ESSENTIALS OF LINGUISTICS 2E

Catherine Anderson, Bronwyn Bjorkman, Derek Denis, Julianne Doner, Margaret Grant, Nathan Sanders, and Ai Taniguchi
McMaster University

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About the Authors

TiLCoP Canada

The members of the Teaching in Linguistics Community of Practice (TiLCoP) are instructors of linguistics at universities in Canada. We meet regularly to talk about our teaching practice and our pedagogical research. TiLCoP came together in 2020 to share resources and support at a time when we were all grappling with a rapid shift in teaching modality in response to the pandemic. Several exciting projects have grown out of our collaboration, including Word to the Whys (a companion podcast for Intro Linguistics courses), a special issue of the *Canadian Journal of Linguistics*, and of course this textbook!

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Catherine Anderson (she/her) is an Associate Professor, Teaching Stream, in the Department of Linguistics & Languages and the Director of the Gender & Social Justice program at McMaster University. She earned a PhD in Linguistics from Northwestern University in 2004, and a BA from McMaster in the department where she is now a faculty member. The thread that connects her wide-ranging teaching and research interests is partnership: collaborating with learners and colleagues to further justice and to make learning accessible and enjoyable. Catherine lives with her wife and their twin teenage sons in Hamilton, on the territory governed by the Dish With One Spoon wampum agreement between the Haudenosaunee and Anishinaabe Nations.

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A Note to Instructors

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1. Please fill out this adoption form to allow our funder to track the book's use.
2. Send an email to teaching.in.linguistics@gmail.com to receive an Instructor's package (not yet available, but we're working on it!), which will include answer keys for the exercises at the end of each chapter.

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Aileen Lin created artwork. David Wiesblatt recorded the ASL video examples. Bartłomiej Czaplicki and Deepam Patel created audio. Bianca James and Tata Ruffle in McMaster's Department of Linguistics and Languages administered the grant funds. Kate Brown, Accessibility Program Manager at McMaster, advised us on accessible design. We are grateful for their work.

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CHAPTER OVERVIEW

Chapter 1: Human Language and Language Science

Learning Objectives

- When you've completed this chapter, you'll be able to:
- Differentiate between prescriptive and descriptive ways of thinking about language,
- Identify components of mental grammar,
- Explain some properties of all human languages,
- Describe some techniques for doing language science, and
- Discuss the ethics of doing language science.

In this chapter, we begin to explore what language is, and how language scientists (also known as linguists) think about it and observe it. It might well be that most of experience learning about language has had to do with rules that you could get right or wrong. That's not the approach we're taking in this book. Instead, we're going to look at how to use the tools and techniques of linguistics to observe the patterns of human languages. From these observations, we'll try to draw some conclusions about the abstract principles and organization of human language in people's minds and in language communities. Along the way, we'll also consider the ways that language science and people's attitudes about language have bolstered colonial structures of power and privilege and have been used to do harm.

1.1: What even is language?
1.2: What grammars are and aren't
1.3: Studying language scientifically
1.4: Thinking about standards and "proper" grammar
1.5: Doing harm with language science
1.6: Doing good with language science
1.7: Exercise your linguistics skills
1.8: Three waves of sociolinguistics
1.9: Summary

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1.1: What even is language?

We're all users of language. Right now I'm talking and writing to you in a variety of Canadian English, and I bet many of you also know one or more other languages. Linguistics is the scientific study of human language. That definition is short, but it's not exactly simple, is it? How do we study language scientifically? And what even is language?

The word *language* is used for several different complex concepts that are interconnected with each other. One use of the word is to refer to individual languages, like American Sign Language (ASL), Basque, English, Langue des signes québecoise (LSQ), Nishnaabemwin, Xhosa, and many others.

The word *language* can also refer to other, related notions. If you're a programmer, you might have a section on your résumé that lists the computer languages you know, like Python, R, C++, or Perl. Computer languages are not usually the focus of linguistics, even though many linguists use them to analyse linguistic data! There are also metaphorical uses of the word *language*, such as body language or love languages. These uses of the word are also outside of what linguistics usually studies.

For the moment, let's think about one particular language, because it happens to be the one we're using now. I'm using one variety of English (a variety spoken by a middle-aged white lady in Ontario). Before I started making this video, I used my fingers to type words on my keyboard. Now as I read those words and talk to you, I'm squeezing the air out of my lungs; I'm vibrating my vocal folds, and I'm manipulating parts of my mouth to produce sounds. Those sounds are getting captured by a microphone and recorded on my computer, then I'll upload them to the eBook. If you're listening to this video, the sounds I recorded are playing on your device, and your eardrums are reacting to the auditory information. If you're reading the text or the captions, your eyes are reacting to the visual information. Your eyes and your ears send signals to your brain. And somehow, after all that, if my communication was successful, you end up with an idea in your mind that's similar to the idea in mine. There must be something that we have in common to allow that to happen: some shared system that allows us to understand each other's ideas through language. This shared system is what many linguists call the **mental grammar**, and one of the goals of linguistics is to find out what that shared system is like.

So we've focused our definition of linguistics a little bit, by saying that we're interested in the scientific study of human language, of the grammar, the shared system that allows us to understand each other. What is the grammar like? Or to put it another way, what do we know when we know a language?

What is grammar?

Imagine you're an alien, you've just arrived on Earth, and you need to figure out how to understand the language used in the particular earthling community that you've landed in. What kinds of things do you need to figure out? One of the first things you'll need to know about that language is what counts as talking. Is this language signed or vocalized? In other words, what is the **modality** of the language? Many human languages are **vocalized** (or "spoken"). In this modality, language users make sounds with their larynx, tongue, teeth and lips, and receive sounds with their ears. Other human languages are **signed**. Language users make signs with their fingers, hands, wrists and forearms, and receive signs by sight or by touch. Even though they have very different modalities, sign and vocal languages share many properties in their grammars. In this book, we'll try to reserve the words *speaking* and *speech* for vocal languages, and refer to **language users** when we're talking about languages of any modality. In other places you might also see *languaging* used as a verb to mean "using language in any modality".



Figure 1.1. Cookies.

Once you've figured out the modality, what next? You probably need to segment the stream of auditory or visual information into meaningful units. By observing carefully, you might be able to figure out that a particular sequence of sounds or gestures recurs in this language, and that some consistent meaning is associated with that sequence. For example, maybe you've noticed that the language users you've encountered make the sounds "cookie" as they're offering you a round, sweet, delicious baked good. Or maybe you've noticed that when that word has a *z* sound at the end of it, *cookies*, you're being offered more than one of them!

The part of the grammar that links up these forms with meanings is the **mental lexicon**. It's a bit like a dictionary in your mind. Knowing a word in a language involves recognizing its form – the combination of signs or sounds or written symbols, and its meaning. For the majority of words in the world's languages, the link between form and meaning is **arbitrary**.



Figure 1.2. Pumpkin.

For example, the English word for this thing is *pumpkin* and the Nishnaabemwin word is *kosmaan*. There's nothing inherently orange or round or vegetabley about either of those word forms: the pairing of that meaning to that form is arbitrary in each language. (But there are words whose form has an iconic, less arbitrary relationship their meaning; we talk about them more later in this book.)

Suppose you've figured out that cookies are delicious and you want to ask your earthling hosts for more of them. To do that, you need to figure out how to control the muscles of your mouth, tongue, and lips to speak the word for cookie, or how to use your hands, fingers, wrists and forearms to sign the word. In other words, you need to know something about the **articulatory phonetics** of the language. This brings up an important point about grammar: when we know a language fluently, a lot of our grammatical knowledge is unconscious, or **implicit**. For the languages that you know, your knowledge of the lexicon is probably fairly conscious or explicit, and probably also some of your knowledge about your language's **morphology**: that's the combinations of meaningful pieces inside words (like how if you want more than one cookie you say *cookies* with a *z*). But you're probably not as conscious of things like how you use your articulators to make the sounds *k* or *z*.

Our implicit knowledge of language also includes **phonology**, information about how the physical units of language can be combined and how they change in different contexts. **Syntax** is the part of your mental grammar that knows how words can or can't be combined to make phrases and sentences, much of which is implicit. Syntax works hand in hand with **semantics** to allow the grammar to calculate the meanings of these phrases. And the **pragmatics** part of the mental grammar can help you to know what meanings arise in different contexts. For example, "I have some news," could be interpreted as good news or bad news depending on the context.

All of these things are parts of the grammar: the things we know when we know a language. But a lot of this knowledge is implicit, and the thing about implicit knowledge is that it's hard to observe. One of the most important jobs we're doing in this textbook is trying to be explicit about what mental grammar is like, and about what kinds of evidence we can use to figure that out. We'll talk about this challenge more in Section 1.3 below.

What about reading and writing?

I bet you're wondering why I didn't include reading and writing as part of the mental grammar above. After all, as a student you probably invested a lot of time into learning how to read and write. And those skills are indeed part of the grammatical knowledge you have about your language. But language users don't actually need to know how to read and write to have a mental grammar.

It’s common for kids in Canada to start learning to read and write around age five, but they are pretty competent in the phonetics, phonology, morphology, syntax and semantics of one or more languages before they ever go to school.



Figure 1.3a. Vertical Mongolian Script.

Монгол

Figure 1.3b. Cyrillic Mongolian script.

Furthermore, language users could start using a different writing system without changing anything else about the grammar. Mongolian, for example, presently uses two different writing systems: the Cyrillic alphabet and traditional Mongolian script, which is written vertically. Speakers of Mongolian understand each other’s speech no matter which script they use to record the language in writing. And there are plenty of human languages that just don’t have written forms. Signed languages like ASL and LSQ, for example, don’t have written forms. Most signers are bilingual in their sign language and in the written form of another language.

So, because not every human language has a reading and writing system and not every language user has access to reading and writing systems, we consider these skills to be secondary parts of the mental grammar. If you’re literate in your language, then that literacy is certainly woven into your mental grammar. But literacy isn’t necessary for grammatical competence.

Check your understanding

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1.2: What grammars are and aren't

The previous section was a very quick tour of some of the parts of the mental grammar. We'll be discovering a lot more about grammar throughout this book. Notice that we're using the term *grammar* a little differently from how you might have encountered it before. Maybe your experience of grammar is as a textbook or style guide with a set of rules in it, rules that lead to consequences if you break them — you'll lose points on your essay or get corrected with a red pen. What we're most interested in this book is the mental grammar: the system in your mind that allows you to understand and be understood by others who know your language. Every human language has a mental grammar: that's how the users of each language understand each other!

This is a really important idea. One way that people sometimes express racist, colonialist and ableist ideas is to deny the validity of a language by claiming that it "has no grammar". But the truth is that **all languages have grammar**. All languages have a system for forming words, a way of organizing words into sentences, a systematic way of assigning meanings. Even languages that don't have alphabets or dictionaries or published books of rules have users who understand each other; that means they have a shared system, a shared mental grammar. Using linguists' techniques for making scientific observations about language, we can study these grammars.

The other important thing to keep in mind is that no grammar is better than any others. Maybe you've heard someone say, "Oh, I don't speak real Italian, just a dialect," implying that the dialect is not as good as so-called real Italian. Or maybe you've heard someone say that Québec French is just sloppy; it's not as good as the French they speak in France. Or maybe you've heard someone say that nobody in Newfoundland can speak proper English, or nobody in Texas speaks proper English, or maybe even nobody in North America speaks proper English and the only good English is the Queen's English that they speak in England. From a linguist's point of view, **all languages and dialects are equally valid**! There's no linguistic way to say that one grammar is better or worse than another. This is part of what it means to study grammar from a scientific approach: scientists don't rate or rank the things they study. Ichthyologists don't rank fish to say which species is more correct at being a fish, and astronomers don't argue over which galaxy is more posh. In the same way, doing linguistics does not involve assigning a value to any language or variety or dialect. We also need to acknowledge, though, that many people, including linguists, do attribute value to particular dialects or varieties, and use social judgments about language to create and reinforce hierarchies of power, privilege and status. We'll look at some examples in Section 1.4 and in Chapter 2 we'll go into more detail about the terms terms *language*, *variety*, and *dialect.*

One of the most fundamental properties of grammar is **creativity**. One obvious sense of the word *creative* has to do with artistic creativity, and it's true that we can use language to create beautiful works of literature. But that's not the only way that human language is creative. The sense of creativity that we're most interested in in this book is better known as **productivity** or **generativity**. Every language can create an infinite number of possible new words and sentences. Every language has a finite set of words in its vocabulary – maybe a very large set, but still finite. And every language has a small, finite set of principles for combining those words. But every language can use that finite vocabulary and that finite set of principles to produce an infinite number of sentences, new sentences every single day.

A consequence of the fact that grammar is productive is that **languages are always changing**. Have you heard your teachers or your parents say something like, "Kids these days are ruining English! They should learn to speak properly!" Or if you grew up speaking Mandarin, maybe you heard the same thing, "Those teenagers are ruining Mandarin! They should learn to speak properly!" For as long as there has been language, older people have complained that younger people are ruining it. Some countries, like France and Germany, even have official institutes that make rules about what words and sentence structures are allowed in the language and which ones are forbidden. But the truth is every language changes over time. Languages are used by humans, and as humans grow and change, and as our society changes, our language changes along with it. Some language change is easy to observe in the lexicon: we need to introduce new words for new concepts and new inventions. For example, the verb *google* didn't exist when I was an undergraduate student, and now googling is something I do nearly every day. Languages also change in their phonetics and phonology, and in their syntax, morphology and semantics. In Chapter 10 we'll look at the systematic ways that linguists study variation and change.

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1.3: Studying language scientifically

We said that linguistics is the science of human language. When we say that linguistics is a science, that doesn't mean you need a lab coat and a microscope to do linguistics. Instead, what it means is that the way we ask questions to learn about language uses a scientific approach.

The scientific way of thinking about language involves making systematic, **empirical observations**. That word *empirical* means that we observe data to find the evidence for our theories. All scientists make empirical observations. Entomologists observe the life cycles and habitats of insects. Chemists observe how substances interact. Linguists observe how people use their language. Just like entomologists and chemists, linguists aim for an accurate description of the phenomenon they're studying. And like other scientists, linguists strive to make observations that are not value judgments. If an entomologist observes that a certain species of beetle eats leaves, she's not going to judge that the beetles are eating wrong, and tell them that they'd be more successful in life if only they ate the same thing as ants. Ideally, the same would be true of linguists — we wouldn't go around telling people how they should or shouldn't use language. Of course, like all scientists, and like all humans, linguists have biases that often prevent us from reaching this ideal; more on this later in the book. But the goal for doing language science is to do so with a **descriptive** approach to language, not a **prescriptive** approach, to describe what people do with their language, but not to prescribe how they should or shouldn't do it.

For example, you could describe English plurals this way:

> Adding *-s* to a noun allows it to refer to many of something, like *apples*, *books*, or *shoes*.

Or you could prescribe how you think people should form plurals this way:

> Because the word *virus* is derived from Latin, you should pluralize it as *viri*, not *viruses*.[1]

So when we're doing linguistics, our goal is to make descriptive, empirical observations of language. But one challenge to being a language scientist is that a lot of what you're studying is hard to observe. Unlike our entomologist friends, we can't just go out to the garden and poke around and find some grammar crawling on a plant. We have to figure out how to make observations about the mind. Throughout this book you'll get introduced to the many different tools of language science, which allow us to make systematic observations of how humans use language.

Going meta: Observing what's possible in a language

As I keep saying, a lot of the linguistic knowledge we have is unconscious. One of the tools we can use to get at our mental grammar is to try to access **metalinguistic awareness**, that is, the conscious knowledge you have about your grammar, not the grammatical knowledge itself. If you've studied a language in school you probably have some metalinguistic awareness about it because you got taught it explicitly. But for your first language, the one you grew up speaking, it can be a little more difficult to access your metalinguistic knowledge because so much of it is implicit. It's a skill that we'll keep practicing throughout this book.

Here's an example of accessing your metalinguistic awareness. Say you want to create a new English word for a character in a game. Are you going to call your cute little creature a *blifter* or a *lbitfer*? Neither of those forms exists in English, but they both use sounds that are part of English phonetics. You probably have a strong feeling that *blifter* is an okay name for your new creature, while *lbitfer* is a pretty terrible name. Notice that your sense that *lbitfer* is wrong is not a prescriptive sense — it's not that it sounds rude or you'll get in trouble for combining those sounds that way. It just … can't happen. You've made a descriptive observation that *lbifter* is not a possible word in English. From that observation, we can conclude that *lbitfer* is ungrammatical in English.

Since linguistics uses the word *grammar* in a particular way, the words *grammatical* and *ungrammatical* also have a specific meaning. An **ungrammatical** word or phrase or sentence is something that just can't exist in a particular language: the mental grammar of that language does not generate it. Notice that grammaticality isn't about what actually exists in a language; it's about whether a form could exist. In this example, both *blifter* and *lbitfer* have the same sounds in them, but *blifter* could be an English word and *lbifter* couldn't. In other words, *blifter* is grammatical in English and *lbifter* is ungrammatical in English.

It's often useful to compare similar words, phrases or sentences to try to access our metalinguistic awareness. Let's look at another example of observing what's possible. Here are two similar sentences, both of which are possible (or acceptable) in English.

a. Sam compared the forged painting with the original.

b. Sam compared the forged painting and the original.

Let's try to make questions out of these sentences:

c. Did Sam compare the forged painting with the original?
d. Did Sam compare the forged painting and the original?

Observing those two questions, we can see that both (c) and (d) are acceptable in English. Now let's try a different kind of question:

e. What did Sam compare the forged painting with?
f. *What did Sam compare the forged painting and?

Comparing these two sentences gives us a really clear finding: (e) is possible, but (f) is not. We use an asterisk or star at the beginning of sentence (f) to indicate that it just can't happen. These **acceptability judgments** (also sometimes known as **grammaticality judgments**) are our empirical observations: these two similar sentences are both possible as declarative statements (a-b) and as yes-no questions (c-d), but when we try to make a wh-question out of them, the result is acceptable for the first one (e) but not for the second one (f). Having made that observation, now our job is to figure out what's going on in the mental grammar that can account for this observation. Why is (e) grammatical but (f) isn't?

More tools for language science



Figure 1.4. Hoodie.

Because it can be tricky to access metalinguistic knowledge, you might not want to rely on the acceptability judgments of one single language user. Instead, you could use a survey to gather quantitative data about acceptability from many users. We can also use **surveys** to **elicit** the words that people use for particular items. From survey data we know that some people call this thing a sweatshirt, other people call it a hoodie, and people in Saskatchewan call it a bunny hug. Surveys are particularly useful for learning about regional variation, which you can learn more about in Chapter 10. If you're studying regional and social variation you might also gather data using **interviews**, in which you could ask questions like, "Does the 'u' in *student* sound like the 'oo' in *too* or the 'u' in *use*?".

A **corpus** is another tool that allows us to make language observations. A corpus is a big database that collects examples of language as used in the world, from books, newspapers, message boards, videos. Some corpora contain only written text, and others include video of signed language, or audio files with phonetic transcription. The nice thing about tools like acceptability judgments, surveys, and corpora is that they're relatively easy to use: you don't need a lot of training or money to ask people what word they use for athletic shoes, or to see how a word or phrase is used in a corpus. We'll use some of these accessible tools throughout this book.

There are also more specialized tools for doing language science. Phoneticians use a variety of software for analyzing audio and video recordings of speakers and signers. Praat (Boersma & Weenink, 2022) is a popular waveform editor for analyzing audio recordings. While Praat is specialized for linguists, it has some similarities to audio-editing programs for podcasting. ELAN (*ELAN | The Language Archive*, 2021) is a powerful tool that allows a user to annotate video recordings, and the program SLP-Annotator (Lo & Hall, 2019) also enables phonetic **annotations** of video-recorded sign language. Some phoneticians also make anatomical measurements of the articulators, using ultrasound or palatography for speech or motion capture for signing.

We can draw on techniques from behavioural psychology to make observations about language use in real-time using **experiments**. You might measure reaction times and reading times for words and sentences, or ask participants to listen to words that are mixed with white noise. Some experiments use eye-tracking to measure people's eye movements while reading a text, watching a signer, or listening to a speaker. It's even possible to use **neural imaging** techniques like electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) to observe brain activity during language processing. You can learn more about interpreting the data from these experiments in Chapter 13.

When you're starting out in linguistics, it's often really exciting to use the scientific method to think about grammar, as you start to see that grammar is not just a set of arbitrary rules to memorize so you sound "proper". Even if we're not peering through a microscope wearing a lab coat, the tools of language science allow us to make systematic observations of how humans use language. And we can interpret those observations to draw conclusions about the human mind.

Check your understanding

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1. This prescriptive statement doesn't reflect what really happens in English, since most English speakers talk about *viruses*, not *viri*. And in fact, it doesn't even reflect what happens in Latin, since the Latin word *virus* did not have a plural form! ↵

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1.4: Thinking about standards and “proper” grammar

In previous sections we learned that one of the goals of doing linguistics is to describe languages and dialects accurately without ranking any dialect as better than any other. This is actually a pretty radical goal, because of course language is a deeply human behaviour, and therefore is deeply intertwined with human relationships and social categories. Relationships like teacher-student, doctor-patient, or customer-server, for example, all involve power relations that play a role in people’s expectations about language. Likewise, the communities that we belong to, whether they’re based on ethnicity, religion, profession, fandom, or any other social category, shape how we use language and how we expect others to use language. So when we’re studying language scientifically, we can’t separate the grammar from all the other social pieces.

So we’re striving for this radical goal of considering **all languages and dialects as equally valid** from a linguistic point of view, but we also have to acknowledge that people have attitudes and expectations that arise from social power dynamics, and these attitudes – whether positive and negative – lead to linguistic **bias**. Everyone, including linguists, has linguistic biases. We can’t help making judgments about people based on how they use language. But by learning to think about the relationship between language and power, we can gain **metalinguistic awareness** of our own linguistic biases, at the same time as we’re developing metalinguistic awareness of our grammars.

Here’s an example of a linguistic bias that’s really prevalent in Canada and the US. North Americans tend to perceive all the varieties of British English as having **high prestige**. They tend to assume that speakers of UK English are better educated and more intelligent than speakers of North American varieties of English — even for varieties that have low prestige in the United Kingdom. Someone who speaks a variety that’s stigmatized in the UK might arrive in Canada to find that everyone thinks their English is very fancy. Their English hasn’t changed, but people’s attitudes towards it have!

Language Standards and “Standard” Languages

Some ways of using language are associated with higher prestige. Because of colonialism, these are often the forms of language used by white people, by wealthier people, or by people who have received more formal education.

When people talk about the “standard” variety of a language, they usually mean the form that has been **standardized**, that is, the form that most closely matches the language used in dictionaries, textbooks, and high-status media. This standardization happens via social mechanisms of power. In France, for example, there’s an official government body, the *Académie Française*, that decides what counts as correct, standard French. In 2017, when they noticed more and more French writers including feminine nouns and adjectives alongside the standard masculine forms, they published a declaration that this kind of inclusive writing was a mortal danger (“*un péril mortel*”) for French! It’s their literal job to tell people they’re languaging wrong.

Unlike French, English does not have an official language police to enforce prescriptive language rules, but that doesn’t mean the standardized varieties of English are any less connected to power and privilege. Instead, standardized English is enforced through social norms, through dictionaries and style guides, textbooks and grammar-checking software. There’s no official Boss of Canadian English warning about the dangers of gender-inclusive language, but it was still a big deal when the in-house style guide of the *Globe and Mail*, a national newspaper in Canada, decided in 2017 that it was okay to use specific singular *they*. And in the UK, the shorthand term for the highest-prestige variety is “the Queen’s English” — who has more power and privilege than a monarch?

To be clear, the “standard” that these authorities enforce isn’t chosen out of nowhere, and is not somehow objectively determined to be the best or clearest variety. (Remember there’s no linguistic way to determine “best” when it comes to language.) The standard is usually just the variety that’s associated with economic, social, or political power. For many languages, the “standard” is whatever variety is spoken in the capital city, or by a dominant political class. For English and for other European languages, the variety that people categorize as “standard” tends to be the variety that white people with a certain amount of formal education use.

In North America, we can observe how assumptions about standard languages intersect with our ideas of race by considering the variety of English associated with Black speakers. You’ll see this variety called **African American Language (AAL)**, **African American Vernacular English** (AAVE), **Black English**, or **Ebonics**, depending on who’s talking about it and when. I’ll use the term *Black English* here, following Calhoun et al. (2021), to include people who use this variety and who are part of the African diaspora but not necessarily African-American. One important thing to note is that not all Black folks in the United States speak

Black English, and not all speakers of Black English are Black, but using this variety of English is a strong indicator of Black American identity. Even though Black English is characteristically American, and has many speakers across many different regions of the USA, it's somehow not what anyone means when they refer to Standard American English. That reveals the common linguistic bias: when people say "standard language" they usually think "the language that white people use".

Isn't it good to have standards?

You might think of having a standardized variety of a language as a good thing, or at least as a neutral thing. We're used to having a single variety of English appear in most written sources, for example. It's easy to view standardization as positive if the variety that you and your family used when you were growing up was relatively close to the standardized variety used in schools. But if we assume that the standardized form is the only correct or proper form, we end up discriminating against users of different varieties. Here are some examples:

- More than 90% of people Haiti speak Kreyòl, a language with its own consistent grammar and spelling. But public education in Haiti is offered in standardized French. So when kids start school, they get told by their teachers that their language is wrong (Degraff & Stump, 2018). The same pattern holds true for kids who speak Black English in most US schools. It's harder for them to learn!
- A judge in Alberta disregarded the medical evidence provided by an expert witness, a doctor who spoken Nigerian English. In his ruling, the judge made it clear that he distrusted the doctor's medical opinion because his accent was not Canadian. (Grant, 2019)
- A Black deaf man who signed in Black ASL was imprisoned in an institution for decades because the signers who assessed him categorized his variety of ASL as incoherent, so they labelled him as languageless and incompetent. (Burch & Joyner, 2007)

We'll learn about more examples in Chapter 2.

Because elementary and high schools usually teach language in a prescriptive way, you've probably internalized the assumption that the standardized variety of your language is the best or most correct variety, and maybe even the assumption that languages have to have standards. Using your growing metalinguistic awareness, you can start to question why some varieties are considered standard and others aren't. It's likely that the answers to those questions have more to do with social status than with grammar.

Check your understanding

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1.5: Doing harm with language science

Content Note: This section includes discussion of residential schools.

As exciting as it is to think about language scientifically, it's important to remember that science is not inherently virtuous as a field. Humans can use the tools of science to do harm, and that includes the tools of linguistics. Much of the foundational work in the field of Linguistics was carried out by Christian missionaries whose goal was less to discover the systematic nature of mental grammar and more to convert people to their religion. Their work has several consequences for Indigenous languages.

The missionaries who first came to the land that is currently called Canada were European Christians. They started to document the **Indigenous** languages they encountered so that they could use them to teach Christian doctrine, and so that they could conduct trade and obtain resources. As they wrote down the words and structures they learned, they used the Roman alphabet and based their assumptions about how language worked on what they knew from studying Latin and other European languages. What this means is that the earliest written documents for these Indigenous languages described the languages through that point of view. The Roman alphabet (the same alphabet that English uses today) developed to represent European languages, so it's not very accurate at representing the phonetics of other languages.

Once they had enough language written down, the missionaries started translating the Christian Bible into the local languages. Since written documents are permanent in a different way from speech and sign, writing a text has the effect of "freezing" that form of the language. So when the Europeans started teaching literacy using their written texts, the result was that some of the variation across languages fell out of use as the written forms took priority. And these effects weren't accidental or benign. From the missionaries' own writings we can see that they considered Indigenous languages to be inferior to European languages. They complained, incorrectly, that the languages didn't have words for *soul* and *belief* and *angel*, and they thought that the complex grammars, which we'll learn more about in later chapters, were barbaric. In the History of the Language Sciences, Edward Gray writes:

> *"Jesuits generally derided the languages, characterizing the polysynthetic character of American languages as a symptom of social decay. In keeping with their heathen character, missionaries widely assumed, [Indigenous people] had failed to impose grammatical discipline on their languages." (Gray 2000, p. 934)*

On the one hand, we might point to the work of these European Christian missionaries in documenting Indigenous languages as foundational to the field of linguistics. And in some cases, those written documents have served as source material for work to reawaken sleeping languages like Huron-Wendat. But at the same time, we have to acknowledge that the missionary work did real harm: the documentation itself was inaccurate and led to the loss of many features of the languages. As the Christian church gained power on this continent, they stopped trying to teach in the local languages and instead imposed English or French, often violently. In fact, eliminating Indigenous languages and cultures was the stated goal of the Canadian government. Well into the 20th century, police, church and government officials forcibly seized Indigenous children, removed them from their families, and sent them to residential schools. In these schools, children were separated from their siblings and cousins and forbidden to speak their families' languages. They were starved, physically and sexually abused, and some of them murdered. Under these conditions, it's not surprising that they stopped using their family languages: using English or French was a matter of sheer survival. In spite of the colonial government's attempts to assimilate Indigenous people into "the habits and modes of thought of white men" (MacDonald, quoted in TRC (2015)), some Indigenous languages still have living speakers, while others are asleep. You can learn more about the work that Indigenous people are doing to reclaim their languages in Chapter 9.

When we're doing language science, it might be tempting to try to dissociate ourselves from the harm those missionaries did, to say, "they were doing religion, not linguistics." But modern scientific practices of linguistics have also done harm to Indigenous and other minoritized languages. Linguists rely on language users to provide language data, but those who spend their time and energy answering our questions don't always get much in return. Sometimes linguists gather data to test a particular scientific hypothesis, and the data ends up existing only in obscure scholarly publications when it could also have been made available to the community of language users themselves, for preserving and teaching their language. Sometimes what is merely data to a linguist is a sacred story or includes sensitive personal information, and publishing it might violate someone's beliefs or privacy. Even if a

linguist is careful to work descriptively, there's a real risk of linguistic and cultural appropriation if they become the so-called authority on the language without being a member of the language community. And sometimes linguists' attempts at descriptive statements can turn into prescriptive norms: if a linguist writes "In Language X, A is grammatical and B is ungrammatical" based on what they've learned from one set of speakers, that observation can become entrenched as the standard variety of Language X, even if there's another group of speakers out there for whom B is perfectly grammatical.

