages.

These **optimal and critical periods** exist for

- vision
- hearing
- math and logic
- language - birth to age 10
- emotional development

For example, the **optimal and critical period window** for language is birth to 10 years but the circuits in the auditory section of the brain are wired by age 1. The more words a child hears in a meaningful way by age 2, the larger the child's vocabulary will be. Think about the impact of that for caregivers of infants and toddlers and on the importance of proper **hearing screenings**.

Trauma, Toxic Stress and Cortisol

This is also the time to reduce a young child's stress levels. The experiences a child has can affect how the brain is structured and even the physical size of the brain. **Toxic stress** -- when a child experiences strong, frequent, and/or prolonged adversity—

- physical or emotional abuse
- chronic neglect,
- caregiver substance abuse
- caregiver mental illness
- exposure to violence
- accumulated burdens of family economic hardship

Without adequate adult support changes the architecture of the brain and other organs and causes impairment. Toxic stress releases high levels of **cortisol** into the system which can have long lasting health effects. However, it is important to remember that children are very resilient. There are many ways children can overcome challenging starts in life.



Fig. 4.2.6. Parents and baby interaction (serve and return).

Image Source: Anna Shvets. [Parents playing with their baby](#). *Pexels.com*

Serve and Return Interactions

Serve and return interactions shape brain architecture. When an infant or young child babbles, gestures, or cries, and an adult responds appropriately with eye contact, words, or a hug, neural connections are built and strengthened in the child's brain that support the development of communication and social skills. Much like a lively game of tennis, volleyball, or Ping-Pong, this back-and-forth is both fun and capacity-building.

When caregivers are sensitive and responsive to a young child's signals and needs, they provide an environment rich in serve and return experiences. Because responsive relationships are both expected and essential, their absence is a serious threat to a child's development and well-being. Healthy brain architecture depends on a sturdy foundation built by appropriate input from a child's senses and stable, responsive relationships with caring adults.

If an adult's responses to a child are unreliable, inappropriate, or simply absent, the developing architecture of the brain may be disrupted, and subsequent physical, mental, and emotional health may be impaired. The persistent absence of serve and return interaction acts as a "double whammy" for healthy development: not only does the brain not receive the positive stimulation it needs, but the body's stress response is activated, flooding the developing brain with potentially harmful stress hormones.

Building the capabilities of adult caregivers can help strengthen the environment of relationships essential to children's lifelong learning, health, and behavior. A breakdown in reciprocal serve and return interactions between adult caregivers and young children can be the result of many factors. Adults might not engage in serve and return interactions with young children due to significant stresses brought on by financial problems, a lack of social connections, or chronic health issues.

Sources

- [Lifespan Development - Module 4: Infancy](#) by Lumen Learning references *Psyc 200 Lifespan Psychology* by Laura Overstreet, licensed under CC BY 4.0.
- [Serve and Return](#). *Center for the Developing Child*. Harvard University.

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4.3: Reflexes

Reflexes

Infants and children grow and develop at a rapid pace during the first few years of life. The development of both gross and fine motor skills helps a child go from a completely dependent newborn to an independently functioning toddler in about a 3-year span.

Infants are equipped with several reflexes which are **involuntary movements** in response to stimulation. These involuntary movements occur automatically and are signals that the infant is developing normally and functioning well neurologically. Within the first several weeks of life these reflexes are replaced with **voluntary movements or motor skills**.

Table 4.3 - Common Infant Reflexes

Reflex	Description	Image	Reflex	Description	Image
1. Sucking	Infants automatically suck on anything that touches the lips.	 Image Source: Breastfeeding infant. Wikimedia Commons	5. Moro	A startle reflex caused by sudden noise or loss of support to the head and neck that causes infants to spread out their arms and legs then quickly contract their limbs inward. Involuntary at birth. Disappears at about 2 months.	 Image Source: Moro reflex. Wikimedia Commons

2. Rooting	Infants turn their head when their cheek is touched. Involuntary at birth. Disappears at about 4 months.	 Image Source: Rooting. Wikimedia Commons	6. Tonic Neck	When lying on the back with the head to one side infants will extend the arm and leg on that side while flexing the limbs on the opposite side (looks like a fencer pose). Involuntary at birth. Disappears at about 5-7 months.	 Image Source: a two-week-old baby. Education
3. Palmar Grasp	Infants' fingers automatically grip anything that touches their palm. Involuntary at birth. Disappears at about 5-6 months.	 Image Source: Raul Lina. Grasping Reflex. Flickr.com	7. Stepping	Legs move in stepping like motion when feet touch a smooth surface. Also known as the walking or dancing reflex. Involuntary at birth. Disappears at about 2 months.	 Image Source: Education

4. Babinski or Plantar Grasp	Infants' toes will fan out and curl when their heel is stroked from head to toe. Involuntary at birth. Disappears at about 9-12 months.	 Image Source: Babinski newborn. Wikimedia Commons			
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Much of a baby's activity in her first weeks of life is reflexive. For instance, when you put your finger in her mouth, she doesn't think about what to do, but sucks by reflex. When confronted by a bright light, she will tightly shut her eyes, because that's what her reflexes make her do. She's born with many of these automatic responses, some of which remain with her for months, while others vanish in weeks.

In some cases, reflexes change into voluntary behavior. For example, your baby is born with a **rooting** reflex that prompts her to turn her head toward your hand if you stroke her cheek or mouth. This **helps her find the nipple at feeding time**. At first, she'll root from side to side, turning her head toward the nipple and then away in decreasing arcs. But by about three weeks she'll simply turn her head and move her mouth into position to suck.

Sucking is another **survival reflex** present even before birth. If you had an ultrasound test done during pregnancy, you may have seen your baby sucking her thumb. After birth, when a nipple (either breast or bottle) is placed in your baby's mouth and touches the roof of her mouth, she automatically begins to suck. **This motion takes place in two stages:** First, she places her lips around the areola (the circular area of pigmented skin surrounding the nipple) and squeezes the nipple between her tongue and palate. This is referred to as **expression** an action that forces out the milk. Then comes the second phase, or the **milking action**, in which the tongue moves from the areola to the nipple. This whole process is helped by the negative pressure, or suction, that secures the breast in the baby's mouth.

Coordinating these rhythmic sucking movements with breathing and swallowing is a relatively complicated task for a newborn. So even though this is a reflexive action, not all babies suck efficiently at first. With practice, however, the reflex becomes a skill that they all manage well.

Eventually these motions become less reflexive (involuntary) and more directed, your infant will start to use these movements (voluntary) to console herself. She also may be comforted when you give her a pacifier or when you help her find her thumb or her fingers.

Another, more dramatic reflex during these first few weeks is called the **Moro reflex**. If your baby's head shifts positions abruptly or falls backward, or she is **startled** by something loud or abrupt, she will react by throwing out her arms and legs and extending her neck, then rapidly bringing her arms together and she may cry loudly. The Moro reflex, which may be present in varying degrees in different babies, peaks during the first month and then disappears after two months.

One of the more interesting automatic responses is the **tonic neck reflex**, otherwise known as *the fencing posture*. You may notice that when your baby's head turns to one side, her arm on that side will straighten, with the opposite arm bent as if she's fencing. Do not be surprised if you don't see this response, however. It is subtle, and if your baby is disturbed or crying, she may not perform it. It disappears at five to seven months of age.

You'll see still another reflex when you stroke the palm of your baby's hand and watch her immediately grip your finger (**Palmar**

grasp). Or stroke the sole of her foot, and watch it flex as the toes curl tightly (**Babinski reflex**). In the first few days after birth, your baby's grasp will be so strong that it may seem she can hold her own weight—but don't try it. She has no control over this response and may let go suddenly.

Aside from her strength, your baby's other special talent is **stepping**. She can't support her own weight, of course, but if you hold her under the arms (being careful to support her head, as well) and let her soles touch a flat surface, she'll place one foot in front of the other and "walk." This reflex will disappear after two months, then recur as the learned voluntary behavior of walking toward the end of the first year.

Although you may think of babies as utterly defenseless, they have several **protective reflexes**. For instance, if an object comes straight toward her, she'll turn her head and try to squirm out of its way. (Amazingly, if the object is on a path that would make it a near miss instead of a collision, she will calmly watch it approach without flinching.) Yes, she's very dependent on her mother and father at this age, but she's not totally defenseless.

The following are some of the normal inborn reflexes you will see your baby perform during her first weeks. Not all infants acquire and lose these reflexes at the same time, but this table will give you a general idea of what to expect.

Sources

- [Newborn Reflexes](#). *Healthy Children.org*. (Adapted from *Caring for Your Baby and Young Child: Birth to Age 5*. 7th Edition. © 2019 American Academy of Pediatrics)
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). (Page 74). Licensed under CC BY-NC-SA 3.0.

4.4: Motor Skills

Gross Motor Skills

Voluntary movements involve the use of large muscle groups and are typically large movements of the arms, legs, head, and torso. They are referred to as **gross motor skills** (or **large motor skills**). These skills begin to develop first.

Examples include

- moving to bring the chin up when lying on the stomach,
- moving the chest up,
- rocking back and forth on hands and knees, and then
- crawling

Many babies, if seated in a carrier or other device that frees the hips, may begin to explore an object with one's feet as early as 8 weeks of age. This may be easier than reaching for an object with their hands, which requires much more practice and effort.

Sometimes an infant will try to move toward an object while crawling but then move backward because of the greater amount of strength in the arms than in their legs! This also tends to lead infants to pulling up on furniture, usually with the goal of reaching a desired object. This will eventually lead to taking steps and then walking.



Fig. 4.4. Baby crawling.

Image Source: Shubham Rawat. [Close-Up Shot of a Toddler Crawling on the Floor](#). Pexels.com

Physical Gross Motor Milestones

As stated above, infants and toddler grow very quickly and meet physical milestones rapidly in the first few years of life. The table below shows typical major milestones that occur during the first formative years -- behaviors or physical skills seen in infants and toddler as they grow and develop.

Table 4.4 - Gross Motor Milestones

Typical Age	What Most Children Do by This Age
2 months	• Can hold head up and begins to push up when lying on tummy • Makes smoother movements with arms and legs
4 months	• Holds head steady, unsupported • Pushes down on legs when feet are on a hard surface • May be able to roll over from tummy to back • Brings hands to mouth • When lying on stomach, pushes up to elbows
6 months	• Rolls over in both directions (front to back, back to front) • Begins to sit without support • When standing, supports weight on legs and might bounce • Rocks back and forth, sometimes crawling backward before moving forward
9 months	• Stands, holding on • Can get into sitting position • Sits without support • Pulls to stand • Crawls
1 year	• Gets to a sitting position without help • Pulls up to stand, walks holding on to furniture ("cruising") • May take a few steps without holding on • May stand alone
18 months	• Walks alone • May walk up steps and run • Pulls toys while walking • Can help undress self

2 years	• Stands on tiptoe • Kicks a ball • Begins to run • Climbs onto and down from furniture without help • Walks up and down stairs holding on • Throws ball overhand
3 years	• Climbs well • Runs easily • Pedals a tricycle (3-wheel bike) • Walks up and down stairs, one foot on each step

Fine Motor Skills

More exact movements of the feet, toes, hands, and fingers are referred to as **fine motor skills** (or **small motor skills**). These include the ability to reach and grasp an object in coordination with vision. **Newborns** cannot grasp objects voluntarily but do wave their arms toward objects of interest.

At about **4 months of age**, the infant can reach for an object, first with both arms and within a few weeks, with only one arm. Grasping an object involves the use of the fingers and palm, but no thumbs.

At about **9 months of age** babies begin to grasp an object using the forefinger and thumb. This is known as the **pincer grip**. This ability greatly enhances the ability to control and manipulate an object and infants take great delight in this newfound ability. They may spend hours picking up small objects from the floor and placing them in containers. And as those objects will often next go into the mouth, caregivers must be vigilant about keeping items small enough to be choking hazards out of reach of little fingers. By 9 months, an infant can also watch a moving object, reach for it as it approaches and grab it.

This is quite a complicated set of actions if we remember how difficult this would have been just a few months earlier.



Fig. 4.4.1. Toddler feeding himself with a spoon

Image Source: Matt Preston. [In a Mess](#). Flickr.com

Physical Fine Motor Milestones

While fine motor skills are slower to develop (in accordance with **proximodistal development**), remarkable progress is made in fine motor development during the first three years. In the first few years of life children go from having no intentional fine motor control to being able to manipulate objects to play and learn, as well as beginning to care of themselves.

The following is a table of the major milestones in fine motor development.

Table 4.4.1. Fine Motor Milestones

Typical Age	What Most Children Do by This Age
2 months	• Grasps reflexively • Does not reach for objects • Holds hands in fist
4 months	• Brings hands to mouth • Uses hands and eyes together, such as seeing a toy and reaching for it • Follows moving things with eyes from side to side • Can hold a toy with whole hand (palmar grasp) and shake it and swing at dangling toys

6 months	• Reaches with both arms • Brings things to mouth • Begins to pass things from one hand to the other
9 months	• Puts things in mouth • Moves things smoothly from one hand to the other • Picks up things between thumb and index finger (pincer grip)
1 year	• Reaches with one hand • Bangs two things together • Puts things in a container, takes things out of a container • Lets things go without help • Pokes with index (pointer) finger
18 months	• Reaches with one hand • Bangs two things together • Puts things in a container, takes things out of a container • Lets things go without help • Pokes with index (pointer) finger
2 years	• Builds towers of 4 or more blocks • Might use one hand more than the other • Makes copies of straight lines and circles • Enjoys pouring and filling • Unbuttons large buttons • Unzips large zippers • Drinks and feeds self with more accuracy

3 years

- Drinks and feeds self with more accuracy
- Draw a circle with a crayon, pencil, or marker
- Play with toys that have small moving parts and/or buttons
- Turn the pages of a book one at a time
- Create towers of six or more blocks
- Work door handles and open twist-on bottle tops

Source

- Leon, Ana R. [Children's Development](#). Licensed under CC BY 4.0

4.5: Sensory Capacities

Sensory Capacities

Throughout much of history, the newborn was considered a passive, disorganized mysterious little being who possessed minimal abilities. Current research has demonstrated just the opposite, the newborn has very developed and well-organized sensory and perceptual abilities.

• Vision

The womb is a dark environment void of visual stimulation, and as a result vision is the most poorly developed sense at birth. Time is needed to build those neural pathways between the eye and the brain. Newborns typically cannot see further than 8 to 16 inches away from their faces, which is approximately the distance from the newborn's face to the mother/caregiver when an infant is breastfeeding or bottle-feeding). Within hours of birth an infant also shows a preference for the face of its own mother.

An infant's visual acuity is about 20/400, which means that an infant can see something at 20 feet that an adult with normal vision could see at 400 feet and the world may look quite blurry to young infant. Around 6 months of age, infants' visual acuity improves and approximates adult 20/25 acuity.

This weakness in early visual acuity means infants will look longer at a checkerboard with only a few large squares than one with many smaller squares. An infant's threshold for seeing a visual pattern is higher than an adults. Toys that are manufactured with black and white patterns rather than pastel colors offer a higher contrast, which makes the pattern more visible to the immature visual system.



Fig. 4.5. Infant looking at caregiver while bottle-feeding

Image Source: [Infant Feeding](#) by Ben_Kerckx on Pixabay

When looking at a person's face, newborns do not look at the eyes the way adults do; rather, they tend to look at the chin—a less detailed part of the face. By 2 or 3 months, they will seek more detail when visually exploring a face or an object and begin showing preferences for:

- unusual images over familiar ones, for
- patterns over solids, for
- faces over patterns, and for
- three- dimensional objects over flat images.

Newborns have difficulty distinguishing between colors, but within a few months they can discriminate between colors as well as adults do. Sensitivity to binocular depth cues, which require inputs from both eyes, is evident by about 3 months and continues to develop during the first 6 months. By 6 months, the infant can perceive depth perception in pictures as well as their environment. Infants who have experience crawling and exploring will pay greater attention to visual cues of depth and modify their movement and actions appropriately.

• Hearing

The ability of a fetus to hear is evident as soon as the 7th month of prenatal development. While in utero they will register specific information heard from their mother's voice. Infants are born with a very keen sense of hearing. They prefer their mother's voices over another female when speaking the same words, they can distinguish between a familiar and unfamiliar voice during their first few weeks, and between very similar sounds as early as one month after birth.

Infants are especially sensitive to the frequencies of sounds in human speech and prefer the exaggeration of infant-directed speech. Additionally, they are innately ready to respond to the sounds of any language, however some of this ability will be lost by 7 or 8 months of age as the infant becomes more familiar with the sounds of a specific language and less sensitive to sounds that are part of an unfamiliar language.

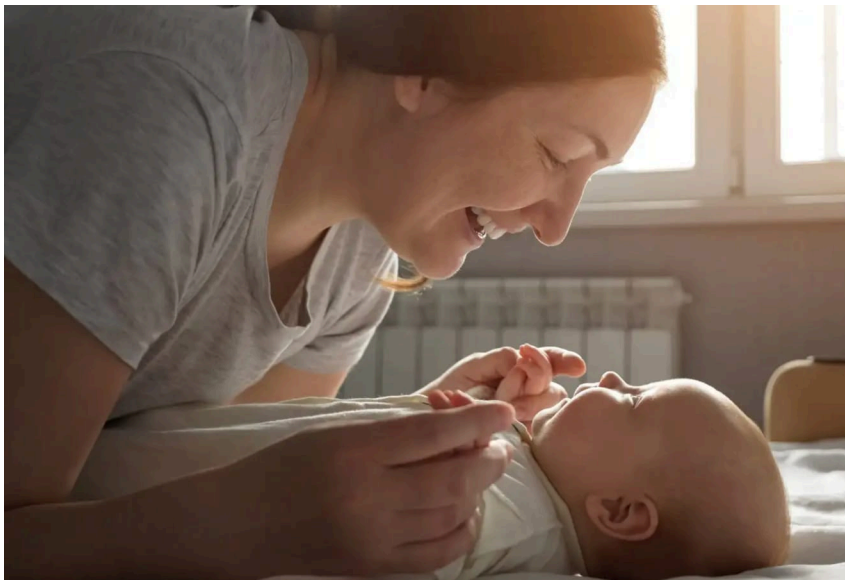


Fig 4.5.1. Newborn babies seem to recognize the language spoken by their mother.

Image Source: Fida Hussain/AFP/ Getty Images. Chen Ly. [Babies may start to learn language before they are born.](#) *NewScientist.com*. November 22, 2023.

• Taste and Smell

Studies of taste and smell demonstrate that babies respond with different facial expressions, suggesting that certain preferences are innate. Newborns can distinguish between sour, bitter, sweet, and salty flavors and show a preference for sweet flavors. 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.

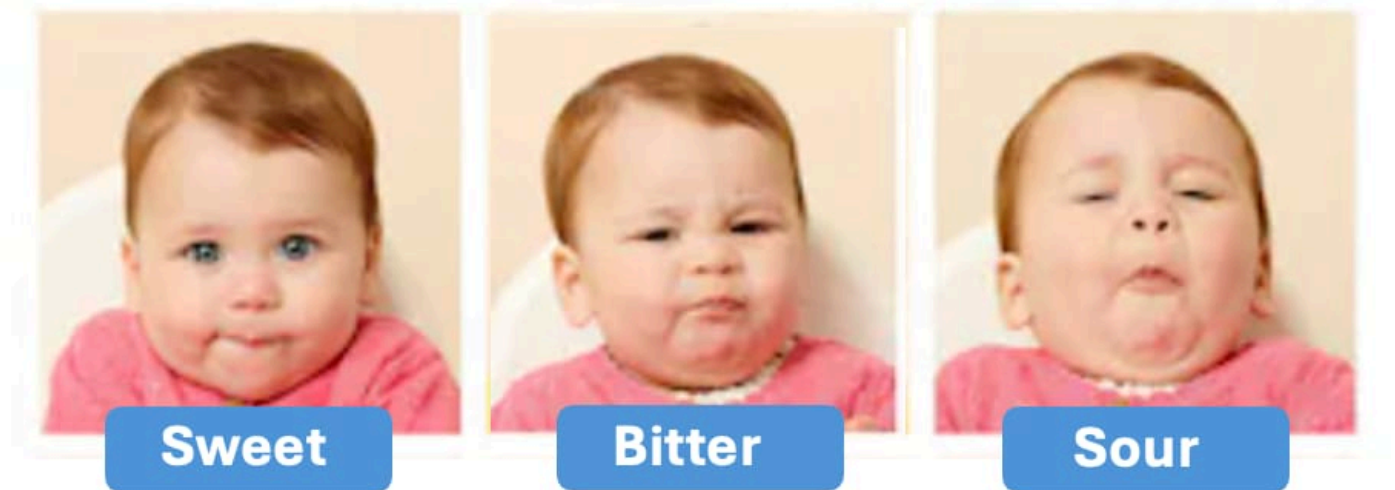


Fig. 4.5.1. Baby Responding to different tastes

Image Source: Created from images found in the article. [Nine baby feeding faces every parent needs to know, and what they mean](#). *Kidspot*. news.com.au. April 24, 2019.

Source

- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). Licensed under CC BY-NC-SA 3.0.

4.6: Breastfeeding

Breastfeeding

Breastfeeding has many benefits for you and your baby. It helps build your baby's immune system and offers the perfect nutrition. Breast milk is considered the ideal diet for newborns. **Colostrum**, the first breast milk produced during pregnancy is very rich in nutrients and antibodies. Breast milk changes by the third to fifth day after birth, becoming much thinner, but containing just the right amount of fat, sugar, water and proteins to support overall physical and neurological development. Breast milk contains everything your baby needs to grow and develop. It provides a unique and specific formula of vitamins, minerals and antioxidants.

Breast milk supports a baby's health because it

- is easy for their developing tummy and intestines to digest
- contains antibodies that protect against infection and boost immunity.
- promotes healthy weight gain.
- changes in composition to meet your baby's nutritional needs over time.
- contains substances that naturally soothe your baby



Figure 4.17 – A nurse helping a new mother to breastfeed.

Image Source: [World Breastfeeding Week spotlights lifelong benefits of nursing. Health.mil.](#) July 11, 2023.

A Historic Look at Breastfeeding

The use of **wet nurses** -lactating women hired to nurse others' infants- during the Middle Ages eventually declined and by the late 1800s mothers increasingly breastfed their own infants.

In the early part of the 20th century, breastfeeding experienced another decline. By the 1950s, formula was viewed as superior to breast milk, and breastfeeding was practiced less frequently.

During the late 1960s and 1970s, greater emphasis began to be placed on natural childbirth and breastfeeding and the benefits of breastfeeding were more widely publicized. Gradually rates of breastfeeding began to climb, particularly among middle-class educated mothers who received the strongest messages to breastfeed.

Today, many women receive consultation from a **lactation specialist or consultant** before being discharged from the hospital to

ensure that they are informed of the benefits of breastfeeding and how to breastfeeding effectively by helping mothers understand the basics of breastfeeding and offer guidance on proper positioning and latch techniques to ensure the baby is getting enough milk and the mother is comfortable. They can address any concerns or challenges related to breastfeeding, such as latch issues, milk supply, or pain. This guidance and support for first-time mothers, especially, is important. Without it new mothers may become upset or discouraged and stop breastfeeding.

Maternal Benefits of Breastfeeding

Several recent studies have reported that it is not just babies that benefit from breastfeeding, mothers do as well, and in multiple ways.

- stimulates contractions in the mother's uterus to help it regain its normal size
- quicker recovery from childbirth
- may make it easier for to lose the weight gained during pregnancy
 - breastfeeding burns extra calories, which can help with weight loss
- contributes to certain health outcome
 - lower risk of developing breast cancer particularly among higher risk racial and ethnic groups
 - lower rates of ovarian cancer
 - reduced risk for developing Type 2 diabetes and rheumatoid arthritis

It's recommended mothers exclusively breastfeed for the first 6 months if possible. This early period is the most crucial for providing your baby with the nutrients and antibodies they need to grow and develops

Challenges to Breastfeeding

According to the CDC, 60% of mothers do not breastfeed for as long as they intend. How long a mother breastfeeds her baby is influenced by many factors, including

- issues with lactation and latching
- concerns about infant nutrition and weight
- mother's concern about taking medications while breastfeeding
- unsupportive work policies and lack of parental leave
- cultural norms and lack of family support
- unsupportive hospital practices and policies

If mothers are unavailable to their infants at feeding them, they can provide breast milk for their babies by using a breast pump and expressing the milk and freezing it to be bottle-fed later. However, some mothers find that even after the initial encouragement they receive in the hospital to breastfeed, the outside world is less supportive of such efforts. Some workplaces support breastfeeding mothers by providing flexible schedules, private rooms where they can pump, and even welcoming infants, but many do not, and mothers are forced to stop breastfeeding.

In addition, not all women may be able to breastfeed. Women with HIV are routinely discouraged from breastfeeding as the infection may pass to the infant. Similarly, women who are taking certain medications or undergoing radiation treatment may be advised against breastfeeding.



Figure 4.18 – A father bottle-feeding his infant

Image Source: Ilya Haykinson. [Mateo](#). is licensed under CC BY-SA 2.0

Alternatives to Breastfeeding

There are many reasons that mothers struggle to breastfeed or should not breastfeed, including:

- low milk supply
- previous breast surgeries
- illicit drug use
- medications
- infectious
- disease
- inverted nipples

Other mothers choose not to breastfeed. Some reasons for this include

- lack of personal comfort with nursing, the
- time commitment of nursing,
- inadequate or unhealthy diet, and
- needing or wanting more convenience and flexibility as to who can feed the infant

For these mothers and infants, formula is available. Besides breast milk, infant formula is the only other milk product that the medical community considers nutritionally acceptable for infants under the age of one year (as opposed to cow's milk, goat's milk, or follow-on formula). Formula can be used in addition to breastfeeding (supplementing) or as an alternative to breast milk.

The most used infant formulas contain purified cow's milk whey and casein as a protein source, a blend of vegetable oils as a fat source, lactose as a carbohydrate source, a vitamin-mineral mix, and other ingredients depending on the manufacturer. In addition, there are infant formulas which use soybeans as a protein source in place of cow's milk (mostly in the United States and Great Britain), and formulas which use protein hydrolysed into its component amino acids for infants who are allergic to other proteins.

Cost of Breastfeeding

In addition to the nutritional benefits of breastfeeding, breast milk does not have to be purchased. This may be an important incentive for choosing to breastfeed. But there are also those who challenge the belief that breast milk is free. For breast milk to be completely beneficial for infants the mother's life choices will ultimately affect the quality of the nutrition an infant will receive.

Cost of the nutritional intake of the mother is a factor. Breastfeeding will both limit some food and drink choices as well as necessitate an increased intake of healthier options. A simple trip down the supermarket aisles will show you that nutritious and healthier options can be more expensive than some of the cheaper more processed options. A large variety of vegetable and fruits must be consumed, accompanied by the right proportions and amounts of the whole grains, dairy products, and fat food groups. Additional cost accrue as breastfeeding mothers are encouraged to take vitamins regularly.

Both breastfed and bottle-fed infants benefit from the bonding and healthy emotional development for infants that takes place at feeding time. This is good news for mothers who may be unable to breastfeed for a variety of reasons and for fathers who might feel left out.

Sources

- [About Breastfeeding Data](#). *CDC Breastfeeding Data*. Centers of Disease Control and Prevention. June 28, 2024.
- [Benefits of Breastfeeding](#). *HealthLibrary*. ClevelandClinic.org. July 17, 2023.
- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0.

4.7: Introducing Solid Foods to a Baby

When, What, and How to Introduce Solid Foods

The **American Academy of Pediatrics** recommends children be introduced to foods other than breast milk or infant formula when they are about 6 months old, although that may vary somewhat. It is not recommended feeding babies solid foods during the first 4 months. This is because babies younger than 4 months still have immature tummies and bowels and they are also not able to can't chew or swallow well either. As babies get older, they need solid food to get enough nutrients to grow and develop properly. Important nutrients include iron and zinc.

Introducing solids is also important for helping babies learn to eat, giving them experience of new tastes and textures from a range of foods. It develops their teeth and jaws, and it builds other skills that they'll need later for language development.

Here are some **signs** that show that an infant is ready for foods other than breast milk or infant formula:

- baby has good head control
- baby can sit with little or no support
- shows an interest in food – for example, they look at what's on your plate
- opens his or her mouth and leans forward when you offer them food on a spoon



Fig 4.7. Baby being spoon-fed.

Image Source: [Introducing solids: why, when, what and how. Babies.](#) raisingchildren.net.au

How Should Foods Be Introduced?

When you're first introducing solids, try offering **1-2 teaspoons of food once a day**. At first, your baby might have only a small taste and probably won't swallow much. As your baby grows, you can increase the amount according to your baby's appetite and signs.

By 12 months, your baby should be eating around 3 small meals a day, plus breast milk or infant formula.

When your baby is ready for solids, first foods might be smooth or finely mashed, depending on what your baby likes. Over the next weeks and months, your baby can move on to roughly mashed or minced foods and then chopped foods. All foods should be very soft.

Your baby needs a **variety of food textures**. This helps your baby learn how to chew, and chewing helps with speech development and self-feeding. It also helps to prevent feeding difficulties as your baby develops. Babies can chew even before they get their first teeth.

The key is to **include iron-rich foods of the right texture** in your baby's first foods. Iron-rich foods include:

- iron-fortified infant cereal - oat, barley, and multi-grain instead of only rice cereal
- minced meat, poultry and fish
- cooked tofu and legumes
- mashed, cooked egg (avoid raw or runny egg)

To these iron-rich foods, you can add other healthy foods of the right texture like:

- vegetables – for example, cooked potato, pumpkin, sweet potato, carrot, broccoli or spinach
- fruit – for example, banana, apple, pear, melon or avocado
- grains – for example, oats, bread, roti, naan, rice, noodles and pasta
- dairy foods – for example, full-fat yoghurt and full-fat cheese.

You can **introduce any number of new foods at a time and in any order**. When you offer your baby a variety of foods, they can try plenty of new tastes and get a range of nutrients. It may take numerous attempts before a child gains a taste for a certain food and caregivers should not give up if a food is refused on first offering.

Children should be allowed to try one food at a time at first and there should be 3 to 5 days before another food is introduced. This helps caregivers see if the child has any problems with that food, such as food allergies. It is no longer recommended that caregivers delay introducing these foods to all children, but if there is a family history of food allergies, the child's doctor or nurse should be consulted.

The eight most common allergenic foods are

1. milk
2. eggs
3. fish
4. shellfish
5. tree nuts
6. peanuts
7. wheat
8. soybeans

Signs that your baby is getting enough nutrition from both solids and breast milk or formula during this time:

- has plenty of wet diapers – at least 6-8 wet cloth diapers or 5 very wet disposables in 24 hours
- is alert and mostly happy after and between feeds
- is gaining weight at about the right rate
 - your child and family health nurse will weigh your baby at your regular check-ups.

Milk Anemia

Definition: Milk Anemia

A condition in which milk consumption leads to a lack of iron in the diet

Infants younger than 12 months who drink cow's milk rather than breast milk or iron-fortified formula are more likely to have anemia. Anemia is a problem in which the body does not have enough healthy red blood cells. Red blood cells bring oxygen to body tissues.

During their first 6 months of life, babies use the iron transmitted from their mothers before they were born and stored in their bodies. Infants also get some iron from breast milk or infant formula, but these iron reserves diminish as the baby gets older.

Because they grow rapidly, infants and toddlers need to absorb a lot of iron each day. By around 6 months, babies need to start having iron-rich solid food. Milk anemia most commonly affects babies 9 - 24 months old. Children older than 12 months who drink too much cow's milk may also have anemia if they do not eat enough other healthy foods that have iron.

Cow's milk leads to anemia because it:

- contains less iron
- causes small amounts of blood loss from the intestines
- makes it harder for the body to absorb iron

As their iron level and blood counts become lower, signs of milk anemia may appear. The infant or toddler may:

- behave irritably
- become short of breath
- crave unusual foods (called pica)
- eat less food
- feel tired or weak all the time
- have a sore tongue
- experience headaches or dizziness

Severe anemia presents with

- blue-tinged or pale whites of eyes
- brittle nails
- pale skin color

Growth Faltering (formerly know as Failure to Thrive)

Definition: Growth Faltering

Occurs when an infants growth rate is significantly below that of other children of similar age and gender.

Growth faltering often occurs in children whose nutritional intake is insufficient for supporting normal growth and weight gain. It typically presents before two years of age, when growth rates are highest. Physicians often identify it during routine office visits, when a child's growth parameters are not tracking appropriately on growth curves. It is a common and treatable condition. The baby may simply need to take in more calories to get back on track or they might need treatment for an underlying condition such as:

- errors of metabolism
- acid reflux
- anemia
- diarrhea
- Cystic fibrosis,
- Crohn's disease
- celiac disease
- cleft palate
- tongue tie
- milk allergies
- hyperthyroidism
- congenital heart disease

Growth faltering may also be caused by situational or environmental factors:

- inability to produce enough breast milk
- inadequate food supply
- insufficient number or volume of feedings
- insufficient nutrition

- caregiver's actions
- neglect

Several of these factor may co-exist. For example a baby experiencing pain from acid reflux may refuse food and the caregiver is hesitant to force the baby to eat.

Sources

- [Anemia caused by low iron - infants and toddlers](#). *Medline Plus*. February 17, 2024.
- [Introducing solids: why, when, what and how](#). Babies. raisingchildren.net.au
- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0.
- [When, What, and How to Introduce Solid Foods](#). *Infant and Toddler Nutrition*. CDC. March 20, 2025

4.8: Infant Health

Common Physical Conditions and Issues during Infancy

Infants depend on the adults that care for them to promote and protect their health. Some physical conditions and issues are very common during infancy. Many are normal, and the infant's caregivers can manage them if they occur. The key is learning about and understanding what is normal for the infant and becoming comfortable with their routine.

New parents and caregivers often have questions about such things as:

- Bowel Movements
- Teething
- Spitting Up/Vomiting
- Urination
- Diaper Rash
- Jaundice
- Colic/Purple Crying



Fig 4.8. Infant being diapered.

Image Source: DaddyDiaper. [Daddy does the best diapers.](#) Wikimedia Commons.

Bowel Movements

Infants' bowel movements go through many changes in color and consistency, even within the first few days after birth. While the color, consistency, and frequency of stool will vary, hard or dry stools may indicate dehydration and increased frequency of watery stools may indicate diarrhea.

Teething

Although newborns usually have no visible teeth, baby teeth begin to appear generally about 6 months after birth. During the first few years, all 20 baby teeth will push through the gums, and most children will have their full set of these teeth in place by age 3.

An infant's front four teeth usually appear first (two on top, and two on bottom) at about 6 months of age, although some children

don't get their first tooth until 12-14 months. As their teeth break through the gums, some infants become fussy, and irritable; lose their appetite; or drool more than usual.

The FDA does not recommend gum-numbing medications with an ingredient called benzocaine because they can cause a potentially fatal condition in young children. Safe forms of relief include a chilled teething ring or gently rubbing the child's gums with a clean finger.

Spitting Up/Vomiting

Spitting up is a common occurrence for young infants and is usually not a sign of a more serious problem. But if an infant is not gaining weight or shows other signs of illness, a health care provider should be consulted.

Urination

Infants urinate as often as every 1 to 3 hours or as infrequently as every 4 to 6 hours. In case of sickness or if the weather is very hot, urine output might drop by half and still be normal. If an infant shows any signs of distress while urinating or if any blood is found in a wet diaper medical care should be sought.

Diaper Rash

A rash on the skin covered by a diaper is quite common. It is usually caused by irritation of the skin from being in contact with stool and urine. It can get worse during bouts of diarrhea. Diaper rash usually can be prevented by frequent diaper changes.

Jaundice

Jaundice can cause an infant's skin, eyes, and mouth to turn a yellowish color. The yellow color is caused by a buildup of bilirubin, a substance that is produced in the body during the normal process of breaking down old red blood cells and forming new ones. Normally the liver removes **bilirubin** from the body. But, for many infants, in the first few days after birth, the liver is not yet working at its full power. As a result, the level of bilirubin in the blood gets too high, causing the infant's color to become slightly yellow—this is jaundice.

Although jaundice is common and usually not serious, in some cases, high levels of bilirubin could cause brain injury. All infants with jaundice need to be seen by a health care provider. Many infants need no treatment. Their livers start to catch up quickly and begin to remove bilirubin normally, usually within a few days after birth. For some infants, health care providers prescribe phototherapy—a treatment using a special lamp—to help break down the bilirubin in their bodies.

Colic: The Period of PURPLE Crying

Many infants are fussy in the evenings, but if the crying does not stop and gets worse throughout the day or night, it may be caused by **colic**. Babies may cry inconsolably or scream, extend or pull up their legs, and pass gas. Their stomachs may be enlarged. The crying spells can occur anytime, although they often get worse in the early evening.

It can be confusing and concerning to be told your baby "has colic" because it sounds like it is an illness or a condition that is abnormal. Colic simply means your otherwise healthy baby cries excessively for no apparent reason. Healthcare providers define colic as intense crying for more than three hours a day, at least three days a week, for more than three weeks. Often, there's nothing you can do to relieve your crying baby.

All babies cry — it's the way they communicate their needs. But a colicky baby is inconsolable and screams without any obvious cause. The crying usually starts suddenly at about the same time every day, often in the afternoon or evening hours. However, when your baby isn't crying, they act completely normal.

The **Period of PURPLE Crying** program is an evidence-based shaken baby syndrome/abusive head trauma (SBS/AHT) prevention program available since 2007.

While colic in babies is harmless and passes quickly, the condition can be frustrating for parents. Dr. Ronald Barr, a developmental pediatrician who has extensively studied infant crying, came up with the phrase the **Period of PURPLE Crying**. His idea was to explain this phase to parents of new babies so they would know it was normal and they would be encouraged that it would come to an end. The **Period of PURPLE Crying** usually starts around 2 weeks of age and ends around 3 to 5 months of age. The acronym PURPLE does not mean the baby turns purple while crying but is used as a meaningful and memorable way to describe what parents and their babies are going through. There are other common characteristics of this phase, or period, that all babies go through to some extent. The acronym PURPLE helps parents learn how to care for their crying baby — and themselves — during this time. It is a new way to help parents understand this time in their baby's life, which is a normal part of every infant's development.

Table 4.8 - The Letters in **PURPLE** stand for...

	PERIOD	OF	PURPLE	CRYING	
P	U	R	P	L	E
Peak of crying	Unexpected	Resists soothing	Pain expression	Long lasting	Evening
Crying increases with each week, with crying the most problematical in the second month, then gradually tapering off by 3-5 months.	Crying can come and go with no clear reason.	Crying will continue no matter how many ways the caregiver tries to soothe the baby.	A crying baby may look like they are in pain, but they are not.	Crying can last as long as 5 hours per day.	Crying may occur in late afternoon and early evening.

The word **PERIOD** means crying has a beginning and an end.

"It was so discouraging," said one dad. "Our baby giggles and seems fine during the day and almost like clockwork, he starts crying around 6 pm. He is growing and healthy, so why does he cry like this?"

When these babies are going through this period, they seem to resist soothing. Nothing helps. Some infants seem to be soothed by being held, rocked, or wrapped snugly in a blanket. Some like a pacifier. Even though certain soothing methods may help when they are simply fussy or crying, these bouts of inconsolable crying are different. Nothing seems to soothe them. During this phase of a baby's life they can cry for hours and still be healthy and normal. Parents often think there must be something wrong or they would not be crying like this. Often parents say their baby looks like he or she is in pain. They think they must be, or why would they cry so much. Babies who are going through this period can act like they are in pain even when they are not.

YouTube Video

This interactive element is not available in this format. Visit the link or scan the QR code to access it online.

[View this YouTube Video online](#)



Shaken Baby Syndrome (SBS)

It's very normal to experience frustration when a baby cries nonstop for hours. The key is to focus on calming yourself and understand that you may not be able to calm your baby. It's not your fault or the fault of the baby's. It's normal for healthy babies to cry and some babies cry much more than others. When a baby cannot be consoled, and caregivers may feel pushed to the limit and lose control and shake the baby in an attempt to make them stop crying. This can have devastating life-threatening effects.