It's not only in settler states like Canada that languages are harmed by **colonialism**. Capitalism offers a strong incentive for people all around the world to speak English so they can participate in the labour market. And the more they use English, the less they use their local languages. In Chapter 12 we'll consider some of the ways that the field of Applied Linguistics and the teaching of English as a Foreign Language (EFL[1]) can reinforce racist norms.

As a field, linguistics is also responsible for harms to disabled people and their language practices. In Chapter 11 we'll see how deaf kids are often deprived of language input because of **oralism**, the view that vocal language is more important than signed language. Oralism is prevalent in the field of linguistics, which often fails, like the first edition of this book did, to study or teach the linguistic structures of sign languages. The practice of observing patterns of language across many users, even from a descriptive point of view, has the tendency to identify **norms** of language use which then makes it all too easy to describe anything that differs from the norm as disordered. For example, Salt (2019) showed that when linguists used standard interview techniques to research autistic people's conversation, they found "deficits" in their pragmatic abilities. But when the autistic participants were observed in conversation with each other, no such deficits were apparent. Salt concluded that it was the research method itself, namely, the interview, that gave rise to the so-called pragmatic disorders of autism. Similarly, MacKay (2003) reported his experience of **aphasia** resulting from a stroke. His account eloquently illustrates how the standard diagnostic and treatment techniques ignored his communicative adaptations and treated him as incompetent.

What's the lesson for us, then, as 21st-century linguists? I'm going to aim for some humility in my scientific thinking. I love using the tools of science to observe language. But I try to remember that science is one way of knowing, which brings its own cognitive biases. In other words, doing linguistics is not a neutral exercise. One of the fundamental lessons of this book is to move from thinking about grammar as a set of prescriptive rules in a book to seeing grammar as a living thing in our minds. But let's not get stuck in that way of thinking either. In addition to thinking about language as something that lives in the individual minds of individual humans, let's also remember that language is something that lives in communities and is shared among users, in the conversations we have and the stories we tell. We'll continue to explore these ways of thinking about language throughout the rest of this book.

Check your understanding

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1. Also known as English as a Second Language (ESL) or English as an Alternate Language (EAL). ↵

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1.6: Doing good with language science

In the previous section we tried to acknowledge the ways that linguistics has done and continues to do harm, like many fields of academic inquiry. Acknowledging those harms is only part of our responsibility. In this book, we're trying to focus on ways we can use the tools of language science to address some of those harms and even more importantly, do some good in the world. We also hope that working with this book will make you excited to carry on doing linguistics! So let's think about some of the things linguistics can prepare you to do.

In the tech sector, people with linguistics training use their skills to improve software that summarizes texts, translates from one language to another, synthesizes natural-sounding speech for your voice assistant or your GPS, helps your voice assistant understand your speech! As I'm writing this book, speech recognition systems do an okay job on standardized American English accents, especially when spoken by lower voices, but are much less accurate for higher voices and for the many different accents that English speakers use. Maybe you'll be one of the linguists who pushes back against these biases that are built into the algorithms!

Speaking of tech, another field where language science is valuable is in developing language-learning apps. That owl that scolds you if you skip your daily Esperanto practice was designed by linguists! Many people who are learning a new language find that their learning is enhanced by gaining the kind of metalinguistic awareness that you'll acquire from this book.

That brings us to another really important area where linguistics is important: in supporting Indigenous people who want to reclaim, revive, or revitalize their languages. As we'll see in later chapters, linguistic analysis of these grammars can be useful for creating teaching materials and supporting adult language learners who did not have the chance to learn their languages as children. Speaking for myself as a settler, I would want to be careful not to position myself as the expert who's here to save the language! Instead, I'd want to follow the lead of Indigenous community members in deciding how and where to deploy my linguistics skills.

Linguistics training is not only good for language learning, but also for language teaching! Studying linguistics is often a good entry point to getting certified as an ESL teacher, or learning how to teach any other language for that matter.

A lot of students are drawn to studying linguistics because they want to pursue a clinical career in speech-language pathology. Ideally, evidence from language science informs the treatments that clinicians offer. For example, if someone has a brain injury, their ability to produce or understand language might be impaired, and speech therapy can sometimes recover some of that function. Or a trans person who wants their voice to sound different might seek the advice of a speech-language pathologist as part of their transition. Some clinicians take their careers in a more Hollywood direction and offer accent or dialect coaching for actors!

Linguists find their skills called upon in many other industries. I personally know linguists who have been paid for their expertise in:

- testifying in court as to the interpretation of contracts and policies,
- interpreting how customers understand the products they use,
- identifying the author of a disputed document,
- consulting on potential brand names for new medications, and
- creating entirely new languages for film and TV series.

Language is everywhere. It's fundamental to how humans interact with each other, so understanding how language works is part of understanding people. And understanding people just might be a step towards doing some good in the world.

Check your understanding

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1.7: Exercise your linguistics skills

Exercise 1. The terms *first language* and *L1* (or sometimes, *native language*) refer to the language you learned from the people around you from your very early childhood. Many people have more than one L1. What is your L1? Do you have more than one? Make two scientific observations about your L1. Remember that scientific observations are descriptive, not prescriptive.

Exercise 2. Pretend you're working for a start-up that has developed a cool new product. Your company turns to you, the in-house linguist, to come up with a name for this new product. It has to be a unique name that doesn't already exist. What will you name your company's cool new product?

Now, look at this list of product names generated by other students. Which of them are good product names and which aren't? What makes something a good name? How do you know?

mentocular	swoodiei	torrix	baizan
jibberdab	keerild	euquinu	tuitionary
kzen	zirka	hbiufk	fluxon

Exercise 3. One of the many ways that mental grammar is generative is that it is always possible to create new words in a language. English often allows the creation of new verbs from existing nouns, even from proper names like in the following sentences:

- We're **Megabussing** to Montreal this weekend.
- You can find out the answer by **Googling**.
- The kids got **Pfizered** before going back to school.

Create three new verbs from English nouns (common nouns or proper names), and put each one in a sentence to illustrate its meaning.

Exercise 4. Think of a word that has only recently entered English, so it's not yet in mainstream dictionaries. Observe some examples of the word being used in context, either in your regular conversations or by searching online. Based on your observations of the word in context, write a dictionary definition of the word.

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1.8: Three waves of sociolinguistics

Recent work in variationist sociolinguistics seeks not just to understand patterns of variation by appealing to social factors but seeks to understand how language and linguistic variation work to express and construct socially-meaningful demarcations. In a 2012 paper, sociolinguist Penelope Eckert identified three 'waves' in the history of the field. In the first wave, variationists sought to find correlations between linguistic variation and macro-sociodemographic facts about the participants in their study. In this wave, patterns of linguistic variation were understood as simply falling out from social structures and pre-existing social stratification. In the second wave, variationists recognized that locally-relevant facts about their participants also played an important (if not more important) role in understanding patterns of linguistic variation. For example, the social clique that high school students belong to might be a better predictor of the linguistic behaviour than a student's social class. In the third (and current) wave of sociolinguistics, the paradigm has shifted and people's **agency** with respect to their language use is emphasized, as is the social meaning of variation. Variationist questions today are less, "what social factors correlate with an individual's linguistic behaviour" but rather, are more like, "how do individuals make use of linguistic variation to express and construct their position in society?", "how does the use of a particular variant alter the formality/context?" and "how do multiple variables combine to form linguistic styles that signal a wide array of social meanings?"

Scott Kiesling's (1998) study of frat boys is a great example of a third wave approach to linguistic variation. In the mid 90s, he spent time with a English-speaking members of a fraternity at an American university. He recorded them in two different contexts: socializing and during fraternity meetings where the members discuss business matters. These meetings followed a set format and were governed by a parliamentary process (e.g., calls to order, one person holding the floor at a time etc.). Seating at these meetings was also arranged by seniority and power with executive members sitting at the front, and other members arranged in terms of seniority, with the powerless new members to the left and more powerful and more senior members to the right. This context was decidedly more formal than when socializing and this is reflected in the frat boys use of variable *-ing*: they used way more of the non-standard [ɪn] variant while socializing than during the meetings. Well, most of them at least. Three of the frat boys showed the opposite pattern and used more of the non-standard variant during the meetings. Kiesling looked closely at the interactional contexts where these guys were using [ɪn] and found that they were using [ɪn] while expressing certain stances and identities. In (8), we can see an excerpt from one of these frat boys. He is making a pitch to be elected to the fraternity's executive council.

(8)	Um I'm not gonna um put a load of shit in you guys whatever.
	You guys know I'm a **fuckin'** hard worker. I work my ass off for everything. …
	And if you nominate me for this position, I'll put a hundred percent effort towards it.
	I mean I have **nothin'** else to do 'cept **fuckin'** school work and the fraternity.

The speaker in (8) expresses a hard working persona that links him with the working class. He's know for telling it like it is without 'bullshitting' folks. His high rate of the non-standard variant in this formal context not only expresses this working class persona, but also works to reframe the context, breaking down the formality and turning the event into one of camaraderie, humour, and friendliness.

A second speaker who uses more [ɪn] during the formal context is the president of the fraternity. In this context, He is at the top of the hierarchy; he is the one with the most structural power. He uses an increased rate of the non-standard in the formal meetings as

a means of expressing a confrontational stance when he is in opposition to, or as we can see in example (9), when he is frustrated with the membership.

(9)	Every semester all we do is sit around and argue about money money money money
	And I'm not gonna pay this **fuckin'** money. All right?
	You, you guys **sittin'** back I know you guys are **thinkin'** I'm gonna pay this **fuckin'** money just 'cause I *have* money.
	I'll tell you what, I ain't gonna pay a **fuckin'** thing. All right?

What other linguistic features in (9) can be connected with working class toughness?

Kiesling argues that this all connects with the cultural discourse of dominance – the idea that to be a man is to be strong and authoritative. Dominance is most readily expressed through real authority and power. However, working class men, who tend to lack real authority and power, must resort to the expression of dominance through physical means. Men of all stripes, truly powerful or not, draw on this connection when using non-standard variants (remember the idea of covert prestige discussed in section 10.8). Non-standard speech indexes working class physical toughness and this indexes dominance. We see this clearly with the fraternity president in (9). But what about the speaker in (8)? His use of non-standard speech isn't about dominance but about signalling solidarity, informality, and camaraderie. Dominance still comes through here though in a subtle way. He is actively recreating the speech context for everyone… this is a powerful interactional move.

To help you to understand the differences between the three waves of sociolinguistics, let's use a concrete example. Let's think about how each of these waves might interpret how Maisie, a Canadian English speaking person, uses variable *-ing*.

- First wave interpretation: Maisie uses a high rate of the standardized [ɪŋ] variant because she is a young, white, middle class, woman.
- Second wave interpretation: Maisie belongs to a certain locally-relevant social group: she's a 'jock' in Eckert's sense and her high use of standardized [ɪŋ] aligns with that group's general conformity with authority and normative behaviour.
- Third wave interpretation: Maisie makes frequent use of [ɪŋ] in her speech to construct her identity as an articulate and educated woman.

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1.9: Summary

Variationist sociolinguistics is a subfield of linguistics that investigates the link between language and society by way of examining linguistic variation. Linguistic variables, or two or more ways of doing the same thing, are the primary object of study. Linguistic variables exist in all varieties and all domains of language (from phonetic to pragmatic). Variationist sociolinguistics has uncovered facts about linguistic structure, social structure and the process of language change by examining the patterns of variation between the two (or more) variants of variables and the sociocultural context. Variationist sociolinguistics has roots in dialectology but became a distinct field in terms of its data (using sociolinguistic interviews and corpora), its analytic methods (applying quantitative and statistical techniques) and its focus (expanding to consider language in use by the entire social range of the language community, not just 'NORMS'). This chapter considered several sociocultural factors – style, place, social status, gender, and ethnicity – but there is a wide array of factors that have been found to be important to understanding linguistic variation. While early variationist sociolinguistic research sought to explain variation by finding correlations between these kinds of social factors and patterns of variation, modern approaches to sociolinguistic variation focus on how people agentively use language and linguistic variation for identity work, to both align and disalign from others, and to shape and reshape the social context.

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CHAPTER OVERVIEW

Chapter 2: Language, Power, and Privilege

Learning Objectives

- When you've completed this chapter, you'll be able to:
- Describe the relationships between power and language in a variety of scenarios.
- Find real-world examples of relationships between power and language.
- Use your metalinguistic awareness to interpret your own and others' attitudes about language.

Language is a central part of how we interact with one another as humans. Through language, we not only communicate ideas and information, we also express and construct aspects of our identity. That's why we start this book by considering some of the social aspects of language.

2.1: Language and identity
2.2: Language and offence
2.3: Derogation, toxicity, and power imbalances
2.4: The power of names
2.5: Pronouns, language change, and the grammar police
2.6: Linguistic law enforcement
2.7: Legally enshrined harms
2.8: Exercise your linguistics skills

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2.1: Language and identity

Language can change the world. For real!

Imagine you're at the wedding of two friends. They've walked down the aisle, they've said lovely things about each other, they've exchanged rings, some people are shedding happy tears, and things are approaching the big moment: "I do." "I do." "I now pronounce you married". They kiss, you cheer, and the world is a little bit different now. Just a few moments ago your friends were unmarried and now they are married! This has real-world, material consequences for them. Perhaps your friends filed separate taxes last year, now they must file together. Maybe they had distinct medical insurance policies, now one can be a dependent on the other's plan. If they live in a common law country, they now have spousal privilege. All of these changes to the world can be traced to those three utterances: "I do" "I do" "I now pronounce you married"! By uttering these words, your friends and the officiant have changed the world, ever so slightly.

There are other words and phrases, like *pronounce* and *I do*, that affect the world. For example, if you're playing a game of chess and realize that your chance of winning is exceedingly low, you may tell your opponent "I concede". The game is now over and you lost (sorry). After a successful job interview, if your hopefully-soon-to-be boss says "you're hired!", well congrats, you've got a new job now! These are examples of how we can "do things with words", as the philosopher of language, J. L. Austin put it. They are examples of the **performativity** of language. Words and phrases like *I concede* are called **performative speech acts**. These are utterances that not only convey some kind of information but also perform a function or an action that affects reality. We will revisit performative speech acts in Section 8.9 when we discuss theories of meaning.

As much as performative speech acts are powerful in the sense that they change the world, they also require the right context to do this. When a group of kids on recess put on a 'wedding' and two of them 'get married', it doesn't matter how many times or how loud another kid says "I now pronounce you married", the world hasn't changed in the same way that the same words changed your friends' lives. If you simply shout "I DECLARE BANKRUPTCY", that's not enough to actually change your financial situation! The ability for certain words and phrases to perform real-world actions depends on a combination of the authority and sincerity of the utterer and the uptake of the audience and general population. In other words, does the audience recognize the authority and sincerity behind the words and, therefore, accept their power to perform the intended action? The child officiant at a fake wedding doesn't have the authority to pronounce anyone married and filing for bankruptcy requires more than one's simple declaration! For words to do things, society must agree that certain words can do certain things in certain contexts; they have the power they do because we recognize that they have this power. That said, not 100% of people will agree on which words have power in which contexts, and disagreements over these questions can be contentious.

The philosopher Judith Butler extended the idea of performativity from certain speech acts, like *I pronounce*, *I concede*, *you're fired*, *I promise*, *I hereby declare* etc., to suggest that aspects of our identities are forged into reality by way of our language use and other social practice. From this perspective, all language is performative, not just particular speech acts. Butler's focus was on gender as a 'performative accomplishment': certain social practices (including language) come to be associated with men or women (or not) and these social practices then come to be seen as masculine or feminine (or not), and as people who express themselves as masculine or feminine (or not) repeat these patterns over and over again, a link between certain social practice and gender is reinforced. Social practices that reinforce gender include things like wearing a tie or wearing a pink skirt, picking flowers or cutting the lawn, walking into certain bathrooms, and, most importantly for us, using language in certain ways. As we'll discuss in Chapter 10, language features are used, both directly and indirectly, in the performance of different ways of being a man, or being a woman, or not.

We can extend Butler's idea beyond gender and understand *all* aspects of our identity as being performative accomplishments. Our identity is something socially constructed, and through sustained social practice that we mutually agree has certain meaning, we are active in its construction. Every time I say the Canadian English linguistic stereotype *eh*, I am both carving out my identity as a Canadian and reinforcing the link between *eh* and Canadian-ness. If, at the beginning of a lecture, I 'drop my *g*s' (e.g., I might say *good mornin'* and *how is everybody doin'* today instead of *morning* or *doing*), I signal that I am a laid-back person who isn't interested in abiding by the general expectation that a university lecture is a formal context. If I take a sip of a beer and, using the jargon of craft beer connoisseurship, ask "am I detecting a hint of *Cascade hops* on the *finish*?" I am staking a claim as a member of the craft beer drinking community; I am expressing that I not only enjoy and am knowledgeable about the drink but that I ***am*** the

kind of person who enjoys and is knowledgeable about the drink and all the social associations that might entail (perhaps masculine, millennial, a hipster, and not *too* serious like those *wine* people!) (see Konnelly 2020).

When we talk about *performativity* it's important to make a distinction with another common understanding of performance. When we say that aspects of our identity are *performative*, we aren't saying that, for example, our gender is like a role we play in stage performance. It's not about acting and definitely not about acting like someone who isn't you. When we talk about performativity and language, we mean that language *performs* certain functions for us. It's the idea that we make ourselves through our behaviours and language performs that function for us.

If language can be used to perform actions, then language has power to do both good and harm.

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2.2: Language and offence

Content Note: This section discusses swear words and also makes brief mention of the concept of racial slurs.

Taboos and offence

In the previous section, we saw that language has a power beyond communicating the literal meaning: things can happen in the world as a result of us uttering something. Language is very powerful in this way. We just discussed how language is how we perform our identity. Another power that language has is the emotional effect that producing and/or perceiving certain expressions can have on us. Let's unpack what that means in this section and the next section.

What do we mean by emotional effect? One example of this is swears. Although the English words *poop* and *shit* have the same basic meaning and refer to the same physical substance, they are not completely interchangeable in conversation. While *poop* is fairly innocuous, almost childish, *shit* is considered **taboo**, which means that its use is avoided in except under certain circumstances. Violating this taboo by using it in the wrong circumstances is likely to cause offence. For example, if you break your toe and shout, "Oh, poop!", no one will be offended (though you may not feel as satisfied!), but if you ask a young child, "Do you need to take a shit?", this will surely offend many adults. Context matters, and using taboo language in the wrong context is culturally offensive, rather than just amusing or awkward.

Contrast this with other pairs of words that have the same basic meaning but different associations, but neither of which are considered offensive. For example, the English words *odour* and *aroma* both refer to smells. We tend to talk about unpleasant odours and pleasant aromas, but mixing up these associations won't offend anyone. The negative association of the word *odour* is not sufficient to make the word taboo.

It's easy to think that taboos are avoided in conversation because the taboo words themselves are bad somehow. This might be true for cases like *shit* where the word itself has a lot of negative emotional content attached to it. However, this is not always the case. In Kambaata (a Highland East Cushitic language of the Afro-Asiatic family, spoken in Ethiopia), it is traditionally taboo for a woman to use any words that begin with the same sounds as the name of her spouse's parents, so she is expected to use **taboo avoidance**, which is the replacement of taboo words with other words (Treis, 2005). This is not because of any negativity towards the in-laws or their names, but rather, it is a sign of respect for these relatives.

So language taboos can exist for either negative or positive reasons. What makes an expression taboo is that uttering it breaks the taboo and causes offence. Across the world's languages, there are many types of taboo language. The names of respected people are often taboo: in-laws (as in Kambaata and many other languages), community elders, emperors, etc. Many languages also have taboo words for bodily waste, sexual organs and functions, death, and religious items or ideas.

Likewise, the strategies for taboo avoidance are varied. In Kambaata, many words have alternate forms that would be used to avoid matching an in-law's name. For example, a married Kambaata woman whose father-in-law is named *Tiráago* might replace the word *timá* 'leftover dish' with *ginjirá* to avoid using the beginning *ti–* sound that matches her father-in-law's name.

Instead of avoiding similarity, another taboo avoidance strategy is to replace the taboo word with a similar form, to help evoke the taboo word without actually uttering it. This is common for swear words, which may often be replaced with less offensive words that have similar form. An English speaker might yell out *sugar* or *shoot* when they stub their toe instead of *shit*. The matching initial sound retains some of the emotional power of uttering the actual swear word, while minimizing the offence that could result from violating the taboo against swearing.

Swearing and physical pain

The power of swearing is very real! Many studies (e.g. Stephens et al. 2009; 2020) show that swearing in response to pain actually seems to reduce the pain we feel. Interestingly, though similar-sounding words from taboo avoidance might carry some of the same emotional power, they don't seem to help with the pain itself in the way that the original swear words do. So the next time you drop a hammer on your foot, take comfort in knowing that your offensive swears can be beneficial!

Using a word versus mentioning a word

Most of the time when we communicate, each word is just one of many words strung together in an utterance. This is the ordinary **use** of these words. So in an English sentence like *wheat is a grain*, each of the words are used to say something about the world. In this case, the sentence is discussing wheat as a real world object, the actual physical grain itself, with the word *wheat* being **used** to refer to the grain.

However, an important feature of language is that it can be used to describe itself. That is, we can use language **metalinguistically** to discuss properties of language. This is what makes the entire field of linguistics possible! But it's not just linguists who do this. Ordinary language users frequently have metalinguistic conversations about language, and they do so by **mentioning** words and expressions as linguistic objects, rather than using them to refer to real world concepts. For example, while we use the word *wheat* in sentences like *wheat is a grain*, a sentence about the word itself would be mentioning it rather than using it, for example, if we were talking about how the word *wheat* is historically related to the word *white*. Here, we are not talking about the physical grain itself or the literal colour white, but rather, we are talking about the English words for that grain and that colour.

How to be a linguist:

The convention when we're being meta, that is, mentioning words that we need to talk about metalinguistically, is to present the mentioned words and expression in italics. We will revisit this convention in Chapter 7, when we talk about the meaning of linguistic expressions.

This difference between using a word and mentioning it is sometimes called the **use-mention distinction**. It is helpful to keep this in mind especially when discussing taboo words. In some cases, mentioning the taboo word doesn't seem to call up the taboo the same way that using it does. To return to our *shit* example, there's a fairly strong taboo against using swear words in professional writing like textbooks, so it would be surprising if we used the word *shit* in this chapter. However, when the topic under discussion is swear words as linguistic objects, as a phenomenon within language, we need to be able to mention the word *shit*, which is what we've done here.

The use-mention distinction does not give us the free pass to utter all taboo words in all contexts. There are especially offensive and highly volatile taboo words, like racial **slurs** (words that insult and denigrate certain marginalised groups of people, in this case based on perceived race), whose mere mentions are known to cause visceral emotions in hearers. Even for non-slurring taboo words like *shit*, some contexts are so sensitive to the taboo, that even mentions of them violate the taboo. In both of these cases, if you need to allude to the word, you can use a different strategy. You might choose a complex circumlocution like *a four-letter word referring to excrement*, or you might mask the word in some way by replacing some letters with asterisks or dashes (s***, *s–t*), referring to the word by its first letter (s-word), bleeping an audio track, or blurring an image or video.

Check your understanding

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⚠️ **Content note:** This paper mentions a highly volatile racial slur without censoring it.

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2.3: Derogation, toxicity, and power imbalances

Content Note: This section discusses swear words and the concept of slurs. A slur that is used against women is mentioned briefly.

Offense revisited

At the beginning of this chapter, we discussed how language can be used to perform actions and construct our identity. This can be a good thing: we might use language, for example, to establish positive social relationships with people. When I went to elementary school in Japan, it was typical for my classmates to call me *Taniguchi-san* towards the beginning of the school year. *-san* is a suffix you can add to the end of names in Japanese: *-san* is fairly polite, but not too polite. When my classmates in elementary school started to get to know me better, they started to call me *Ai-chan*. That linguistic act let me know that we're friends! *-chan* is a suffix for names, used for endearment. Some of my *super* close friends even gave me in-group exclusive nicknames like *Ai-pyon* (*-pyon* is roughly a hopping sound in Japanese; but they gave me this nickname not because I hopped a lot, but mostly because it sounded cute)! Now *that* linguistic act said that we were really, really good friends. In this way, language can be an act of expressing solidarity with others.

It's important to recognize, however, that language can do harm, too. We introduced the notion of **offense** in the previous section. Vulgarities

The term **vulgarity** refers to expressions that involve taboo bodily references (e.g., *shit*, *ass*). The term **expletive** refers to expressions that are used for outbursts (e.g., *damn*). Some expressions can be both a vulgarity and an expletive.

like *shit* can cause offense in some contexts. Offense is a kind of social and/or psychological harm that is done to discourse participants. This means that if you say *shit* in a spoken conversation where it is taboo, it's the people who hear it that the harm is done to. If you sign what is shown in Figure 1 in a signed conversation where it is taboo, then it's the people who see it that the harm is done to. The harm can range from fairly mild to more severe, depending on how offensive the expression itself is, and what context it was produced in. For example, for some people, *I don't give a damn* generally may not be as offensive as *I don't give a shit*. If a small Japanese child says *kuso omoshire:* (roughly 'fuckin' hilarious') during dinner out of rebellion, that might not be as offensive as an adult saying the same thing in a room full of children.

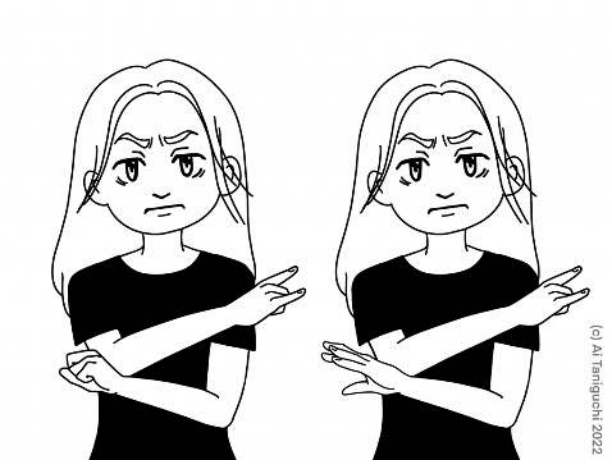


Figure 1. American Sign Language (ASL) sign for *bullshit.*

Offense can happen regardless of speaker/signer intent. Let's say you were learning Japanese and you had no idea that *kuso omoshire:* was vulgar (maybe you thought it just meant 'extremely funny'), and you say it in front of children. People who hear you can still be offended by this, regardless of your lack of malicious intent. Unintentional utterances of vulgarities are likely perceived to be less offensive than intentional ones, but nevertheless, the harm that it caused at the time of utterance cannot be undone — however small it is. It is similar to how stepping on someone's foot does its harm, regardless of whether it was intentional or not.

Derogation

Another kind of harm that language can do is **derogation** (or **pejoration**). Some linguistic expressions are **derogatory** (or **pejorative**), which means that these expressions disparage people. For example, the word *jerk* and *asshole* in English are derogatory: they express the utterer's condemnation of the referent. Offense and derogation are not the same thing. Offense has to do with how discourse participants are affected: if you spill coffee on yourself and say "Shit!" in front of your grandmother, your grandmother may take *offense* upon hearing that vulgarity. However, what you have said is not derogatory towards her (or anyone); it's not an insult towards her (or anyone) in any way in this context. So the vulgar expletive *shit* is offensive (in this context) but not derogatory. Speaking about taboo topics, even if you do not use vulgar terms (e.g., using more "neutral" terms to discuss bodily functions over dinner), may also be offensive but not necessarily derogatory.

Of course, many expressions that are derogatory are also offensive. The vulgarity *asshole* is taboo in some contexts and therefore offensive in those contexts. It's also derogatory because you're putting someone down with that term.

It is also possible for expressions to be derogatory but not offensive. This one is a little bit trickier because many derogatory things also cause offense. One example where something may be derogatory but not offensive on the surface might be **coded slurs**. In 2012, a police officer was fired partially because he called one baseball player a "Monday". *Monday* is sometimes used as a coded racial slur. This means that for those who share the knowledge that *Monday* is code for certain racialised groups, they can say things like *I hate Mondays* to express their bigoted ideologies to each other — and the people who are targeted by the slur will be unaware of this derogation. So in this case, *Monday* is (secretly) derogatory, but would not cause offense without the in-group knowledge.

Slurs, toxicity, and power imbalances

In summary of what we have learned so far: **offense** has to do with the impact that a linguistic expression has on the discourse participants, and **derogation** has to do with the attitude that the utterer of the linguistic expression has. Derogatory expressions like *jerk*, *idiot*, and *asshole* are sometimes called **particularistic insults** or **general pejoratives**. They are used to condemn a specific person (and not an entire group of people) for some specific behavior at some specific time. When you use particularistic insults, you are expressing your strong disapproval of the other person based on something they did.

Other derogatory terms may disparage an entire group of people, rather than a particular person for a specific incident. **Slurs** are insults that denigrate specific marginalized groups of people. For example, *femoid* is a slur against women, used in certain online subcultures. Calling someone a *femoid* expresses the utterer's attitude that this person is condemnable *because* this person is a woman. This is not a particularistic insult, because it is not the case that the utterer is expressing disapproval of this person (that happens to be a woman) for some specific incident. Rather, they are expressing disapproval of women in general, and therefore by extension disapproval of this person who is a woman.

Slurs are powerful, highly taboo, and can cause a lot of harm. The great emotional weight of slurs arises from the power differential between the person using the slur and the person targeted by it. Where such a power differential exists, the person wielding the slur is invoking and reenacting an entire historical context of violence against the targeted group (Davis & McCready, 2020). Expressing racism without a slur (e.g., "I hate Japanese people") and expressing racism with a slur (e.g., "She is a ___") are both terrible things to do, but using a slur causes extra visceral emotional harm. In fact, some studies show that slurs are processed in a different part of the brain than other forms of language (Singer, 1997). This particular kind of offensive emotional power that slurs have is sometimes called the **toxicity** of slurs (Rappaport, 2020). As alluded to in the previous section, some slurs are so toxic that even mentioning them or accidentally using words that sound or look similar to them can do harm.