Shaken Baby Syndrome (SBS) is a name given to the group of injuries that result from the forceful shaking of a child, with or without direct impact to the head. It is a severe form of physical child abuse that can occur from as little as 5 seconds of shaking.

It may be caused from vigorously shaking an infant by the shoulders, arms, or legs. Children's brains are softer, their neck muscles and ligaments are weak, and their heads are large and heavy in proportion to their bodies. The result is a type of **whiplash**, similar to what occurs in some auto accidents. The **whiplash effect** created by shaking an infant can cause **intracranial (within the brain)** or **intraocular (within the eyes) bleeding**. When an infant or toddler is shaken, the brain bounces back and forth against the skull. This can cause bruising of the brain (cerebral contusion), swelling, pressure, and bleeding in the brain. The large veins along the outside of the brain may tear, leading to further bleeding, swelling, and increased pressure.

Shaken Baby Syndrome (SBS) does not result from gentle bouncing, playful swinging or tossing the child in the air, or jogging with the child. It also is very unlikely to occur from accidents such as falling off chairs or down stairs, or accidentally being dropped from a caregiver's arms. Short falls may cause other types of head injuries, although these are often minor.

Often there is no obvious external head trauma or physical signs of injury, such as bruising, bleeding, or swelling. Outwardly, the infant looks perfectly fine. However, rib fractures are common and can be seen on x-rays. In some cases, the condition can be difficult to diagnose and may not be found during an office visit.

Outward signs such as symptoms can vary, ranging from mild to severe. They may include:

- convulsions or seizures
- decreased alertness
- extreme irritability or other changes in behavior
- confused, restless, or agitated state
- lethargy, sleepiness, not smiling
- loss of energy or motivation
- loss of consciousness
- not breathing
- loss of focus or vision
- pale or bluish skin
- poor feeding, lack of appetite
- vomiting

Shaken Baby Syndrome (SBS) can result in death, mental retardation or developmental delays, paralysis, severe motor dysfunction, spasticity, blindness, and seizures.

Who's at Risk?

Infants and very small children are especially vulnerable to this type of abuse. Keep in mind how large their heads are heads are large in comparison to their bodies, and their neck muscles are weak. Children under one year of age are at highest risk, but **Shaken Baby Syndrome (SBS)** has been reported in children up to 5 years of age.

Shaking often occurs in response to a baby crying or having a toilet-training accident. The perpetrator tends to be male and is primarily the biological father or the mother's boyfriend or partner.

Caregivers are responsible for about 9 - 21% of cases. The explanation typically provided by the caregiver—*I was just playing with the baby*—does not begin to account for the severity of the trauma. Many times, there is also a history of child abuse.

Can It Be Prevented?

Shaken Baby Syndrome (SBS) is completely preventable. It's dangers are not well appreciated by the general public, with 25-50% of people unaware of the dangers and risks of shaking a baby. Simply worded and well designed information cards on the dangers of shaking and alternatives to dealing with a crying infant have been shown to change parental knowledge and understanding of appropriate child behavior management techniques. Home visitation programs conducted between the prenatal period and the age of two, have shown to decrease rates of maltreatment in certain populations. Physicians are expected to detect and manage cases of child maltreatment, yet they often have inadequate training in this field.

These steps can help decrease the risk for shaken baby syndrome:

- Never shake a baby or child in play or in anger. Even gentle shaking can become violent shaking when you are angry.
- Do not hold your baby during an argument.
- If you find yourself becoming annoyed or angry with your baby, put the baby in their crib and leave the room. Try to calm down. Call someone for support.
- Call a friend or relative to come and stay with the child if you feel out of control.
- Contact a local crisis hotline or child abuse hotline for help and guidance.
- Seek the help of a counselor and attend parenting classes.
- Do not ignore the signs if you suspect child abuse in your home or in the home of someone you know.



Fig. 4.8.1. Shaken Baby Syndrome (SBS) Information Cards

- Image Source: [Children's Trust Fund, Missouri](#).
- Image Source: Lorena Lucas. [Shaken Baby Syndrome Prevention Training for Child Care Providers](#). SlidePlayer. February 2011.

Abusive Head Trauma

Shaken baby syndrome (SBS) is part a bigger picture known as **abusive head trauma (AHT)**, a severe form of physical child abuse that results in a traumatic brain injury for the infant or child. Nearly all victims of abusive head trauma suffer serious, long-term health consequences - vision problems, developmental delays, physical disabilities, or hearing loss. As many as 1 of every 4 babies who experience **abusive head trauma (AHT)**, dies.

Abusive Head Trauma (AHT) facts:

- leading cause of physical child abuse deaths in children under 5 in the United States.
- accounts for approximately one third of all child maltreatment deaths
- the most common trigger for abusive head trauma is inconsolable crying
- babies less than one year old are at greatest risk of injury from abusive head trauma
- can be prevented by awareness and understanding the dangers of shaking a baby
- by providing support to parents and caregivers

The Bottom Line

We learned that shaking a baby can cause death or permanent brain damage. It can result in life-long disability. Always remember, when babies cry, it is normal to feel frustrated, helpless, or angry, but it's most important for you to stay calm than it is to stop the crying. Make a plan ahead of time

Having a plan to cope with crying can help. Healthy strategies for dealing with a crying baby include:

- finding the reason for the crying
- checking for signs of illness or discomfort, such as diaper rash, teething, tight clothing.
- feeding or burping.
- soothing the baby by rubbing its back; gently rocking; offering a pacifier;
- singing or talking.
- taking a walk using a stroller or a drive in a properly secured car seat.
- calling the doctor if the baby seems sick

It's OK to ask for help. All babies cry. Caregivers often feel overwhelmed by a crying baby. Calling a friend, relative, or neighbor for support or assistance lets the caregiver take a break from the situation. If immediate support is not available, the caregiver could place the baby in a crib (making sure the baby is safe), close the door, and check on the baby every five minutes.

Sources

- [About Abusive Head Trauma](#). *Child Abuse and Neglect Prevention*. CDC. May 16, 2024.
- [Crying Ages 3 and Younger](#). Health Information and Tools / Health A-Z. MyHealthAlberta.ca . March 22, 2024.
- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0
- [Shaken Baby Syndrome](#). *Medical Encyclopedia*. Medline Plus. January 24, 2023.
- [The Period of Purple Crying](#).. National Center on Shaken Baby Syndrome.

4.9: Toilet Learning

Learning to Use the Toilet

As the infant grows into a toddler, toilet learning becomes a major milestone. Although we will talk about it here in physical development, the process involves all the domains. The term most used by caregivers for this process is **toilet learning**. This is a skill that needs to be learned like any other task. Toileting should never be the cause of discipline.



Fig. 4.9. Child sitting on toilet

Image Source: [Toilet Learning](#). *Healthy Living*. CaringForKids.csp.ca

Toilet Learning is a Process

It may be helpful to think of toilet learning as a process where both the adult and child each has their own "jobs" to do.

The adult's "job" is to create a supportive learning environment:

- recognize the child is in control of his or her body
- let the child decide whether to use the potty or a diaper/pull-up each day.
- teach the child words for body parts, urine and bowel movements.
- provide the child with the tools they need to be successful at toileting (such as a small potty chair, potty seat, stool, etc.).
- expect and handle accidents without anger
- avoid both punishment and too much praise

The child's "job" is to:

- decide whether to use the toilet or a diaper/pull-up.
- learn their body's signals for needing to use the toilet.
- use the toilet at his own pace

The Four Stages of Toilet Learning

When it comes to toilet learning, every child is different. Some children are ready as young as 18 months, but most start between

2 and 4 years of age. Be patient and follow the child's cues through each stage of the process. As a caregiver it is also important to communicate with the child's family to be consistent.

Stage One: Toilet Play

- pretends to toilet usually with their clothes on
- observes others going to the bathroom
- shows an interest in the toilet by liking books about learning to use the toilet

Stage Two: Toilet Practice

- practices flushing
- practices pulling pants up and down
- practices getting on and off the toilet
- practices squatting and standing
- practices hand washing
- asks whether a diaper is wet or dry, clean or dirty

Stage Three: Toilet Learning Readiness

- is dry in their diaper for several hours in a row
- has regular and predictable bowel movements
- shows interest in wearing "real" underwear
- feels the need to urinate by showing gestures, using facial expressions, or expresses it verbally
- acquires the desire to be clean
- has words for using the toilet, such as "potty"
- tells you when they have to go
- can pull pants up and down for themselves
- stands and sits well on their own
- shows signs of pushing and concentration when they are ready for a bowel movement
- tells you they are soiled or wet and needs to be changed

Stage Four: Independent Toileting

Toilet learning won't happen overnight. Toileting independence is child directed. Children notice their body signals by themselves, and are able to use the toilet or ask for help using the toilet outside of the home.



Fig. 4.9.1. Toddler on a toilet chair

Image Source: Tod Morris. [Potty training Jaiden](#). Flickr.com

Make a Plan

A child might be more stable on a **toilet chair** so that their feet can touch the floor. If you don't use a toilet chair, you'll need a toilet seat adapter and a footstool.

- be sure to dress the child in clothes they can pull up and down easily by themselves
- choose words for body fluids, functions and parts
 - use the right words - urine, bowel movement, penis and vagina - to help avoid confusion or embarrassment
 - avoid negative words like "dirty" or "stinky," which can make the child feel self-conscious
- let the child pretend to help a favorite doll or stuffed animal use the toilet

Always go with the child to the bathroom.

Practice

Develop a routine. Have enough time to patiently help a child every single day.

- have child sit on the toilet at specific times during the day
 - first thing in the morning,
 - after meals or snacks
 - before and after naps.
- help child get used to the toilet.
 - let them sit on the toilet while fully dressed
 - encourage them to sit on it for a few minutes without wearing a diaper
- watch for signs that they need to use the toilet.
 - encourage child to tell you when they need to go.
 - be sure to praise, even if they tell you after the fact
- read to the child while they sit on the toilet to help them to relax
- show child how to wipe properly
 - girls should wipe from front to back. Most
 - an adult will need you to wipe for them, especially after bowel movements, until preschool age
- teach child to wash his hands after using the toilet
- expect accidents – they will happen!
 - be sure not to punish or overreact
 - have a change of clothes on hand.

Boys usually learn to pee sitting down first. This is okay. They can learn to stand up later. When child has used the toilet successfully for at least a week, suggest they try cotton underpants or training pants. Make this a special moment. Typically pull ups are not recommended as a toilet learning tool. The pull up stays too dry and does not indicate to the child that they have urinated and are wet.

What if toilet learning doesn't work?

If the first try at toilet learning doesn't work, the child may just not be ready. Don't be disappointed or upset. Don't rush a child into using the toilet. If child refuses to use the toilet, take a break from the training for about 1 to 3 months.

The child may not want to pass a stool in a toilet, especially if they don't have good support for their feet. If that happens, let them have bowel movements in a diaper so they don't get constipated. Constipation can cause bowel movements to be painful. If it hurts, it's likely to take even longer to learn to use the toilet.

Sometimes a child who has been using the toilet will slip back and start to have accidents. This can be caused by a period of stress, like a new baby or a recent move. If this is the case, it's okay to go back to using a diaper. Watch for signs the child is ready to try again.

Even though a child may be clean and dry all day, it could take several more months or years for them to stay dry during naps or

all night.

There may be concerns to refer to a doctor if:

- child is not using the toilet by 4 years old.
- child was using the toilet well for 6 months or more and now seems to be slipping back, without a major stressor
- child is withholding stool, experiences pain when using the toilet, or has blood in the stool
- child develops redness or rash around the vagina or a foul smelling or cloudy urine
- child suddenly seems to need to go more frequently or urgently.

Sources

- [All About Potty Training](#). *Child Development and Family Center*. Northern Illinois University.
- Hayward, Kristi. [The Four Stages of Toilet Learning](#). *Child Development and Family Center*. Northern Illinois University.
- [Toilet Learning](#). *Healthy Living*. CaringForKids.csp.ca

4.10: Protecting Health through Immunization



Fig. 4.10. Healthcare worker placing band-aid over a baby's immunization shot.

Image Source: [Immunization Information](#). Maternity Hub. *Shared Care Initiative*. Fraser Northwest Division.

Childhood Immunizations

Vaccinations are one of the greatest achievements of science and public health. They have contributed to dramatic declines in vaccine-preventable diseases (diseases that vaccines can help prevent or lessen).

An important way we can protect an individual child's health (and those around them) is through **immunization**. While vaccines given through injection may hurt a little, the diseases they prevent diseases that can have serious or lifelong impacts, and in some cases death. Vaccines are biological preparations that improve immunity against a certain disease. Vaccines have contributed to the eradication and weakening of numerous infectious diseases:

- measles
- mumps
- rubella
- smallpox
- chicken pox
- meningitis
- hepatitis B
- polio
- diphtheria
- tetanus
- pertussis (whooping cough)

Measles can cause encephalitis (inflammation of the brain) and blindness, and **polio** can cause paralysis. Some vaccine-preventable diseases can even result in death. [Polio transmission](#) has been eliminated in the United States since 1979, including Wisconsin, due to successful vaccination programs.



Fig. 4.10.1. Toddler covered in measles. Fig 4.10.2. 5-year old girl using crutches and leg braces after contracting polio

Image Source: Lowell Georgia / Science Photo Library [Small boy covered with measles rash](#). Image source: Elaine Burns. [The Reluctant Poster Child](#). [PolioPlace](#). Post-PolioHealthInternational.com. 2011.

How Vaccines Work

Vaccines work very well. No medicine is perfect, of course, but most childhood vaccines produce immunity about 90–100% of the time. Immunizations are important for adults as well as for children.

Here's why:

- The immune system helps the human body fight germs by producing **antibodies** to combat them. Antibodies are protective proteins that attach to antigens (foreign substances) — such as bacteria, fungi, viruses and toxins — and remove them from your body.
- Once the immune system produces antibodies to a specific, it “remembers” the germ and can fight it again.
- Vaccines contain germs that have been killed or weakened.
 - When given to a healthy person, the vaccine triggers the immune system to respond and thus build immunity

Before vaccines, people gained immunity only by getting and surviving a disease. What about the argument still made by some people that vaccines don't work that well . . . that diseases would be going away on their own because of better hygiene or sanitation, even if there were no vaccines?

That simply isn't true.

Now, with better hygiene and sanitation we can help prevent the spread of disease, but the germs that cause disease will still be around, and if they are, they will continue to make people sick.

Immunizations are an easy and less risky way to become immune. Vaccines are the best defense we have against serious, preventable, and sometimes deadly contagious diseases. Looking at the history of any vaccine-preventable disease, shows that the number of cases of disease starts to drop when a vaccine is licensed. Vaccines are the most effective tool we have to prevent infectious diseases.

Vaccines are Safe: Facts vs Myths

Vaccines are an effective means of preventing life-threatening illnesses by boosting the body's natural immune response to diseases caused by viruses and bacteria. Although vaccines have been proven to be both safe and effective based on sound scientific evidence, several myths have been spread, keeping vaccines at the center of controversy. These concerns range from

fears about overloading the child's immune system to controversial reports about devastating side effects of the vaccines. Although children continue to get several vaccines up to their second birthday, these vaccines do not overload the immune system.

The three top myths circulating are:

Myth 1: Vaccines contain many harmful ingredients

- **Fact:** Vaccines contain ingredients at appropriate doses that allow the product to be safely administered. Vaccines contain ingredients at a dose that is even lower than the dose we are naturally exposed to in the foods we eat and the products we use everyday.
 - A vaccine must go through extensive testing to help ensure its safety, purity, potency and effectiveness. Vaccines undergo thorough testing in laboratories and in clinical trials with human subjects.
 - After new vaccines are approved for public use, scientists continue to monitor them by analyzing data about their safety and effectiveness. This helps find and evaluate potential safety concerns as soon as possible. In recent decades, changes in vaccine production and administration have created strong vaccine safety monitoring systems and have reduced the number of side effects after vaccination as well resulted in safer vaccines.

Myth 2: Vaccines cause autism and sudden infant death syndrome (SIDS)

- **Fact:** Science has not yet determined the cause of autism or SIDS.
 - Because both autism and SIDS may be diagnosed around the same age as routine immunizations are given there is no cause and effect the two.
 - Rumors that the measles-mumps-rubella (MMR) vaccine was linked to autism occurred because of a widely discredited, unethical, and [flawed 1998 study](#). In fact, there have been several well-controlled independent studies that **disprove** this theory and have **not found any evidence to support a link between vaccinations and autism**.

Myth 3: Vaccine-preventable diseases are just part of childhood, it's better to get sick than to get immunized

- **Fact:** Vaccine-preventable diseases have many serious complications that can be avoided through immunization. Even a disease as common as the flu can be serious. More than 226,000 people (including 20,000 children) are hospitalized from complications of the flu (inflammation of the heart, brain or muscle tissues, or failure of the kidneys or lungs). About 36,000 people die from influenza each year.
 - Vaccines stimulate the immune system to produce an immune response similar to natural infection but they don't have the properties to cause full blown illness and do not put the immunized person at risk of a disease's potential complications.

Potential Vaccine Side-Effects

Vaccines are continually monitored for safety but like any medication they can cause side effects in some people. Most of these side effects are minor and go away within a day or two:

- redness or swelling at the injection site
- sore arm
- low-grade fever
- fatigue
- as severe allergic reaction, are very rare.⁵⁰

Vaccines remain the most effective tool we possess for preventing disease and improving public health in the future. Be aware that a decision not to immunize a child also involves risk and could put the child and others who encounter him or her at risk of contracting a potentially deadly disease.

The Immunization Schedule

On-time vaccination throughout childhood is essential because it helps provide immunity before children are exposed to potentially life-threatening diseases. Vaccines are tested to ensure that they are safe and effective for children to receive at the recommended ages.⁵

Fully vaccinated children in the U.S. are protected against sixteen potentially harmful diseases. Vaccine-preventable diseases can be very serious, may require hospitalization, or even be deadly — especially in infants and young children.⁵⁹

Here is the recommended schedule from the CDC to ensure a child is fully vaccinated.

Table 4.10. Immunization Schedule

BIRTH	2 MONTHS	4 MONTHS	6 MONTHS	12 MONTHS	15 MONTHS	18 MONTHS	4-6 YEARS	11-12 YEARS	16 YEARS
HepB	HepB	HepB	HepB	HepA		HepA			
	DTap	DTap	DTap		DTap		DTap	DTap	
	Polio	Polio	Polio				Polio		
	Hib	Hib	Hib	Hib					
	PCV	PCV	PCV	PCV					
	RV	RV	RV						
				MMR			MMR		
				Varicella			Varicella		
								HPV	
							MCV4		MCV4

Vaccine-Preventable Diseases: Symptoms and Complications

HepB (Hepatitis B)

- **Symptoms:** fever, headache, weakness, vomiting, joint pain, jaundice (yellowing of skins and eyes) or no symptoms
- **Transmission:** contact with blood or body fluids
- **Complications:** chronic liver infection, liver cancer, liver failure

HepA (Hepatitis A)

- **Symptoms:** highly contagious liver infection, fatigue, sudden nausea, diarrhea, vomiting, abdominal pain, clay or gray-colored stools, jaundice, intense itching
- **Transmission:** direct contact, contaminated food or water
- **Complications:** loss of liver function, liver failure

DTap - (Diphtheria, Tetanus, and Pertussis (Whooping cough))

- **Symptoms** (Diphtheria): thick, gray membrane covering the throat and tonsils, fever, chills, weakness, swollen glands, breathing difficulty
- **Symptoms** (Tetanus): headache, fever, sudden involuntary muscle spasms, seizures, breathing difficulties
- **Symptoms** (Pertussis): coughing, violently and rapidly, until all air has left the lungs and a person is forced to inhale, causing a "whooping" sound, cold-like symptoms
- **Transmission:** air, direct contact
- **Complications** (Diphtheria): swelling of the heart muscle, heart failure, coma, paralysis, death

- **Complications** (Tetanus): laryngospasm (uncontrolled tightening of the vocal cords), pulmonary embolism (blockage in lungs caused by a blood clot), death
- **Complications** (Pertussis): bacterial pneumonia, seizures, inflammation of the brain, and death

Polio

- **Symptoms:** sore throat, fever, nausea, headache, muscle pain, stiff neck or no symptoms
- **Transmission:** air, direct contact
- **Complications:** encephalitis, meningitis, paralysis, death

Hib (*Haemophilus influenzae* type b)

- **Symptoms:** fever, chills, cough, chest pain, difficulty breathing, belly pain, diarrhea, nausea, anxiety, confusion
- **Transmission:** air, direct contact
- **Complications:** meningitis, amputation due to blood infection, brain damage, hearing loss

PCV (Pneumococcal)

- **Symptoms:** fever, chills, cough, chest pain, rapid or difficulty breathing
- **Transmission:** air, direct contact
- **Complications:** airway blockage, collapsed lung, lung abscess, infection of the heart lining, blood infection, meningitis, death

RV (Rotavirus)

- **Symptoms:** diarrhea, fever, vomiting,
- **Transmission:** through the mouth
- **Complications:** dehydration, electrolyte imbalance, metabolic acidosis, and in rare cases seizures, encephalitis

MMR (Measles, Mumps, Rubella/German Measles)

- **Symptoms** (Measles): rash, fever, cough, pinkeye, runny nose, headache, sore throat, light sensitivity, Koplik spots in mouth
- **Symptoms** (Mumps): fever, headache, muscle aches, tiredness, swollen salivary glands or lymph nodes, jaw pain, difficulty swallowing, loss of appetite
- **Symptoms** (Rubella/German Measles): rash, fever, swollen lymph nodes, cough runny nose, sore throat
- **Transmission:** air, direct contact
- **Complications** (Measles): ear infection, diarrhea, pneumonia, encephalitis, miscarriage or premature birth, death
- **Complications** (Mumps): inflammation of testicles leading to testicular atrophy and sterility in males, inflammation of brain, pancreas, ovaries, loss of hearing, death
- **Complications** (Rubella): miscarriage, premature birth, stillborn baby, birth defects, arthritis (in 70% of women), brain infection

Varicella (Chickenpox)

- **Symptoms:** rash, headache, fatigue, fever
- **Transmission:** air, direct contact
- **Complications:** infected blisters, bleeding disorders encephalitis (brain swelling), pneumonia

MCV4 (Meningococcal, Meningitis)

- **Symptoms:** fever, headache, stiff neck, nausea, vomiting, sensitivity to light, and confusion, rash
- **Transmission:** air, direct contact
- **Complications:** hearing or vision loss, seizures, amputation, cognitive problems (memory, learning, concentration), coordination and balance issues, death

HPV (Human papillomavirus)

- **Symptoms:** genital warts, unusual growths, lumps, sores, or no symptoms
- **Transmission:** direct skin-to-skin contact, childbirth, sexual activity
- **Complications:** a variety of cancers (cervix, vulva, penis, anus, throat) which often take years or decades to develop

Sources:

- [Immunity and Immunizations](#). *Disease Prevention and Healthy Lifestyles* Contemporary Health Issues by Judy Baker, Ph.D., licensed under CC BY-SA 4.0. LibreTexts Medicine.
- [Vaccine Guidance from the Mayo Clinic](#). *Mayo Clinic Health System*. March 13, 2024.
- [Vaccine safety: Answers to 6 common questions](#). *Mayo Clinic Health System*. August 8, 2024.
- [Vaccines: The Myths and the Facts](#). *Tools for the Public*. American Academy of Allergy, Asthma, and Immunology.

4.11: Safety

Safety

Infants and toddlers are curious, but they lack the judgement to recognize the dangers of their actions, so childproofing the home and providing adult supervision are essential for this developmental age group.^[2]

Fatal injury (death) and nonfatal injury risks for infants and toddlers:

- suffocation and choking
- injury by fire or other burns
- falls
- accidental poisoning
- drowning (the leading cause of injury or death under age 4)
- motor vehicle accidents

Choking

Toddlers are at a high risk for choking. As they begin to be mobile and to eat solid foods, this risk increases. At mealtimes items like hot dogs could potentially get stuck in a throat when sliced and served in rounds, so it should be cut horizontally to help prevent choking. Whole grapes are another round food that has the potential to get stuck in a toddler's throat, so slice them vertically in half or quarters so that the pieces are easy to chew. Small items like Legos, beads, buttons, pen caps, batteries, magnets, and coins should be placed out of the reach of a child under age 3.

A caregiver must provide proper supervision and make sure the environment is child proofed. Using a **choking tube** or **choke tester** to see if an item is choke proof is one means of monitoring **choking hazards** in the home. If an object fits completely in the tube, it is a great risk for causing choking.

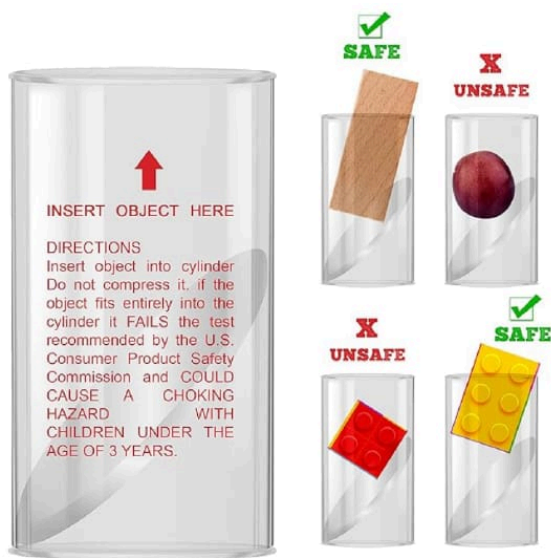


Fig. 4.11. Choking tube or choke tester.

Image source: [Anti-Choking Hazard Device for Kids](#). Amazon.com

Car Seat Safety



Fig. 4.11.1. Infant in rear-facing car seat.

Image source: [Children's Hospital Colorado](#)

The most dangerous thing that U.S. children do as part of daily life is ride in a car. Car crashes are a leading cause of death for children 4 years and older.

Infants are especially vulnerable during a car crash because their skeletons are less mature, their heads are heavy, and their necks are fragile. Their ligaments are also stretchy. When a baby is riding in a rear-facing car seat, their whole body - neck, head, and torso - is cradled within the back of the safety seat which protects them from the impacts of a crash. A rear-facing car seat protects the baby better in other types of crashes, particularly side impact crashes.

The **American Academy of Pediatrics** advises parents and caregivers to keep use rear-facing car seats for children as long as possible, up to the weight or height limits of their car seat. Many convertible rear-facing car seats can accommodate a child up to 40-50 pounds which includes most children 4 and under. Rear-facing car seats should be used **ONLY** in the back seat of a car with an active airbag.

A 2- to 4-year-old child in a car seat should be restrained with a five-point harness system - two shoulder straps, two hip straps and a buckle strap. A five-point harness system has more places to distribute crash forces and offers better protection than a lap and shoulder belt.

When a child has grown enough they can use a front-facing car seat which can accommodate children up to 65 pounds. Always use the top tether strap (the long piece of webbing with a clip on the end located on the top back of a forward-facing car seat) according to the vehicle owner's manual and child restraint manufacturer's instructions.

Boppy Safety



Fig. 4.11.2 Dad feeding baby supported by boppy.

Image Source: [Boppy Original Support Nursing Pillow - Spice Woodland](#). Natural Resources.com

Boppy pillows are sold to support children while nursing, they are not designed for sleep and are not safe for sleep. However, many families and care providers allow babies to sleep on these nursing pillows. While propping your baby up on a nursing pillow can make feedings easier and more comfortable for both parties involved, letting your baby sleep on a nursing pillow could be a fatal mistake. Infants are unable to pull themselves off if they slide down into the curve and their head starts pushing back on the curve of the pillow and then goes forward. In addition, deaths occur when children are left unattended or sleeping on or near these pillows, and the baby rolls over, rolls off, or falls asleep face down or their heads may fall in such a way that can block their airway and lead to suffocation.

Safe Sleep Advice

- Bare is Best --- This means an empty crib - no blankets, pillows, padded bumpers, or other items to the baby's sleep environment.
- Back to Sleep --- Always place infants to sleep on their backs on a firm, flat surface.

Sources

- [Car Seat Safety Laws: Tips and Guidance for Kids of All Ages](#). *Just Ask Children's*. Parenting Articles. Children's Hospital Colorado. November 11, 2024.
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). . Licensed under CC BY-NC-SA 3.0.
- [Safety Considerations Across the Life Span](#). *Safety*. Nursing Fundamentals (Open RN). shared under a [CC BY 4.0](#) license

4.12: Sleep



Fig. 4.12. Newborn infant sleeping.

Image source: Andrés Nieto Porras. [Sleeping newborn infant](#). Wikimedia Commons. December 18, 2012. Licensed under the Creative Commons Attribution-Share Alike 2.0

Sleep

A newborn typically sleeps approximately 16.5 hours during a 24-hour period, usually in shorter spurts and splitting sleep time equally between day and night and often. These multiple sleep periods are known **polyphasic sleep**. At one month of age, an infant is averaging 15 hours per 24-hour period and by 6 months of age dropping to 14 hours. By the time children turn 2, they are averaging closer to 10 hours per 24 hour period.

The average newborn will spend close to 50% of their sleep time in the **Rapid Eye Movement (REM)** phase, which decreases to 25% to 30% in childhood as they grow into childhood.

Sudden Infant Death Syndrome and Safe Sleep

Sudden Infant Death Syndrome (SIDS) is identified when the death of a healthy infant occurs suddenly and unexpectedly. Medical and forensic investigation, including autopsy, regarding cause of death show have been inconclusive. SIDS is the leading cause of death in infants 1 to 12 months old. Researchers speculate there may be a connection between SIDS and possible problems in the area of an infant's brain that regulates breathing and waking up from sleep.

Researchers have found that the most important action to prevent SIDS may be to place a baby on their back to sleep.



Figure 4.12.1. – A baby sleeping safely.

Image source: Jean Zaar. Chapter 4: Physical Development in Infancy & Toddlerhood. *Child Growth and Development*. Licensed under a Creative Commons Attribution-NonCommercial 4.0

Risk Factors for SIDS

Babies are at higher risk for SIDS if they sleep:

- on their stomachs
- on soft surfaces
 - adult mattress, couch, chair, boppy, or under soft coverings
- under soft or loose bedding
- get too hot during sleep
- are exposed to cigarette smoke in the womb or in their environment
- in an adult bed with parents, other children, or pets and is especially dangerous if the
 - adult smokes, has recently had alcohol, or is tired
 - baby is covered by a blanket or quilt
 - baby sleeps with more than one bed-sharer
 - baby is younger than 11 to 14 weeks of age.

Reducing the Risks of SIDS

Always place baby on his or her back to sleep (for naps and at night). and

- use a firm and flat surface.
- use only a tight-fitting sheet on the sleep surface,
- use no other bedding or soft items in the sleep area.
- in same room as parents, but on a separate surface designed for infants \
- do not put soft objects, toys, crib bumpers, or loose bedding under, over, or anywhere near baby's sleep area
- do not smoke during pregnancy or allow smoking around baby.
- consider giving baby a pacifier.
- do not let baby get too hot during sleep.
- get regular health checkups (including vaccines).
- avoid products that go against safe sleep recommendations, especially those that claim to prevent or reduce the risk of SIDS

YouTube Video

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Sources

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*.. Licensed under CC BY-NC-SA 3.0.
- Zaar, Jean [Chapter 4: Physical Development in Infancy & Toddlerhood](#). *Child Growth and Development*. Licensed under a Creative Commons Attribution-NonCommercial 4.0

4.13: Tummy Time

Tummy Time

Tummy time is placing a baby on their stomach to play. Practicing tummy time helps babies develop the muscles necessary to lift their heads and, eventually, to sit up, crawl and walk. Remember the adage: **back to sleep, tummy to play**. A baby should always be awake during tummy time be carefully watched.



Fig. 4.13. Tummy time method.

Image Source: Karleigh Page. [My Baby Hates Tummy Time! Tips for Parents](#). *NAPA (Neurological and Physical Abilitation) Centre*.

Often families or caregivers are concerned about infants developing flat heads or bald spots when laying their baby's on their backs to sleep. **Tummy time** is not only an excellent way for young children to develop motor skills, but it also helps to prevent flat heads and bald spots.

Infants have a variety of reactions to being placed face-down on the floor. Until they develop the muscles necessary to lift their heads from an awkward face-plant position, many babies hate tummy time. Others seem to love the view. And still others are indifferent, making happy noises no matter which end is up. Whatever the baby's reaction, tummy time helps the baby develop motor skills that eventually lead to crawling.

Why is Tummy Time Important?

Spending awake time belly-down offers lots of benefits for the infant.

- allows baby to work different muscles than those they'd use on their back. By
 - practicing push-ups will help baby develop the muscles in arms, shoulders, upper back and neck that will eventually enable them to lift head.
- sets the stage for motor skills like reaching, rolling over, sitting up and crawling
- prepares the baby for the exciting developmental stages to come.
 - at 3 months, most babies can lift their heads 45 degrees (leaning on their forearms);
 - at 4 months, most babies can lift their heads 90 degrees (pushing up on their hands).
 - at around 9 months, many babies begin crawling
 - although some begin earlier and others never crawl at all — which is perfectly normal

Tip's to Encourage Tummy Time

The American Academy of Pediatrics (AAP) recommends that babies begin tummy time the very day they come home from the hospital. Begin with 2-3 minutes at a time and eventually work up to a total of 15 minutes per day in two or 3 sessions of 3-5 minutes each. As the baby gets older, you can leave them on the belly for longer stretches, since older babies need more time on their tummies to build strength.

The ideal time to do tummy time is after the baby wakes up from a nap or following a diaper change.

- place baby on tummy on a play mat or clean towel on a clear space on the floor
- surround baby with a few favorite toys
 - spread toys around the baby in a circle so they'll be tempted to reach for them
 - helps develop all the different muscles to eventually sit up, crawl and walk
- as baby begins enjoying tummy time, work up to longer and more frequent sessions throughout the day
- get down on the floor with baby, face-to-face or side-by-side
 - talk to them and offer a special toy for entertainment.
- place an unbreakable mirror in front of baby so they can see their own face.
 - vary the position, from in front of baby to either side
- prop baby up by placing a firm cushion under their chest and arms if they initially protest tummy time
 - try to wean off using these props
- place baby on your own tummy while you lie on your back (watch out for drool!). Or
 - raise them overhead as you lie down in a modified baby "bench press"

YouTube Video

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Source

- de Bellefonds, Colleen. [Tummy Time for Babies](#). *What to Expect*. March 15, 2022.

4.14: Chapter 4- Review

Chapter 4: Review

In this chapter we looked at:

Physical changes during the first three years

- body proportions - head to body ratio
- brain development
- hormonal

Common infant reflexes

- sucking and rooting
- tonic neck
- palmar grasp and plantar grasp
- stepping
- Moro reflex

Gross motor skills development

- holds head up, holds head unsupported
- roll from tummy to back
- sits without support
- rocks back and forth
- crawls
- stands, walk, runs

Fine motor skills development

- brings hands to mouth
- hold a small object
- follows movement with eyes
- brings objects to mouth
- picks up object with thumb and forefinger
- reaches with one hand
- bangs two objects together
- puts objects in a container and takes them out
- builds a tower of blocks

Sensory Capacities

- vision
 - newborn - difficulty distinguishing between colors
 - 6 months - can perceive depth perception in both the environment and in pictures
- hearing
 - fetus can hear by 7 month in utero
 - newborns have keen sense of hearing
 - babies prefer the sound of their mother's voice
 - sensitives to different frequencies in human speech
- taste and smell

- respond to taste and smell with facial expressions
- can distinguish between bitter, sour,, and sweet flavors

Breastfeeding

- supports babies' health, development and unity
- maternal benefits
- challenges
- alternatives

Solid Foods

- readiness factors
- important nutrients
- introducing solid foods
- milk anemia

Infant Health

- common physical conditions and issues
 - bowel movements and urination
 - teething
 - spitting up/vomiting
 - diaper rash
 - jaundice
 - purple crying
- shaken baby syndrome
 - risk and prevention
 - head trauma
 - abusive trauma

Toilet Learning

- readiness factors
- the process - making a plan

Immunization

- how vaccines work
- vaccine safety
- myths vs. facts
- immunization schedules for childhood vaccines

Safety for Infants and Toddlers

- choking hazards
- car seats
- boppies

Sleep

- newborns sleep 16.5 / 24 hours in short spurts
- sleep / wake periods
- Sudden Infant Death Syndrome (SIDS)

Tummy Time

- helps babies develop the muscles necessary to lift their heads and, eventually, to sit up, crawl and walk
- encouraging tummy time - different methods

CHAPTER 5: COGNITIVE AND LANGUAGE DEVELOPMENT IN INFANCY AND TODDLERHOOD

5.1: Chapter 5- Introduction

5.2: Piaget- Sensorimotor and Preoperational Stages

5.3: Vygotsky- Social Theory of Cognitive Development

5.4: Cognitive Milestones

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5.1: Chapter 5- Introduction



Fig. 5.1. The words *up*, *go*, *no*, *yes*, *help*, *more*, and *all done* are among the first functional words a baby will say.

Image Source: [Functional First Words: What are They and Why do They Matter?](#) *Tiny Talkers LLC*.

To better understand the large spectrum of cognition that infants and toddlers go through, it is important to analyze and comprehend various theories that relate to their growth and development.

After this chapter, you should be able to:

Learning Objectives

- describe the **substages** of the **Piaget's** sensorimotor and preoperational stages
- explain how the **social environment affects cognitive development** according to **Vygotsky's theory**
- discuss the **progression of language development** during the first three years

5.2: Piaget- Sensorimotor and Preoperational Stages

Piaget: Stages of Cognitive Development

Jean Piaget (1896-1980) is one of the most influential cognitive theorists. He was inspired to explore children's ability to think and reason by watching his own children's development.

He was one of the first to recognize and map out the ways in which children's thought differs from that of adults. Jean Piaget is the most noted theorist when it comes to children's cognitive development. He **believed that children's cognition develops in stages**.

Schemas begin to develop during infancy, in the **sensorimotor stage**. Schemas are a way of interpreting and understanding information. They are used created to create meaning behind symbols and objects. As a child progresses into the **preoperational stage**, their schemas become solidified in their conscious thought.

Piaget explained this growth for infants and toddlers in the following stages:

- **Sensorimotor Stage (Birth through 2 years old)**
 - learning happens via the baby's senses and movements
- **Preoperational Stage (2-7 years old)**
 - learning as the child begins to think symbolically using words and pictures that represent objects

Sensorimotor Stage



- Birth – 2 years
- Knowledge gained through the senses and through movement.

Preoperational Stage



- Ages 2-7 years
- Thinks symbolically, not logically. Egocentric..

Fig 5.2. Visual representing Piaget's Sensorimotor and Preoperational stages.

Sensorimotor Intelligence

Piaget describes **intelligence in infancy as sensorimotor** or based on direct, physical contact. Infants taste, feel, pound, push, hear, and move in order to experience the world. His view is that the infants' main task is to **coordinate their sensory impressions with their motor activity**.

It is during the sensorimotor stage that children go through a period of dramatic growth and learning. As infants interact with their environment, they are continually making new discoveries about how the world works.

The **cognitive development** that occurs during this period takes place over a relatively short period of time and involves a great deal of growth. Children not only learn how to **perform physical actions** such as crawling and walking; they also **learn a great**

deal about language from the people with whom they interact.

Key Cognitive Developments of the Sensorimotor Stage

- babies learn about the world directly through their sensory and motor experiences
 - physical actions such as sucking, grasping, and moving their arms, legs, and the rest of their body
 - sensory activities such as looking, listening, tasting, and touching
- babies come to learn they are separate from the people and objects around them
 - object permanence
- babies realize that their actions can cause things to happen in their environment
- babies learn about cause and effect by interacting with their environment and
 - learning their actions cause something to happen and associate their actions with outcomes
- symbolic thought
 - mentally picturing objects, things, events
- nonverbal communication -
 - interactions with caregivers teaches them about gestures and facial expressions

Object Permanence



Fig 5.2.1. Baby playing peek-a-boo.

Image Source: [Cognitive and emotional benefits of playing peek-a-boo with your 5-month old](#). *Montessori Baby Ed*. Magical Movement Company. 2025.

Imagine a game of peek-a-boo!