Because power imbalance is a crucial component of a slur, insults aimed at high-status groups of people don't have the same effect. Such an insult can be impolite or even offensive, but without the associated invocation of targeted violence, it doesn't achieve the same level of harm that a true slur does.

Another consequence of this understanding of slurs is the possibility to **reclaim** a slur as a means of empowerment, as a marker of shared identity and solidarity against oppression. For example, the word *queer* was long used as a slur for members of the 2SLGBTQ+ community, but in the 1990s activists and academics began to reclaim the word and use it to express queer solidarity among themselves. These days, *queer* is a common umbrella term for this community, and Queer Studies is a recognized area of

academic study. At the same time, some members of the community who've been targeted by this slur are not yet ready to embrace it.

On the other hand, some slurs have been so thoroughly rehabilitated that they've become mainstream. Women fighting for equal voting rights, or suffrage, were originally called *suffragists*. A British journalist coined the term *suffragette* in 1906, using the diminutive, feminine *–ette* ending in an attempt to insult. But the activists adopted the term themselves and it is no longer considered a slur.

A recurring theme of this chapter and of this book is that language is about more than grammar, and words do more than just refer to literal things in the world. Slurs provide one example of how language encodes and enacts social relationships: we can use language to express our status relative to others, and we also use language to enforce other people's status relative to ourselves. With your linguistics training in hand, you can use your metalinguistic awareness to examine some of these power relations, and maybe even to resist or correct the damage that can be wielded through language.

Check your understanding

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⚠ **Content note:** These papers mention a highly volatile racial slur without censoring it (sometimes in a reclaimed sense, sometimes not).

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2.4: The power of names

Our names are intimately entwined with our personhood. In addition to pointing to you as an individual, your name also provides many clues about your membership in social categories. People make guesses about your gender, age, and ethnicity on the basis of the clues they infer from your name. For example, imagine you're moving into residence at a Canadian university and you see your neighbours' names on their doors. On one side is Kimberley and on the other is Kimiko. Even before you meet Kimiko and Kimberley, you've probably made a guess about what they look like based on their names. Your guess might be wrong because these clues arise from general patterns, not absolutes, but your experience gave you some expectations.

Matched-Guise Study

It can be hard to make direct observations of people's attitudes about social difference, because it's generally not socially acceptable to express negative attitudes towards minority groups. So instead, we can use a technique called a **matched-guise** study to try to draw conclusions about attitudes. It works like this: The researchers present participants with some kind of **stimulus**. In one study (Oreopoulous 2011), the stimuli were a set of résumés. The researchers held the stimulus constant and changed the **guise** that it appeared in — in this case, the guise was the name at the top of the résumé. Different employers received the same résumés (the same stimuli) under different names (different guises).

The core idea in a matched-guise study is that if you find a difference in your participants' ratings, that difference isn't because of the stimulus, because you've held the stimulus constant. Any difference in ratings must be because of the guise — the way you labelled your stimuli.

There's evidence from social science research that employers and landlords also make guesses about people based on their names. And as you might expect, the guesses they make are shaped by societal structures of power and privilege. In a matched-guise study in Toronto, (Oreopoulous, 2011) the research team submitted thousands of mock résumés to job postings. They found that a given résumé with an English-sounding name like *Matthew Wilson* was much more likely to get a callback than the same résumé under the name *Rahul Kaur*, *Asif Sheikh*, or *Yong Zhang*, even when the résumé listed a Canadian university degree and indicated fluency in English and French. That same year, another matched-guise study (Hogan & Berry 2011) sent email inquiries to Toronto landlords who had advertised apartments on Craigslist. The landlords responded to emails from typically Arabic male names like *Osama Mubbaarak* at much lower rates than to inquiries from typically English names like *Peter McDonald*. It's clear that the hiring managers and the landlords in these studies used applicants' names to make judgments about their ethnicity and about their value as a potential employee or tenant.

I'm guessing that many of you reading, watching, or listening to this have names that are not traditionally English, and maybe you've grappled with this question: do I use my own name, or do I choose an English name that will be easier for my teachers and classmates to pronounce? On one hand, using an English name might just make daily life a little bit simpler in an English-dominant society. On the other hand, it's not fair that this pressure to conform to English even exists! Your name doesn't just do the job of signaling things about you to other people; your name can also be a vital expression of your own individual identity, representing a profound connection to your family, language, and community.

This is the case for many people who are working to reclaim their Indigenous languages: using a name from that language not only connects them to their ancestors, but also expresses resistance to the colonial names assigned in residential schools. When children arrived at residential school for the first time, they were given an English or French name and their hair was cut, two powerful symbols that the school intended to sever the children's connections to their home communities. Because of that trauma, many survivors of the schools also chose English or French names for their children and grandchildren rather than names from their own languages. This was the case for Ta7talíya Nahanee, a Sḵwx̱wú7mesh decolonial facilitator and strategist, whose grandfather gave her the English name that appears on her official Canadian documents. In June 2021, in response to Call To Action 17 of the Truth and Reconciliation Commission (2015), Canada launched a program that allows Indigenous people to reclaim their Indigenous names on passports and other official documents free of charge. But when Ta7talíya applied to have her documents changed to her Sḵwx̱wú7mesh sníchim name, the government denied her request, because of a rule that forbids numerals like "7" in legal names. But in Sḵwx̱wú7mesh sníchim orthography, 7 is not a numeral — it's a letter that corresponds to the glottal stop [ʔ], a contrastive phoneme in the language (see Chapter 4). Ta7talíya Nahanee is currently fighting for the right to her name. In an interview with the Toronto Star, she argued: "If all of us are able to share with the world every time we show our ID, it just opens up that normalizing

Indigenous language, normalizing Indigenous teachings and normalizing Indigenous ways. So please make policy that works for us." (Keung, 2021)

Trans folks also know how powerful names are for expressing identity. If you've gone through a gender transition you might have experienced a sense of liberation when others call you by a name of your choice that matches your gender. And maybe you've also experienced the pain of being **deadnamed**, when someone uses your old name either accidentally or deliberately.

Deadnaming, forcible renaming, and mispronouncing names are all ways that people use language, specifically names, to enforce social structures of power. In the early 1900s when travelling by train was a luxurious experience for middle class white people in Canada, most of the train porters were Black, and all of them were called George. As historian Dr. Dorothy Williams says:

> *"Using Black men at that period, just 10, 20, 30 years from the end of slavery was a signal or a signpost to whites that these men should still be servants to them. […] So they didn't have to have an identity. Just like in slavery, they didn't have to have an identity as these Black men were now going to be called George, because that was the easiest reference most whites could make to get attention. Just call him George." (Bowen & Johnson, 2022)*

And it's not just in the olden days that Canadians expressed white supremacy through names. During the 2021 federal election, at least one person on Twitter repeatedly referred to NDP leader Jagmeet Singh as *Juggy*. Of the three leaders of the main federal parties, Singh was the only person of colour. Calling him *Juggy*, with English spelling and that diminutive affix -y, not only erased his Punjabi-Canadian identity but also infantilized him.

These examples all illustrate what Mary Bucholtz (2016) calls **indexical bleaching**. Replacing someone's name with an English one, or mispronouncing it so it sounds more English, are ways of "bleaching" that person's identity: it strips away their connection to family, community and language, and in place calls them by a name that sounds more English, that is, more white. In other words, it's a way of reinforcing existing structures of power and privilege.

Check your understanding

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2.5: Pronouns, language change, and the grammar police

Analogously to names, we also use pronouns to express things about our own identity and make guesses about other people's identities. We'll learn more about pronouns in Chapter 6, but for now here's a simple explanation. In standardized varieties of English[1], first-person pronouns (*I, me, we, us*) refer to the person who is speaking, signing, or writing and second-person pronouns (*you*) are for the person being addressed. Third-person pronouns refer to someone else, and can often replace a noun phrase in a sentence. Here are some examples of English third-person pronouns.

inanimate singular	*it*	Samnang really enjoyed the latest book by Ivan Coyote. Samnang really enjoyed it.
animate singular masculine	*he, him*	Samnang invited Steve to a movie. Samnang invited him to a movie.
animate singular feminine	*she, her*	Samnang thinks the woman who lives next door is a good gardener. Samnang thinks she is a good gardener.
animate singular ungendered	*they, them*	The passenger in Seat 3A forgot their coat. They forgot their coat.

In the sentence, "Samnang really enjoyed the latest book by Ivan Coyote", we can replace that noun phrase, *the latest book by Ivan Coyote* with *it*. "Samnang invited Steve to a movie." We can replace *Steve* with *him:* "Samnang invited him to a movie." In the next sentence, "Samnang thinks the woman who lives next door is a good gardener", we can replace that phrase with *she*: "Samnang thinks she is a good gardener". In, "The passenger in Seat 3A forgot their coat", we can replace that noun phrase with, "They forgot their coat."

Notice that third-person singular pronouns give some vague clues about their referent: we assume that *it* refers to a thing, *he* to a boy or a man, and *she* to a woman or girl. Those three categories — thing, human male, human female — are very broad, and yet, they can still be used to do harm and exclude people. In many cultures there's a general expectation that we use appropriately-gendered pronouns when we're referring to people. Even when we meet a tiny baby who can't possibly be offended, we're still careful to ask "boy or girl?" and to use the relevant pronoun. After infancy, getting **misgendered** with the wrong pronouns can range from embarrassing to outright dangerous. Furthermore, a two-way distinction between masculine and feminine is too simple to describe the rich variation among human genders. A person who's neither male nor female (for example, non-binary, genderqueer, or gender-fluid) can experience both *he/him* and *she/her* as misgendering. Here's where the pronouns *they* and *them* are useful.

The pronoun *they* doesn't offer many clues: it doesn't specify whether the referents are animate or inanimate, masculine or feminine. Here are some examples of plural *they*:

plural ungendered animacy unspecified	*they, them*	The pistachio cupcakes are delicious. They are delicious.The prof told the students that class was cancelled. The prof told them that class was cancelled.

In fact, *they* doesn't always even specify whether it's singular or plural. Here are some more examples.

number unspecified	I don't know who was in here but they left a big mess.
singular, gender unspecified	One of my students told me they needed an extension.

In "I don't know who was in here but they left a big mess", we don't know how many people left the big mess – it could be one, two, or twenty, and the pronoun *they* doesn't give us any clues. In this next one, "One of my students told me they needed an

extension", it's clearly only one student who asked for an extension, and either we don't know their identity or it just isn't relevant to the story, so *they* also does the job. This singular use of *they* has been common in English for about 600 years. These days, English is changing to include the use of *they* to refer to a single person whose identity we do know, as in, "Samnang told me they needed an extension."

In many ways, this shift from unspecified-singular-*they* to specific-singular-*they* feels like a tiny change to the grammar of English. But since this change is related to a change in patriarchal gender norms, people who benefit from those norms tend to get prescriptive, insisting that singular they is always ungrammatical in every circumstance. The *Chicago Manual of Style* tells people "it is still considered ungrammatical", and the *AP Stylebook* tells you it's "acceptable in limited cases" but they'd really prefer if you didn't use it. And then there are the extremely crabby folks like Jen Doll, who complains, "The singular they is ear-hurting, eye-burning, soul-ravaging, mind-numbing syntactic folly. Stop the singular they. Stop it now." (Doll 2013). But no matter how much the prescriptivists complain, specific-singular-they is getting used more and more widely. In 2015 the American Dialect Society voted it the Word of the Year and the Merriam-Webster Dictionary did the same in 2019.

The funny thing is, the English pronoun system went through a very similar change hundreds of years ago. In the 16th century, English used to have both a singular and a plural second-person pronoun. If you were talking to a group of people, you'd say *you* just like we do now. But if you were talking to just one person, you'd address them as *thou* or *thee*, like, "What classes art thou taking this term?" or "Can I buy thee a drink?". By the 17th century, *thou* and *thee* had all but disappeared and were only reserved for conversations with people you're very close to. So the pronoun *you* became both singular and plural. In modern English, we don't have *thou* or *thee* at all unless we're trying to be funny or old-fashioned. But it can be pretty useful to have a way of distinguishing between singular and plural, so some varieties of spoken English have other plural forms, like *y'all* or *you guys* or *youse*. Maybe your variety of English has one of these.

Linguists are conducting systematic research on how the change to English *they* is unfolding. Bjorkman (2017) found that English speakers with a conservative grammar didn't use *they* in this way, but those with an "innovative" grammar did. Ackerman (2019) has proposed that the more trans and non-binary friends you have, the likelier your grammar is to have specific-singular-*they*. Conrod (2019) showed in their dissertation that older people were less likely to use it and younger people were more likely, and Konnelly & Cowper (2020) tracked the three stages of grammatical change that are in progress.

No one can stop language from changing. But language users can speed up language change. Misgendering people does real harm. One way to make it less likely that non-binary people will be misgendered is for English to make this small change to include specific-singular-*they*. And the way that language changes is for people to change how they use it. If you already have specific-singular-*they* in your grammar, use it as much as you can! And if you'd like to change your own mental grammar, Kirby Conrod (2017) gives some good advice — slow down, listen to people who use it in their own language, and practice! The more you use it, the more natural it will feel.

Check your understanding

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1. Many languages have more subtle distinctions than these in their pronoun systems but all languages encode at least a three-way difference between first-, second- and third-person pronouns. ↵

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2.6: Linguistic law enforcement

In many cultures there's a general sense that it's rude to criticize or call attention to various kinds of social difference. In Canada, most kids learn in school that it's impolite to stare at a person who has a visible disability, to make jokes about fat bodies, or to comment on someone's gender-nonconforming appearance. Or at least, we learn not to express these opinions in public.

In contrast, it's not only socially acceptable but even expected and encouraged to criticize language use that deviates from the privileged standard, calling it improper, ungrammatical, or worse. In this unit we'll look at some of the domains where prescriptive standards of grammar get wielded like law enforcement, to keep social order.

Policing Voices

We saw in the previous unit that people who object to using *they/them* pronouns for non-binary people often phrase their objections not in terms of gender norms but terms of grammar, insisting that *they* can't possibly be singular because that would be ungrammatical! Bradley's (2019) work has shown that people with prescriptive views of grammar also tend to have conservative views about the gender binary — in other words, it's not just about grammar.

Another way that people police language use to enforce gender norms is by criticizing women's voices. When I was young, the older generation complained about uptalk? When your pitch rises? At the end of a sentence? Beginning sometime in the 2010s, the moral panic started to center on **vocal fry**. Chapter 3 will give us a chance to explore more about how humans make speech sounds in the vocal tract. For now, you should know that vocal fry is a way of producing speech with very low frequency vibrations of the vocal folds, so that it sounds creaky. **Creak** is actually one of the technical linguistic terms for this voice quality, and creak is a systematic part of the phonetics, phonology, and prosody of many spoken languages around the world (Davidson 2020).

In addition to the jobs the vocal fry does in the grammar, it also provides social cues that listeners interpret. Davidson's (2020) review article mentions studies that found that speakers who use vocal fry are perceived as more bored, more relaxed, less intelligent and less confident, among other attributes. But even though men and women speaking English are about equally likely to creak, for some reason listeners, or at least listeners older than 40, find it wildly more irritating when women do it. Ira Glass, host of the podcast *This American Life* and frequent vocal fryer himself, reports that he's received dozens of emails complaining about his female colleagues' vocal fry, "some of the angriest emails we ever get. They call these women's voices unbearable, excruciating, annoyingly adolescent, beyond annoying," (Glass, 2015) but no emails complaining about his voice or those of his male colleagues. Confirming Glass's anecdotal report, Anderson et al.[1] (2014) found that, "The negative perceptions of vocal fry are stronger for female voices relative to male voices" and they recommend that "young American females should avoid using vocal fry speech in order to maximize labor market opportunities." Does that sound familiar? Just like the résumé study we learned about in the previous unit, this is another instance of job candidates being judged not for their qualifications and experience, but for the social cues being indexed by their voice. It's not too likely that the pitch of your speaking voice is related to your job performance, so rather than telling job candidates to change their name or change how they use language to conform to the biases of the hiring manager, how about we train hiring committees to overcome these biases?

Policing Accents

Besides voice, another part of language use that is subject to linguistic law enforcement is accent. Everybody has an accent, but we tend to notice only the accents that are different from our own. In an earlier unit, we learned about the common belief that a standardized variety is the best or most correct way of using language. That logic extends to accents as well: a non-standard accent is often **stigmatized**. The accent itself is neither bad nor good, but the stigma means that people have negative attitudes and expectations about it. Where English is the majority language, people who learned English later in life often encounter that stigma. And there are also L1 varieties whose speakers experience stigma, such as Black English, the varieties spoken in the southeastern United States, and Newfoundland English.

Chapters 11 and 12 deal with how children and adults learn language in much more detail. Here, we'll use the term ***first language*** or **L1** to refer to the language(s) that you learned from birth from the people around you, and **L2** for any language you learned after you already had an L1, even if it's actually your third or fourth language.

Why do L2 users have different accents from L1 users? The short answer is that, when you learn an L2, your mental grammar for that L2 is influenced by the experience you have in your L1. (The longer answer comes in a later chapter!) So your accent in your

L2 is shaped by the phonology of your L1. What this means is that if your L1 is English and you learn Japanese as an L2, your accent in Japanese is likely to be different from that of your classmate whose L1 is Korean.

For people whose accents are different from the mainstream, there can be many negative consequences. You're less likely to get a job interview (Oreopoulos, 2011), and your boss might not recognize your skills (Russo et al., 2017). It's harder to find a landlord who's willing to rent you an apartment (Purnell et al., 1999; Hogan & Berry, 2011). If you have to go to court, what you say won't be taken as seriously (Grant, 2019), and the court reporter is likelier to make mistakes in transcribing your testimony (Jones et al., 2019). Kids whose accents aren't mainstream are disproportionately labelled with learning disabilities and streamed out of academic classrooms into special ed (Adjei, 2018; Kooc & Kiru, 2018). And probably Alexa, Siri, and Google won't understand your requests (Koenecke et al., 2020)!

Why do these things happen? Well, in the case of Alexa, it's because the training data doesn't include enough variation in dialects and accents. But the rest of these situations arise from people's expectations, and their expectations come from their experiences and their attitudes. Two linguists at the University of British Columbia conducted a matched-guise study with UBC students as listeners (Babel & Russell, 2015). They recorded the voices of several people who had grown up in Canada and had English as their L1. When they played these recordings to the listeners, they presented them either as audio-only, with a picture of the face of a white Canadian person, or with a picture of a Chinese Canadian person. For any given voice, the listeners rated the talker as having a stronger accent when they saw a Chinese Canadian face than when they saw a white Canadian face, and they were also less accurate at writing down the sentences the talker said. Apparently the faces influenced how well the listeners understood the talkers.

The researchers interpret their results as a mismatch of expectations. In Richmond, BC, where they conducted their study, more than 40% of the population speaks either Cantonese or Mandarin. If you live in Richmond, you have a greater chance of encountering L1 Chinese speakers in your daily life than L1 English speakers. So when you see a face that appears Chinese, you have an expectation, based on your daily experience, that that person's English is going to be Chinese-accented. If the person's accent turns out to be that of an L1 English speaker, the mismatch with your expectations makes it harder to understand what they say.

So we've seen that people's expectations, their experiences and their attitudes can lead to stigma for language users with accents that are different from the mainstream. And that stigma can have serious, real-life consequences on people's employment and housing and education. In addition to the consequences for the person producing an unfamiliar accent, there can also be consequences for the person trying to understand an unfamiliar accent. Those consequences can be pretty serious if you're finding it difficult to understand the person giving you medical advice (Lambert et al., 2010), or teaching you differential equations (Ramjattan, 2020; Rubin, 1992). Accent "neutralization" is big business and L2 English speakers experience a lot of pressure to "reduce" their accents (Aneesh, 2015). As we'll see in more detail in Chapter 12, it's hard to change your accent after childhood, because your L2 grammar is shaped by your L1 experience. And your accent is part of who you are — it's part of your story and your community. As linguists, let's resist the narrative that pressures everyone to conform to some arbitrary standard accent. Luckily enough, psycholinguistic research shows us that it's much easier to change your comprehension of unfamiliar accents than it is to change your L2 production.

Just as our experience and our expectations can lead to stigma, our experience also influences our perception. The more experience we have paying attention to someone, the better we understand them: this is called **perceptual adaptation**. Perceptual adaptation was first shown for a single talker: the longer people listened to an unfamiliar talker, the more they understood of what the talker said (Nygaard, 1994). Extensions of that research have also shown that experience listening to several speakers with a particular accent makes it easier to understand a new speaker with that same accent (Bradlow & Bent, 2008). And it turns out that listening to a variety of unfamiliar accents then makes it easier to understand a new talker with a completely different accent (Baese-Berk et al., 2013). In short, the more experience we have paying attention to someone, the more familiarity we have with the way they produce language, and the more familiarity we have, the better we'll understand what they're saying.

So if you want to better understand someone whose accent is different from yours, the best way to accomplish that is to pay attention to them for longer. Likewise, if someone thinks your accent is hard to understand, you can just tell them to pay attention!

Check your understanding

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2.7: Legally enshrined harms

In previous sections we saw how people police each other's language as a means of asserting power. But what about language policies imposed by actual governments in power? Governments and institutions use language to create unity in some cases and division in others. One way that governments wield their power is through language policies, which can be used to erase or reinforce social identities. They can be used to encourage or force people to speak or not speak particular languages, to prove competency in a language, or affect the physical landscape of our communities by regulating the language that appears on signs. Language policies can be implemented for positive or negative motivations, or sometimes they are well-intentioned, but short-sighted.

Canada, of course, has two official languages, French and English, but as we will see in Chapter 15, there are over 80 languages Indigenous to Canada from 9 different language families! Why should French and English, both imported languages, be the official languages?

The *Official Languages Act* was instituted in 1969 by Prime Minister Pierre Trudeau in order to maintain national unity between English and French Canada, in response to increasing francophone nationalism in the province of Quebec. At the time, the anglophone minority dominated the industrial, commercial, and financial sectors in Quebec. The *Official Languages Act* also led to Canada's policy of multiculturalism.

The *Official Languages Act* had some positive effects across Canada; it improved education and employment opportunities for francophones outside of Quebec. New Brunswick became officially bilingual. The Supreme Court of Canada overturned a law that had been in place since 1890 that made Manitoba officially monolingual, despite the fact that, when Manitoba joined Confederation in 1870, it had approximately equal numbers of francophones (often Métis) and anglophones. However, the *Official Languages Act* has a major shortcoming. What about Canada's Indigenous peoples? It does not offer protection or even recognition of the importance of these languages.

In Canadian history, language policies have been used as a part of the oppression of Indigenous peoples. Sections 1.4 and 2.4 in this book introduce the harms done to Indigenous people and communities by the residential school policy in Canada, which forced Indigenous children's attendance at the government and church-run facilities. The Government of Canada policed Indigenous people's language even prior to the creation of residential schools in the 1880s, with policies pushing toward assimilation and the loss of Indigenous languages and cultures. The government's goal was the assimilation of Indigenous children, to train them for menial jobs and weaken their claims to their land. Official policy dictated that English and French be the only languages of instruction at residential schools. Schools forbade children from using their home languages, and enforced the ban with cruel punishments. These policies were examples of **linguistic imperialism** or **linguistic colonialism**, wherein the suppression of language is part of a more general oppression of Indigenous cultures by settler-colonial powers (see Griffith, 2017). They further constituted attempted linguicide (the killing of a language), because children were prevented from practicing their first languages and associated their use with punishment and feelings of shame. These children also felt isolated from their home cultures as the ability to communicate in their home languages were lost (see e.g., Fontaine, 2017). The harms to people and communities due to the loss of languages at the hands of residential schools are lasting and ongoing. The parent-to-child transmission of language has been broken in a majority of Canada's Indigenous communities. Some residential school survivors still find it difficult to speak their native tongue because it is associated with trauma from their time at school. New legal policy may however be a positive part of the process of reclamation of Indigenous languages. For example, in a 2017 article, Fontaine calls for legal policy entitling children to education in their ancestral language, beyond the right to education in English and French (see the Canadian Charter of Rights and Freedoms, 1982, Section 23). The calls to action of the Truth and Reconciliation Commission of Canada included calls for the protection of Indigenous languages (see The Truth and Reconciliation Commission 2015), leading to the establishment of the *Indigenous Languages Act* in 2019. This act provides legal protection to Indigenous languages including funding for reclamation and revitalization.

The consequences of Canada's official focus on English-French bilingualism are still evident today. When Mary Simon was appointed Governor General in 2021, she was criticized for her lack of French proficiency, even though she is bilingual in English and Inuktitut. Simon promised to learn French and also related her language experience to educational policy in Canada, stating that "Based on my experience growing up in Quebec, I was denied the chance to learn French during my time in the federal government day schools" (as reported by CTV news, 2021).

The province of Quebec has its own language laws, with the goal of protecting French from assimilation into the anglophone majority in Canada. Quebec's language laws limit who is allowed to attend an anglophone school and require the French on signs to come first and to be twice as large as other languages. Unfortunately, though, these laws do not apply only to English, but to all languages, which negatively affects the Indigenous peoples of Quebec. The majority of Cree and Mohawk speakers in Quebec, for example, have English as their second language, and so these laws increase their difficulty in accessing education and other provincial services.

The Quebec Cree passed their own language act in 2019, the first law passed since they achieved self-governance in 2017. In contrast to Quebec's laws, however, they are not enforcing compliance for now. Instead, local governments, businesses, and others will need a Cree language plan for increasing the use of Cree in their organizations.

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2.8: Exercise your linguistics skills

Exercise 1. Many linguists avoid the term *standard language* and instead refer to these dialects as ***standardized***. Use your morphology skills to think about the following words: *prioritized*, *finalized*, *Americanized*, *revitalized*.

a. What does the *-ize* morpheme add to the meaning of these words?
b. What difference in meaning is conveyed by the difference between the terms *standardized language* and *standard language*?
c. Why might you choose one term over the other?

Exercise 2. If you speak an L2, how do you feel about your accent in that language? What factors do you think influence your feelings about your accent? Are any of those factors related to the language itself, or are they about prestige or power?

Exercise 3. Do you have different names or nicknames that you use with different people in your life? What factors influence what name you use with different groups? What happens if someone uses your "other" name?

Exercise 4. There are some social contexts where using swear words is offensive, and others where swearing is acceptable. Give an example of at least one of each kind of context, and for each context, describe the role that swearing plays in terms of **face**. In each context, is positive or negative face threatened or enhanced?

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CHAPTER OVERVIEW

Chapter 3: Phonetics

Learning Objectives

- When you've completed this chapter, you'll be able to:
- Identify the locations and functions of parts of the human anatomy relevant to the articulation of spoken and signed languages,
- Provide articulatory descriptions of given examples of phones and signs, and
- Identify the meanings of many common symbols from the International Phonetic Alphabet.

A key aspect of any language is its physical reality in the world: how we transmit linguistic signals from one person to another. This chapter explores this physical reality by looking at the body parts used for language, how they move to create a linguistic signal, and how linguists categorize, describe, and notate these physical properties so they can record and access information about a language.

3.1: Modality
3.2: Speech articulators
3.3: Describing consonants- Place and phonation
3.4: Describing consonants- Manner
3.5: Describing vowels
3.6: The International Phonetic Alphabet
3.7: Signed language articulators
3.8: Describing signs
3.9: Signed language notation
3.10: Syllables
3.11: Stress
3.12: Tone and intonation

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3.1: Modality

The major components of communication

An act of communication between two people typically begins with one person constructing some intended message in their mind (step ❶ in Figure **3.1.1**). This person can then give that message physical reality through various movements and configurations of their body parts, called **articulation** (step ❷). The physical **linguistic signal** (step ❸) can come in various forms, such as sound waves (for spoken languages) or light waves (for signed languages). The linguistic signal is then received, sensed, and processed by another person's **perception** (step ❹), allowing them to reconstruct the intended message (step ❺). The entire chain of physical reality, from articulation to perception, is called the **modality** of the language.

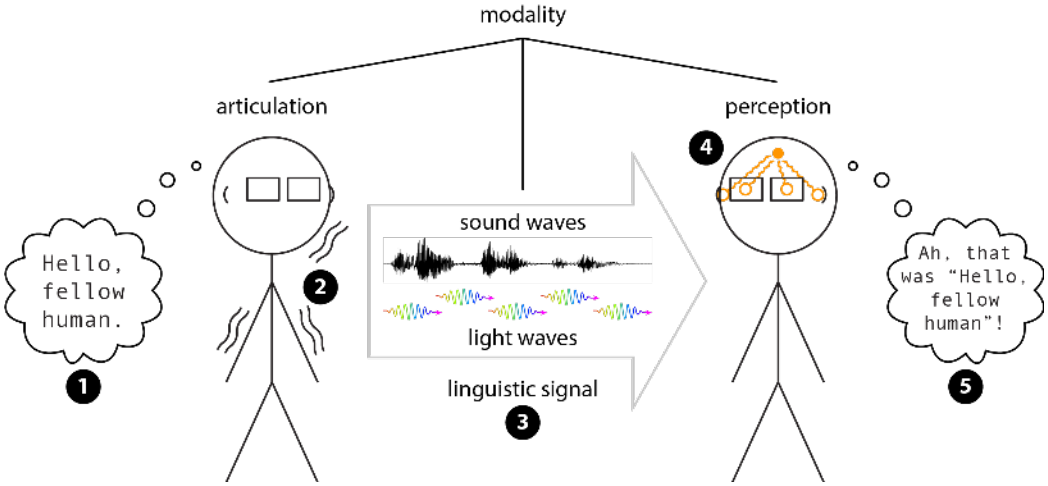


Figure **3.1.1**: Steps in the transmission of a linguistic signal from one person to another.

Spoken and signed languages

The modality of **spoken languages**, such as English and Cantonese, is **vocal**, because they are articulated with the vocal tract; **acoustic**, because they are transmitted by sound waves; and **auditory**, because they are received and processed by the auditory system. This modality is often shortened to **vocal-auditory**, leaving the acoustic nature of the signal implied, since that is the ordinary input to the auditory system.