When babies have developed a sense of **object permanence**, they realize that people and things continue to exist whether or not they can see or hear them. This cognitive skill begins to emerge between 4-8 months of age. At this stage, for example, the baby experiences the caregiver goes away, but also realizes they comes back. An object may disappear and then reappear. Object permanence is an essential building block for working memory, language development, and emotional attachment.

One way to test if the baby has developed object permanence is to hide a toy under a cloth as the infant watches. A baby with a sense of object permanence will lift the cloth to seek the toy while a very young baby will amazed that something can reappear after being gone. At this stage babies are learning about **existence**.



Fig 5.2.2 Baby develops a sense of object permanence by playing with a toy where a ball disappears then reappears.

Image Source: [Object Permanence](#). Parent Resources. Lovevery.

Piaget's Preoperational Stage

The foundational skills and knowledge gained during the sensorimotor stage are essential for children's ability to learn and use language effectively. but the actual emergence of language typically occurs in the next stage, the **preoperational stage**. They are becoming more developed in their with language and thinking, they still tend to view things in very concrete terms and focus on tangible, observable details. They have not yet developed the capacity for abstract or generalized thinking.

Characteristics of the preoperational stage

Here's a list of the main characteristics of this stage of development.

- **Egocentrism**
 - early in this stage a young child assumes that other people see, hear, and feel the same things they do, they struggle to see things from the perspective of another person
- **Animism**
 - example of egocentrism and reflects egocentric thinking
 - the act of giving life-like qualities to inanimate objects
 - the child believes that toys, dolls, and everyday items are alive just like they are
 - peaks as the child enters the preoperational stage but will also fade as a child develops a more concrete understanding of the meaning of life
 - example: a child believes their toys are afraid of the dark because they themselves are afraid of the dark and insists the lights be kept on for the toys
- **Centration**
 - a child can only make judgments based on one level of comparison or focus on only one detail of a situation at a time and will neglect, ignore, or fail to realize other details are also part of the situation
 - example: a child sees 2 rows of paper clips, one row of 5 paper clips and one row of 7 paper clips
 - when asked to point to the **longer** row the child points to the row of 5 paper clips focusing only on the concept of **longer** not yet realizing that a greater **number** (a second detail) means a longer row
- **Conservation**
 - linked to centration - a child can not yet understand either logic or measurements (time, length, mass, area, quantity, volume, weight).
 - they don't understand that a quantity stays the same even if you change the size, shape, or container it's in
 - until the age of 5 most children can't understand that all 4 glasses contain an identical amount of water even if one is taller

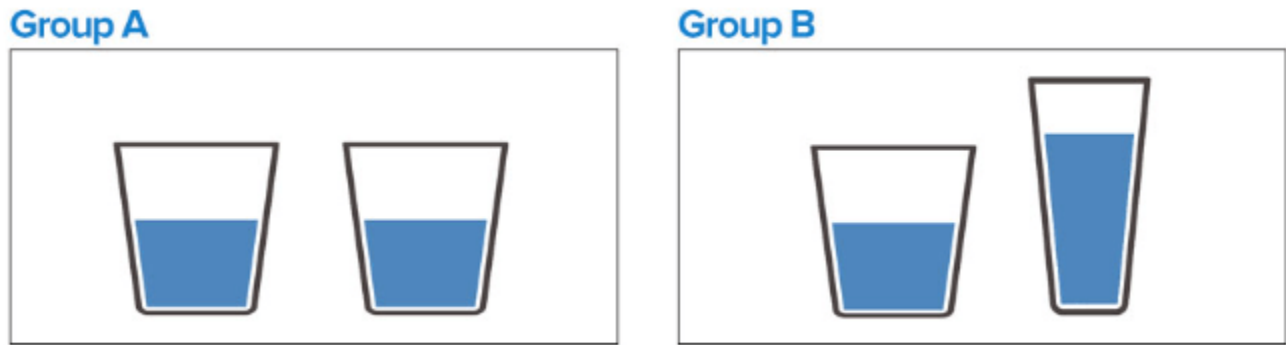


Fig. 5.2.3 Example of conservation. Group A shows 2 identical glasses of water. Group B shows one glass of water identical to those in Group A and one glass that is taller and narrower but contains the same amount of water.

Image source: GinaMarie Guarino, LPC-MHSP. [Preoperational Stage](#). *Find a Therapist*. Updated January 2nd, 2024.

- **Parallel play**
 - linked to egocentrism
 - small children play alongside one another but not with each other, they do not yet engage in cooperative play, where two children play the same game cooperatively together
 - at this stage although children may be talking, but only to express what they see, feel, or need, they don't yet realize that talking is a way of interacting socially
- **Imaginative or pretend play**
 - a child activates the imaginative part of the mind and these skills grow during this stage even as they tend to remain concrete thinkers about the world around them
 - the point at which a child begins to learn how to problem solve and incorporates reasoning into play
 - children imagine different scenarios and situations
 - the child learns how to incorporate logic into different combinations of solutions
 - example - a child is playing with the doll and pretending it is alive and needs a crib to sleep in, so goes in search of a shoe box too use as a crib
 - the child demonstrates the use of schema, symbolism, and problem solving; they imagine the shoebox is a crib because it is a space with 4 walls where the baby can be placed in and taken out easily
- **Symbolic representation / symbolism**
 - in the late sensorimotor stage children begin to think symbolically and realize that words and objects are symbols for something else
 - in the the preoperational stage the child will learn how to differentiate between different objects with similar characteristics, for example learning that 'cat' and 'dog' both have fur and four legs, but understands they are different types of creatures
 - symbolism will be exhibited during imaginative play, when they substitute one thing for another similar thing, for example pretending a pencil is a magic wand

Sources

- Guarino, GinaMarie. [Preoperational Stage](#). *Find a Therapist*. Updated January 2nd, 2024.
- Leon, Ana R. [Children's Development](#). Licensed under CC BY 4.0
- Lewis, Rhona. [The Preoperational Stage of Cognitive Development](#), *Healthline*. January 13, 2020.

5.3: Vygotsky- Social Theory of Cognitive Development

Vygotsky: Development is Determined by Environmental Factors

Piaget set the tone for much of current-day research, but his theory has also received a great deal of pushback, claiming Piaget ignored the huge influence that society and culture have in shaping a child's development.

A contemporary of Piaget's, researcher Lev Vygotsky (1896–1934) had come to similar conclusions as Piaget about children's development, in thinking that children learned about the world through physical interaction with it, Vygotsky thought created and shaped by use of language and tools in the process of interacting and constructing the cultural and social environment

Key Differences: Vygotsky vs. Piaget

- **Piaget - Theory of Cognitive Development**
 - children moved naturally through different stages of development, based on biological predispositions and their own individual interactions with the world
- **Vygotsky - Cultural-Historical Activity Theory (CHAT)**
 - children's social environment with adult or peer intervention was a much more important part of the developmental process these natural stages



Fig. 5.3. Dad observes while young boy puts a puzzle together.

Image Source: [Tenzin's Puzzle](#). Licensed under CC BY-NC-SA 2.0.

Vygotsky concentrated more on the child's immediate social and cultural environment and his or her interactions with adults and peers. He argued that development occurred first through children's immediate social interactions, and then moved to the individual level as they began to internalize their learning. While Piaget saw the child as actively discovering the world through individual interactions with it,

Zone of Proximal Development

Vygotsky saw the child as more of an apprentice, learning through a social environment of others who had more experience and were sensitive to the child's needs and abilities.

The **zone of proximal development (ZPD)** can also be described as the area between what a learner can do by himself and that which can be attained with the help of a 'more knowledgeable other' adult or peer. The '**more knowledgeable other**', or **MKO**, shares knowledge with the student to bridge the gap between what is known and what is not known. Once the student has expanded his knowledge, the actual developmental level has been expanded and the ZPD has shifted. The ZPD is always changing as the student expands and gains knowledge.

YouTube Video

This interactive element is not available in this format. Visit the link or scan the QR code to access it online.

[View this YouTube Video online](#)



Sources

- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0
- [Vygotsky's zone of proximal development](#). *Instructional Methods Strategies and Technologies to Meet the Needs of All Learners (Lombardi)*. LibreTexts. is shared under a CC BY-NC-SA.

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5.4: Cognitive Milestones

Typical Cognitive Milestones

Children are actively learning about the world as they perceive it from the time they are in the womb. Here is a table of some of the cognitive milestones infants and toddlers typically develop.



Age 2 Months

Image Source: April. [This fantastic baby is two months old!](#)
License CC BY-NC-SA 2.0

- Pays attention to faces
- Begins to follow things with eyes and recognize people at a distance
- Begins to act bored (cries, fussy) if activity doesn't change



Age 4 months

Image Source: [Sweet Baby Jude at 4 months](#). License CC BY-NC-SA 2.0

- Lets you know if he is happy or sad
- Responds to affection
- Reaches for toy with one hand
- Uses hands and eyes together, such as seeing a toy and reaching for it
- Follows moving things with eyes from side to side
- Watches faces closely
- Recognizes familiar people and things at a distance



Age 6 months

Image Source: [6 Month Old Online Checklist](#). CDC.gov

- Looks around at things nearby
- Brings things to mouth
- Shows curiosity about things and tries to get things that are out of reach
- Begins to pass things from one hand to the other



Age 9 months

Image Source: Visa Kopu, [Oona](#). License CC BY-ND 2.0

- Watches the path of something as it falls
- Looks for things he sees you hide
- Plays peek-a-boo
- Puts things in mouth
- Moves things smoothly from one hand to the other
- Picks up things like cereal o's between thumb and index finger



Age 1 year

Image Source: Jennifer Kelly Geddes. [Your 1-Year-Old's Developmental Milestones](#). *What to Expect*.

- Explores things in different ways, like shaking, banging, throwing
- Finds hidden things easily
- Looks at the right picture or thing when it's named
- Copies gestures
- Starts to use things correctly, for example, drinks from a cup, brushes hair
- Bangs two things together
- Puts things in a container, takes things out of a container
- Lets things go without help
- Pokes with index (pointer) finger
- Follows simple directions like "pick up the toy"



Age 18 months

Image Source: [Easy Baby Art and Sensory Activities](#).
[HomegrownFriends](#)

- Knows what ordinary things are for, for example, telephone, brush, spoon
- Points to get the attention of others
- Shows interest in a doll or stuffed animal by pretending to feed
- Points to one body part
- Scribbles on own
- Can follow 1-step verbal commands without any gestures; for example, sits when you say “sit down”



Age 2 years

Image Source: Martin LeBar. [SweetwaterNWR](#). Flickr.com

- Finds things even when hidden under two or three covers
- Begins to sort shapes and colors
- Completes sentences and rhymes in familiar books
- Plays simple make-believe games
- Builds towers of 4 or more blocks
- Might use one hand more than the other
- Follows two-step instructions such as “Pick up your shoes and put them in the closet.”
- Names items in a picture book such as a cat, bird, or dog



Age 3 years

Image Source: [3-year-old Salvadoran girl holds her puppy.](#)
NARA & DVIDS Public Domain Archive

- Can work toys with buttons, levers, and moving parts
- Plays make-believe with dolls, animals, and people
- Does puzzles with 3 or 4 pieces
- Understands what “two” means
- Correctly name familiar colors
- Understand the idea of same and different, start comparing sizes
- Pretend and fantasize more creatively
- Follow three-part commands
- Remember parts of a story
- Understand time better (for example, morning, afternoon, night)

Source

- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0

5.5: Language Development

Language Development

Do newborns communicate? Absolutely! Newborns are naturally wired to seek human connection and communicate their needs, however, their communication is non-verbal. Babies communicate their thoughts and needs using their bodies, voices and facial expressions --- crying, cooing, and squealing, eye contact, smiling, and grimacing, and gestures or body movements like leg movements reflecting excitement or distress, and later on, pointing gestures.

Each baby has their **unique nonverbal language**. Notice and distinguish which cries indicate pain, hunger, pain, discomfort, or frustration, and learn to translate their different vocalizations, movements, gestures and facial expressions. Because the nature of the love and care they receive during these early stages greatly influence their future development, it's important caregivers are able to "tune in," be **attuned** to the nonverbal cues and signals babies provide.

Infant Communication - Nonverbal Cues

Fig. 5.5. Meanings/needs related to a baby's nonverbal cues.

Baby's Need	Baby's Nonverbal Cues
Hunger	• strong sucking • concentrated expression • upset when feeding stops
Fullness	• closes lips • pulls or pushes away • fussy • loss of concentration • discomfort
Tired	• irritable • crying or change in cry • red eyes • yawning • lack of focus • clenched fists • rubbing face
Playful	• bright eyes • reaching for toys or faces • excited expression • waving arms and legs • seeking stimulation

Boredom	• closed eyes • crying • fussiness • seeking attention • wanting to be held • yawning
Comfort	• crying • agitation • seeking eye contact • looking for closeness (security) •

Stages of Language Development

Intentional Vocalizations

- Infants begin to vocalize and repeat vocalizations, such as **cooing**, within the first couple of months. Cooing is a gurgling, musical vocalization that can serve as a source of entertainment to an infant who has been laid down for a nap or seated in a carrier on a car ride.
- **Cooing serves as practice for vocalization.** The infant hears his or her own voice and tries to repeat sounds that are entertaining. Infants also begin to learn the pace and pause of conversation as they alternate their vocalizations back and forth with someone else. Cooing initially involves making vowel sounds like “oooo”. Later, consonants are added to vocalizations such as “nananananana”.

Babbling and Gesturing

At 4-6 months of age, infants begin making even more elaborate vocalizations with the ability to repeat whatever sounds are characteristic of the language heard. As the infant grows more accustomed to a language, these sounds will no longer be used.

- guttural sounds
- clicks
- consonants
- vowel sounds
- stand ready to equip the child

Deaf babies also use gestures to communicate wants, reactions, and feelings. Because gesturing seems to be easier than vocalization for some toddlers, sign language is sometimes taught to enhance one’s ability to communicate by making use of the ease of gesturing. The rhythm and pattern of language is used when deaf babies sign just as it is when hearing babies babble.

Understanding

At around 10 months of age, an infant can understand far more than they can say. This is similar to trying to learn a second language when it’s easier to be able to follow a conversation than to contribute to it. This can also be called **receptive language** – language you understand when receiving (taking in).

Holophrastic Speech

Children begin using their first words at about 12-13 months of age and may use partial words to convey thoughts at even younger ages. These **one-word expressions** are referred to as **holophrastic speech**.

For example, the child may say “**ju**” for the word “**juice**” and use this sound when referring to a bottle. The listener must interpret the meaning of the **holophrase** and when this is someone who has spent time with the child, interpretation is not too difficult. They know that “ju” means “juice” which means the baby wants some milk! But someone who has not been around the child will have trouble knowing what is meant. Imagine the parent who to a friend exclaims, “Ezra’s talking all the time now!” The friend hears only “ju da ga” which, the parent explains, means “I want some milk when I go with Daddy.” This is **expressive language**, language you make (express).

First Words and Cultural Influences

If a baby lives in an English-speaking environment, their first words tend to be nouns, and labels objects such as cup or ball. If a baby lives in a Chinese-speaking environment, which is a verb-friendly language, they will learn more verbs.

- different emphasis based on culture.
 - Chinese children may be taught to notice action and relationship between objects
 - American children may be taught to name an object and its qualities (color, texture, size, etc.).

Vocabulary Growth Spurt

Year-old babies typically have a vocabulary of about 50 words. By the time they become toddlers, they have a vocabulary of about 200 words and begin putting those words together in **telegraphic speech** (like an old school telegraph) or the more up to date “text message speech” that typically only includes the minimal amount of words to convey the message. For example, a child might say “Go car” instead of “Let’s go ride in the car.”

An 18-month-old toddler can typically combine words and express themselves further by using expressions such as “baby bye-bye” or “doggie pretty”. Words needed to convey messages are used, but the articles and other parts of speech necessary for grammatical correctness are not yet used. Unnecessary words are not used.

- “Give baby ball” is used rather than “Give the baby the ball.”

Language Milestones

In the first 3 years of life, children go from communicating by crying to being able to express themselves with words. Below is a table of common language milestones for infants and toddlers.

Fig. 5.5.1. Expected language milestones.

Typical Age	Language Milestone
2 months	• coos, makes gurgling sounds • turns head toward sounds
4 months	• begins to babble • babbles with expression and copies sounds he hears • cries in different ways to show hunger, pain, or being tired

6 months	• responds to sounds by making sounds • strings vowels together when babbling (“ah,” “eh,” “oh”) and likes taking turns with parent while making sounds • responds to own name • makes sounds to show joy and displeasure • begins to say consonant sounds (jabbering with “m,” “b”)
9 months	• understands “no” • makes a lot of different sounds like “mamamama” and “bababababa” • copies sounds and gestures of others • uses fingers to point at things
1 year	• responds to simple spoken requests • uses simple gestures, like shaking head “no” or waving “bye-bye” • makes sounds with changes in tone (sounds more like speech) • says “mama” and “dada” and exclamations like “uh-oh!” • tries to say words you say
18 months	• says several single words • says and shakes head now • points to show others what is wanted
2 years	• points to show others what they want • points to things or pictures when they are named • knows names of familiar people and body parts • says sentences with 2 to 4 words • follows simple instructions • repeats words overheard in conversation • points to things in a book
3 years	• says his or her name and age • speaks 250 - 500 words • answer simple questions • speaks in sentences of five to six words, and speaks in complete sentences by age 4 • speak clearly, although he may not be fully comprehensible until age 4 • tells stories

Child-Directed Speech

Why is a horse a “horsie”? Have you ever wondered why adults tend to use “baby talk” or that sing-song type of intonation and exaggeration used when talking to children? This represents a universal tendency and is known as **child-directed speech**. It involves exaggerating the vowel and consonant sounds, using a high- pitched voice, and delivering the phrase with great facial expression.

Why is this done?

Child-directed speech plays a crucial role in the early stages of language development by making language more accessible and engaging for infants. The exaggerated intonation, slower tempo, and simplified vocabulary, helps the baby hear the sounds and captures their attention and facilitates language acquisition.

Research shows:

- infants are more able to respond to and engage with child-directed speech than they are with adult-directed speech
- child-directed speech helps infants differentiate between sounds and develop phonetic recognition as they build toward future language development

Sources

- Leon, Ana R. *Children's Development*. Licensed under CC BY 4.0
- [Understanding Baby's Nonverbal Cues and Signals](#). Kabrita.com.

5.6: Chapter 5- Review

Chapter 5: Review

In this chapter we looked at:

Jean Piaget - Stages of Cognitive Development Theory

- Cognitive Developments of the **Sensorimotor Stage** (Birth - 2 years old)
 - Schemas
 - Physical actions
 - Sensory activities
 - Object Permanence
 - Cause and effect
 - Symbolic thought
 - Nonverbal communication
- Characteristics of the **Preoperational Stage** (2-7 years old)
 - Egocentrism
 - Centration
 - Conservation
 - Parallel play
 - Imaginative play
 - Symbolic representstion

Lev Vygotsky - Social Theory of Cognitive Development

- Cognitive development and the role by social environment and human interaction
- Zone of proximal development

Cognitive milestones

- Ages 2 months – 3 years

Language development

- Baby's needs
- Nonverbal cues

Stages of language development

- Intentional vocalizations
- Babbling and gesturing
- Understanding
- Holophrastic speech
- Telegraphic speech

Language milestones

- Ages 2 months – 3 years

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CHAPTER 6: SOCIAL AND EMOTIONAL DEVELOPMENT IN INFANCY AND TODDLERHOOD

- 6.1: Chapter 6- Introduction
- 6.2: Temperament
- 6.3: Parenting Is Bidirectional
- 6.4: Infant Emotions
- 6.5: Social and Emotional Milestones
- 6.6: Forming Attachments
- 6.7: Chapter 6- Review

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6.1: Chapter 6- Introduction



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Social and Emotional Development in Infants

While temperament is determined by genetics and emotions develop through maturation, the early interactions we have with the adults that care for us as infants and toddlers are very important for healthy emotional development. In this chapter we'll examine some of the important interactions and milestones in **social and emotional development** during the first three years of life.