Signed languages, such as American Sign Language and Chinese Sign Language, also have a modality: they are **manual**, because they are articulated by the hands and arms (though most of the rest of the body can be used, too, so this component of modality might best be called *corporeal*); **photic**, because they are transmitted by light waves; and **visual**, because they are received and processed by the visual system. This modality is often shortened to **manual-visual**.

Other modalities are also possible, but full discussion is beyond the scope of this textbook. One notable example is the **manual-somatic** modality of **tactile signing**, in which linguistic signals are articulated primarily by the hands and are perceived by the somatosensory system, which is responsible for sensing various physical phenomena on the skin, such as pressure and movement. This modality can be used for deafblind people to communicate, often by adapting aspects of an existing signed language in such a way that the signs are felt rather than seen. Some examples of such languages include tactile Italian Sign Language (Checchetto et al. 2018) and a tactile version of American Sign Language called Protactile (Edwards and Brentari 2020).

Finally, it is important to note that actual instances of communication are often **multimodal**, with language users making use of the resources of more than one modality at a time (Perniss 2018, Holler and Levinson 2019). For example, spoken language is often accompanied by various kinds of **co-speech behaviours**, such as shrugging, facial expressions, and hand gestures, which are used for many meaningful functions in the linguistic signal: emphasis, emotion, attitude, shifting topics, taking turns in a conversation, etc. (Hinnell 2020; also see Sections 8.7 and 10.4 for discussion of some related issues and examples). A full analysis of how language works must ultimately take into account its multimodal nature and the complexity and flexibility of how humans do language.

Terminological note: Signed languages are sometimes called *sign languages*. Both terms are generally acceptable, so you may encounter either one in linguistics writing. *Sign languages* has long been the more common term, but *signed languages* has recently been gaining popularity among deaf scholars.

Another piece of relevant terminology that is in flux is the long-standing distinction in capitalization between uppercase *Deaf* (a sociocultural identity) and lowercase *deaf* (a physiological status). However, this distinction has been argued to contribute to elitist gatekeeping within deaf communities, so many deaf people have pushed to eliminate this distinction (Kusters et al. 2017, Pudans-Smith et al. 2019).

In this textbook, we follow these prevailing modern trends by using *signed languages* and by not using the *Deaf/deaf* distinction. However, the alternatives are still widespread in linguistics writing, so you may still encounter them.

For these issues, it is important to proceed with caution and follow the lead of anyone more knowledgeable than you, especially if they are deaf. If you are uncertain what usage is appropriate in a given situation with a given deaf person, ask what they prefer.

The study of modality

Because spoken languages have long been the default object of study in linguistics, and because the vocal-auditory modality is centred on sound, the study of linguistic modality is called **phonetics**, a term derived from the Ancient Greek root *φωνή* (*phōnḗ*) 'sound, voice'. However, all languages have many underlying similarities, so linguists have long used many of the same terms to describe properties of different modalities, even when the etymology is specific to spoken languages. This includes the term *phonetics*, which is now commonly used to refer to the study of linguistic modality in general, not just the vocal-auditory modality.

This is an important reminder that the etymology of a word may give you *hints* to its meaning, but it does not *determine* its meaning. Instead, the meaning of a word is determined by how people actually use that word (for more discussion of meaning, check out Chapter 7 on semantics). This usage-based meaning can diverge and even contradict historical etymology, especially in scientific fields where our knowledge of the world is constantly evolving.

An example of such a divergence between etymology and current usage for a scientific term can be seen with the English word *atom*, which comes from the Ancient Greek *ἄτομος* (*átomos*) 'indivisible'. This term was used by Ancient Greek philosophers to represent their belief that atoms were the smallest building blocks of matter. However, more than 2000 years later, we discovered that atoms are in fact divisible, being made up of protons, neutrons, and electrons. Rather than rename atoms, we just kept the old name and accepted that its etymology was no longer an accurate representation of our current scientific knowledge. The same is true for the term *phonetics*.

However, be aware that many linguists still hold biased views about language and linguistics, and they often forget to include signed languages and other modalities when talking about phonetics or language in general. Some may even think signed languages cannot have phonetics at all. As linguists have become more knowledgeable about linguistic diversity and more sensitive to challenges faced by marginalized groups, there has been an ongoing shift towards increased inclusivity in how we talk about language. As with any such shift, some people will remain in the past, while others will be proactively part of the inevitable future.

In this chapter, we focus on **articulatory phonetics**, which is the study of how the body creates a linguistic signal. The other two major components of modality also have dedicated subfields of phonetics. **Perceptual phonetics** is the study of how the human body perceives and processes linguistic signals. We can also study the physical properties of the linguistic signal itself. For spoken languages, this is the field of **acoustic phonetics**, which studies linguistic sound waves. However, there is currently no comparable subfield of phonetics for signed languages, because the physical properties of light waves are not normally studied by linguists. Perceptual and acoustic phonetics are beyond the scope of this textbook.

Check your understanding

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3.2: Speech articulators

Overview of the vocal tract

Spoken language is articulated by manipulating parts of the body inside the **vocal tract**, such as the lips, tongue, and other parts of the mouth and throat. The vocal tract is often depicted in a **midsagittal diagram**, a special kind of diagram that represents the inside of the head as if it were split down the middle between the eyes. Midsagittal diagrams are conventionally oriented as in Figure 3.2, with the nostrils and lips on the left and the back of the head on the right, so that we are viewing the inside of the human head from its left side. The main regions and individual articulators of the vocal tract labelled in Figure **3.2.1** are defined and described in more detail in the rest of this section and the following sections.

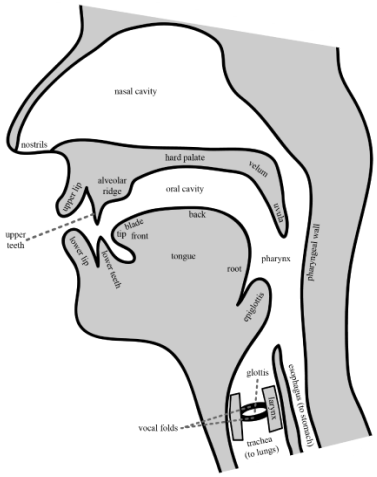


Figure **3.2.1**: Midsagittal diagram of the human vocal tract.

Open spaces in the vocal tract

There are three main open regions of the vocal tract. The **oral cavity** is the main interior of the mouth, taking up space horizontally from the lips backward. The **pharynx** is behind the oral cavity and tongue, forming the upper part of what we normally think of as the throat. Finally, the **nasal cavity** is the open interior of the head above the oral cavity and pharynx, from the nostrils backward and down to the pharynx.

The bottom of the pharynx splits into two tubes: the **trachea** (also known as the **windpipe**), which leads down to the lungs, and the **esophagus**, which leads down to the stomach. The esophagus is not normally relevant for phonetics, but the trachea is important, since the vast majority of spoken language is articulated with air coming from the lungs, and as discussed later in Section 3.3, there are ways we can manipulate that airflow when it passes from the trachea to the pharynx.

Phones as a basic unit of speech

The pieces of the vocal tract can be articulated in various ways to create and manipulate a wide range of sounds. In the phonetics of spoken languages, we are primarily interested in studying units of speech called **phones** or **speech sounds**. It is difficult to provide a precise definition of what a phone is, either in general or for a specific spoken language, but roughly speaking, a phone in a spoken language is a linguistically significant sound, which means that can be used as part of an ordinary word in that language. For example, the ordinary English words *spill*, *slip*, *lisp*, and *lips* each contain four phones; in fact, these words have the same four phones, just in different orders (with some slight variation in how they are pronounced; see Chapter 4 for more information).

There are many other sounds we can produce with the vocal tract or even with other body parts, such as burps, snorts, finger snaps, etc., However, these are not typically studied in phonetics, because they are not known to be phones in any spoken language. However, even though they do not occur in ordinary words, they may still be used to express non-linguistic meaning. For example, in some cultures, snapping fingers can indicate quickness or a desire for attention.

Note that spoken languages may differ in how they use phones and whether they even use the same phones at all. For example, English speakers may use clicking sounds to express disapproval (the soft teeth-sucking *tsk-tsk* click) or to urge a horse to go faster

(the loud popping *giddyup* click), but they are not phones in English, because they are not used within ordinary words. However, these same sounds do occur as phones in some other languages, such as Hadza (a language isolate spoken in Tanzania; Sands et al. 1996) and isiZulu (a.k.a. Zulu, a Southern Bantu language of the Niger-Congo family, spoken in southern Africa; Poulos and Msimang 1998).

We have to be careful about what kinds of words we look at to determine the phones of a language, because there are some marginal word-like expressions that can be used while speaking, but which may contain sounds that are not phones in the language. For example, the English word *ugh* is often pronounced with a rough gravelly sound that is otherwise not used in English, and we can say things like *Kaoru noticed their car was making a glzzk-glzzk-glzzk sound*, where *glzzk* is some impromptu sound produced to mimic the noise made by a vehicle in desperate need of repair.

One of the most fundamental distinctions between phones is whether they are **consonants** or **vowels**. The next three sections address how consonants and vowels are articulated and how they are described and categorized in meaningful ways by linguists.

Check your understanding

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3.3: Describing consonants- Place and phonation

Consonants as constrictions

Consonants are phones that are created with relatively narrow constrictions somewhere in the vocal tract. These constrictions are usually made by moving at least one part of the vocal tract towards another, so that they are touching or very close together. The moving part is called the **active** or **lower articulator**, and its target is called the **passive** or **upper articulator**. Vowels have wider openings than consonants, so they are not usually described with the terms used here; more appropriate terminology for vowel articulation is discussed in Section 3.5.

Active articulators

The active articulators we find in phones across the world's spoken languages are listed below, in order from front to back. They are also labelled in the midsagittal diagram in Figure **3.3.1**.

1. the **lower lip**, which is used for the consonants at the beginning of the English words *pin* and *fin*
2. the **tongue tip** (the frontest part of the tongue; also called the **apex**), which is used for the consonants at the beginning of the English words *tin* and *sin*
3. the **tongue blade** (the region just behind the tongue tip; also called the **lamina**), which is used for the consonants at the beginning of the English words *thin* and *chin*
4. the **tongue front** (the tip and blade together as a unit, also called the **corona**); it is useful to have a unified term for the tip and blade together, since they are so small and so close, and languages and even individual speakers of the same language may vary in which articulator is used for similar phones; for example, while many English speakers use the tongue tip for the consonant at the beginning of the word *tin*, other speakers may use the tongue blade or even the entire tongue front; however, while there may be variation in some languages, the distinction between the tip and blade is crucial in others, such as Basque (a language isolate spoken in Spain and France), which distinguishes the words *su* 'fire' and *zu* 'you', both of which sound roughly like the English word *sue*, with the tongue tip used for *su* and the tongue blade used for *zu* (although this distinction has been lost for some speakers under influence from Spanish; Hualde 2010)
5. the **tongue back** (the upper portion of the tongue, excluding the front; also called the **dorsum**), which is used for the consonants at the beginning of the English word *kin* and *gone*
6. the **tongue root** (the lower portion of the tongue in the pharynx; also called the **radix**), which is not used for consonants in English but is used for consonants in some languages, such as Nuu-chah-nulth (an endangered language of the Wakashan family, spoken in British Columbia)
7. the **epiglottis** (the large flap at the bottom of the pharynx that can cover the trachea to block food from entering the lungs, forcing it to go into the esophagus instead), which is not used for consonants in English but is used in for consonants in some languages, such as Archi (a Lezgic language of the Northeast Caucasian family, spoken in Russia)

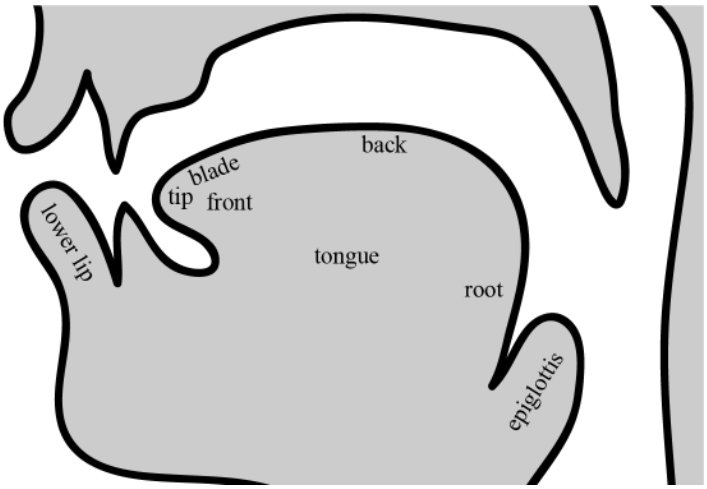


Figure **3.3.1**: Midsagittal view of the active articulators of the vocal tract.

Note that while the lower teeth could theoretically be an active articulator (we can move them towards the upper lip, for example), it turns out that no known spoken language uses them for this purpose, so we do not include them here.

Each of the active articulators has a corresponding adjective to describe phones with that active articulator. These adjectives are given in the list below, again from front to back:

1. **labial** (articulated with the lower lip)
2. **apical** (articulated with the tongue tip)
3. **laminal** (articulated with the tongue blade)
4. **coronal** (articulated with the tongue front)
5. **dorsal** (articulated with the tongue back)
6. **radical** (articulated with the tongue root)
7. **epiglottal** (articulated with the epiglottis)

Thus, we could say that the English words *pin* and *fin* begin with labial consonants, while *thin* and *chin* begin with laminal consonants. Note that all apical and laminal consonants are also coronal, so *thin* and *chin* can also be said to begin with coronal consonants.

Passive articulators

The passive articulators we find in phones across the world's spoken languages are listed below, in order from front to back. They are also labelled in the midsagittal diagram in Figure **3.3.2**.

1. the **upper lip**, which is used for the consonants at the beginning of the English words *pin* and *bin*
2. the **upper teeth**, which are used for the consonants at the beginning of the English words *fin* and *thin*
3. the **alveolar ridge** (the firm part of the gums that extends just behind the upper teeth, recognizable as the part of the mouth that often gets burned from eating hot food), which is used for the consonants at the beginning of the English words *tin* and *sin* (though some speakers may use the upper teeth instead or in addition)
4. the **postalveolar region** (the back wall of the alveolar ridge), which is used for the consonants at the beginning of the English words *shin* and *chin*
5. the **hard palate** (the hard part of the roof of the mouth; sometimes called the **palate** for short), which is used for the consonant at the beginning of the English word *yawn*
6. the **velum** (the softer part of the roof of the mouth; also called the **soft palate**), which is used for the consonants at the beginning of the English words *kin* and *gone*
7. the **uvula** (the fleshy blob that hangs down from the velum), which is not used for consonants in English but is used for consonants in some languages, such as Q'anjob'al (a language of the Mayan family, spoken in Guatemala)
8. the **pharyngeal wall** (the back wall of the pharynx), which is not used for consonants in English but is used in languages that have consonants with the tongue root or epiglottis as an active articulator (such as Nuu-chah-nulth and Archi mentioned earlier)

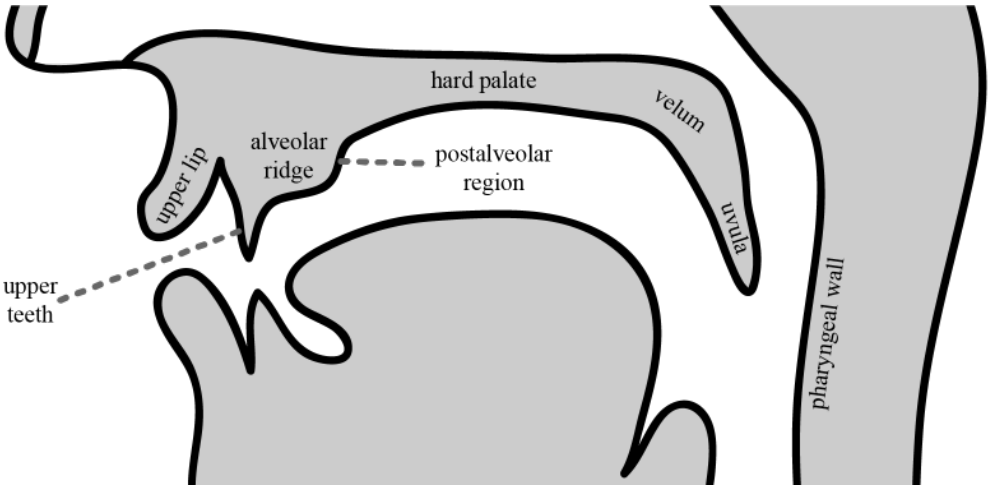


Figure **3.3.2**: Midsagittal diagram of the passive articulators in the vocal tract.

Each of the passive articulators has a corresponding adjective to describe phones with that passive articulator. These adjectives are given in the list below, again from front to back:

1. **labial** (articulated at the upper lip)
2. **dental** (articulated at the upper teeth)
3. **alveolar** (articulated at the alveolar ridge)
4. **postalveolar** (articulated at the back wall of the alveolar ridge)
5. **palatal** (articulated at the palate)
6. **velar** (articulated at the velum)
7. **uvular** (articulated at the uvula)
8. **pharyngeal** (articulated at the pharyngeal wall)

Thus, we could say that the English words *tin* and *sin* begin with alveolar consonants, while *kin* and *gone* begin with velar consonants.

Since all consonants have two articulators, they could be described by either relevant adjective. For example, the consonant at the beginning of the English word *shin* could be described as a laminal consonant (because of its active articulator) as well as a postalveolar consonant (because of its passive articulator).

Note that the term *labial* is ambiguous in whether it refers to the lower or upper lip. In general, this ambiguity is not a problem, so labial consonants include those with the lower lip as an active articulator as well as those with the upper lip as a passive articulator.

Place of articulation

The overall combination of an active articulator and a passive articulator is called a consonant's **place of articulation**, or simply **place** for short. Places of articulation are usually described with a compound adjective that refers to both articulators, with the adjective for the active articulator first (without the *–al* ending), then a linking *–o-*, followed by the adjective for the passive articulator.

For example, the consonant at the beginning of the English word *fin* is a **labiodental** consonant, because it is articulated with the lower lip (*labi-*) at the upper teeth (*-dental*), as circled in the midsagittal diagram in Figure **3.3.3**a. Similarly, the consonant at the beginning of the English word *kin* is **dorsovelar**, because it is articulated with the tongue back (*dors-*) at the velum (*-velar*), as circled in the midsagittal diagram in Figure **3.3.3**a.

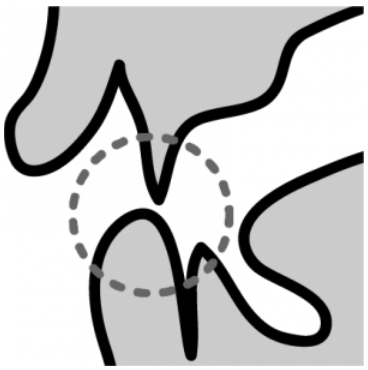


Figure **3.3.3**a: Midsagittal diagram of a labiodental place of articulation.

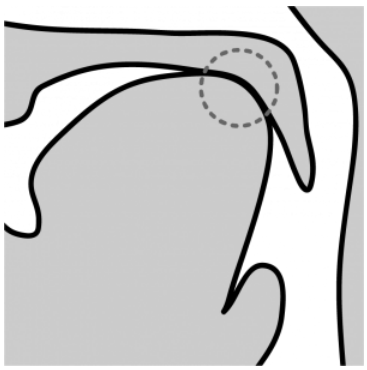


Figure **3.3.3**a: Midsagittal diagram of a dorsovelar place of articulation.

Not all combinations of active and passive articulators are used in the world's spoken languages. Some are simply impossible. For example, ordinary humans cannot stretch their lower lip to reach all the way back to the pharyngeal wall, so there is no such thing as a labiopharyngeal consonant.

Other combinations are physically possible, but no spoken language is known to use them. For example, most people have no difficulty touching their tongue tip to the velum, but that articulation is awkward enough that no language seems to have apicovelar consonants. Of course, our knowledge of language is constantly expanding, so we could theoretically come across apicovelar consonants in some language someday, but it is unlikely.

Many of the places of articulation are used frequently enough that their corresponding compound adjectives are normally replaced with a shorter adjective, often highlighting just the passive articulator. For example, **apicoalveolar** (tongue tip and alveolar ridge) is often shortened to just *alveolar*, because the tongue tip is more commonly used than the tongue blade when the alveolar ridge is the passive articulator. The full adjective can be used as needed to distinguish apicoalveolar from **laminoalveolar** (tongue blade and alveolar ridge), such as when a language has both kinds of alveolar consonants, as with Basque mentioned earlier.

Other shortened adjectives are used because one of the articulators is predictable from the other. For example, *dorsovelar* is often shortened to just *velar*, because no other active articulator is ever used with the velum as a passive articulator.

Other common shortened adjectives for places of articulation are listed below:

- **laminodental** (tongue blade and upper teeth) ⇒ dental
- **dorsopalatal** (tongue back and hard palate) ⇒ palatal
- **dorsouvular** (tongue back and uvula)⇒ uvular
- **radicopharyngeal** (tongue root and pharyngeal wall) ⇒ pharyngeal
- **epiglottopharyngeal** (epiglottis and pharyngeal wall) ⇒ epiglottal

Note that palatal phones move the entire upper part of the tongue, both the front and the back, so they technically count as both coronal and dorsal. However, the tongue back is often considered the more important active articulator, and it is often the only active articulator listed for palatals.

Some other alternative adjectives are used in certain special cases. For example, consonants that use both lips as articulators, such as the consonants at the beginning of the English words *pin* and *bin*, are called **bilabial** rather than the inelegant term *labiolabial*. Note that for bilabial phones, both lips are involved roughly equally, with each actively moving towards the other as mutual targets. So for the bilabial place of articulation, it is technically more accurate to say that the lips are the lower and upper articulators, but it is common to refer to the lower lip at the active articulator and the upper lip as the passive articulator.

Another special case are dental consonants. There are two main types. In the most common case, the tongue blade is on or near the back of the teeth (as circled in Figure **3.3.4**a). In the other main type, the tongue protrudes between the two sets of teeth, with the tongue blade below the bottom edge of the upper teeth (as circled in Figure **3.3.4**b). The first type of dental consonant is what is often referred to by default as *dental* (as a shortening for *laminodental*), while the second type is called **interdental**. The consonants at the beginning of the English words *thin* and *then* are commonly articulated as interdental.

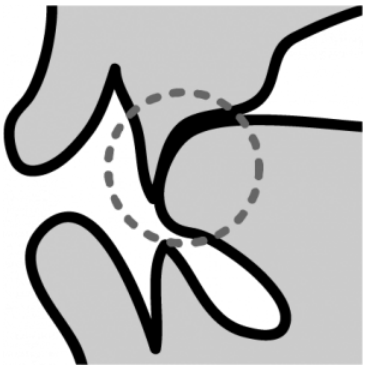


Figure **3.3.4**a: Midsagittal diagram of a dental (laminodental) articulation.

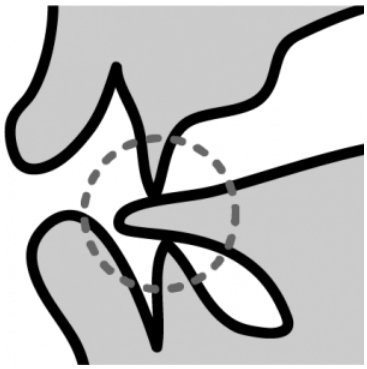


Figure **3.3.4**b: Midsagittal diagram of an interdental articulation.

Finally, there are also two main types of postalveolars. In the most common case, the tongue blade is on or near the alveolar ridge (as circled in Figure 3.7a). In the other case, the tongue tip curls backward, so that the tip points towards the hard palate, and the underside of the tongue tip is at or near the back wall of the alveolar ridge (as circled in Figure 3.7b). The first type of postalveolar consonant is what is often referred to by default as *postalveolar*, while the second type is called **retroflex**. The consonant at the beginning of the English word *run* is articulated as retroflex by some speakers, but there is much variation.

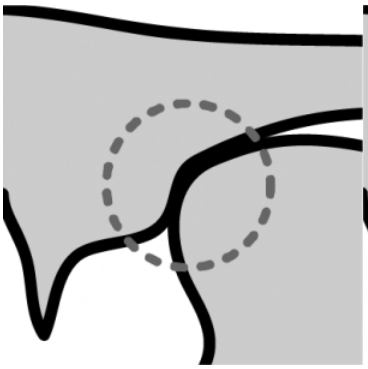


Figure 3.3.5a: Midsagittal diagram of a postalveolar articulation.

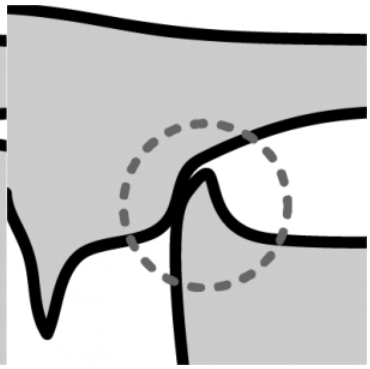


Figure 3.3.5b: Midsagittal diagram of a retroflex articulation.

Glottal articulation

There is one important place of articulation that is somewhat different from the ones discussed so far. At the top of the trachea is the **larynx** (or **voice box**). Inside the larynx are the **vocal folds** (or **vocal cords**), which are two membranes that stretch from front to back. The vocal folds are separated by an empty space, the **glottis**. These structures are shown from the side in the midsagittal diagram in Figure 3.3.6a and in more detail as viewed looking down the throat in Figure 3.3.6b.

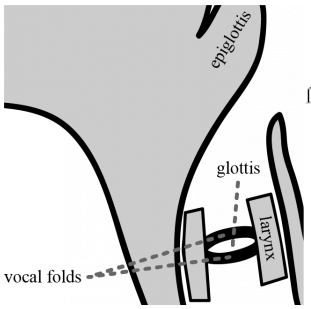


Figure 3.3.6a: Midsagittal diagram of the larynx.

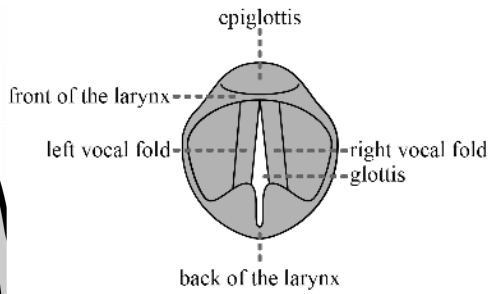


Figure 3.3.6b: Top view of the larynx.

Some consonant phones seem to consist only of articulation of the vocal folds, with no significant movement of any of the active articulators discussed previously. We see this with the first consonant in the English words *he* and *who*. Such phones are said to have a **glottal** or **laryngeal** place of articulation. Unlike other consonants, they have no clear active or passive articulator (since both vocal folds move equally) and no clear lower or upper articulator (since the vocal folds are at the same height).

Additionally, across the world's spoken languages, we find that glottal consonants behave somewhat oddly, sometimes acting more like vowels than consonants. Because of this, glottal consonants are sometimes said to have no inherent place of articulation of their own. Instead, they seem to pick up aspects of the articulation of the phones around them, especially vowels. You should be able to observe this in the first consonant of the English words *he* and *who*, especially in the configuration of the lips. the lips are spread into a smile throughout *he*, but they are rounded throughout *who* (see Section 3.5 for more information about lip configuration and other vowel properties). So even though we may think of these two words as starting with the same consonant, they are articulated in different ways, at least at the lips. But importantly, they have the same glottal articulation.

Regardless of the problematic nature of the glottal place of articulation, it is still typically counted among the possible places of articulation for consonants, and we follow that practice here. A full table of the places of articulation discussed in this chapter is given in Table 3.1, showing the usual shortened adjective and the active and passive articulators (with none given for glottal, since neither of the vocal folds has a privileged status over the other).

Table **3.3.1**. Places of articulation

place of articulation	*active articulator*	*passive articulator*
bilabial	lower lip	upper lip
labiodental	lower lip	upper teeth
dental / interdental	tongue blade	upper teeth
alveolar	tongue tip	alveolar ridge
postalveolar	tongue blade	postalveolar region
retroflex	underside of the tongue tip	postalveolar region
palatal	tongue front and back	hard palate
velar	tongue back	velum
uvular	tongue back	uvula
pharyngeal	tongue root	pharyngeal wall
epiglottal	epiglottis	pharyngeal wall
glottal	—	—

In addition to acting as a place of articulation for some consonants in some languages, the vocal folds are also used to regulate airflow through the vocal tract for most consonants and vowels in all spoken languages. In particular, when the vocal folds are configured in the right way, airflow through the glottis will cause the vocal folds to vibrate.

You can feel this vibration by placing your fingers on the front of your throat where the larynx is, while making the sound of a bee buzzing, like the sound of the consonant at the end of the English word *buzz*. If instead you make the sound of a snake hissing, like the sound of the consonant at the end of the English word *bus*, you should feel that there is no vocal fold vibration. Switch between buzzing and hissing to feel the change in the presence versus absence of vibration: *zzzzz-sssss-zzzzz-sssss-zzzzz-sssss*.

Vocal fold vibration is often called **voicing**, and a phone with vocal fold vibration is called **voiced**, while a phone without it is called **voiceless** or **unvoiced**. There are many other ways the vocal folds can play a role in shaping airflow. This larger category of manipulating airflow with the vocal folds in different ways is called **phonation**; you may sometimes see the term *voicing* refer to phonation generally, but this should be avoided, so that *voicing* can refer specifically to phonation in which the vocal folds vibrate. In this textbook, we will only discuss voiced and voiceless phonation.

Check your understanding

References

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3.4: Describing consonants- Manner

Manners of articulation

Consonant phones can also be categorized by their **manner of articulation** (or **manner** for short), which is how air flows through the vocal tract, based on the size and shape of the constriction between the articulators.