After this chapter, you should be able to:

Learning Objectives

- classify types of **temperament**
- discuss the roles of culture and gender in **socialization**
- describe the sequence of **emotional development** during the first three years.
- compare **John Bowlby's theories of attachment and attachment styles**
- explain **Eric Erikson's stages** of
 - trust vs mistrust and
 - autonomy vs shame and doubt

6.2: Temperament

Temperament

Consider time you spent around or interacting with infants or even how you compare with your siblings or other children you have known well. How were they alike? How did they differ?

You may have noticed that some seemed to be in a better mood than others and that some were more sensitive to noise or more easily distracted than others. These differences may be attributed to temperament.

Definition: Term

Temperament is the innate characteristics of the infant, including mood, activity level, and emotional reactivity, noticeable soon after birth.

In the 1956 landmark **New York Longitudinal Study** conducted by Stella Chess and Alexander Thomas evaluated 140 children's temperament based on parental interviews. The infants were assessed on **10 dimensions of temperament** including:

- activity level
- rhythmicity (regularity of biological functions)
- approach/withdrawal (how children deal with new things)
- adaptability to situations
- intensity of reactions
- threshold of responsiveness (how intense a stimulus must be for the child to react)
- quality of mood
- distractibility
- attention span
- persistence

Based on the infants' behavioral profiles, they were categorized into three general types of temperament:

- **Easy** (40% of babies)
 - able to quickly adapt to routine and new situations
 - remains calm
 - easy to soothe
 - usually in a positive mood
- **Difficult** (10% of babies)
 - reacts negatively to new situation
 - has trouble adapting to routine
 - usually negative in mood
 - cries frequently
- **Slow to Warm to Up** (15% of babies)
 - low activity level
 - adjusts slowly to new situations
 - often negative in mood

Notice the percentages do not add up to 100%. Not all children were able to be placed neatly into one of the categories.

Think about how each type of child might be approached to improve interactions with them. An easy child requires less intervention, but still has needs that must not be overlooked. A slow-to-warm-up child may need to be given advance warning if new people or situations are going to be introduced. A child with a difficult temperament may need to be given extra time to burn off their energy.

A caregiver's ability to work well and accurately read the child will enjoy a goodness-of-fit, meaning their styles match and

communication and interaction can flow. Parents who recognize each child's temperament and accept it, will nurture more effective interactions with the child and encourage more adaptive functioning.

The results of the **New York Longitudinal Study** provided a groundbreaking re-interpretation of human development. Although parenting skills were important contributors to children's later adjustment, it was learned that the temperament of the child played a significant role in their development as well. Chess and Thomas were among the first researchers to credit children as contributors to their own development—not as passive recipients of caregiving. They described how **bi-directional transactions** between children and their parents influenced each other's behavior.

The interaction between the child's temperament and the environment was conceptualized within a **goodness of fit** framework which results when the properties of the environment and its expectations or demands are in sync with the child's own individual capacities, characteristics, and ways of being. If there is a match between the child's temperament and their environment, optimal development can be achieved. Conversely, **poorness of fit** can lead to maladaptive functioning. In addition, consideration must also be given to the values and demands of an individual's culture and socioeconomic group.

The **goodness of fit model** continues to influence temperament-based intervention today. It provides practitioners with a framework for assessing individuals within their specific environmental context.

Source

- [4.12: Temperament \(Ob11\)](#). *Infancy*. Psych 172: Developmental Psychology (Bobola). LibreTexts Social Sciences Library.
- [Baby's personality: Chess and Thomas' baby temperaments](#). *OviaHealth.com*.

6.3: Parenting Is Bidirectional

Parenting Is Bidirectional



Fig. 6.3. Parents in two-way interaction with toddler.

Image Source: [Family first](#). Freerange.com. [Equalicense](#).

Definition: Bidirectional Parenting

The concept, **Parenting is Bidirectional**, means that parents affect their children AND children influence their parents.

Parenting is a complex process in which parents and children influence one another. There are many reasons that parents behave the way they do. The multiple influences on parenting are still being explored.

Proposed influences on parental behavior include

- parent characteristics
- child characteristics
- contextual and sociocultural characteristics

Parent Characteristics

Parents bring unique traits and qualities to the parenting relationship that affect their decisions as parents. These characteristics include the

- age of the parent
- gender
- belief systems
- personality
- developmental history
- knowledge about parenting and child development
- mental and physical health

Parents' personalities affect parenting behaviors. Parents who have more agreeable personality traits appear to be better able to respond to their children positively and provide a more consistent, structured environment for their children. Parents who are less anxious and less negative also support their children's autonomy more than parents who are anxious and less agreeable.

Parents' developmental histories, or their experiences as children, also affect their parenting strategies. Parents may learn parenting practices from their own parents. Fathers whose own parents provided monitoring, consistent and age-appropriate discipline, and warmth were more likely to provide this constructive parenting to their own children

Patterns of negative parenting and ineffective discipline also appear from one generation to the next. However, parents who are dissatisfied with their own parents' approach may be more likely to change their parenting methods with their own children.

Child Characteristics

Child characteristics affect parenting behaviors and roles.

- gender
- birth order
- temperament (easy, difficulty, slow to warm, or a combination of these)
- health status

An infant with an **easy temperament** may enable parents to feel more effective, as they are easily able to soothe the child and elicit smiling and cooing.

A cranky or fussy infant with a **difficult temperament**, elicits fewer positive reactions from his or her parents and may result in parents feeling less effective in the parenting role. Over time, parents of more difficult children may become more punitive and less patient with their children. Parents who have a fussy, difficult child are less satisfied with their marriages and have greater challenges in balancing work and family roles.

Contextual Factors and Sociocultural Characteristics

The parent-child relationship does not exist in isolation.

Context is the circumstances in which parents are raising their children also influence their parenting. Parents who experience economic hardship are more easily frustrated, depressed, and sad, and these emotional characteristics affect their parenting skills. For example, mothers who perceived their neighborhood as more dangerous also showed less warmth with their children, perhaps because of the greater stress associated with living a threatening environment.

- economic stability vs. economic hardship or poverty
 - housing
 - food
 - healthcare
- social networks and social support (or lack of)
- safety of schools and neighborhood

Culture also influences parenting behaviors in fundamental ways. Culture is a complex, learned, and shared way of life for communities of people which shape how people interact with each other and their larger community. The term culture refers to all the beliefs, customs, ideas, behaviors, and traditions of a society that are passed through generations. Culture is transmitted to people through language as well as through the modeling of behavior, and it defines which traits and behaviors are considered important, desirable, or undesirable.

Culture is dynamic, not static, constantly evolving as societies change and interact with each other. Cultural elements include

- common understanding of what is right, wrong, and important
- traditions and customs - behavior and rituals passed down through generations
 - ways people dress, eat, and greet each other
 - rituals associated with major life events like births, marriages, and deaths
- education - the specific process by which knowledge and skills are passed from one generation to the next
- arts and literature - different forms of creative expression (visual art, film, music, theater, etc.) that reflect a culture's values

and belief

- social norms - rules and expectations for how individuals should behave in specific situation
- religion or a belief system that provides meaning and purpose in life
- politics and government - a system of laws and institutions that govern a society
- language - primary means of communication and expression
 - language and communication styles can vary significantly across cultures

Within a culture there are norms and behavioral expectations. These cultural norms can dictate which personality traits are considered important. The researcher Gordon Allport considered culture to be an important influence on traits and defined common traits as those that are recognized within a culture. These traits may vary from culture to culture based on differing values, needs, and beliefs. Positive and negative traits can be determined by **cultural expectations**: what is considered a positive trait in one culture may be considered negative in another, thus resulting in different expressions of personality across cultures. Personality

Definition: Personality

An individual's consistent pattern of feeling, thinking, and behaving, is the result of the continuous interplay between biological disposition and experience.

Temperament does not change dramatically as we grow up, but we may learn how to work around and manage our temperamental qualities. Temperament may be one of the things about us that stays the same throughout development.

Personality develops from temperament. As children mature biologically, temperamental characteristics emerge and change over time. A newborn is not capable of much self-control, but as brain-based capacities for self-control advance, temperamental changes in self-regulation become more apparent. For example, a newborn who cries frequently doesn't necessarily have a grumpy personality; over time, with enough parental support and increased sense of security, the child might be less likely to cry.

In addition, personality is made up of many other features besides temperament:

- developing self-concept
- motivations to achieve or to socialize
- values and goals
- coping styles
- sense of responsibility and conscientiousness

Many other qualities are encompassed into personality. These qualities are influenced by the child's biological dispositions, but even more by their experiences with others, particularly in close relationships. Both biological disposition and experiences with others guide the growth of individual characteristics and becomes increasingly elaborated, extended, and refined over time.

Cultural Influences and Personality

Considering the influence culture has on personality is important because Western ideas and theories do not apply to all cultures. There is a great deal of evidence that the strength of personality traits varies across cultures.

Individualist Cultures

People who live in individualist cultures tend to believe that independence, competition, and personal achievement are important. People in individualist cultures displayed more personally-oriented personality traits.

- European
- North American
- Australian

Collectivist Cultures

People who live in collectivist cultures tend to value social harmony, respectfulness, and group needs over individual needs. People in collectivist cultures displayed more socially-oriented personality traits.

- Asian
- African
- South American

Cultural Influences and Parental Goals

Parents have **different goals** for their children that partially depend on their individual culture:

- parents in **individualist cultures** emphasize goals for independence and individual achievement
- parents in **collectivist cultures** prioritize maintaining harmonious relationships and being embedded in a strong network of social relationships

Sources

- Diener, Marissa L. [The Developing Parent](#). *Noba Module*. University of Utah. Licensed under CC NC-SA 4.0.
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). Licensed under CC BY-NC-SA 3.0.
- Overstreet, Laura. [Module 4: Infancy](#). *Lifespan Development*. Lumen Learning. Licensed under CC BY 4.0

6.4: Infant Emotions

Infant Emotions



Image Source: Designed by Freepik. [Baby Collection](#).

Birth

Infants exhibit **two emotional responses**:

- **attraction**
 - situations that bring comfort, stimulation, and pleasure
- **withdrawal**
 - unpleasant stimulation such as bitter flavors or physical discomfort
- infants exhibit **social engagement** in the form of **social smiling**
 - response to smiles to those who engage their positive attention

3 - 5 Months

- babies express pleasure as laughter
- babies express displeasure more specifically as fear, sadness, or anger

6 - 8 Months

- anger is often the reaction to being prevented from obtaining a goal, such as a toy being removed
- sadness is typically the response when infants are deprived of a caregiver
- fear is often associated with the presence of a stranger, known as **stranger wariness** (object permanence)
- fear is also associated departure of significant others known as **separation anxiety** (object permanence)
- may experience jealousy as young as 6 months of age

Categories of Emotions

Emotions are often divided into **two general categories**, *basic emotions (primary)* and *self-conscious emotions (secondary)*.

- **basic emotions (primary emotions)** appear first in infancy
 - interest
 - happiness
 - anger
 - fear
 - surprise
 - sadness
 - disgust

Toddlers are developing important traits of **self-concept** and **self-esteem**. Self-concept is how an individual views who they are based on their habits, skills and temperament. In other words, it is the ability to reflect on one's own traits, skills and behavior. This comes without judgement. It is the identifying information.

On the other hand, self-esteem is an attitude or view that an individual has about him or herself. It also refers to factors that we accept and value in ourselves and can be either negative or positive. Caregivers have a valuable role in helping children to develop positive self-esteem.

- **self-conscious emotions (secondary emotions)**, appear as children start to develop a self-concept and require social instruction on when to feel such emotions
 - envy
 - pride
 - shame
 - guilt
 - doubt
 - embarrassment

Situations in which children learn self-conscious emotions varies from culture to culture.

- individualistic cultures teach us to feel pride in personal accomplishments
- collective cultures children are taught to not call attention to themselves, unless you wish to feel embarrassed for doing so

Facial Expression

Conveying emotion with facial expressions of emotion are important regulators of social interaction. In the developmental literature, this concept has been investigated under the concept of **social referencing**; that is, the process whereby infants seek out information from others to clarify a situation and then use that information to act.

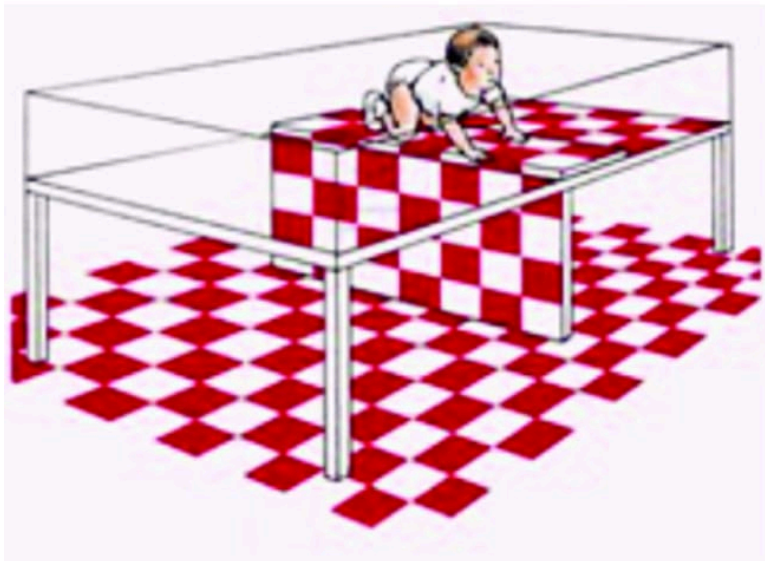


Fig. 6.4. Illustrations of a visual cliff.

Image Source: Jay Hedge. [Visual Cliff](#). *ResearchGate*.

A **famous experiment in social referencing** comes from work by Joseph Campos and colleagues and the **visual cliff**. The "cliff" is actually a table covered with a sturdy but transparent safety plexiglass and textured with a high-contrast checkerboard pattern, so that a drop off or cliff, is clearly visible through the plexiglass.

A toy is placed on top of the safety glass to attract the infant and the mother is positioned beyond the toy at the far side of the table. When the baby invariably begins to crawling to their mothers. When the infants reached the center of the table, the mother posed an expression of fear, sadness, anger, interest, or joy. The results differed depending on the mother's facial expression.

- no infant crossed the table when the mother showed fear
- only 6% crossed when the mother posed anger
- 33% crossed when the mother posed sadness
- 75% crossed when the mother posed joy or interest

Other studies provide similar support for **facial expressions as regulators of social interaction**. In one study researchers posed facial expressions of neutral, anger, or disgust toward babies as they moved toward the toy and measured the amount of inhibition the babies showed in touching it. The results for 10-15-month olds were the same: anger produced the greatest inhibition, followed by disgust, with neutral the least.

This study was later replicated using joy and disgust expressions, altering the method so that the infants were not allowed to touch the toy until one hour after exposure to the expression. At 14 months of age, significantly more infants touched the toy when they saw joyful expressions, but fewer touched the toy when the infants saw disgust.

Watch the babies in the short video below.

YouTube Video

This interactive element is not available in this format. Visit the link or scan the QR code to access it online.

[View this YouTube Video online](#)



Self-Regulation

A final emotional change is in self-regulation. **Emotional self-regulation** refers to strategies we use to control our emotional states so that we can attain goals. This requires effortful control of emotions and initially requires assistance from caregivers. Young infants have very limited capacity to adjust their emotional states and depend on their caregivers to help soothe themselves. Caregivers can offer distractions to redirect the infant's attention and comfort to reduce the emotional distress.

As areas of the infant's prefrontal cortex continue to develop, infants can tolerate more stimulation. By 4-6 months, babies can begin to shift their attention away from upsetting stimuli. Older infants and toddlers can more effectively communicate their need for help and can crawl or walk toward or away from various situations. This aids in their ability to self-regulate. Temperament also plays a role in children's ability to control their emotional states, and individual differences have been noted in the emotional self-regulation of infants and toddlers.

Developing a Sense of Self

During the second year of life, children begin to recognize themselves as they gain a sense of self as separate from their primary caregiver. In a classic experiment children 9-24 months of age were placed in front of a mirror after a spot of rouge was placed on their nose as their mothers pretended to wipe something off the child's face in the mirror. If the child reacted by touching his or her own nose rather than that of the "baby" in the mirror, it was taken to suggest that the child recognized the reflection as him or herself.

Between 15 and 24 months most infants developed a sense of **self-awareness**. Self-awareness is the realization that you are separate from others. Once a child has achieved self-awareness, the child is moving toward understanding social emotions such as guilt, shame or embarrassment, as well as sympathy or empathy.



Fig. 6.4.1. 13-month old looks at self in a mirror.

Image Source: Samantha Steele. [Zoe peeking round the corner of the mirror](#). Flickr.com

Source

- Lally, Martha and Suzanne Valentine-French. *Lifespan Development: A Psychological Perspective*. Licensed under CC BY-NC-SA 3.0.

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6.5: Social and Emotional Milestones

Social and Emotional Milestones: Infants and Toddlers

As infants and toddlers grow and increasingly interact with more people, their social and emotional skills develop. The table below outlines the social and emotional milestones that they typically experience during the first two years.



Image Source: [Cultivating Skills: How Kids Play, Learn & Grow. Nurturing Early Learning.](#) Territory Kids Early Learning. TerritoryKids.com.au

Fig. 6.5. Expected Social and Emotional Milestones

Age	Social and Emotional Milestones Typically Experienced
2 Months	• begins to smile at people • can briefly calm self (may bring hands to mouth and suck on hand) • tries to look at parent
4 Months	• smiles spontaneously, especially at people • likes to play with people and might cry when playing stops • copies some movements and facial expressions, like smiling or frowning
6 Months	• knows familiar faces and begins to know if someone is a stranger • likes to play with others, especially parents • responds to other people's emotions and often seems happy • likes to look at self in a mirror

9 Months	• may be afraid of strangers • may be clingy with familiar adults • has favorite toys
1 Year	• is shy or nervous with strangers • cries when mom or dad leaves • has favorite things and people • shows fear in some situations • hands you a book when wants to hear a story • repeats sounds or actions to get attention • puts out arm or leg to help with dressing • plays games such as “peek-a-boo” and “pat-a-cake”
18 Months	• likes to hand things to others as play • may have temper tantrums • may be afraid of strangers • shows affection to familiar people • plays simple pretend, such as feeding a doll • may cling to caregivers in new situations • points to show others something interesting • explores alone but with parent close by
2 Years	• copies others, especially adults and older children • gets excited when with other children • shows more and more independence • shows defiant behavior (doing what he has been told not to) • plays mainly beside other children, but is beginning to include other children, such as in chase games
3 Years	• imitates parents and friends • shows affection for familiar family and friends • understands the idea of "mine" and "his/hers" • shows a wide range of emotions, such as being sad, angry, happy, or bored

Source

- [CDC's Developmental Milestones](#). *Learn the Signs, Act Early*. Center for Disease Control (CDC). 2022.

6.6: Forming Attachments

Forming Attachments

Definition: Attachment

The close bond with a caregiver from which the infant derives a sense of security.

The formation of attachments in infancy has been the subject of considerable research as attachments have been viewed as foundations for future relationships. Additionally, attachments form the basis for confidence and curiosity as toddlers, and as important influences on self- concept.

John Bowlby: Attachment Theory

John Bowlby developed the concept of **attachment theory**. He defined attachment as the affectional bond or tie that an infant forms with the mother. An infant must form this bond with a primary caregiver in order to have normal social and emotional development. In addition, Bowlby proposed that this attachment bond is very powerful and continues throughout life. He used the concept of **secure base** to define a **healthy attachment** between parent and child.

A **secure base** is a **parental presence** that gives the child a sense of safety as the child explores the surroundings.

Secure attachments are characterized by the child's confidence in the caregiver's availability and responsiveness. Children with secure attachments feel safe to explore their environment, show distress when separated from their caregiver, and exhibit joy upon their caregiver's return. Additionally, Bowlby observed that infants would go to extraordinary lengths to prevent separation from their parents, such as crying, refusing to be comforted, and waiting for the caregiver to return.



Fig 6. A mother providing a secure base as her infant plays on a slide.

Image Source: [Pxhere.com](https://pxhere.com). Licensed CC0 1.0 Universal

Bowlby also looked at the phenomenon of **insecure attachments** which are characterized by the child's lack of confidence in their caregiver's availability and responsiveness.

This insecurity can manifest in different ways, such

- **avoidant behavior** - avoiding or ignoring the caregiver
- **resistant behavior** - resisting contact with the caregiver
- **disorganized behavior** - a mix of avoidant and resistant behaviors).

Bowlby observed that these same responses and behaviors were common to many other mammals, and consequently argued that these negative responses to separation serve an evolutionary function. Because mammalian infants cannot feed or protect themselves, they are dependent upon the care and protection of adults for survival. Thus, those infants who were able to maintain proximity to an attachment figure were more likely to survive and reproduce.

Erik Erikson: Stage 1 - Trust vs. Mistrust

In chapter 1 we briefly saw that Erik Erikson formulated an **eight-stage theory of psychosocial development**. Erikson agreed 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. The trust vs. mistrust stage is the first stage of psychologist Erik Erikson's theory of **psychosocial development**. It begins at birth and lasts until a child is around 18 months to two years old. Since babies are almost entirely dependent on their caregivers, the way parents interact with them has a profound effect on a child's health.

According to Erikson, this is the most important period of a child's life, as it shapes their view of the world as well as their overall personality.

Overview

- **Psychosocial Conflict:** Trust vs. mistrust
- **Major Question:** "Can I trust the people around me?"
- **Basic Virtue:** Hope
- **Important Event:** Feeding

However, it's important to keep in mind that trust and mistrust exist on a spectrum. People are neither completely trusting nor completely mistrusting. There will be times when a baby's needs go unmet. The key is that an infant's trustworthy relationships and interactions outweigh, for the most part, their untrustworthy ones. A healthy amount of mistrust of our environment prepares us for the reality of the world and an important lesson as adults is to know when to be cautious and self-protective ..

• Problems Establishing Trust

One study done with female twins, both identical and fraternal, concluded that a trusting personality seems to be at least in part genetic, while a mistrustful or distrusting personality seems to be learned from family and other social influences. Erikson believed that mistrust could contaminate all aspects of one's life and deprive the individual of love and fellowship with others. Consider the implications for establishing trust if a caregiver is unavailable or ill-prepared to care for a child, or if a child is unwanted, or has physical or other problems that make him or her more challenging to parent. Under these circumstances, we cannot assume that the parent is going to provide the child with a feeling of trust.

Children raised by consistently unreliable, unpredictable parents who fail to meet their basic needs eventually develop an overall sense of mistrust. Low levels of trust may result in a child becoming confused, depressed or anxious, socially disengaged, suspicious of others. They may also face peer rejection and experience feelings of loneliness, making it difficult to form healthy relationships.

Interestingly enough, research shows that being raised in an untrustworthy environment may actually make a child *more* trusting of untrustworthy people. Researchers believe this is due to an adaptive mechanism that makes it possible for a child to form an attachment bond to an untrustworthy caregiver.

Erikson: Stage 2 - Autonomy vs. Shame and Doubt

This stage occurs between the age of 18 months and around age 2 or 3 years. According to Erikson, children at this stage are focused on developing a greater sense of self-control, an interest in independence or autonomy replaces a concern for trust, as the child begins to walk and talk. Toddlers test the limits of what can be touched, said, and explored.

Overview

- **Psychosocial Conflict:** Autonomy vs. shame and doubt
- **Major Question:** "Can I do things myself or am I reliant on the help of others?"
- **Basic Virtue:** Will
- **Important Event(s):** Toilet training

Erikson believed that toddlers should be allowed to explore their environment as freely as safety allows and in so doing will develop a sense of independence that will later grow to self-esteem, initiative, and overall confidence. Parents goals should both keep your toddler safe while letting them learn to do things for themselves. This establishes a sense of control over themselves and some basic confidence in their own abilities.

As they progress into the second stage, however, it is important for young children to begin developing a sense of personal independence and control. As they learn Autonomy is an important part of development for children.

Autonomy allows children to

- exercise their critical thinking skills
- feel comfortable in their bodies
- gain a greater sense of their identity
- learn from their own mistakes
- make decisions independently
- process their emotions

It can be challenging to stand by and let kids this age do things on their own. It often means letting them spill their drink, button their shirt incorrectly, or stroll out of the house with their shoes on the wrong feet. While you might be tempted to do these tasks for them to minimize mistakes and messes, letting them try on their own is an integral part of fostering autonomy. Kids who have confidence in their skills are more likely to succeed in subsequent tasks such as mastering social, academic, and other skills.

Ways to **encourage** autonomy:

- allow the child to pick out their own clothes to wear to preschool—even if the clothes are mismatched
- toilet-train the child and the child gains a sense of independence.
- let the child choose which snacks they'd like along with lunch or which books to "read" and toys to play with

Ways to **discourage** autonomy:

- consistently rejects the child's ideas
- do not allow a child to make any of their own choices.
- lose patience and intervene to complete the task for them

• Consequences of Shame and Doubt

Shame is defined as a *self-conscious* emotion that results when a person feels there is something dishonorable about themselves or their conduct. A person who experiences shame may hide parts of themselves from social relationships; they may also engage in avoidant or defensive behaviors. Shame is linked with mental health conditions like depression, anxiety, eating disorders, and low self-esteem.

Self-doubt is linked with low self-esteem levels, as well as greater nervousness in regard to performance. Attempts to excessively control children, making decisions for them, and overly surveilling them and their activities may unknowingly contribute to greater levels of self-doubt in their children.

It's important to keep in mind that at some point, every child will experience shame and doubt. Erikson's theory simply points out that, during this stage of childhood, a child benefits from having more opportunities than not to engage with the world on their own terms. Being consistently blocked from having their own experiences or voicing their own thoughts, for instance, may be harmful.

Mary Ainsworth and the Strange Situation

Developmental psychologist Mary Ainsworth, a student of John Bowlby, continued studying the development of attachment in infants. Ainsworth and her colleagues 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.

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 the research team. The investigators were especially interested in how the child responded to the caregiver leaving and returning to the room, referred to as the "reunion."

YouTube Video

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Categories of Attachment

Based on their behaviors, the children are categorized into one of four groups where each group reflects a different kind of attachment relationship with the caregiver. One style is secure and the other three styles are referred to as insecure.

- A child with a **secure attachment style** usually explores freely while the caregiver is present and may engage with the stranger. The child will typically play with the toys and bring one to the caregiver to show and describe from time to time. The child may be upset when the caregiver departs but is also happy to see the caregiver return.
- A child with an **ambivalent (sometimes called resistant) attachment style** is wary about the situation in general, particularly the stranger, and stays close or even clings to the caregiver rather than exploring the toys. When the caregiver leaves, the child is extremely distressed and is ambivalent when the caregiver returns. The child may rush to the caregiver, but then fails to be comforted when picked up. The child may still be angry and even resist attempts to be soothed.
- A child with an **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.
- A child with a **disorganized/disoriented attachment style** seems to have an inconsistent 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.

Caregiver Consistency

Consistency plays a pivotal role in a child's life, providing them with a sense of security, stability, and emotional well-being.

Consistency in caregiving routines, expectations, and responses creates a predictable environment for children. When children know what to expect they:

- feel secure and develop a sense of trust in their caregivers
- are reassured that their needs will be met and that they can rely on their caregivers for support and guidance
- develop a sense of control and mastery over their environment.
- anticipate and participate in daily activities with confidence, enhancing their self-esteem and overall well-being

Consistency in emotional responses from caregivers is crucial for a child's emotional development. When caregivers consistently respond with warmth, empathy, and understanding, children learn

- to trust their own emotions and develop healthy emotional regulation skills
- to build trust and strengthens the attachment bond between child and caregiver
- that emotional support provides a safe space for them to express their feelings and learn how to navigate them effectively.
- *inconsistent emotional responses*, such as being dismissive or unpredictable, can
 - lead to confusion and insecurity in children. Inconsistency may
 - cause children to doubt the validity of their emotions
 - question their caregivers' availability for emotional support

Consistency in communication is another essential element in maintaining consistency. Clear and consistent communication

- helps children understand what is expected of them and what they can expect from their caregivers. Consistent
- in use of language, tone, and behavior fosters a sense of safety and trust

Consistency in discipline is also important. Establishing consistent consequences for behaviors helps children understand the boundaries and expectations set for them, enabling them to develop self-discipline and make appropriate choices.

Social Deprivation

Severe deprivation of parental attachment can lead to serious problems. According to studies of children who have not been given warm, nurturing care, they may show developmental delays, failure to thrive, and attachment disorders (Bowlby, 1982). Non-organic failure to thrive is the diagnosis for an infant who does not grow, develop, or gain weight on schedule. In addition, postpartum depression can cause even a well-intentioned mother to neglect her infant.

Non-organic failure to thrive is the *diagnosis for an infant who does not grow, develop, or gain weight on schedule and there is no known medical explanation for this failure*. Poverty, neglect, inconsistent parenting, and severe family dysfunction are correlated with non-organic failure to thrive.

Reactive Attachment Disorder

Definition: Reactive Attachment Disorder.

A condition where a child doesn't form healthy emotional bonds with their caretakers (parental figures), often because of emotional neglect or abuse at an early age. Children with RAD have trouble managing their emotions. They struggle to form meaningful connections with other people. Children with RAD rarely seek or show signs of comfort and may seem fearful of or anxious around their caretakers, even in situations where their caretakers are quite loving and caring. - [Cleveland Clinic](#)

Reactive attachment disorder (RAD) may occur when:

- children experience social neglect or deprivation, r
- repeatedly change primary caregivers that limit opportunities to form stable attachments
- reared in unusual settings (such as institutions) that limit opportunities to form stable attachments or have difficulty forming attachments

According to the Diagnostic and Manual of Mental Disorders, 5th ed. those children experiencing neglectful situations and also displaying markedly disturbed and developmentally inappropriate attachment behavior:

- being inhibited and withdrawn
- display minimal social and emotional responsiveness to others, and
- have a limited positive affect

This disorder often occurs with developmental delays, especially in cognitive and language areas.

Fortunately, most severely neglected children do not develop Reactive Attachment Disorder, occurring in less than 10% of such children. The quality of the caregiving environment after serious neglect also affects the development of this disorder.

Resiliency

Being able to overcome challenges and successfully adapt is known as **resiliency**. Even young children can exhibit strong **resilience** to harsh circumstances. Resiliency can be attributed to certain personality factors, such as an easy-going temperament. Some children are warm, friendly, and responsive, whereas others tend to be more irritable, less manageable, and difficult to console, and these differences play a role in attachment.

Attachment, like most other developmental processes, is affected by an **interplay of genetic and socialization influences**. Receiving support from others also leads to resiliency. A positive and strong support group can help a parent and child build a strong foundation by helping and positive attitudes toward the newborn and parent. In a direct test of this idea, Dutch researcher van den Boom.

Sources

- Cherry, Kendra. [Autonomy vs. Shame and Doubt in Psychosocial Stage 2. How early experiences build \(or undermine\) self-reliance.](#) *VeryWellMind*. February 2025.
- Cherry, Kendra. [Trust vs. Mistrust: Psychosocial Stage 1: The Most Crucial Stage of Childhood.](#) *VeryWellMind*. July 2024.
- Lally, Martha and Suzanne Valentine-French. [Lifespan Development: A Psychological Perspective](#). Licensed under CC BY-NC-SA 3.0.
- Palm, Meredith. [Lifespan Human Development: A Topical Approach](#). Licensed under CC BY-SA 4.0. 2023
- [The Role of Consistency and Predictability in Building Attachment Relationships in Children's Homes.](#) *Proactive Approaches Group Limited*. London. 2023

6.7: Chapter 6- Review

Chapter 6: Review

In this chapter we looked at:

- temperament and goodness-of-fit
- parenting is bidirectional
 - parent characteristics
 - child characteristics
- contextual factors and parenting
- sociocultural characteristics and parenting
 - individualist cultures
 - collectivist cultures
 - cultural influences and personality
 - cultural influences and parental goals
- infant emotions: Birth – 3-years
 - categories of emotions
 - facial expressions
 - visual cliff
 - self-regulation
 - sense of self
- social and emotional milestones: Birth - 3-years
- theories and styles of attachment
 - John Bowlby
 - Erik Erikson's
 - stage 1: trust vs mistrust
 - stage 2: autonomy vs shame and doubt
 - importance of attachment
 - factors that can impede attachment

CHAPTER 7: DEVELOPMENTALLY APPROPRIATE ENVIRONMENTS FOR INFANTS AND TODDLERS

7.1: Chapter 7- Introduction

7.2: Caregiving Routines

7.3: Daily Schedule and Transitions

7.4: Curriculum

7.5: Developmentally Appropriate Environments

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7.1: Chapter 7- Introduction



Fig. 7.1. Daycare Design.

Image Source: [Daycare Design](#). *Impeccabuild*.

Developmentally Appropriate Environments for Infants and Toddlers

While we have looked at the developmental characteristics of the infant and toddler, the environment and care provided are important in fostering this development. Let's examine some of the important components of **developmentally appropriate environments** for infants and toddlers.

After this chapter, you should be able to:

Learning Objectives

- identify the importance of **caregiving routines**
- demonstrate diapering an infant
- discuss the **curriculum** of an infant and toddler setting
- explore cultural variations in care
- examine components of a **developmentally appropriate infant and toddler environment**

7.2: Caregiving Routines

Caregiving Routines

In chapter 1 we looked at theorist [Magda Gerber](#) and learned that caregiving routines are a very important part of the environment for infants and toddlers. A routine is a consistent, predictable event that helps young children understand the nature of the childcare environment and feel secure there. Caregivers should be focused on routines that meet the needs of the child as well as incorporate interactions with the child.

A well-planned regular routine:

- enables children to reduce anxiety by knowing what is coming next
- encourages children's positive behavior by meeting their basic needs
 - eating and sleeping,
 - active and quiet play
 - time alone and time with other children

A routine activity is an excellent time to practice the serve and return speech that is so important to brain development. The most common infant and toddler routines are feeding, napping and diapering/toileting.

State Regulations

Child care licensing is a process where state governments set minimum health and safety requirements that child care programs must meet to legally operate. These requirements help ensure your child is healthy and safe in a child care program. Licensing requires that child care programs are monitored to ensure they continue to meet those requirements.

Wisconsin State Child Care Licensing

The state of Wisconsin regulates healthy, safe and nutritious practices that licensed care settings must follow. These regulations do not necessarily relate to higher quality care but are to ensure minimum safety requirements. There are many general regulations and some additional ones specifically for infants and toddlers. Here are a few related to caregiving routines.

- Prior to admission, the licensee shall obtain written information from a child's parent or guardian to individualize the program of care for the child.
- Childcare workers shall use the information obtained from the parents to provide care to the child.
- Information shall include the following:
 - Schedule of meals and feeding.
 - Types of food introduced and timetable for new foods.
 - Toileting and diapering procedures.
 - Sleep and nap schedule.
 - The child's way of communicating and being comforted.
 - Developmental and health history.
- Childcare workers shall document changes in a child's development and routines every 3 months based on discussion with the parent.
- Childcare workers shall respond promptly to a crying child's needs.
- Emphasis in activities shall be given to play as a learning and growth experience.
- Throughout the day each infant and each toddler shall receive physical contact and attention such as being held, rocked, talked to, sung to and taken on walks inside and outside the center.
- Routines relating to activities such as taking a nap, eating, diapering and toileting shall be used as occasions for language development and other learning experiences.
- When a non-mobile child is awake, the childcare worker shall change the child's body position and location in the room periodically. Non-mobile children who are awake shall be placed on their stomach occasionally throughout the day.

Napping

- Each infant and each toddler shall be allowed to form and follow his or her own pattern of sleeping and waking.

Feeding

- Childcare workers shall do all the following: Feed each infant and each toddler on the child's own feeding schedule. Ensure that food, breast milk, and formula brought from home are labeled with the child's name and the date and are refrigerated, if required.
- Hold a child who is unable to hold a bottle whenever a bottle is given.
- Bottles may not be propped.
- Hold or place a child too young to sit in a highchair in an infant seat during feeding.
- Wide based highchairs, hook-on chairs or infant seats with safety straps shall be provided for children who are not developmentally able to sit at tables and chairs.
- Encourage children to experiment with self-feeding with their hands and spoons.
- Eating utensils and cups shall be scaled to the size and developmental level of the children.

Diapering and Toileting

- Childcare workers shall do all the following:
 - Plan toilet training in cooperation with the parent so that a child's toilet routine is consistent between the center and home.
- Universal Precautions
 - All bodily secretions are potentially infectious
 - All staff exposed to bodily secretions shall wear single use, disposable gloves, hands will be washed after gloves are removed
 - Child's hands will be washed with soap and warm running water after diapering.
 - Infant's hands may be washed with single use soapy cloth.
 - Children one and over must use running water
 - Hand sanitizer may not replace hand washing

Diapering Area

- Must be cleaned and disinfected after each use
 - Cleaning – soap and water
 - Disinfectant (bodily fluids) – bleach formula (one Tablespoon bleach to one- quart water) or other approved (like quat), for bodily fluids (diaper table, bodily fluid clean-up) – stronger chemical versus....more diluted for common germs
 - Both only good for 24 hours, must be made every day
 - Sanitizer (anything a child can lick – toys/counters)
- Diaper changing pads – more sanitary to remove and use changing table surface
 - Place so that caregiver can see other children in room
 - If surface is above floor level – provide a barrier to prevent falling
 - **YoungStar** always requires keeping a hand on the child
- Must have sink with hot/cold running water.
- Kitchen sink may not be used
- Shall be a ready supply of dry and clean clothing and diapers to meet needs of all the children

Medication

- Need parent permission in writing for diaper cream, lotions, powder, salves
 - update every 6 months
 - Should be in original container and labeled with child's name
- Directions for use should be posted in diapering area
- Application should be recorded on daily sheet, not in medical log
- Medication should be kept out of reach of children
- Medication may not be expired

Glove Use and Removal

Fig. 7 1. Chart describing removal of gloves.



The 6-step process to use and remove gloves

1. pinch and hold the outside of the glove near the wrist area
2. peel downwards away from the wrist, turning the glove inside-out
3. pull the glove away until it is removed from the hand, holding the inside-out glove with the gloved hand
4. with ungloved hand, slide fingers under the wrist of the remaining glove. Do not touch the outer surface of the glove
5. peel downwards, away from the wrist, turning the glove inside out
6. continue to pull the glove down and over the inside-out glove being held in the gloved hand

Garbage

- Must be rigid, covered and emptied daily
- Diapering pail (diaper/gloves/wipes) needs to have a foot activated cover and be plastic lined
 - Container is washed and disinfected daily
- Place parent-supplied soiled cloth diapers in labeled plastic bags kept separate from other cleaning

Timeliness

- Staff checks children for signs that they are wet or soiled on a regular basis according to each child's personal schedule.
- Diapers will be changed as soon as possible once discovered or at a maximum of every 2 hours.
- Diapering should be used for language development and other learning experiences

Toilet Learning

- Plan toilet learning in cooperation with the parent so that a consistent routine is followed
- No toileting may happen under 18 months
- Child under age 30 months do not need to be counted in determining the number of toilets, but must have at least one
- If potty chairs are used for children under 30 months, the chairs will be provided in a ratio of 1 chair per 4 children
- Steps or blocks shall be provided if the sink and toilets are not proportioned to the size of the child
- A child may not be punished for a lapse in toilet learning
- Children in the process of learning to use the toilet will be encouraged to be as independent as is developmentally

appropriate, easy on/off clothing

Steps for Diapering a Child based on Licensing and YoungStar Recommendations

- ____ 1. Ready all supplies ~ diaper /wipe ~ may need more than one /gloves / medications
- ____ 2. Wash your hands for 20 seconds
- ____ 3. Bring child to the changing area. Remember to prep the child for the activity and TALK to them throughout the process. Always keep one hand on child while on the changing table.
- ____ 4. Put on latex glove – if necessary
- ____ 5. Remove child's bottom clothing and open soiled diaper
- ____ 6. Wipe front to back using a single use diaper wipe~ one swipe per wipe
- ____ 7. Remove soiled diaper and gloves, putting them into a plastic bag
- ____ 8. Apply any ointments/creams as directed by parents; secure dry diaper; dress child, but do not stand them on the 'dirty' table surface.
- ____ 9. Wash hands and assist child in washing hands
- ____ 10. Place child in a safe area where he/she will have access to learning materials.
- ____ 11. Wet/soiled clothes should be bagged/double bagged and labeled with the child's name
- ____ 12. Wash your hands for 20 seconds
- ____ 13. Clean changing table surface by washing with soap and water, then spray disinfectant; let air dry for at least 2 minutes
- ____ 14. Wash your hands for 20 seconds
- ____ 15. Record child's diapering on the diaper log and for the family

Sources

- [Licensing Rules for Group Child Care Centers and Child Care Programs Established or Contracted for by School Boards.](#) *Wisconsin Administrative Code DCF 251.* Wisconsin Department of Families and Children. March 2023.
- [YoungStar.](#) Wisconsin Department of Families and Children.