Stops

The most basic manner of articulation is **stop**, in which the active articulator presses firmly against the passive articulator to make a complete closure, blocking all airflow at that point. A bilabial oral stop closures are shown in the midsagittal diagrams in Figure 3.9. There are many kinds of stops across the world's spoken languages. One important distinction for stops is based on the position of the velum. The velum may be raised against the upper pharynx to block off access to the nasal cavity, as indicated by the dotted circle in the midsagittal diagram on the left in Figure **3.4.1**. The forces all airflow to go into the oral cavity only, as indicated by the arrow in Figure **3.4.1**. Such a stop with a raised velum and oral airflow only is called an **oral stop**. The English words *pet* and *get* both begin and end with oral stops. If instead a stop is articulated with a lowered velum, , as indicated by the dotted circle in the midsagittal diagram on the right in Figure 3.9, this allows air to flow into both the oral and nasal cavities. Such a stop with a lowered velum and both oral and nasal airflow is called a **nasal stop**, or sometimes just a **nasal** for short. The English words *met* and *net* both begin with nasal stops.

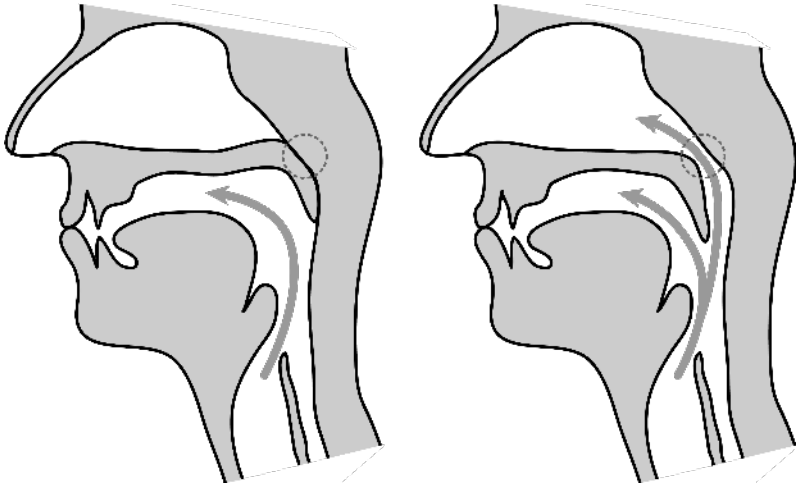


Figure **3.4.1**: Midsagittal diagrams showing a raised velum for a bilabial oral stop (left) and a lowered velum for a bilabial nasal stop (right).Figure 3.9.

The most common type of oral stops are **plosives**, which have airflow from the lungs that gets trapped behind the stop closure, until the air can be quickly released in an explosive burst. Most spoken languages have plosives as their only oral stops, so the terms *plosive* and *oral stop* are often used interchangeably. However, in more careful work, they are distinguished, because plosives are only one kind of oral stop. Other kinds of oral stops include **ejectives** (in which air is pushed up by raising the vocal folds rather than exhaling from the lungs), **implosives** (in which air is sucked in by lowering the vocal folds), and **clicks** (in which air is sucked in by quickly lowering the tongue).

Fricatives

If the active and passive articulators are very close but not touching, creating a narrow constriction, airflow through this constriction becomes very turbulent, resulting in highly random noisy airflow called **frication**, which sounds like hissing or buzzing. A phone articulated this way is called a **fricative**. The English words *set* and *vet* begin with fricatives.

Approximants

If the active and passive articulators are not touching and are spaced far enough apart to create little or no frication in the airflow, then the resulting phone is called an **approximant**. Most approximants have relatively unrestricted airflow through the middle of the oral cavity and are called **central approximants**. However, during the articulation of an approximant, part of the tongue may

instead make full contact with an upper articulator, causing the airflow to be diverted along one or both sides of the tongue, but still without frication. Such an approximant is called a **lateral approximant**. The English words *yet* and *wet* begin with central approximants, while the English word *let* begins with a lateral approximant.

These four manners of articulation are schematized in the diagrams in Figure **3.4.2**, in which the flat bars across the top of each diagram represent the midsagittal view of some arbitrary passive articulator, such as the alveolar ridge or hard palate, while the rounded shapes represent some active articulator, such as the tongue tip or tongue back, and arrows represent the nature of the airflow during the consonant.

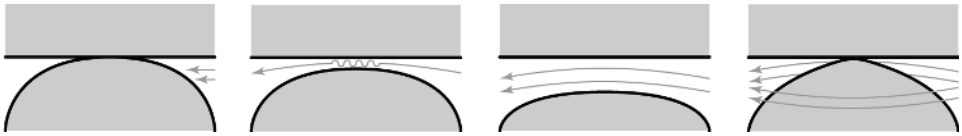


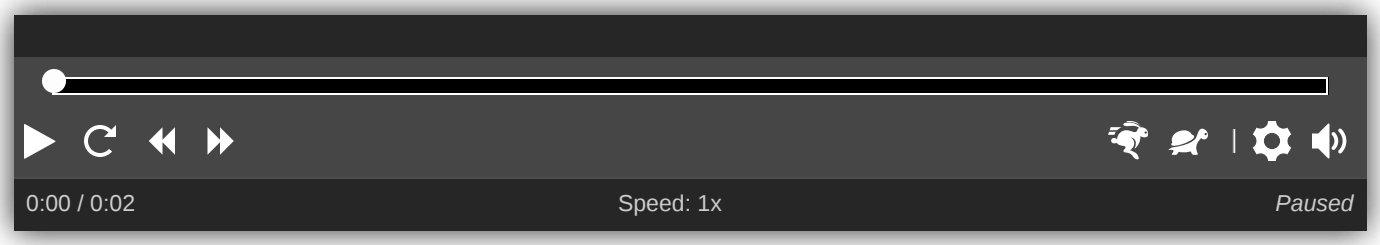
Figure **3.4.2**: Manners of articulation, from left to right: stop, fricative, central approximant, and lateral approximant.

The stop (far left in Figure 3.10) has a complete closure between the two articulators, preventing airflow from getting past. The fricative (second from the left) has a narrow opening with tightly constrained, fricated airflow, indicated in Figure 3.10 with a wavy line in the airflow arrow. The central approximant (third from the left) has a wider opening with relatively unobstructed airflow, indicated by the gently curved arrows. Finally, the lateral approximant (far right) also has a wide aperture, but with a small central obstruction that forces airflow to be diverted around the sides of the obstruction.

Affricates

Normally, the stop closure for a plosive is released relatively quickly, allowing the air to begin flowing almost immediately. However, it is also possible to release the closure slowly, so that a very brief fricative-like sound is created, causing the release of the plosive to have some frication, in which case, we say that it has a **fricated** release. A plosive with such a fricated release is often referred to as an **affricate**, which is a fifth kind of manner of articulation. The English word *jet* begins with an affricate.

Careful study of the language is usually required to determine what is really going on when you encounter some sort of plosive followed by some frication. In this textbook, you will be told whether you are dealing with an affricate or not. It can be difficult to determine the difference between a true affricate versus a sequence of a true plosive followed by a true fricative, because they are both very similar. In some languages, the difference between an affricate and plosive-fricative sequence can change the meaning, as in English with *ratchet* (with an affricate) versus *rat shit* (with a plosive followed by a fricative). The distinction is marginal in English, but it is robust in other languages, such as Polish (a West Lechitic language of the Indo-European family, spoken in Poland). In Polish, the word *czy* 'if, whether' begins with an affricate, while *trzy* 'three' begins with plosive followed by a fricative. The pronunciation of these two Polish words can be heard in the following sound file, first *czy* with an affricate, then *trzy* with a plosive plus a fricative.

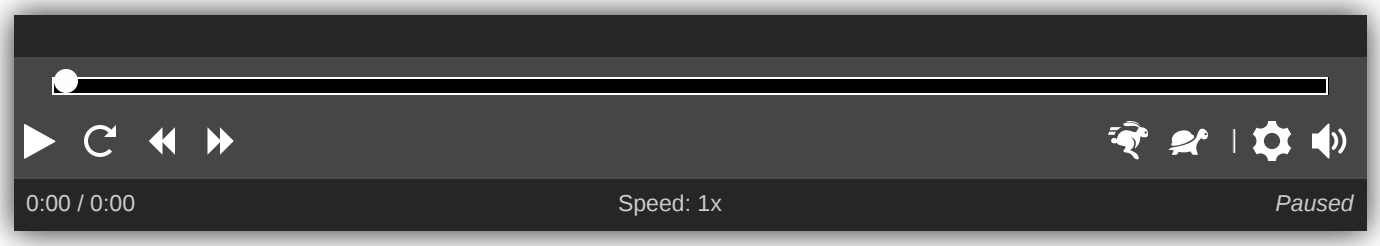


Although most affricates are articulated as plosives with a fricated release, it is possible for other kinds of oral stops to have fricated releases, so ejective affricates, implosive affricates, and click affricates also exist in some of the world's spoken languages.

Other manners of articulation

There are many other manners of articulation that are beyond the scope of this textbook. The two most notable ones are **taps** (also called **flaps**) and **trills**. Taps are like stops, except that the closure is so short that airflow is barely interrupted. The consonant in the middle of the English word *atom* is articulated as a tap for most North American speakers.

Trills are like repeated taps, in which one articulator vibrates quickly against the other, usually 2–3 times. Most dialects of English do not have trills, though some speakers of Scottish English may have a trill for the first consonant of *run*. Some languages have both a tap and a trill, such as Spanish (a Western Romance language of the Indo-European family, spoken in Spain and its former colonies), which has a tap in the middle of the word *pero* 'but' and a trill in the middle of the word *perro* 'dog'. The pronunciation of these two Spanish words can be heard in the following sound file, first *pero* with a tap, then *perro* with a trill.



Other classes of consonants

A few larger groupings of these manners of articulations are also often useful to talk about because of their common patterns in the world's spoken languages (see Chapter 4 for more information). Oral stops, fricatives, and affricates together form the class of **obstruents**, which are defined by having an overall significant obstruction to free airflow in the vocal tract. Consonants with the remaining manners of articulation (nasal stops, approximants, taps, and trills) form the class of **sonorants**, which have fairly unrestricted airflow, either through the nasal cavity (for nasal stops) or through the oral cavity (for approximants, taps, and trills).

Fricatives and approximants, because of their continuous airflow through the oral cavity, can also be referred to collectively as the class of **continuants** (sometimes trills are grouped with the continuants as well).

Note that the terms *sonorant* and *continuant* are typically used to refer only to consonants, but it is sometimes useful to define these classes to include vowels as well.

Putting it all together!

We now have three different ways to talk about how a consonant phone is articulated: its place of articulation, its phonation, and its manner of articulation. We can put these three together to give a complete description of the most common consonant phones. There are many consonants that go beyond this three-part description and require a bit more information to be fully specified, but for the purposes of this textbook, these three categories will be sufficient.

Consider the consonant phone at the beginning of the English word *met*, which has the articulation shown in the midsagittal diagram in Figure 3.**3.4.3**, with crucial aspects of the articulation circled.

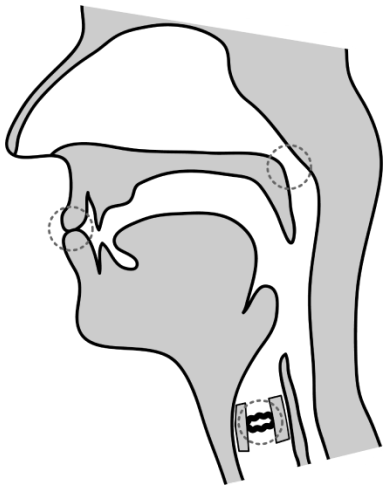


Figure **3.4.3**: Midsagittal diagram of a voiced bilabial nasal stop.

This consonant involves articulation of both lips, so it has a bilabial place of articulation. While saying this consonant, our vocal folds vibrate, so it has a voiced phonation. Finally, the two articulators are pressed firmly together, allowing no airflow through the oral cavity, but the velum is lowered to allow airflow through the nasal cavity, so this consonant has a nasal stop manner of articulation.

Conventionally, these three components in the description of a consonant phone are put in the order *phonation – place – manner*, so the consonant at the beginning of the English word *met* would be fully described as a voiced bilabial nasal stop. Because it is a nasal stop, we can also further classify this consonant as a sonorant.

For another example, consider the consonant phone at the beginning of the English word *set*, which has the articulation shown in the midsagittal diagram in Figure **3.4.4**, with crucial aspects of the articulation circled.

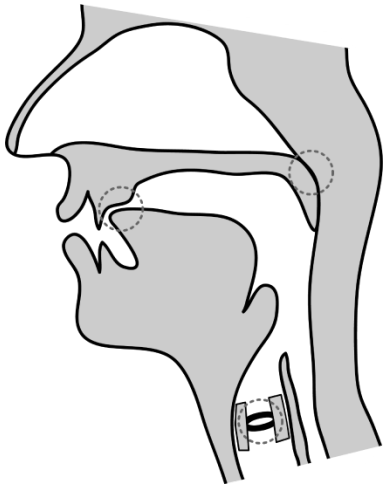


Figure **3.4.4**: Midsagittal diagram of a voiceless alveolar fricative.

This consonant involves active articulation of the front of the tongue; most speakers use the tongue tip, but some may use the tongue blade, either instead of the tip or in addition to it. The passive articulator of this phone can be hard to determine, since the front of the tongue is not touching it, but rather, is separated slightly from it. However, you can sometimes feel what the passive articulator is by breathing in instead of blowing out, because this can cause the passive articulator to become slightly cooler. If you do that with this consonant, you should feel the alveolar ridge getting cooler. Thus, this consonant has an alveolar place of articulation, and whether that place is apical (the default) or laminal depends on the individual speaker.

For this consonant, the vocal folds do not vibrate, so it has a voiceless phonation. Finally, the two articulators are separated very slightly, creating loud, very turbulent airflow, so this consonant has a fricative manner of articulation. Putting it all together, this consonant phone is a voiceless alveolar fricative, or voiceless apicoalveolar fricative, or for some speakers, a voiceless laminoalveolar fricative, if we want to be precise about which active articulator is used. Because it is a fricative, we can also further classify this phone as both an obstruent and a continuant.

Also note that for this consonant, the velum is raised and backed to block airflow from entering the nasal cavity. Fricatives are nearly always oral consonants, because having any airflow leak into the nasal cavity makes it difficult to produce high enough air pressure to force airflow through the narrow fricative opening.

We will look more closely at how to describe some more consonants at the end of this chapter, but for now, focus on understanding the definitions of the various terms that are used to fully describe a consonant's phonation, place, and manner.

Check your understanding

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3.5: Describing vowels

Vowel quality

Vowel phones can be categorized by the configuration of the tongue and lips during their articulation, which determines the vowel's overall **vowel quality**. Vowel quality is often much more of a continuum than consonant categories like place and manner. A slight change in articulation makes little difference in what a vowel sounds like, but it can have a drastic effect on a consonant. For example, moving an active articulator away from a passive articulator by just a tiny bit, less than 1 mm, is enough to turn a stop into a fricative, but that same distance for a vowel will have no noticeable effect. However, we can still identify several broad categories of vowel qualities based on dividing up this continuum into a few major regions.

Height

Vowels are articulated with a larger opening in the oral cavity than consonants are, requiring the tongue to move farther down than for approximants. This is typically facilitated by also moving the jaw down to allow the tongue to move even lower. The height of the tongue during the articulation of a vowel is called **vowel height**, or simply **height** for short.

A vowel with a very high tongue position, as in the English word *beat*, is called a **high** vowel. Some linguists instead call this a **close** vowel, but we will not use that terminology here. High vowels have an opening just slightly larger than for approximants. Indeed, high vowels and approximants are often related in many languages, with one turning into the other in certain positions. Compare the different pronunciations of the phone represented by the letter *i* in the middle of the English words *unique* (with a high vowel) and *union* (with an approximant).

A vowel with a very low tongue position, as in the English word *bat*, is called a **low** vowel. Again, some linguists have a different term that we will not use, calling these vowels **open** instead. Low vowels have the largest opening of any phone, whether vowel or consonant.

A vowel with an intermediate tongue position between high and low, as in the English word *bet*, is called a **mid** vowel. The differences in vertical tongue position for these three categories of vowel height are shown in Figure 3.**3.5.1**, from highest on the left (as in *beat*) to lowest on the right (as in *bat*). Note how the jaw also lowers along with the tongue in these diagrams.

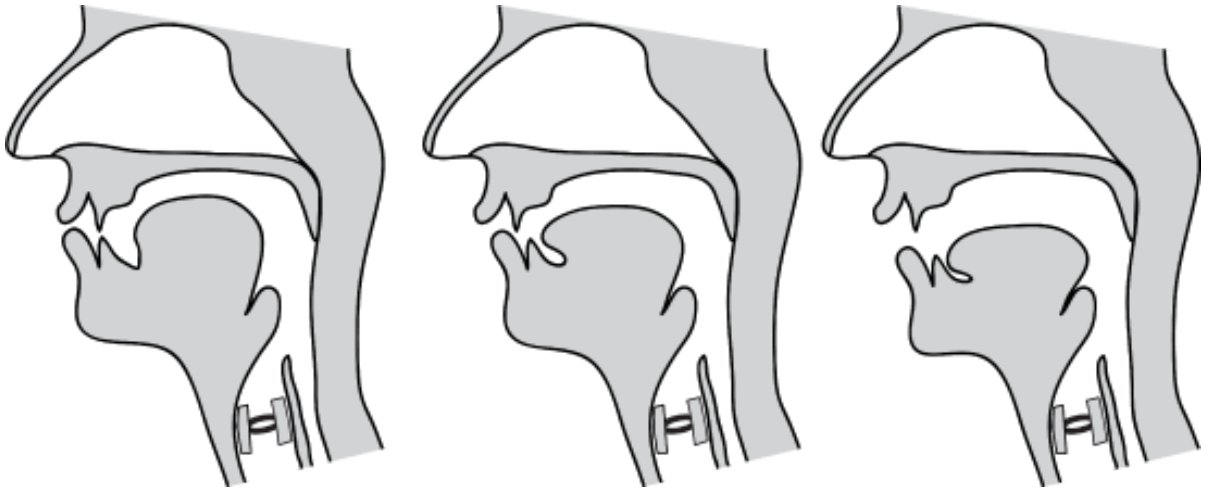


Figure **3.5.1**: Three categories of vowel height: high as in ***beat*** *(left), mid as in* ***bet*** *(centre), and low as in* ***bat*** *(right).*

The horizontal position of the tongue, known as its **backness**, also affects vowel quality. Backness could equally be called *frontness*, and sometimes this term is used, but *backness* is more standard and preferred. If the tongue is positioned in the front of the oral cavity, so that the highest point of the tongue is under the front of the hard palate, as for the vowel in the English word *beat*, the vowel is called a **front** vowel.If the tongue is positioned farther back in the oral cavity, so that the highest point of the tongue is under the back part of the hard palate or under the velum, as in the English word *boot*, the vowel is called a **back** vowel.

If the tongue is positioned in the centre of the oral cavity, so that the highest point of the tongue is roughly under the centre of the hard palate, in between the positions for front and back vowels, as for the English word *but*, the vowel is called a **central** vowel. Be

careful not to confuse the technical terms *central* and *mid*. *Central* refers to an intermediate position in *backness*, while *mid* refers to an intermediate position in *height*. These two terms are not interchangeable! The differences in horizontal tongue position for these three categories of vowel backness are shown in Figure **3.5.2**. from frontest on the left (as in *beat*) to backest on the right (as in *boot*).

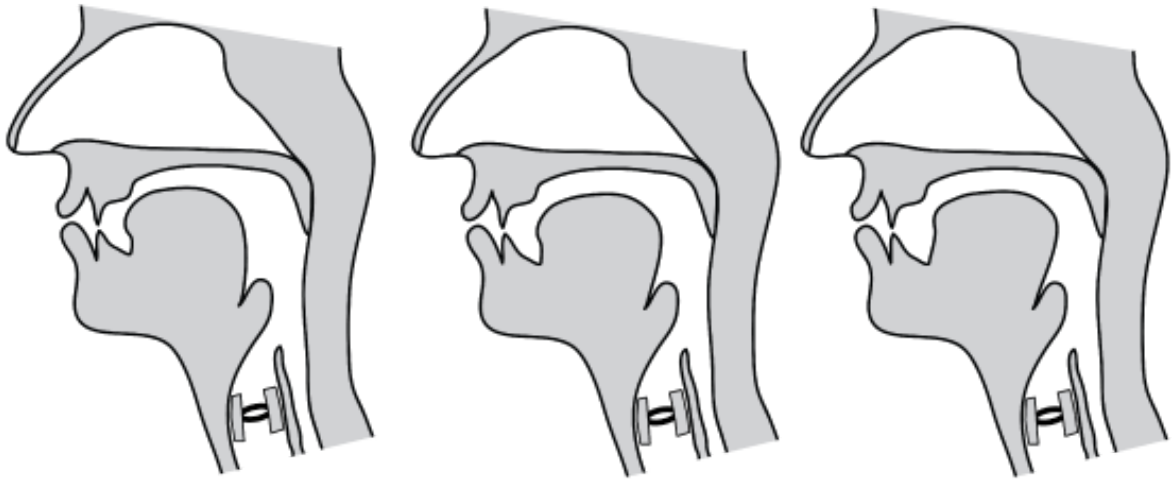


Figure **3.5.2**: Copy and Paste Caption here. (Copyright; author via source)

Note that what counts as front for a vowel depends on its vowel height, because of how the jaw moves. Humans have a hinged jaw, which means that as the jaw moves down to allow for a lower tongue position, the jaw also swings backward, carrying the tongue along with it. As the tongue moves backward due to this hinged movement, its centre position also moves backward, and it becomes more difficult for this lowered tongue to move as far forward as for a higher vowel.

In fact, the frontest position for a low vowel (as in the English word *bat*) typically has an actual overall backness a bit farther back than for a front high vowel (as in the English word *beat*). Thus, backness must be defined relative to the possible range of horizontal positions at a given height, rather than being defined in absolute terms with respect to the roof of the mouth. This results in a skewed shape of the possible combinations of vowel height and backness, with more distance between front and back positions for high vowels than for low vowels.

This is often graphically represented as in Figure **3.5.3**, with the total vowel space drawn as an asymmetric quadrangle, like a rectangle with the bottom left corner cut off. This missing corner represents the space where humans cannot produce a vowel because of the how the tongue moves backward as the jaw lowers. A few example words of English are listed in Figure 3.15 as rough indications for what tongue position many speakers use for the vowels in these words.

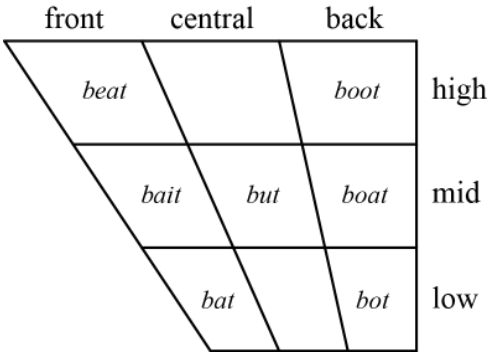


Figure **3.5.3**: Standard vowel quadrangle with example English words.

The cells in this quadrangle represent possible positions of the tongue within the oral cavity. For example, *beat* is shown in the high front cell, which indicates that it is pronounced with a high front tongue position. Note that there is much variation in English vowels across speakers, so the positions in Figure 3.15 are only meant to be suggestive of broad patterns across a range of dialects. The positions of the tongue for the vowels in these words may be somewhat different for you or for other speakers. For example, some speakers may have a low or back vowel for *but*, and some may have a more central vowel for *bot* or *boat*.

Rounding

Vowel quality also depends on the shape of the lips, generally referred to as the vowel's **rounding**. If the corners of the mouth are pulled together so that the lips are compressed and protruded to form a circular shape, as for the vowel in the English word *boot* in many dialects, the lips are said to be **rounded** and the corresponding vowel is called a **round** or **rounded** vowel.

If the corners of the mouth are pulled apart and upward so that the lips are thinly stretched into a shape like a smile, as for the vowel in the English word *beat*, the lips are said to be **spread**.

The lips may also be in an intermediate configuration, neither rounded nor spread, as for the vowel in the English word *but*, in which case, the lips are said to be **neutral**. Spread and neutral vowels are collectively referred to as **unrounded** or **non-rounded** vowels, because the distinction between spread and neutral lips seems almost never to be needed in any spoken language, whereas the distinction between rounded and unrounded frequently is needed. The differences in lip shape for these three categories of vowel rounding are shown in Figure 3.5.4.

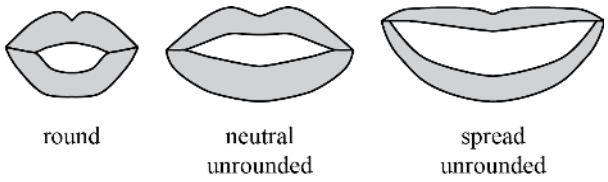


Figure 3.5.4: Three categories of rounding: round as in *boot* (left), neutral as in *but* (centre), and spread as *beat* (right), where neutral and spread are also classified together as unrounded.

Tenseness

The position of the tongue root may also play a role in vowel quality. If the tongue root is advanced forward away from the pharyngeal wall, as for the vowel in the English word *beat*, the tongue root pushes into the rest of the tongue. This causes the tongue to be somewhat denser and firmer overall, so a vowel with an advanced tongue root is sometimes called a **tense** vowel. If the tongue root is instead in a more retracted position closer to the pharyngeal wall, as for the vowel in the English word *bit*, it keeps the tongue somewhat more relaxed, so a vowel with a retracted tongue root is sometimes called a **lax** vowel. The property of whether a vowel is tense or lax is called **tenseness**. The different positions of the tongue root for tense and lax vowels are shown in Figure 3.5.5.

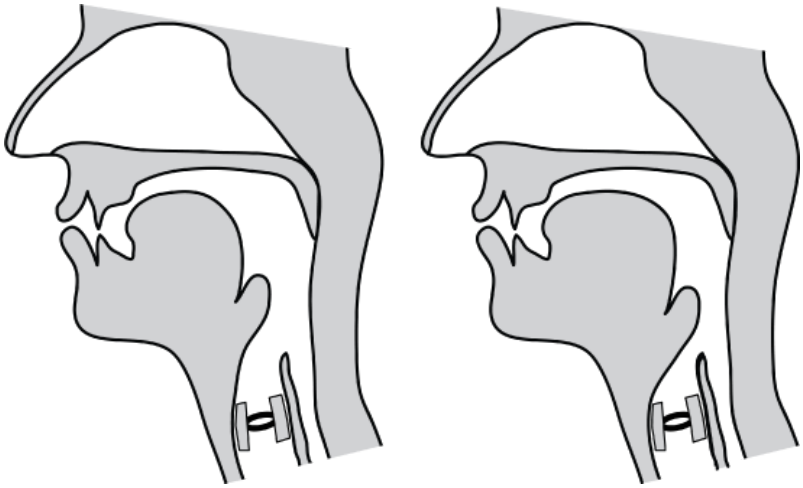


Figure 3.5.5: Two categories of tenseness: tense with an advanced tongue root as in *beat* (left) and lax with a retracted tongue root as in *bit* (right).

For many spoken languages, vowel tenseness is not a relevant property. Languages like Taba (a.k.a. East Makian, a Central-Eastern Malayo-Polynesian language of the Austronesian family, spoken in Indonesia) have only five vowels that are spread quite far apart. There is only one high front vowel, one mid front vowel, etc. These vowels can vary in how tense or lax they might be from one pronunciation to the next, so there is no need to use the terminology *tense* and *lax* to describe them.owever, other spoken languages have more complex vowel systems, with vowel pairs articulated in roughly the same way, except for tenseness. For example, most dialects of English have multiple pairs of vowels that are distinguished primarily by tenseness, such as the vowels in *beat* and *bit*.

Both of them have a high front tongue position and are unrounded, but the *beat* vowel is tense, while the *bit* vowel is lax. Similarly, the vowels of the English words *bait* and *bet* are both front, mid, and unrounded, but the *bait* vowel is tense, while the *bet* vowel is lax. Thus, for languages like English, the *tense*/*lax* terminology is often necessary to fully describe the vowel system.

That said, low vowels are very rarely tense in any language, because lowering the tongue and advancing the tongue root are making almost contradictory demands on the tongue, pushing the bulk of tongue in two different directions. However, the tongue is quite flexible and can physically be both lowered and tensed, so tense low vowels are not impossible, and there are some languages that have them, such as Akan (a Kwa language of the Niger-Congo family, spoken in Ghana), which has both a tense and a lax low vowel.

Nasality

In Section 3.4, we talked about how the velum can move to make a distinction between oral and nasal stops based on whether or not air can flow into the nasal cavity. The same distinction can be for vowels. If a vowel is articulated with a raised velum to block airflow into the nasal cavity, the vowel is called **oral**. If instead the velum is lowered, allowing airflow into the nasal cavity, the vowel is called **nasal** or **nasalized**. The property of whether a vowel is oral or nasal is called its **nasality**. Vowels in most dialects of English are often nasal when they are immediately before a nasal stop, as in the English word *bent*. The different positions of the velum for oral and nasal vowels are shown in Figure **3.5.6**, with arrows indicated direction of airflow.

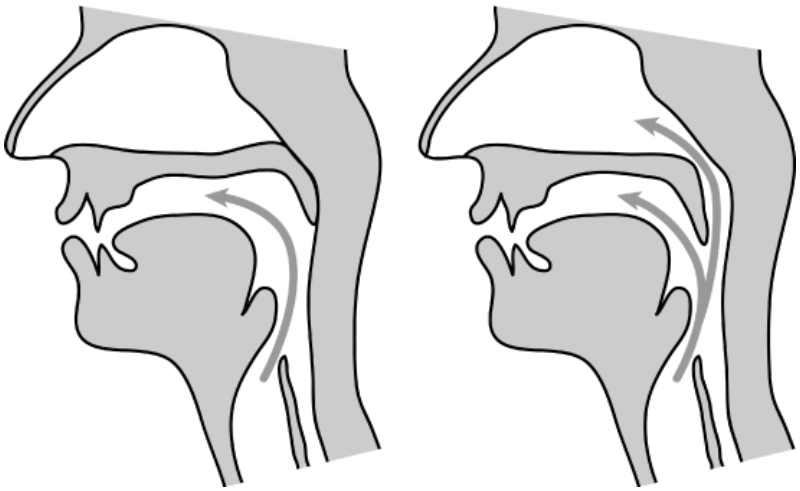
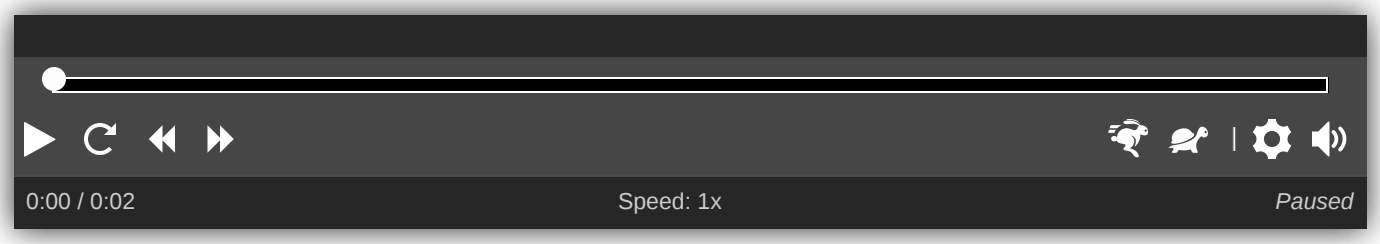


Figure **3.5.6**: Two categories of nasality: oral with a raised velum as in *bet* (left) and nasal with a lowered velum as in *bent* (right).

Length

In addition to differences in vowel quality and nasality, vowels may also differ from each other in **length**, which is a way of categorizing them based on their duration. In most spoken languages where vowel length matters, there is just a two-way distinction between **long** vowels and **short** vowels, with long vowels having a longer duration than their short counterparts. For example, in Japanese (a Japonic language spoken in Japan), the word いい *ii* 'good' has a long vowel, while the word 胃 *i* 'stomach' has a short vowel, although they both have the same vowel quality: they are both high front unrounded vowels. The pronunciation of these two Japanese words can be heard in the following sound file, first いい *ii* with a long vowel, then 胃 *i* with a short vowel.

lowers to a mid position, and then finally ends in a high back position with rounding. The pronunciation of this Vietnamese word can be heard in the following sound file.

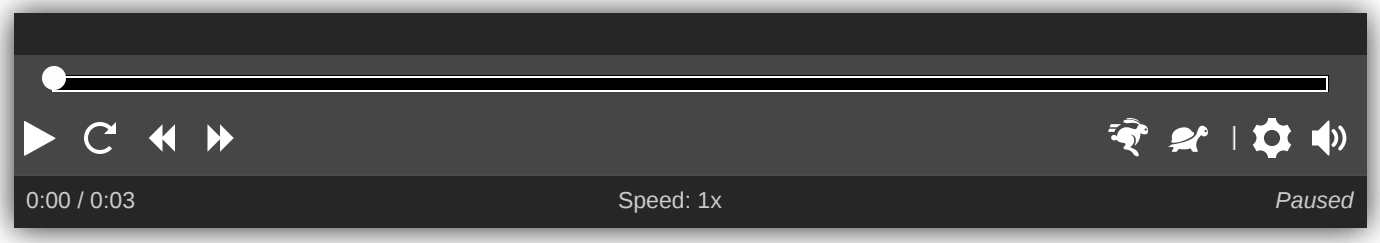


In most dialects of English, vowel length is not used to distinguish words with completely different meanings like it is in Japanese. However, English vowels can still differ in vowel length in some circumstances. For example, English vowels are often pronounced a bit longer before voiced consonants than before voiceless consonants. Thus, the vowel in the English word *bead* is usually pronounced longer than the vowel in the word *beat*, even they both have the same vowel quality: high front unrounded. The tense vowels of English also tend to inherently be a bit longer than their lax counterparts. For example, the tense vowel in the English word *beat* is longer than the lax vowel in *bit*.

Consonants may also differ from each other in length. Long consonants are often called **geminates**, while short consonants are called **singletons**. English does not really make regular use of consonant length, though there are some marginal examples for some speakers, such as *unnamed* (with a geminate alveolar nasal stop) versus *unaimed* (with a singleton alveolar nasal stop). However, many other languages have widespread distinctions based on consonant length.

For example, geminates and singletons are contrasted in Hindi (a Central Indo-Aryan language of the Indo-European family, spoken in India). Hindi has word pairs like सम्मान *sammān* 'honour' (with a geminate bilabial nasal stop in the middle of the word) versus समान *samān* 'equal' (with a singleton bilabial nasal stop in the middle of the word). The pronunciation of these two Hindi words can be heard in the following sound file, first सम्मान *sammān* with a geminate consonant, then समान *samān* with a singleton consonant.

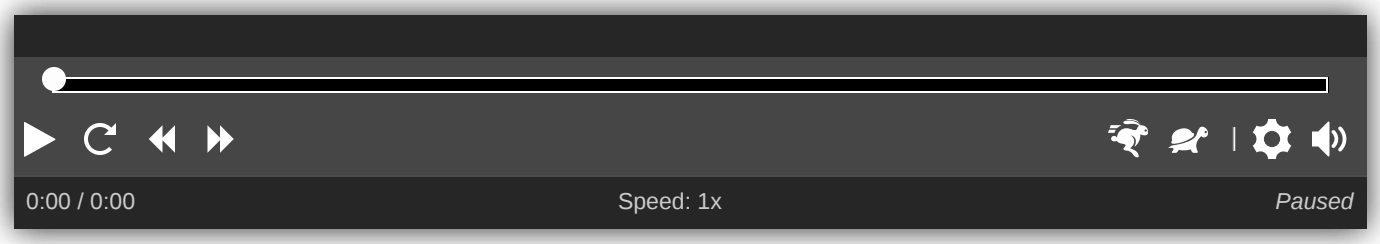
lowers to a mid position, and then finally ends in a high back position with rounding. The pronunciation of this Vietnamese word can be heard in the following sound file.



Multiple vowel qualities in sequence

Many vowels of the world's spoken languages have a relatively stable pronunciation from beginning to end. These kinds of stable vowel phones are called **monophthongs**. However, just as there are dynamic consonant phones (affricates), vowel phones may also change their articulation from beginning to end. Most of these are **diphthongs**, which begin with one specific articulation and shift quickly into another, as with the vowel in the English word *toy*, which begins with a mid back round quality but ends high, front, and unrounded. As with affricates, it can be difficult to determine whether a given change in vowel quality is best treated as a true diphthong or instead as a sequence of two separate monophthongs.

Some languages can even have **triphthongs**, which are vowel phones that change from one vowel quality to another and then to a third, as in *rượu* 'alcohol' in Vietnamese (a Viet-Muong language of the Austronesian family, spoken in Vietnam and China). The word *rượu* has a vowel phone that begins with a high central unrounded quality, then lowers to a mid position, and then finally ends in a high back position with rounding. The pronunciation of this Vietnamese word can be heard in the following sound file.



Putting it all together!

There is not as much consistency in the order of descriptions for vowels as for consonants. Perhaps the most common order is *height – backness – rounding*, but rounding is sometimes given first instead, and though height is usually given immediately before backness, these can also be switched. Thus, the vowel in the English word *bet* might be described as a mid front unrounded vowel, or as an unrounded mid front vowel, or as a front mid unrounded vowel, or as an unrounded front mid vowel. All of these would be considered correct, and other combinations may be used.

When descriptions of nasality are needed, they are almost always placed after the description of vowel quality. Thus, the vowel in the English word *bent* might be described as a mid front unrounded nasal vowel, or as an unrounded mid front nasal vowel, but rarely as a nasal mid front unrounded vowel.

If descriptions of tenseness or length are also needed, these are often placed before the other descriptions, but sometimes either or both may be placed after vowel quality, but usually still before the position for the description for nasality. Thus, the vowel in the English word *bend* could be described as a long lax mid front unrounded nasal vowel, or as a lax mid front unrounded long nasal vowel, or as an unrounded mid front long lax nasal vowel, or many other combinations!

Check your understanding

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3.6: The International Phonetic Alphabet

Segmentation

Note that we have been talking about phones as if it is obvious what they are, but this is not always the case. It is sometimes easy to find a clear separation between the phones in a given word, that is, to **segment** the word into its component phones, but sometimes, it can be very difficult. We can see this difference by looking at **waveforms**, which are special pictures that graphically represent the air vibrations of sound waves. The two waveforms in Figure **3.6.1** show a notable difference in how easy it is to segment the English words *nab* and *wool*.

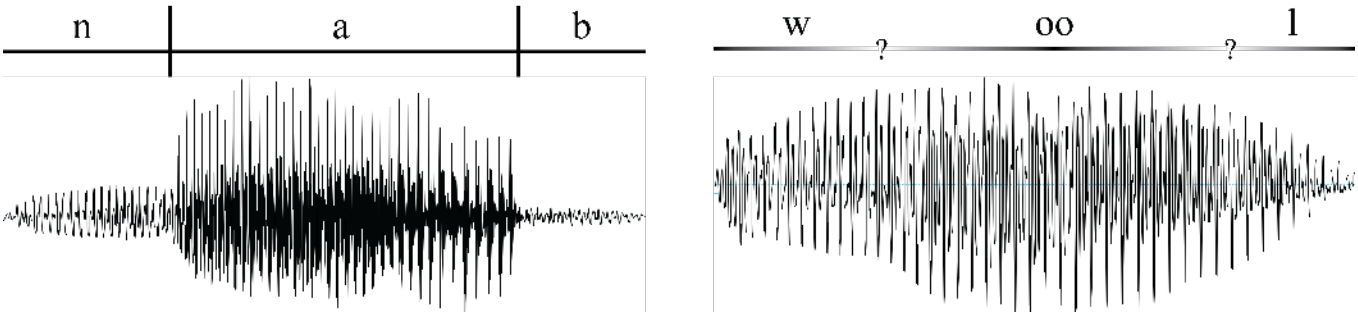


Figure **3.6.1**: Waveforms for the English words *nab* and *wool*.Figure 3.19. Waveforms for the English words *nab* and *wool*.

The waveform for *nab* contains abrupt transitions between three very different regions, corresponding to three phones. In comparison, the waveform for *wool* has smooth transitions from beginning to end, with no obvious divisions between phones. For the purposes of this textbook, all words will be segmented for you, but it is important to remember that when working with raw data from a spoken language, it may not be so clear where the boundaries are between phones.

Transcription

When we can identify the individual phones in a word, we want to have a suitable way to notate them that can be easily and consistently understood, so that the relevant information about the pronunciation can be conveyed in an unambiguous way to other linguists. Such notation is called a **transcription**, which may be very **broad** (giving only the minimal information needed to contrast one word with another), or it may be very **narrow** (giving a large amount of fine-grained phonetic detail), or somewhere in between. Whether broad, narrow, or in between, phonetic transcription is conventionally given in **square brackets [ ]**, so that, for example, the consonant at the beginning of the English word *nab* could be transcribed as [n], with the understanding that the symbol [n] is intended to represent a voiced alveolar nasal stop.

As linguists, we are interested in studying and describing as many languages as we can, so for spoken languages, we ideally want to use a transcription system that can be used for all possible phones in any spoken language. This means we cannot simply use one existing language's writing system, because it would be optimized for representing the phones of that language and would not have easy ways to represent phones from other languages.

In addition, many writing systems are filled with inconsistencies and irregularities that make them unsuitable for any kind of rigorous and unambiguous transcription, even for their associated spoken language. For example, the letter <a> in the English writing system is used to represent different phones, such as the low front unrounded vowel in *nab*, the low back unrounded vowel in *father*, the mid front tense unrounded vowel in *halo*, and the mid central unrounded vowel in *diva*. Conversely, the high front unrounded tense vowel in English can be represented by different letters and letter combinations: <i> in *diva*, <ee> in *meet*, <ea> in *meat*, <e> in *me*, and <y> in *mummy*. That is, then English writing system does not have a one-to-one relationship between phones and letters.

Note that symbols from a writing system are represented here with surrounding **angle brackets < >**. This is a common notational convention in linguistics that helps visually distinguish symbols in a writing system from symbols used for the transcription of phones, which are enclosed in square brackets [ ].

Furthermore, even if English spelling were perfectly regular, many specific English words have different equally valid pronunciations, such as *either*, *data*, and *route*. But even words that seem to have only one consistent pronunciation may in fact be pronounced differently by different speakers in more subtle ways. For example, in Los Angeles and London, the vowel in the word *mop* normally has a low back tongue position, with the London vowel also having some lip rounding that is not used in the Los Angeles pronunciation. In Chicago, the vowel in *mop* is articulated more in the centre of the mouth, making *mop* sound nearly like *map* to other speakers. If we tried to describe in writing how to pronounce a vowel from another language, and we said that it was pronounced the same as the vowel in the English word *mop*, we could not guarantee that the reader would know whether the vowel in question is back and unrounded (as in Los Angeles *mop*), back and round (as in London *mop*), or central and unrounded (as in Chicago *mop*).

The International Phonetic Alphabet

To avoid these problems, linguists have devised more suitable transcription systems for spoken languages, each with their own strengths and weaknesses. In this textbook, we will use a widespread standard transcription system called the **International Phonetic Alphabet** (abbreviated **IPA**). The IPA was created by the **International Phonetic Association** (unhelpfully also abbreviated IPA). The IPA organization was founded in 1886, and the first version of their transcription system was published shortly after. Since then, the IPA transcription system has undergone many revisions as our understanding of the world's spoken languages has evolved. The most recent symbol was added to the IPA in 2005: [ⱱ] for the labiodental tap, a phone found in many languages of central Africa, such as Mono (a Central Banda language of the Ubangian family, spoken in the Democratic Republic of the Congo).

For reference, the full chart for the IPA is given in Figure **3.6.2**. This chart is available under a Creative Commons Attribution-Sharealike 3.0 Unported License, copyright © 2020 by the International Phonetic Association. It is also available online at the IPA's homepage, and there are also some online versions that are accessible for screenreaders, such as this one created by Weston Ruter. \)

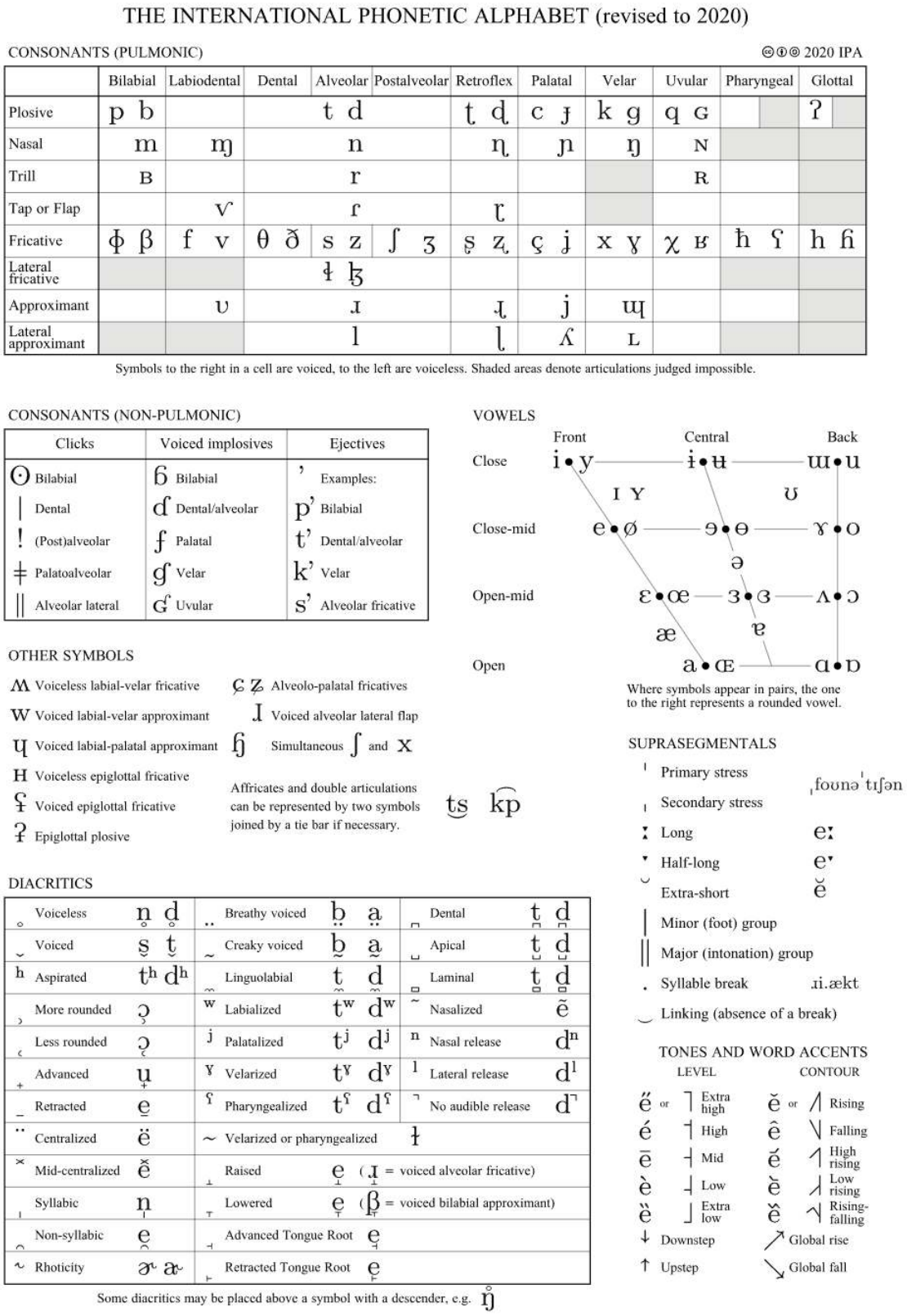


Figure 3.6.2: Full chart of all symbols in the International Phonetic Alphabet.

Learning the IPA takes a lot of time, practice, and guidance, and it is not just about memorizing symbols. The underlying structure and principles behind the organization of the table are what really matter. In this way, the IPA is like the periodic table of elements

in chemistry. So, it is helpful to know that Na is the chemical symbol for the element sodium with atomic number 11 and that [m] is the IPA symbol for a voiced bilabial nasal stop, but it is much more important to know what these concepts are and what those terms mean. What is sodium? What does it mean for an element to have an atomic number of 11? What does it mean for a phone to be voiced? How is the vocal tract configured for a bilabial nasal stop?

This is why this chapter focuses on defining concepts, so that you can build a solid foundation in understanding *how* phones are articulated. The notation is also important, but it has no value without the corresponding conceptual understanding.

Using the IPA

A full discussion of how to use the IPA for transcription is beyond the scope of an introductory textbook like this one. Here, we discuss a few guidelines and some concrete examples from English. For any transcription, it is important to keep in mind who your audience is and what the purpose of the transcription is. Most of the time, we normally only need a fairly broad transcription to get across a basic idea of the most important aspects of the articulation.

One important guiding recommendation from the IPA for broad transcription is to use the **typographically simplest** notation that still conveys the most crucial information. For example, when possible, we should choose symbols like upright [a] and [r] rather than their rotated counterparts [ɐ] and [ɹ]. These upright symbols are easier to type, easier to read, and more reliable in how they are displayed in different fonts.

Another aspect of typographic simplicity is to avoid **diacritics**, which are special marks like [◌̪] and [◌ʰ] that are placed above, below, through, or next to a symbol to give it a slightly different meaning. These are often necessary for certain contexts, but sometimes, they are superfluous and can hinder the reader's understanding. Thus, you should use diacritics when their meaning is crucial, but avoid them otherwise.

Typographic simplicity is also good practice when dealing with a lot of variation between speakers that is not relevant to the main point. For example, the English consonant typically spelled by the letter <r> is pronounced in many different ways by different speakers. Many North Americans have some sort of central approximant, but it varies from alveolar [ɹ], to postalveolar [ɹ̠], to retroflex [ɻ]. Some speakers may also have a constriction between the tongue root and pharyngeal wall, which is indicated in the IPA with a [ˤ] diacritic after the symbol. Some speakers may have some amount lip rounding, which is indicated in the IPA with a [ʷ] diacritic after the symbol. Some speakers may have both pharyngealization and rounding!

That results in at least twelve different possible articulations, each with its own transcription in the IPA, depending on the place of articulation, whether or not there is pharyngealization, and whether or not there is lip rounding. The IPA symbols for these twelve possibilities are given in the list below. For each, the symbols are in order by place of articulation: alveolar, postalveolar, and retroflex.

- no pharyngealization and no rounding: [ɹ], [ɹ̠], or [ɻ]
- pharyngealization and no rounding: [ɹˤ], [ɹ̠ˤ], or [ɻˤ]
- rounding and no pharyngealization: [ɹʷ], [ɹ̠ʷ], or [ɻʷ]
- both pharyngealization and rounding: [ɹˤʷ], [ɹ̠ˤʷ], or [ɻˤʷ]

Furthermore, there are many other rhotic pronunciations beyond those in North American varieties, such as an alveolar tap [ɾ] or trill [r] in Scotland, a voiced uvular fricative [ʁ] in Northumbria, and a labiodental approximant [ʋ] in London.

Thus, when transcribing English in general, there is no one single symbol that accurately represents the pronunciation of this consonant, so for broad transcription, a plain upright [r] with no diacritics is a reasonable choice that follows the IPA's recommendation for typographic simplicity. Of course, when transcribing a specific articulation from a specific speaker, it may make sense to use a more precise symbol, especially if the details of the articulation are important. But generally speaking, a plain upright [r] is normally fine for English, though some linguists may prefer to use [ɹ] or [ɻ] for North American English, even though there are at least a dozen equally valid North American pronunciations. If you are taking a course in linguistics, be sure to follow the standards and conventions set by your instructor.

Why is there so much variation in the pronunciation of English <r>? These consonants belong to an unusual class of phones called **rhotics**, named after the Greek letter **rho <ρ>**, which itself represents a rhotic consonant. Across the world's spoken languages, we find a lot of variation in rhotics. Many languages only have one rhotic, but which particular rhotic they have can be very different

even between closely related languages. The pronunciation of rhotics in a language can also shift over time, especially if the language only has one. There seems to be no single overarching phonetic similarity in the various rhotics, and linguists are still trying to figure out what makes this class of consonants so special.

Even when the pronunciation of a given phone is fairly consistent across speakers, many linguists still choose a typographically simpler transcription. Consider the consonant at the beginning of the English word *chin*, which is a voiceless postalveolar affricate. Affricates in the IPA are normally transcribed by writing the corresponding plosive symbol to represent the stop closure, followed by the corresponding fricative symbol to represent the fricated release, both united under a curved **tie-bar [͡]** to show they are unified as a single phone.

So, to represent the voiceless postalveolar affricate in *chin*, we need to select the correct plosive and fricative symbols. First, let us consider the voiceless postalveolar fricative. We can find its symbol in the IPA chart by looking in the section devoted to consonants. Places of articulation are listed across the top, while manners of articulation are listed down the left. Within a given cell, if there are two symbols, the one on the left is voiceless, and the one on the right is voiced. So looking in the postalveolar column and the fricative row, we find the symbols [ʃ] and [ʒ], and since we are interested in the voiceless fricative, we pick the symbol [ʃ].

However, there is no similar basic symbol for a voiceless postalveolar plosive in the IPA. That part of the chart is blank, so we have to create our own symbol by using the base symbol for a similar consonant and adding one or more diacritics. In this case, we can use alveolar [t] and put a retraction diacritic [̟] under it to indicate that its place of articulation is slightly farther back, as we did for the postalveolar central approximant [ɹ̠] before. Thus, we get [t̠] as the symbol for a voiceless postalveolar plosive.

So, we would begin by putting these two symbols together under a tie-bar: [t̠ʃ]. However, most English speakers also pronounce this affricate with some amount of lip rounding, so a fully accurate transcription would be something more like [t̠ʃʷ], with the [ʷ] diacritic to indicate rounding.

But hardly any linguist transcribes this affricate with that much phonetic detail. It is almost never relevant to indicate that it is round, and the postalveolar location of the stop closure is implied by the fact that it has a postalveolar release. You cannot release a stop closure in a position different from where it is made: if there is a postalveolar release, it necessarily must come from a postalveolar closure. So for typographic simplicity, the affricate is more commonly transcribed simply as [t͡ʃ], with neither of the two diacritics. As with [r] for the English rhotic, [t͡ʃ] is not technically an accurate transcription for most speakers, but it is typographically simpler and conveys of all the crucial information needed to understand the basics of the articulation. The tie-bar on the affricate may also sometimes be left off in transcriptions, so [tʃ] is also a common transcription for this affricate, making it even more typographically simple.

Even without these issues, there is still usually no such thing as “the” correct transcription of a word. Two pronunciations of the same word by the same speaker will always have some differences, because we live in a physical world where we cannot avoid slight imperfections and fluctuations. Even if we wanted to capture all of those possible differences with the IPA, it is simply not designed for that level of phonetic detail. When such detail is important, it needs to be conveyed in other ways, such as with pictures (like waveforms and midsagittal diagrams) and numerical measurements (like loudness in decibels and duration in milliseconds). Thus, an IPA transcription is always inherently missing some details, so we have to decide how much detail is needed and how much should be left out for simplicity.

Transcribing English with the IPA

Despite all these pitfalls, it is still important to get some basic skill in transcription for future work in linguistics. Since this textbook is presented in English, English is a good starting point to give you something concrete in which to ground your understanding of how to do transcription. However, there is much dialectal variation in English, so the transcriptions offered here are very general and may differ from the varieties of English you are familiar with.

We begin with consonants, where there tends to be less variation across dialects. Table **3.6.2** lists some plosives and affricates of English, with their IPA symbol (keeping in mind typographic simplicity) and example words containing each consonant in various positions, where possible. For each word, The portion of the spelling that corresponds to the phone is in bold. Finally, a phonetic description of each consonant is also given.

Table **3.6.2**. English plosives and affricates.

symbol	example (beginning)	example (middle)	example (end)	description
[p]	**p**an	ra**p**id	la**p**	voiceless bilabial plosive
[b]	**b**an	ra**b**id	la**b**	voiced bilabial plosive
[t]	**t**an	a**t**op	le**t**	voiceless alveolar plosive
[d]	**d**en	a**d**opt	le**d**	voiced alveolar plosive
[t͡ʃ]	**ch**in	ba**tch**es	ri**ch**	voiceless postalveolar affricate
[d͡ʒ]	**g**in	ba**dg**es	ri**dg**e	voiced postalveolar affricate
[k]	**c**an	bi**ck**er	la**ck**	voiceless velar plosive
[ɡ]	**g**ain	bi**gg**er	la**g**	voiced velar plosive
[ʔ]	—	uh–oh	—	voiceless glottal plosive

Most of these are straightforward, but as discussed in Section 3.3, the alveolar consonants are normally apicoalveolar, though some speakers may pronounce them with the blade of the tongue. If that detail is necessary, these consonants can be transcribed as [t̪] and [d̪], using the laminal diacritic [̪]. Regardless of the active articulator, some speakers may pronounce these consonants on the back of the teeth rather than on the alveolar ridge, in which case, they would be transcribed as [t̼] and [d̼], using the dental diacritic [̼].

The glottal plosive (also frequently called a **glottal stop**) is only a marginal consonant in English. It can be found as the catch in the throat in the middle of the interjection *uh-oh*. Some speakers also have it elsewhere, such as in the middle of some British English pronunciations of the word *bottle*. It is articulated by making a full stop closure with the vocal folds, blocking all airflow through the glottis.

Table **3.6.3** lists some fricatives of English.

Table **3.6.3**. English fricatives.

symbol	example (beginning)	example (middle)	example (end)	description
[f]	**f**an	wa**f**er	lea**f**	voiceless labiodental fricative
[v]	**v**an	wa**v**er	lea**v**e	voiced labiodental fricative
[θ]	**th**in	e**th**er	tru**th**	voiceless interdental fricative
[ð]	**th**an	ei**th**er	smoo**th**	voiced interdental fricative
[s]	**s**in	mu**s**cle	bu**s**	voiceless alveolar fricative
[z]	**z**one	mu**z**zle	bu**zz**	voiced alveolar fricative
[ʃ]	**sh**in	Hai**ti**an	ru**sh**	voiceless postalveolar fricative
[ʒ]	—	A**si**an	rou**g**e	voiced postalveolar fricative
[h]	**h**en	a**h**ead	—	voiceless glottal fricative

The most notable variation here is that some speakers do not have [θ] and [ð], and instead used [t] and [d] or [f] and [v], depending on the dialect and the position in the word. As with the postalveolar affricates mentioned before, the postalveolar fricatives are also usually somewhat rounded, so they could be more narrowly transcribed as [ʃʷ] and [ʒʷ]. The voiced postalveolar fricative [ʒ] is also one of the rarest consonants in English, and many speakers pronounce it as an affricate in some positions instead of as a fricative. For example, you may hear speakers pronounce the final consonant of *garage* as the affricate [d͡ʒ] rather than the fricative [ʒ].

Table 3.4 lists some sonorants of English. Across the world's spoken languages, sonorants tend to be voiced by default, because their high degree of airflow causes the vocal folds to spontaneously vibrate, unless extra effort is put in to keep them from vibrating. This is true for English, so the phonation of the sonorants is not listed here.

Table 3.3. English sonorants.

symbol	example (beginning)	example (middle)	example (end)	description
[m]	**m**an	si**mm**er	ra**m**	bilabial nasal stop
[n]	**n**un	si**nn**er	ra**n**	alveolar nasal stop
[ŋ]	—	si**ng**er	ra**ng**	velar nasal stop
[l]	**l**ane	fo**ll**y	ba**ll**	alveolar lateral approximant
[r]	**r**un	so**rr**y	ba**r**	(various! see earlier discussion)
[j]	**y**awn	on**i**on	—	palatal central approximant
[w]	**w**on	a**w**ake	—	labial-velar central approximant

A few of these sonorants warrant extra discussion. The alveolar nasal stop [n] has much of the same variation as the alveolar plosives, with some speakers having a laminoalveolar articulation [n̻] and some having a dental articulation [n̪]. The velar nasal stop is often one of the most surprising phones of English to English speakers who are new to phonetics, because is not easily identifiable as its own phone. Many people are misled by the spelling and think they say words like *singer* with a [ɡ], but in fact, most speakers have only a nasal stop there, so that *singer* differs from *finger*, with *singer* having only [ŋ] and *finger* having [ŋɡ]. However, there are speakers who do genuinely pronounce all words like these with a [ɡ] after the nasal stop, but even then, the nasal stop they have is still velar [ŋ], not alveolar [n].