7.3: Daily Schedule and Transitions

Daily Schedules, Routines, and Transitions



Fig. 7.3. Schedule for preschool program.

Image Source: [The Importance of Schedules and Routines](#). Head Start.gov.

Daily Schedules

Many states require child care programs to have written daily schedules. **The National Association for the Education of Young Children (NAEYC)** encourages practices in which “the curriculum guides the development of a daily schedule that is predictable yet flexible and responsive to individual needs of the children.”

How do you develop a daily schedule for a group of infants and toddlers who are each on their own timetable?

This is an important question because infants and toddlers have not yet developed the ability to manage their own feelings and behavior. For infant and toddler care caregivers, creating a daily schedule that is based on responsive care routines makes good sense. Early learning researchers widely agree that adults can best support early learning when a child’s interests are central to the learning experience

As we learned in the previous chapter, predictable consistent daily routines support young children in knowing what to expect and what is expected of them, leading to fewer disruptive behaviors. A consistent **daily schedule and step-by-step routines** give children a predictable day. Schedules and routines in group settings help children:

- feel safe, secure, comfortable, and in control of their environment
- know what is happening now and what will happen next
- know how to do an activity or task
- engage in learning

What is the difference between a schedule and a routine?

- a **schedule** represents the big picture and includes main activities that happen across the day
 - a daily schedule is responsive and sensitive to each infant and toddler in your setting
 - focus on **individual** needs
 - particularly important for babies who are not yet able to regulate their own needs and bodies to accommodate a group schedule
 - routines such as diapering, sleeping, and feeding should happen when each child needs them, not on a clock or a strict schedule
- **routines** are the steps needed to complete each part of the schedule.

Are infant and toddler schedules and routines different?

- **Infants**
 - each child should be on their own **individualized schedule** of naps, feeding, diapering and play routines.
 - the infant's day should be consistent from one day to the next
 - routines should flow in a consistent way that allow infants to focus on their play and learning
- **Toddlers**
 - a uniform **group schedule** that all children follow may can be established for some activities
 - opportunities to explore and practice skill-building allow children to build confidence in their abilities

Transition Times

Definition: Transition Time

When a group of children is being asked to shift from one activity or task to another in a relatively short period of time.

Planning Transition Times

- develop well-planned transition times between routines to help manage behavior
- caregivers should plan on transition times requiring all your attention and focus
 - move children quickly from one routine to another
 - make this time engaging with a fun activity or song
- usually the most difficult and stressful parts of the day in childcare
- lots of movement can mean confusion, lack of structure or chaos
 - can be difficult for some children to react to
 - developmentally, toddlers are not good at waiting or being patient

Sources

- Taintor, Amanda. [The Daily Schedule](#). *Caregiving Practices- Routines*. [Infant and Toddler Care and Development 2e](#). LibreTexts Social Sciences Library. August 2023. Shared under a mixed 4.0 license and was authored, remixed, and/or curated by Amanda Taintor, Todd LaMarr, Wendy Ruiz, Martina Marquez, Emily Elam, Amy Carnahan, and Adrienne Seegers ([ASCCC Open Educational Resources Initiative](#)) .
- [The Importance of Schedules and Routines](#). Head Start.gov.

7.4: Curriculum

Curriculum

At the heart of early childhood curriculum is the child who depends on adults to support and nurture exploration and learning. An appropriate curriculum for infants and toddlers provides guidance and strategies for supporting development and learning, engaging in responsive interactions to build relationships, and partnering with families. It is essential to consider what learning looks like in the minds of infants and toddlers. Children from birth to 5 do not build or acquire their knowledge and skills in domain-specific categories one domain at a time. They relate to each learning experience as a whole experience. They naturally cross the boundaries of domains and simultaneously build concepts related to social-emotional development, science, mathematics, language, social sciences, the arts, physical development, and health.

A good curriculum leaves decisions about what this looks like to the caregiver implementing the curriculum. When it comes to curriculum, caregivers must:

- have room to discover an infant or toddler's "individual curriculum" (e.g., the child's interests, motivations, and needs)
- choose and offer experiences that match a child's (or small group of children's) interests and developmental level
- use everything that happens as a learning opportunity, both planned/intentional and spontaneous
- create environments that reflect children and families served in the program

A responsive, relationship-based curriculum supports child-initiated, child-pursued opportunities to individualize within the chosen or created curriculum.

Infants

Infants continually use all their senses and competencies to relate new experiences to prior experiences and to understand and create meaning. Infants learn all the time in different and integrated ways. Many aspects of learning occur simultaneously, for example, during book reading, infants use their knowledge and cognitive abilities, understanding of language, physical skills, and experiences at home and in the community to make new connections and expand their knowledge of themselves and the world.

Infants and toddlers are constantly moving, thinking, communicating, and feeling: their learning is integrated across domains and occurs almost every moment of the day. The individualized goals of the children in the infant room are often encouraged during caregiving routines. For infants, the caregiving routines ARE the curriculum.

- the infant listens to the caregiver talk about emotions as a diaper is changed
- mealtime becomes a time to learn new sensory words
- **tummy time** near a friend may lead to some social skills as well as motor development

Toddlers

Toddlers may be ready for more specific learning opportunities like a short group time or shared story.

It is common for many programs to integrate many aspects of learning with the use of "themes" as a way to weave learning together for children. For some learners, the connection of several learning experiences all related to a common concept can support deeper learning. The most successful themes are those that emerge out of the children's interest, often called "**emergent curriculum**." Some common themes include:

- family
- friendship and caring
- community helpers
- animals and pets
- activities (art, music, baking, camping)
- transportation (cars, busses, trains, planes)
- locations (parks, lakes, farms,...)

Caregivers must be careful to acknowledge what is developmentally appropriate for their group of children and each individual child. Toddlers can be encouraged, but not forced, to join into a group or other more structured activity. Always remember that children learn best through play. Intentional play-based interactions are the foundation of the curriculum.

What Children Learn Through Play

Physical

- Personal care (hygiene, feeding, dressing,)
- Nutrition
- Safety
- Motor (Movement) Skills
 - Active physical play
 - Perceptual-motor (senses, effort, direction,)
 - Gross (large) motor (running, throwing, ...)
 - Fine (small) motor (hands, fingers, feet, toes)

Cognitive

- Cognitive approaches to learning and self-regulation
 - Maintain attention
 - Self-comfort
 - Curiosity and initiative
 - Self-control of feelings and behavior
 - Engagement and persistence
- Skills of inquiry
 - Observe, investigate, document, communicate
- Knowledge of the natural/physical world
 - Understanding properties and events
- Cause and effect
 - Understanding relationship between cause/effect
- Classification
 - Learning the attributes of objects by exploring
 - Compare, match, sort, categorize
 - Finding similarities and differences
 - Symbol
- Number
 - Understanding quantity (amount, degree)
 - Assigning a numerical symbol to quantity
 - Counting
- Measurement
 - Awareness of difference in properties
 - (size, length, weight, capacity, volume)
 - Seriation (order 3 or more by comparison)
 - (small/medium/large, loud/louder/loudest)
 - Time (sequence of events, rhythm, yesterday/ tomorrow)
- Patterning
 - Recognize, reproduce, repeating sequences
- Spatial relationships Experiences an object's position in relation to others

Language

- Symbol/symbolic reasoning
 - Sounds and letters are put together to represent things
- Receptive language
 - Listening, understanding, responding
- Expressive language
 - Speaking, communicating, conversation

- Graphic (written) language/literacy
 - Interest in print & books, phonology, pre-reading, reading
 - Symbol, letter, print knowledge, pre-writing, writing

Social

- Skills learning with adults
 - Can stay at school without parent
 - Can respond/enjoy adults other than parents
 - Adults will help in times of need
 - Adult will not always solve problems
- Skills learned with peers
 - Different approaches work for different peers
 - Cooperation and turn taking
 - Lead and follow
 - Sustain relationships and helping peers
 - Share materials, equipment, people, ideas
 - Asserting rights and self defense
 - Negotiating skills and solving conflicts
 - Anticipate and avoid problems
 - Realistic expectations and valuing differences
- Skills learning in a group
 - Respect
 - Responsibility
 - Compassion
 - Tolerance
 - Group identity
 - Follow and adapt to routines and expectations
 - How to enter and exit situations
 - Deal with delay of gratification (patience)
- Skills learned as an individual
 - Self-help and self-care
 - Make choices and initiate own activities
 - Cope with rejection, hurt feelings, disappointment
 - Take responsibility

Emotional

- Ability to deal with feelings
 - Notice, label, and accept feelings
 - Express feelings in appropriate ways
 - Deal with feelings of others
 - Resolve inner fears, conflicts
- Ability to exercise judgment
 - Notice, label, and make choices
 - Think through consequences
 - Evaluate effectiveness of choices
 - Learn to take another viewpoint
- Enjoying one's self and one's power
 - Acquire a sense of self
 - Develop self-confidence and self-esteem
 - Build trust in self and others
 - Reveal own personality
 - Learn to take risks & learn from mistakes
 - Become competent in several areas

Creative

- Flexibility (shifting from 1 idea to another)

- Fluency (producing many ideas)
- Sensitivity (awareness (moods, textures, senses,))
- Imagination / Originality
- Risk Taking / Elaboration (pushing boundaries)
- Self as a resource (awareness, confidence in ability)
- Experience (to build mastery to build upon)
- Visual and Performing Arts

The Three A's – Attention, Approval, and Attunement

Using the three A's in caregiving routines ensures that caregivers are making the most of these interaction times. The three A's are attention, approval and attunement. All involve getting down to a child's level while acting calmly, moving slowly, making eye contact and engaging with soft speech. There should be lots of positive energy and smiles.

Attention

In general, the things we pay attention to matter the most. It is easy to become distracted and to try to multitask in our busy lives. Caring for young children is no different. One must be **intentional** while practicing care routines to give full attention to the child. Magda Gerber states it is better to give a child your full attention for a few minutes than to give a child part of your attention for a longer period.

Focus your attention to observe the behavior, skills and needs of children in your care. Identify Vygotsky's **Zone of Proximal Development** and challenge the child with new tasks and vocabulary. As a care provider, think about each individual child and be culturally sensitive and responsive to the ways families raise their children.

Approval

The best type of attention is approval. Smile and encourage the attempts of the child. Show respect for the child by allowing them to complete tasks and help them make choices. Slow the process down and engage with the child. Routines are not assembly lines or checklists to complete. By slowing down and following the child's lead, the caregiver is showing the child that they think the child is competent and independent. A child is rich in resources, strong and confident. They can often do much more than one thinks they can if they are given the opportunity. Children do not just have needs for adults to deal with but rather have rights to appropriate care and education through respect.

Attunement

The caregiver should be aware and responsive to the child. They should be "in tune" to the personality, needs and emotions of each child. Through careful observation a caregiver can learn a child's signals. Reading and responding to children's cues creates an "interactional dance". A caregiver should always allow the child to take the lead. Watching a skilled provider, one often thinks they can read the infant's mind and always knows just what to do for each child; this is attunement.

Benefits of Responsive Caregiving

Responsive caregiving is the foundation of crucial brain development. Providing caregiving routines as curriculum and following best practices of the three A's, children have opportunities to form secure attachments to care providers. As we read earlier, this idea is supported by many theorists. Some childcare centers have used "continuity of care" to maintain this attachment. In this method, a teacher may travel with a group of children from the infant room to toddler room. Often one sees this cycle for a three-year period before the caregiver starts over with a new group of infants. This provides stability and consistency for the child, rather than having to adapt to a new caregiver each year. A high-quality center will also work to eliminate staff turnover so that children have consistent faces.

Additionally, some centers choose to have staff work a 12-hour day so that the caregiver is there with a child all day and can typically communicate with the family and both separation and reunion times.

Establishing communication with the family is the first step to providing culturally responsive care. Each family has their own beliefs and parenting styles. A caregiver should make every attempt to learn more about each family's culture. The culture

may influence their caregiving beliefs or goals for their child. For example, some families may want a young child to learn independence while others may value interdependence. A caregiver may not always agree with the caregiving practices, but unless it is harming the child, the family's practices should be supported to the best of one's abilities. All families should feel welcome into the program and should be reflected in the images, books, songs and toys of the environment. A caregiver should try to learn important words in a child's home language.

Sources

- Stephens, Cindy. [Integrated Curriculum / Themes. *Principles and Practices of Teaching Young Children*](#). LibreTexts Social Sciences Library. Shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by Cindy Stephens, Gina Peterson, Sharon Eyrich, & Jennifer Paris (College of the Canyons) .
- Stephens, Cindy. [What Children Learn Through Play. *Principles and Practices of Teaching Young Children*](#). LibreTexts Social Sciences Library. Shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by Cindy Stephens, Gina Peterson, Sharon Eyrich, & Jennifer Paris (College of the Canyons) .

7.5: Developmentally Appropriate Environments



Fig 7.5. Infant play space in child care center.

Image Source: [Infants & Toddlers Learning Environments: An Introduction](#). *Virtual Lab School*. The Department of Defense Child Development Virtual Laboratory School. 2020.

Developmentally Appropriate Environments

The physical environment in a group care setting powerfully affects children, caregivers, and their interactions. Exploring their physical environment comprises a great deal of the curriculum for mobile infants and toddlers. We must consider the impact of environment on both children and caregivers, and learn to design spaces that contribute appropriately to children's development. A well-designed environment can have enormous positive impact on the well-being of children and teachers. The teacher's intentional design of the learning environment increases opportunities for children to have engaging and meaningful interactions with adults and peers. Along with interactions, instruction, learning activities, and routines, the learning environment is a central part of preschool teachers' planning and implementation of curriculum.

The Well-Designed Classroom

A well-designed environment is, of course, safe for infants and toddlers but, more than that, it supports their emotional well-being, stimulates their senses, and challenges their motor skills. Incorporating some relatively simple features into a classroom can result in significant improvement in the way the spaces are used by both children and caregivers.

Careful consideration of the needs of infants and toddlers to move, to change activities at will, to rest and observe suggests additions and changes that can strongly influence the atmosphere of the classroom.

A quality design aims to create a classroom that is

- highly functional
- aesthetically attractive
- age-appropriate
- child-directed
- teacher-supported

A well-designed group care environment

- promotes children's individual and social development. The
- setting, layout, and equipment give infants many opportunities to challenge themselves through seeing, touching, feeling, and moving
- surroundings that are safe to explore freely, infants learn to map their environment cognitively, to manipulate it, and to master it

The following considerations provide a starting point for the design of a childcare environment:

- group size
- room size
- flooring
- lighting
- color
- storage
- ease of supervision.

Space for Movement

Movement is essential to a child's physical and emotional development. Once an infant can crawl and pull themselves up, moving becomes a major focus of the day. Even if there is nothing safe in the classroom to climb on, they will find a way to climb-onto tables and shelves, rocking chairs, and highchairs. Because these activities are unsafe, the teacher will redirect the child off the piece of equipment. The message the child receives is that what they are interested in doing is not okay. Self-initiated exploration, a primary focus for healthy development, is prevented instead of promoted.

Creating a classroom that supports appropriate movement is a fundamental component in designing a developmentally appropriate environment. Motor competence and emotional competence are closely linked in infants and toddlers.

Feeding oneself, crawling to a desired toy and picking it up, climbing to the top of a loft, and going down a slide are all activities that help the infant develop a sense of self, a feeling that they are capable, that they can achieve, that they can master.

Poorly-Designed Classrooms

Many classrooms are simply not designed to meet the developmental needs of infants and toddlers in group care, nor do they support teachers in their role as facilitators of children's learning and self-directed play.

In infant/toddler classrooms without a design specifically aimed at supporting children's development young children

- spend much of their time aimlessly wandering about the room or
- are only engaged in teacher-directed activities
- lack opportunities for self-directed exploration and focused play

When children are not appropriately engaged:

- aggressive behavior increases
- the caregiver says "no" to the children far too often
- the caregiver acts as police officer and custodian
- manages behavior instead of facilitating individual and group needs

Environmental Screening Tools

Just as a caregiver can use screening tools to assess the development of the child, the caregiver can use screening tools to assess the appropriateness of the environment. One typical tool that is used is the **Infant/Toddler Environment Rating Scale-Revised Edition (ITERS-R™)** is a thorough revision of the original Infant/Toddler Environment Rating Scale (ITERS, 1990). This rating can be used to indicate the quality of a childcare center.

The **rating scale** consists of 39 items organized into 7 subscales:

- **Space and Furnishings**
 - Indoor space
 - Furniture for routine care and play
 - Provision for relaxation and comfort
 - Room arrangement
 - Display for children's work
- **Personal Care Routines**
 - Greeting/departing
 - Meals/snacks
 - Nap
 - Diapering/toileting
 - Health practices
 - Safety practices
- **Listening and Talking**
 - Helping children understand language
 - Helping children use language
 - Using books
- **Activities**
 - Fine motor
 - Active physical play
 - Art
 - Music and movement
 - Blocks
 - Dramatic play
 - Sand and water play
 - Nature/science
 - Use of TV, video, and/or computer
 - Promoting acceptance of diversity
- **Interaction**
 - Supervision of play and learning
 - Peer interaction
 - Staff-child interaction
 - Discipline
- **Program Structure**
 - Schedule
 - Free play
 - Group play activities
 - Provisions for children with disabilities
- **Parents and Staff**
 - Provisions for parents
 - Provisions for personal needs of staff
 - Provisions for professional needs of staff
 - Staff interaction and cooperation
 - Staff continuity
 - Supervision and evaluation of staff
 - Opportunities for professional growth

New curriculum and program items in the revised ITERS include: Helping children understand language; Nature/science; Use of TV, video and computer; Free play; and Group play activities. Items have been added to make the scale more inclusive and culturally sensitive, to address professional needs of staff, and to reflect the latest health and safety information.

In Wisconsin, **The Infant/Toddler Environment Rating Scale-Revised Edition (ITERS-R™)** is used as the foundation of the **YoungStar Quality Rating System**.

Sources

- [Infant/Toddler Environment Rating Scale®, Revised \(ITERS-R™\)](#). *University of North Carolina Frank Porter Graham Child Development Institute* .
- [Infants & Toddlers Learning Environments: An Introduction](#). *Virtual Lab School*. The Department of Defense Child Development Virtual Laboratory School. 2020.
- Stephens, Cindy. [Key Components for Creating Early Childhood Environments](#). *Principles and Practices of Teaching Young Children*. LibreTexts Social Sciences Library. Shared under a CC BY 4.0 license and was authored, remixed, and/or curated by Cindy Stephens, Gina Peterson, Sharon Eyrich, & Jennifer Paris (College of the Canyons) .Key Components for Creating Early Childhood Environments. January 2025.

7.6: Chapter 7- Review

Chapter 7: Review

A developmentally designed environment supports children's individual and social development. It encourages exploration, focused play, and cooperation. It provides choices for children and supports self-directed learning. A developmentally designed environment also supports the caregiver-child relationship. It minimizes management and custodial activities, allowing caregivers more time for interaction, observation, and facilitation of children's development. The caregiving routines become the curriculum.

In this chapter we covered:

- daily schedules and routines
 - the difference between schedules and routines
 - caregiver routines focused on attention, approval, attunement
- transitions time
- curriculum
 - age-appropriate
 - individual
 - group
 - play as curriculum
 - physical
 - cognitive
 - social
 - emotional
 - creative
- benefits of a responsive caregiver
- developmentally appropriate environments
 - well-designed classroom (vs. poorly-designed classroom)
 - space and furnishings
 - personal care routines
 - listening and talking
 - activities
 - interaction
 - program structure
 - parents and staff

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