A notable consonant here is [w], which is special among the consonants of English in being **doubly articulated**, which means that it has two equal places of articulation. It is both bilabial (with an approximant constriction between the two lips) and velar (with a second approximant constriction between the tongue back and the velum). Its place of articulation is usually called **labial-velar**. English used to consistently have two labial-velar approximants, a voiced [w] and a voiceless [ʍ]. Very few speakers today have both of these, but those who do pronounce the words *witch* and *which* differently, with voiced [w] in *witch* and voiceless [ʍ] in *which*.

Now we can move on to the vowels. This is where much of the variation in pronunciation occurs across English dialects, and fully describing all of the vowels in English would take up an entire textbook of its own. Note that this is not a general property of spoken languages overall. Some are like English, with most dialectal variation in the vowels, but others have much more dialectal variation in the consonants, while others may have a relatively even mixture of variation in both consonants and vowels.

Table **3.6.4** lists some monophthongs of English, with a focus on the English vowels as they are broadly pronounced across North American dialects. However, there is still much variation just in North America, and this discussion should not be taken to represent any particular speaker or region, let alone any sort of idealized standard or target pronunciation. This is simply a convenient abstraction that provides a useful baseline, though it is still only a very rough guide, and individual speakers can vary quite a lot from what is discussed here. Note also that unstressed vowels are very unstable, especially in fast speech, so for example, unstressed [u] could be pronounced more like [ʊ] or [ə], even for the same speaker saying the same word. As in most spoken languages, the vowels of English are generally all voiced, so their phonation is not listed here. Example words are given that show the vowel in a stressed syllable, an unstressed syllable, and at the end of the word (see Sections 3.10 and 3.11 for more about syllables and stress).

Table **3.6.4**. English monophthongs.

symbol	example (stressed)	example (unstressed)	example (end)	description
[i]	b**ea**ter	salt**i**er	s**ee**	high front unrounded tense
[ɪ]	b**i**tter	—	—	high front unrounded lax
[e]	b**a**ker	—	s**ay**	mid front unrounded tense
[ɛ]	b**e**tter	—	—	mid front unrounded lax
[æ]	b**a**tter	—	—	low front unrounded
[ɑ]	f**a**ther	—	spa	low back unrounded
[ɒ]	b**o**nnet	—	—	low back round
[ɔ]	b**o**rder	—	s**aw**	mid back round lax
[o]	b**oa**ter	—	s**ew**	mid back round tense
[ʊ]	b**oo**ker	—	—	high back round lax
[u]	b**oo**mer	man**u**al	s**ue**	high back round tense
[ʌ]	b**u**tter	—	—	mid central unrounded lax (stressed)
[ə]	—	an**i**mal	sof**a**	mid central unrounded lax (unstressed)

As noted before, there is a lot of variation that cannot be adequately discussed here, so we only cover a few notable deviations. First, while many speakers pronounce the four tense vowels as monophthongs as transcribed here, most speakers pronounce some or all of them as diphthongs instead, perhaps even having an approximant at the end rather than a vowel. For example, high front unrounded tense [i] may be pronounced more like [ɪi] or [ij] by some speakers. It is especially common for the two tense mid vowels to be pronounced as diphthongs, something like [eɪ] and [oʊ] or perhaps [ej] and [ow].

Many of the back round vowels, especially [ʊ], are fronter and/or unrounded for some speakers in some dialects.

The back vowels in *bore* and *bought* are pronounced similarly to each other by some North Americans, and so they are often represented with the same symbol [ɔ], though note there may still be some differences, with [ɔ] before a rhotic often pronounced somewhat higher, closer to [o]. However, many speakers in Canada and in the western United States have a very different vowel in *bought* from *bore*. Their *bought* vowel is much lower, and for some speakers, it is also unrounded. These speakers use the same low vowel in *bought* that they use in *bot*. For most North Americans, the low vowels in *bot* and *balm* are pronounced the same, either as back round [ɒ] or back unrounded [ɑ]; in some dialects, it may be central unrounded [a]. Others have two different vowels for these words, usually [ɒ] in *bot* and [ɑ] or [a] in *balm*. Needless to say, this part of the vowel system of English is particularly troublesome, and even many expert linguists get aspects of it wrong.

The two mid central vowels [ʌ] and [ə] are often treated as related pronunciations of the same vowel, based on whether or not they occur in a stressed syllable (again, see Sections 3.10 and 3.11 for more about syllables and stress). For now, just note that some vowels of English are pronounced louder and longer than others, which we call **stressed**, while the other softer and shorter vowels are said to be **unstressed**. We can see the difference in stress in pairs like *billow* and *below*, which differ mostly in which syllable is stressed: the first syllable in *billow* and the second syllable in *below*. The two central vowels of English differ in stress: the first syllable of the name *Bubba* is stressed, and the second is unstressed, so we might transcribe this name as [bʌbə]. Although these two vowels sound very similar for many speakers and could easily be notated with the same symbol, there is a long tradition of

notating the unstressed mid central vowel of English with [ə] and the stressed mid central vowel with [ʌ], based on historical pronunciations in which the stressed vowel used to be pronounced much farther back (and still is, in some dialects).

The symbol [ə] has a special name, **schwa**. A common joke among linguists is that their favourite vowel is schwa or that they wish they could be more like schwa, because it is unstressed, referring to a desire to avoid the typically high amounts of stress in academia. However, while schwa is always unstressed in English and in some other spoken languages, in many others, [ə] is a normal vowel like any other vowel and can be stressed. For example, stressed [ə] can be found in languages like Sḵwx̱wú7mesh (a Coast Salish language of the Salishan family, spoken in British Columbia), Romanian (a western Romance language of the Indo-European family, spoken in Romania), and Mandarin (a Sinitic language of the Sino-Tibetan family, spoken in China and nearby areas). Thus, there is nothing that requires [ə] to be unstressed in general, so you should not think of it an inherently unstressed vowel.

Finally, we consider diphthongs and **syllabic consonants**, which are phones that have consonant-like constrictions in the vocal tract but which function more like vowels within English. Some diphthongs and syllabic consonants of English are given in Table **3.6.5**.

Table **3.6.5**. English diphthongs and syllabic consonants.

symbol	example (stressed)	example (unstressed)	example (end)	description
[aɪ]	b**i**ter	—	s**igh**	low central unrounded to high front unrounded diphthong
[aʊ]	br**ow**ner	—	h**ow**	low central unrounded to high back round diphthong
[ɔɪ]	b**oi**ler	—	s**oy**	mid back round to high front unrounded diphthong
[ɻ̩]	b**ur**ning	int**er**val	s**ir**	syllabic rhotic
[l̩]	—	haz**el**nut	sadd**le**	syllabic alveolar lateral approximant
[n̩]	—	cal**en**dar	sudd**en**	syllabic alveolar nasal stop
[m̩]	—	bott**om**less	seld**om**	syllabic bilabial nasal stop

For the diphthongs, the symbols used here represent a rough average over where they typically start and end, but the actual pronunciation varies quite a lot from speaker to speaker and even for the same speaker. The low starting point for [aɪ] and [aʊ] may be closer to back [ɑ] or front [æ], while the mid back starting point for [ɔɪ] may be closer to tense [o]. Additionally, the hiɡh front ending point for [aɪ] and [ɔɪ] may be closer to tense [i] or the approximant [j], while the hiɡh back ending point for [aʊ] may similarly be closer to tense [u] or the approximant [w].

Syllabic consonants are transcribed by using the syllabic diacritic [̩] under the relevant consonant symbol. However, sometimes these are transcribed with a preceding [ə] instead, so that *hazelnut* could be transcribed either as [hezl̩nʌt] or as [hezəlnʌt]. Syllabic rhotics (also called **rhotacized vowels** or **r-coloured vowels**) are so common that they have their own dedicated symbols: [ɝ] in stressed syllables and [ɚ] in unstressed syllables. Thus, *burning* could be transcribed as [bɻ̩nɪŋ] or [bɝnɪŋ], while *interval* could be transcribed as [ɪntɻ̩vl̩] or [ɪntɚvl̩].

With all of this variation, not just in pronunciation by different speakers, but in transcription choices by different linguists, it can be difficult to figure out what is really intended by a given transcription. This is why when exact phonetic details matter, it is a good

idea not to rely solely on the IPA, but to include prose descriptions, midsagittal diagrams, and other tools that can help clarify exactly what is meant.

Check your understanding

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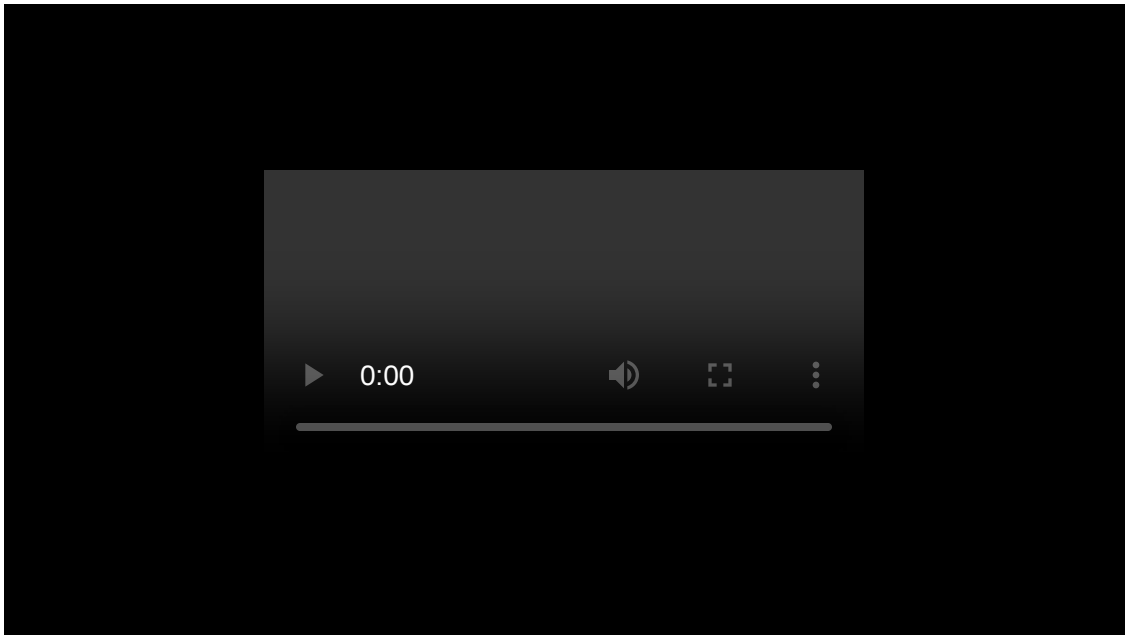
3.7: Signed language articulators

The phonetic units of signed languages

As discussed in Section 3.1, articulatory phonetics is concerned with how the body produces a linguistic signal, regardless of modality. We do not normally want to describe the overall articulation of an entire word in spoken language, so we break it down into phones for easier discussion. So what is the comparable unit for signed languages?

In signed languages, the basic independent meaningful unit, the equivalent of a spoken language word, is generally an individual **sign**. But signs do not seem to have a direct equivalent of phones. Phones are pieces of words that can generally be spoken on their own, completely separate from any other phones. For example, we can take any of the individual phones in the English word [bɛd] 'bed', and say each one on their own. It may be awkward, especially for plosives like [b] and [d], but it is not impossible. The independence of phones from words and each other, as well as their ability to be recombined in different ways to create new words, are key properties of spoken languages.

Now consider the corresponding sign BED in ASL in the following video clip.



Here we see that the sign is formed by configuring the hand in a particular way (flattened out with an open palm) in a particular location (at the side of the head). These traits are inseparable: if we want to shape the hand in some particular way, we must necessarily do so *somewhere*, and similarly, if we want to put the hand in some location, we must necessarily also configure the fingers *somehow*.

In this way, signs seem more like phones than strings of phones. We cannot make an articulation with the tongue tip and alveolar ridge without also deciding how far apart they are, and we cannot articulate a manner of articulation without choosing an active and passive articulator, and thus, without choosing a place of articulation. That is, individual articulatory properties of phones like place and manner are interdependent, in the same way that the shape of the hand and its location are interdependent. But an entire phone itself and an entire sign itself have independent existence from other phones and signs and can be articulated separately from others.

So, the two fundamental units of articulation in signed language that we are concerned with are signs (whole independent words) and the individual articulatory properties of a sign (how various articulators are shaped and moved). Contrast this with spoken languages, where we have three units: entire words, individual articulatory properties (place, manner, etc.), and phones (combinations of articulatory properties that are independent subunits of words). Whether or not signed languages have a corresponding third intermediate unit is a matter of debate. Such a unit may indeed exist, or we may simply be trying to hard to

impose our understanding of spoken languages onto signed languages. See Section 3.10 for discussion of syllables as a possible kind of intermediate organizational unit that both spoken and signed languages seem to have.

Notation of signs

In academic writing, linguistic units from spoken languages are often given in italics, with the **gloss** (meaning) in single quotes, while signs from signed languages are often given in all capitals or small capitals. So we would write *bed* when referring to the English word and *lit* 'bed' when referring to the equivalent French word, but we would write BED or BED when referring to the equivalent sign in ASL.

When writing about ASL using English, it makes sense to use English to write ASL signs, but what should do when writing in English about a signed language like Quebec Sign Language (langue des signes québécoise, abbreviated LSQ) or Turkish Sign Language (Türk İşaret Dili, TİD), which do not have the same connection to English that ASL does?

One option is to write the sign in English (or whatever language you are writing in). So, just as we would write about the ASL sign BED, we would also write about the LSQ sign BED and the TİD sign BED. Another option is to write the sign by switching to the ambient written language most connected to that signed language, and add a gloss in English. In this case, LSQ has a connection to French and TİD has a connection to Turkish, so while we would write about the ASL sign BED, for the other two signs, we would write about the LSQ sign LIT 'bed' and the TİD sign YATAK 'bed', using the French word *lit* and the Turkish word *yatak*. Both options have advantages and drawbacks, and you will see both used in the linguistics literature, though the first option is perhaps the most common.

For signed languages, we have two main categories of articulators to analyze the properties of. The **manual articulators** are the arms, hands, and fingers, which are the primary articulators used for signing. However, most of the rest of the body is also used in signed languages, especially the torso, head, and facial features. All of these other articulators are called the **nonmanual articulators** or sometimes just **nonmanuals**.

Manual articulators

The manual articulators move by means of **joints**, which are points in the body where two or more bones come together to allow for some kind of movement. There are six joint types in the manual articulators: **shoulder**, **elbow**, **radioulnar joint** (or simply **radioulnar**), **wrist**, **base knuckles**, and **interphalangeal joints** (or simply **interphalangeal**), arranged as shown in Figure 3.7.1.

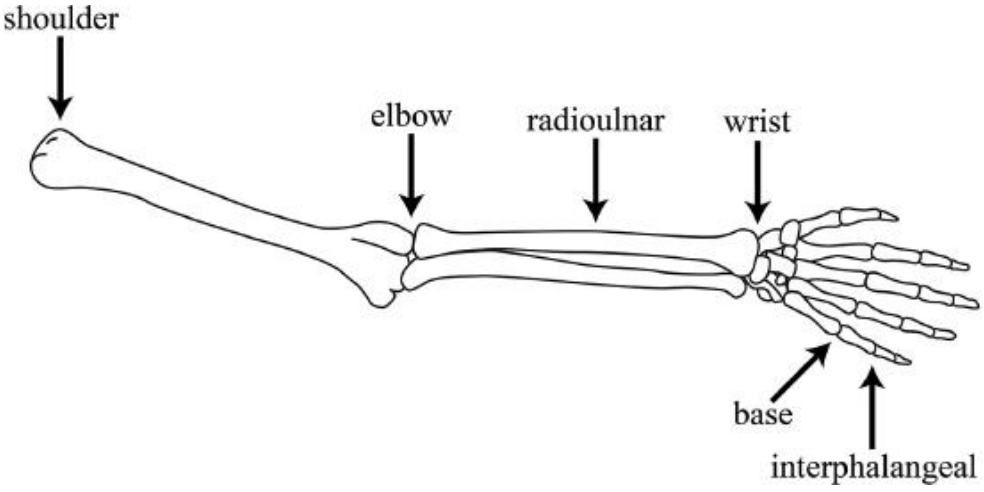


Figure 3.7.1: Joints in the manual articulators.

Shoulder articulation

The shoulder rolls around inside the shoulder blade, allowing for a wide range of motion for the upper arm, as shown in Figure 3.7.2. The motion we use for jumping jacks, with the arms making up and down arcs out to the left and right of the torso is called **abduction** (for the upward/outward direction) and **adduction** (for the downward/inward direction). The motion for raising and lowering the arm up in front of us is **flexion** (for raising) and **extension** (for lowering). Finally, the shoulder can keep the upper arm

in a fixed position while changing the position of the forearm through **rotation**. Movement at the shoulder joint can be any combination of these three kinds of movement.

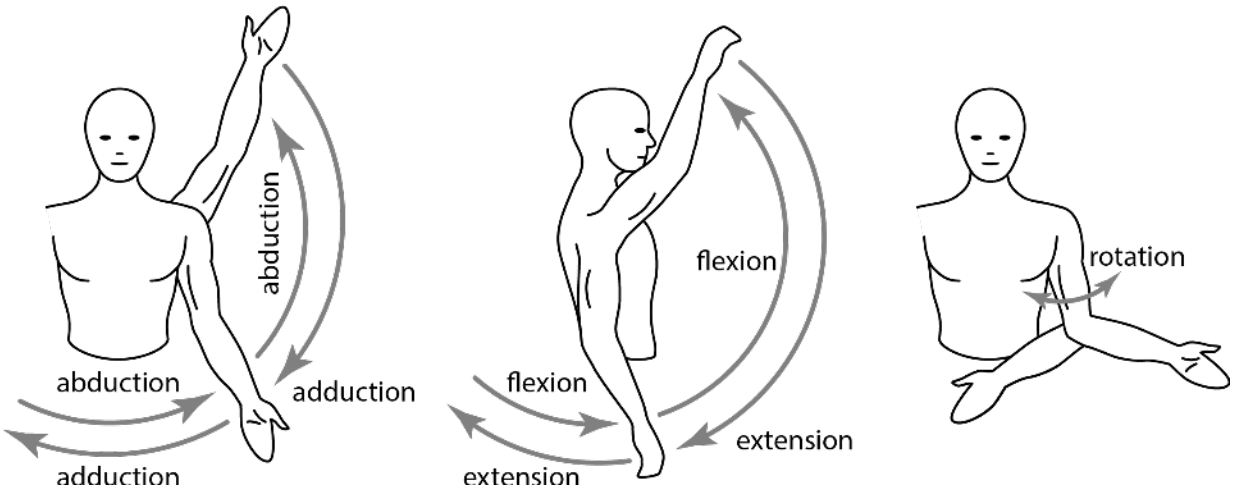


Figure **3.7.2**: Shoulder movement.

Elbow articulation

The elbow is the joint between the upper arm and forearm, and it has a more restricted range of motion than the shoulder, allowing only flexion (bending to bring the forearm closer to the upper arm) and extension (bending the opposite way), as shown in Figure **3.7.3**. Other kinds of movements at the elbow are heavily restricted or impossible. Note that unlike the shoulder, the elbow cannot typically extend backwards from a hanging position, only from a flexed position.

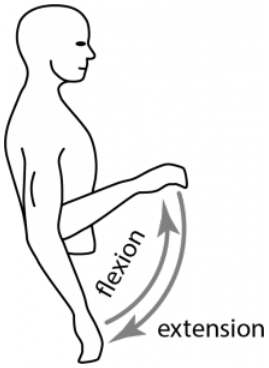


Figure **3.7.3**: Elbow movement.

Radioulnar articulation

The forearm contains two large bones, the **radius** (which is on the the thumb side of the arm) and the **ulna** (on the pinky side). The radius and ulna come together in three different places for three different kinds of movement: at the elbow, at the wrist, and in the middle of the forearm. All three of these points of movement are considered radioulnar joints biologically and have separate names (the superior radioulnar joint at the elbow, the inferior radioulnar joint at the wrist, and the medial radioulnar joint inside the forearm), but in the context of signed language phonetics, we normally only need to talk about one of them, since their movements are all connected. By convention, the one we discuss is the medial radioulnar joint, where the radius and ulna pivot around each other, allowing the forearm to rotate, as shown in Figure **3.7.4**.

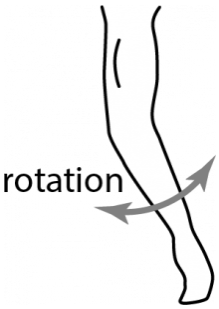


Figure 3.7.4: Radioulnar movement.

Wrist articulation

The wrist is the joint between the forearm and the hand, and it is almost as mobile as the shoulder, as shown in Figure 3.7.5, allowing for abduction (sideways towards the thumb), adduction (sideways towards the pinky), extension (bending backwards), and flexion (bending forwards), but no rotation. Note that what we might initially think of as rotation at the wrist is actually due to radioulnar articulation. Like the shoulder, the wrist can typically extend backwards from a straightened position.

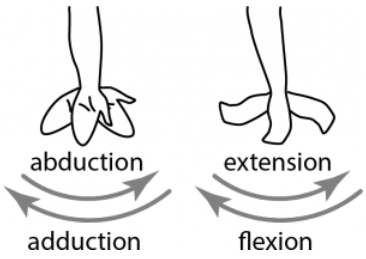


Figure 3.7.5: Wrist movement.

Base knuckle articulation

The base knuckles are the joints where the fingers connect to the palm of the hands. Like the wrist, these joints allow for abduction, adduction, extension, and flexion, but no rotation, and like the elbow, the base knuckles cannot typically extend very far backward from a straightened position. The main movements available for the base knuckles are shown in Figure 3.7.6. Each base knuckle can generally move independently of the other, though some movements are more difficult than others.

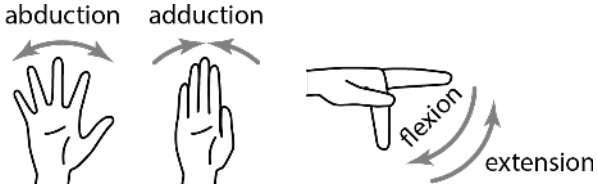


Figure 3.7.6: Base knuckle movement.

Interphalangeal articulation

The interphalangeal joints are the various joints between the individual bones within the fingers. The thumb has only one interphalangeal joint, while the other four fingers have two interphalangeal joints each. Most humans cannot easily articulate the two interphalangeal joints of the same finger separately, so they are usually analyzed together for the purpose of describing signed language articulation. Like the elbow, the interphalangeal joints can only extend and flex, as shown in Figure 3.7.7, and they typically cannot extend backward very much from a straightened position.

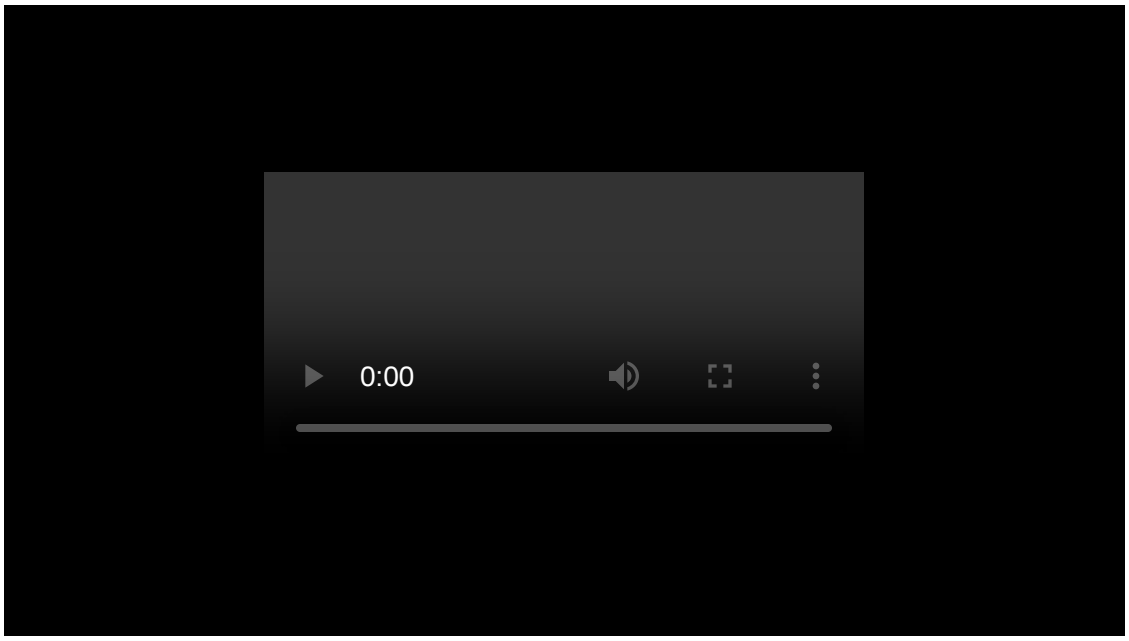


Figure 3.7.7: Interphalangeal movement.

Describing manual movement

An important aspect of describing manual movement in a sign is being able to identify which joints are moving and what kind of movement they are using. This can be quite difficult, because many signed language articulations involve multiple joints moving in different ways. In the following discussion, we explore a few example signs from ASL to determine what kind of movement is occurring.

Consider the ASL sign SORRY in the following video clip.



First, note that the hand must raise up to the chest before the sign begins. This movement does not really count as part of the sign. It is similar to how phones are articulated. In order to make an alveolar plosive like [t], the tongue tip must move to make full contact with the alveolar ridge. The initial movement to the alveolar ridge is not part of [t] itself, but it is necessary incidental movement to get ready to articulate [t]. We can tell that this initial movement is not an inherent part of [t] because of the behaviour of words like *ant* [ænt]. Since the tongue tip is already on the alveolar ridge for [n], we do not need to move it away and then move it back for [t]; we just keep it in place on the alveolar ridge, because that is what is inherent to [t].

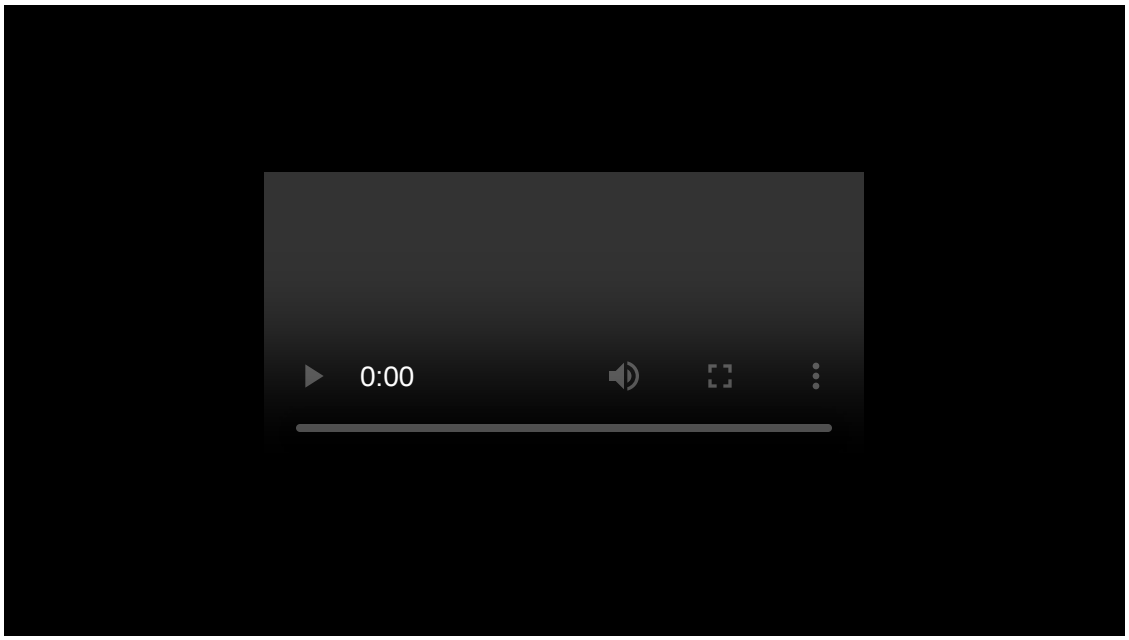
The same is true for the initial positioning movement for SORRY, as well as the final movement to return the hand to its lower starting position. When describing the articulation of a sign, we normally only care about the core movement that happens during the sign itself, not the transitional movements into or out of the sign. Sometimes, it may be difficult to determine whether a given movement is an incidental transitional movement or is instead inherent to the sign, but most of the time, it should be clear what initial and final movements can be ignored.

Now consider the articulation of the hand. It is shaped into a rigid fist, which requires flexing the base knuckles and the interphalangeal joints (except for the thumb, which is extended). However, this is a fixed configuration, not a movement, so we can ignore those joints when describing movement. The actual movement is the hand tracing a small circle on the chest. There seems to be no significant movement at the wrist or radioulnar joints, since the entire forearm down through the hand and fingers all act as a single fixed unit. Thus, we can also ignore these two joints as well.

That leaves the elbow and shoulder as our joints of interest for manual movement in SORRY. Looking carefully at the elbow, we see that it flexes and extends slightly during the circle, causing a change in the angle between the upper arm and forearm. In addition, the elbow itself also changes position in space, moving a bit out to the signer's right side and back again. This cannot be due to elbow movement, since joint movement cannot change the position of a joint itself; if a joint moves through space, it must be because some other joint is moving it. The only joint we have left is the shoulder, so this must be what is responsible for the elbow changing location. The relevant shoulder movement appears to be a small amount of abduction and adduction, perhaps combined with very slight flexion and extension as well.

So, to describe the movement in the ASL sign SORRY, we would say there is both elbow and shoulder movement, and if we need to be more precise, we would say that there is repeated flexion and extension of the elbow, and repeated abduction and adduction of the shoulder, and perhaps also some amount of repeated flexion and extension of the shoulder.

Next, consider the ASL sign APPLE in the following video clip.

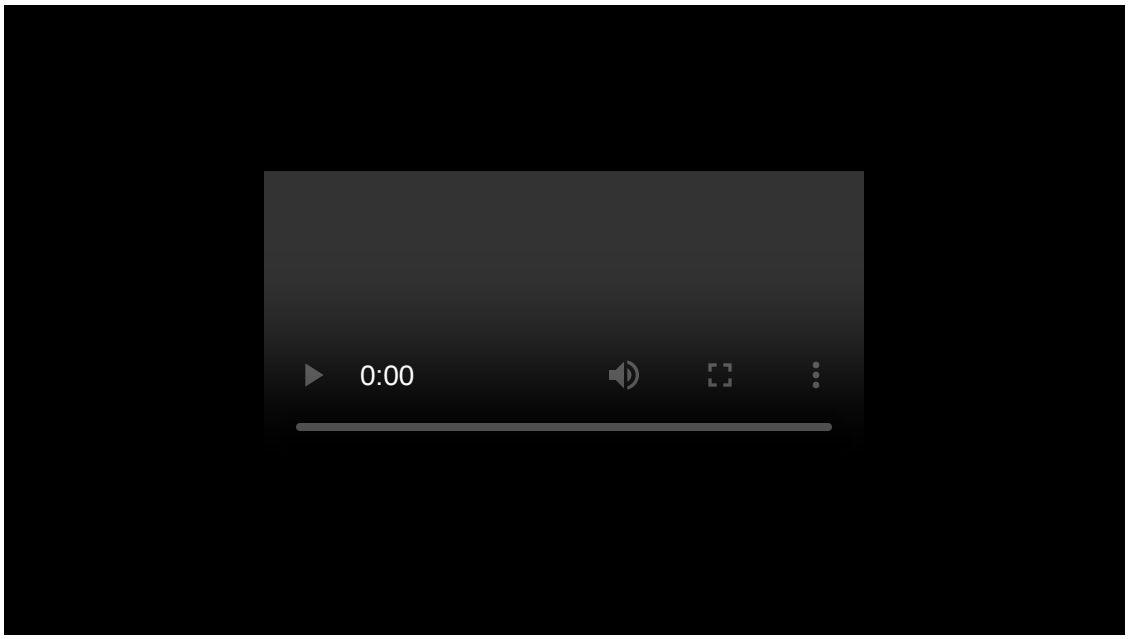


Again, we must ignore the transitional movements into and out of the sign, and as with SORRY, we see that the hand in APPLE is in a fixed shape, this time with the index finger extended at the base knuckle but flexed at the interphalangeal joints, while all of the other fingers are closed loosely together with flexed base knuckles and interphalangeal joints. All of these joints stay in their position throughout the sign, so we can ignore them for describing movement.

Where we do see movement is rotation of the forearm. We know that the wrist cannot rotate, so this must be due to radioulnar rotation. There is no other movement in APPLE, so we can ignore the elbow and shoulder joints.

Thus, for APPLE in ASL, we would say that it has radioulnar movement only, and more precisely, that it has repeated radioulnar rotation.

Finally, consider the ASL sign CHOOSE in the following video clip.



For CHOOSE, the initial transitional movement almost looks like it could be part of the sign, with the hand raising, then flicking backward, as all part of one motion. In this particular case, we will ignore this initial raising, but in general, and it can be difficult to know whether to ignore it or not.

The core movements that we are concerned with here are the movements of the fingers and the backward wrist flick. For the finger movement, we see that the index and thumb come together in a pinching motion. This requires flexion of the base knuckles to bring the two fingers together, and perhaps a very small amount of interphalangeal flexion as the finger and thumb bend very slightly rather than staying perfectly straight. The backwards wrist flick is articulated by extending the wrist backward. There is no radioulnar twisting and no notable elbow or shoulder movement.

Thus, for CHOOSE in ASL, we would say that it has base and radioulnar movement, and perhaps some minor interphalangeal movement, and more precisely, that it has non-repeated base (and maybe interphalangeal) flexion and wrist extension.

Nonmanual articulators

The rest of the body, the nonmanual articulators, especially the torso and the parts of the face, have complex and varied movement, such as eye gaze changes, eyelid narrowing and opening, eyebrow raising and lowering, torso leaning and rotation, head tilting and rotation, cheek puffing, lip rounding and spreading, teeth baring, etc. Nearly any other body part can be a nonmanual articulator, even the feet and buttocks in some signed languages, such as Adamorobe Sign Language in Ghana (Nyst 2007) and Kata Kolok in Indonesia (Marsaja 2008).

The ASL sign SORRY has some of these nonmanual articulations. The signer furrows his brow, pushes his lips together, slightly puffs his cheeks, and gives a slow head shake. All of these nonmanual movements are part of the sign. For any given sign, the nonmanual articulations may not all be necessary to understand the sign, but they are still part of its articulation.

Nonmanual articulation is beyond the scope of an introductory textbook like this, but it plays a crucial role in signed languages and cannot be ignored in a full analysis of signed languages. This is one of the drawbacks for tools like “signed language gloves” that supposedly translate signed language movements into text or speech. These devices regularly appear in popular media; a typical example is presented in Chin 2020. Since these gloves only capture some aspects of manual articulation, but no nonmanual articulation at all, they cannot fully translate signed languages. See Hill 2020 for further discussion of this issue, in particular, the need to directly involve deaf people when designing any kind of signed language technology, to ensure that the technology is actually useful to deaf people.

Check your understanding

References

Chin, Matthew. 2020. Wearable-tech glove translates sign language into speech in real time. UCLA Newsroom. https://newsroom.ucla.edu/releases/glove-translates-sign-language-to-speech

Hill, Joseph. 2020. Do deaf communities actually want sign language gloves? *Nature Electronics* 3(9): 512–513.

Marsaja, I. Gede. 2008. *Desa Kolok — A deaf village and its sign language in Bali, Indonesia*. Nijmegen: Ishara Press.

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3.8: Describing signs

Signed language parameters

Many of the possible types of manual articulations occur so frequently in certain combinations that we can describe them in more efficient ways. We begin by dividing the various manual articulations into four main categories, often referred to collectively as **parameters** (also called **primes**):

- **handshape**: how the base knuckles and interphalangeal joints are configured
- **orientation**: the direction the hand is facing due to the configuration of the other four joints (wrist, radioulnar, elbow, and shoulder)
- **location**: where in space or on the body a sign is articulated
- **movement**: how the manual articulators move

Handshape

The static configuration of the base knuckles and interphalangeal joints in a sign is called its **handshape**. A handshape can be identified by which fingers have which of their base knuckles and/or interphalangeal joints flexed and by how much, as well as whether there is any abduction or adduction of the base knuckles. For example, we could describe the handshapes in Figure **3.8.1** with the given descriptions.

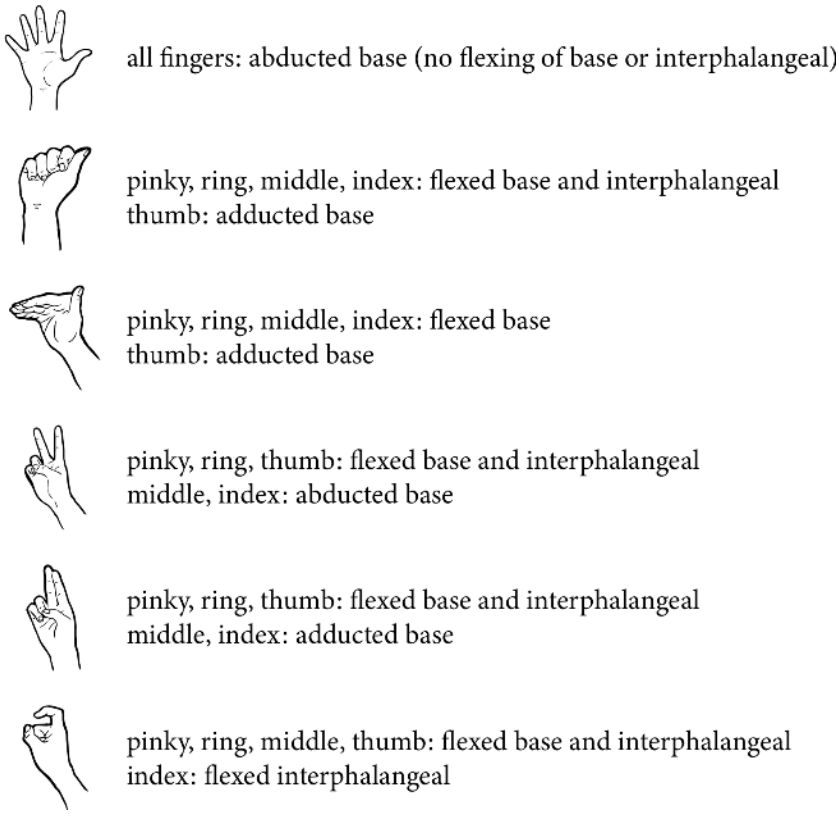


Figure **3.8.1**: Various handshapes and their detailed descriptions of base knuckle and interphalangeal articulation.

However, these kinds of prose descriptions are a bit cumbersome, just like constantly writing “voiceless postalveolar fricative” for the phone [ʃ]. When possible, handshapes are often graphically depicted with iconic pictures like those in Figure **3.8.1**. However, these are not always easily available in certain media, so other solutions may be needed.

Since many handshapes are used to represent numbers or letters from the writing system of the ambient spoken language, a common solution is to use numbers and letters as convenient shorthand labels, somewhat like the IPA. Thus, since the first handshape in Figure 3.28 is used to represent FIVE in ASL, we could call this handshape the “5 handshape”. Similarly, the second handshape in Figure **3.8.1** is used to represent the English letter <S> in ASL, so it can be called the “S handshape”.

However, this system has to be used with caution. The S handshape is used in ASL to represent the English letter <S>, but in Swedish Sign Language (Svenskt teckenspråk, STS), the same handshape represents the Swedish letter <G>. In a discussion in English about STS, the term *S handshape* could be confusing if it has not been made clear which specific handshape it refers to. This is not an isolated problem. There are many other mismatches between these two languages, as shown in Figure **3.8.2**, and of course, there are similar mismatches across signed languages generally.

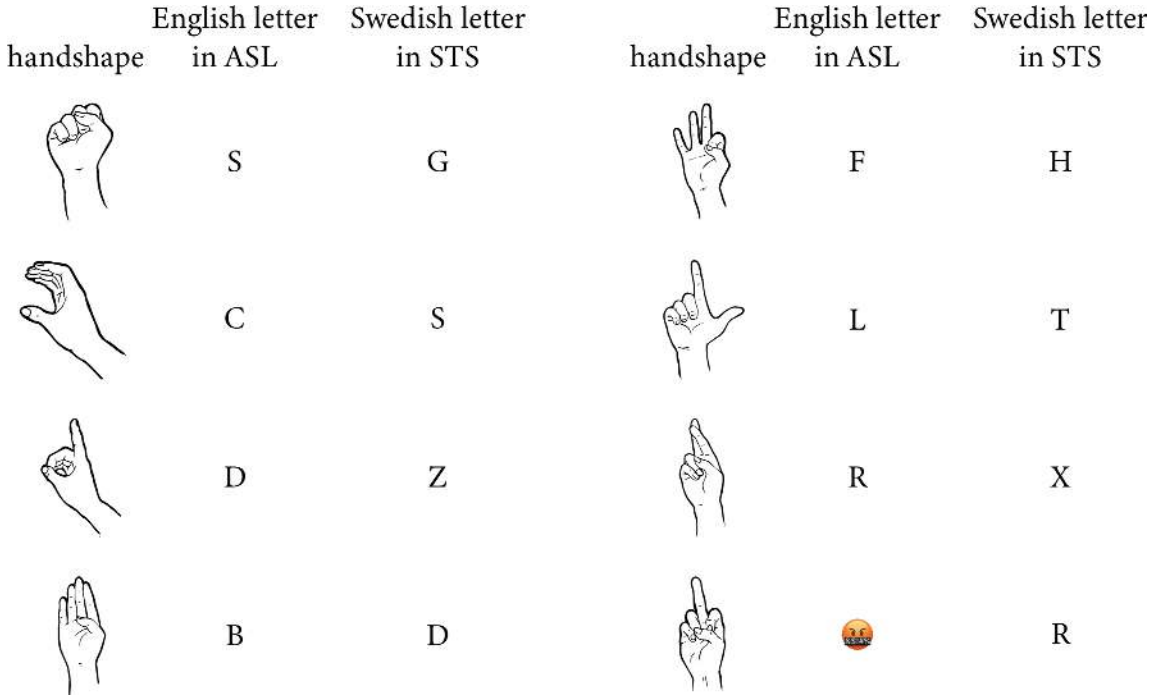


Figure **3.8.2**: Differences between ASL and STS in handshape meanings.

This issue is further complicated by the fact that writing systems do not all use the same characters. For example, it would not even make sense to talk about an "R handshape" for Russian Sign Language, because there is no letter <R> in the Russian alphabet. There is a Russian letter that represents a rhotic, but that letter is the Cyrillic character <P>. This letter is represented in Russian Sign Language by the handshape in Figure **3.8.3**, which is the handshape used for EIGHT in ASL! So when discussing many different signed languages in the same text, this way of describing handshapes can be confusing.



Figure **3.8.3**: The handshape for <P> in Russian Sign Language and EIGHT in ASL.

However, even just for a single signed language, there are far more handshapes than are used for numbers and letters. For example, ASL makes frequent use of the first two handshapes in Figure **3.8.4**, but these are not used to represent any number or English letter, although they are similar to the third handshape in Figure 3.31, which is used to represent the English letter <B>.

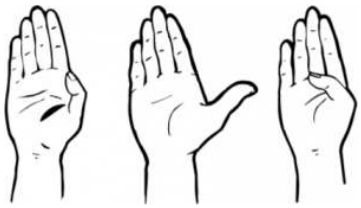


Figure **3.8.4**: Similar handshapes.

For these situations, certain descriptors (*flat*, *open*, *bent*, *closed*, etc.) can be used to describe slight differences between similar handshapes, as in the examples from ASL in Figure **3.8.5**.

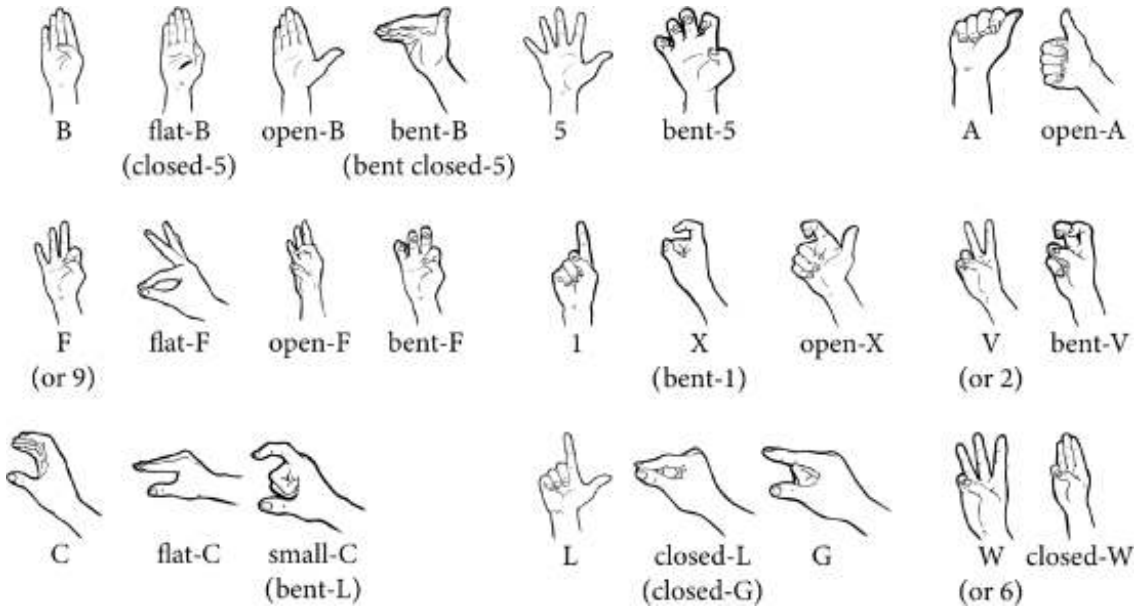


Figure **3.8.5**: Various descriptions for related handshapes.

Because of the problems with this notation and terminology, we will use images where necessary, but we will also use the names typically used for describing handshapes in ASL. Just remember that these names are not universal and would not normally be appropriate when describing handshapes in other languages.

Sometimes, a distinction is made between two types of handshapes. Some of these are called **unmarked** handshapes (Battison 1978), which tend to be the most common handshapes, both across signed languages and within a single language, as well as the earliest ones acquired by children. They are typically the easiest handshapes to both articulate and visually distinguish from each other. They are also often used as default or substitute handshapes in certain circumstances. More recent work argues that the set of unmarked handshapes is probably smaller than previously thought, perhaps containing only the four in Figure **3.8.6** (Henner et al. 2013),

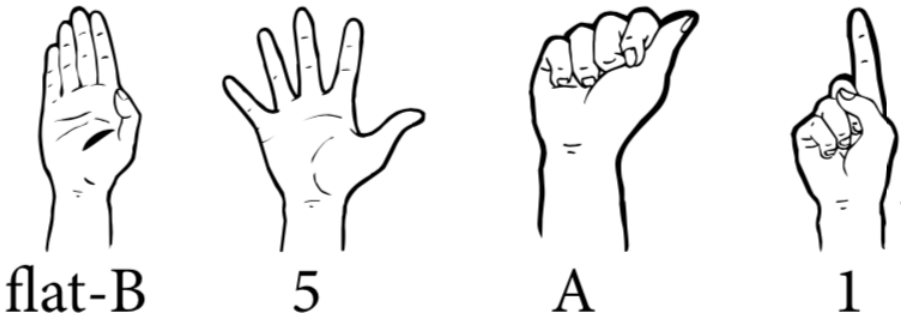


Figure **3.8.6**: Unmarked handshapes.

Marked handshapes are all other possible configurations of the fingers. These are not universal, so a particular marked handshape may be used in some languages but not in others, and when it is used, it may be common in some languages and rare in others.

Orientation

The other four joints (wrist, radioulnar, elbow, and shoulder) can be used to change the orientation of the hand, so that it can face different directions while maintaining the same handshape. For example, the diagrams in Figure **3.8.7** show four different orientations of the flat-B handshape for the right hand as seen by the signer.

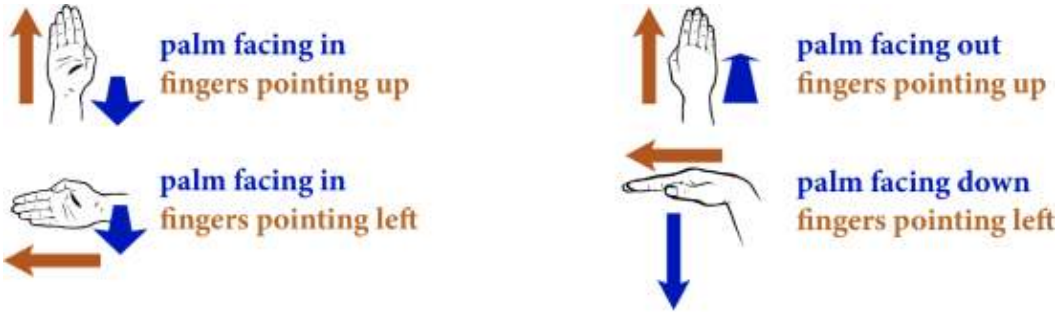
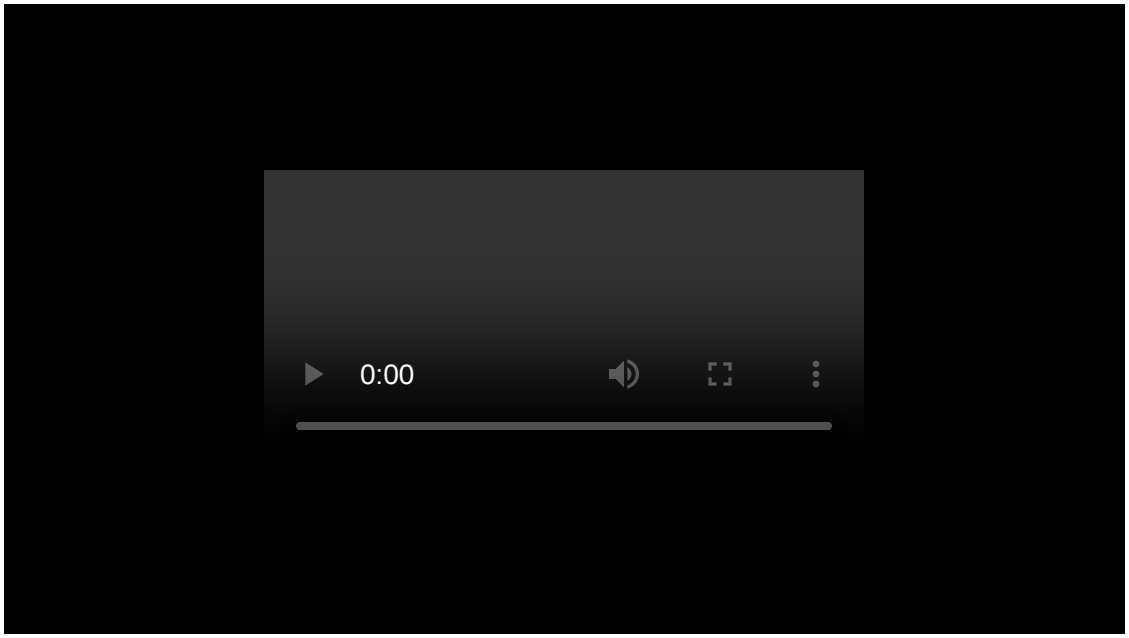


Figure **3.8.7**: Different orientations of the right hand as seen from the signer's point of view.

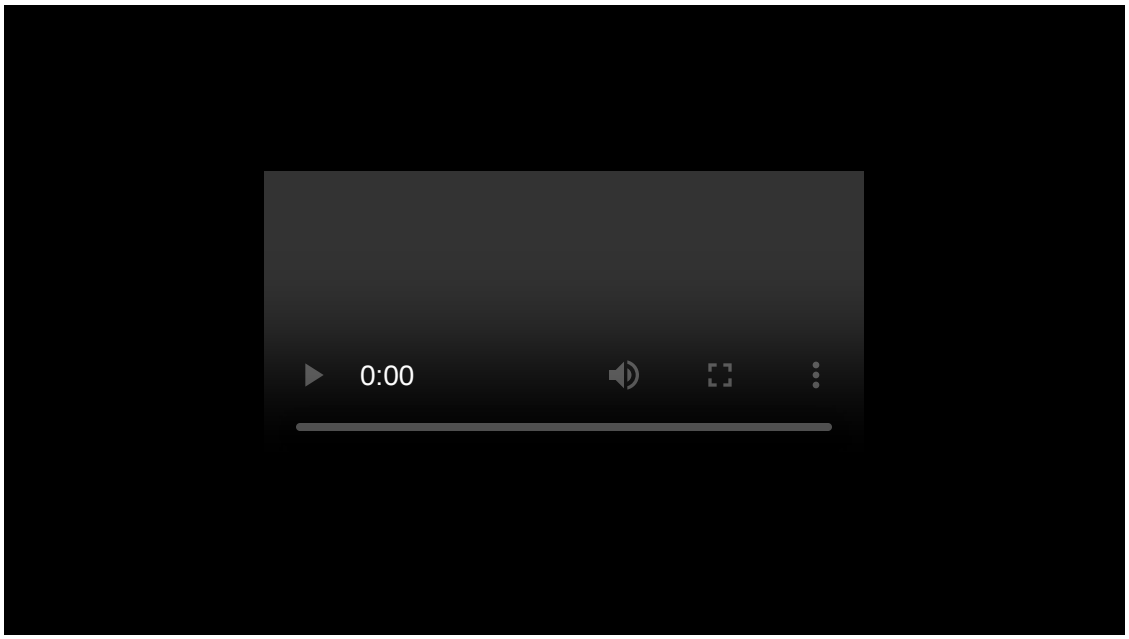
The orientation of the hand is divided into two components: the **palm orientation** (which way the palm is facing, shown in blue in Figure **3.8.7**) and the **finger orientation** (the direction the bones inside the hand are pointing, which is where the fingers would point when straightened, shown in orange in Figure **3.8.7**). Note that if the fingers are bent, the finger orientation may be a bit confusing, but you can determine orientation by straightening out the fingers to see where the fingertips point. Remember that handshape depends only on the base knuckles and interphalangeals, while orientation depends only on the other four joints. Bending at the base knuckles can only change handshape, not orientation.

The orientation of either the palm or the fingers may be described in absolute terms (up, down), or relative to the signer's position (in, out, left, right) or to a particular body part (face, other hand, etc.).

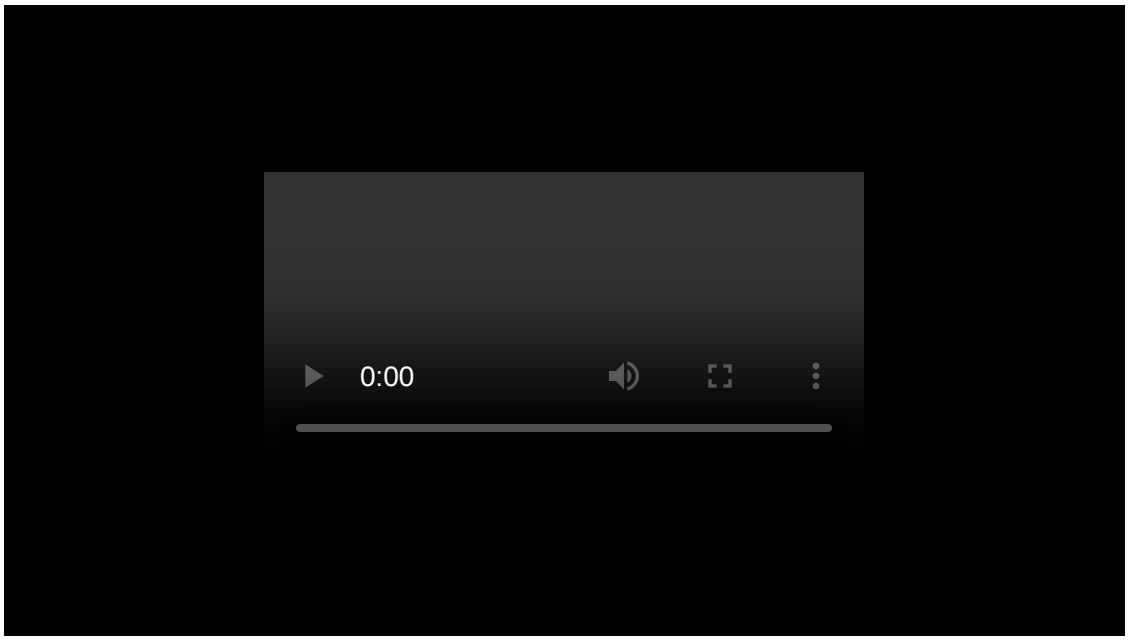
Compare the ASL signs in the following video clips, first YOUR, then THANK-YOU, and finally BED. All three of these signs use the same open-B handshape, but they have different orientations. For YOUR, the palm is oriented out from the signer, and the fingers are oriented up.



For THANK-YOU, the palm is oriented in towards to the signer, and the fingers are oriented diagonally up and to the signer's left.



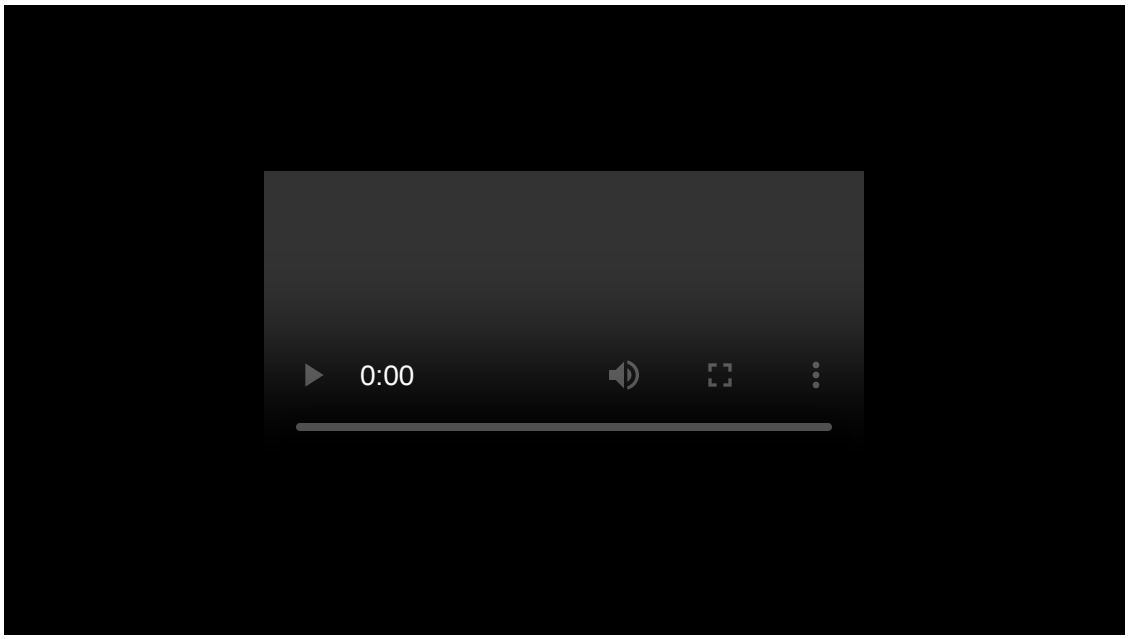
And for BED, the palm is oriented in towards the signer's left cheek, and the fingers are oriented up along the side of the signer's face:



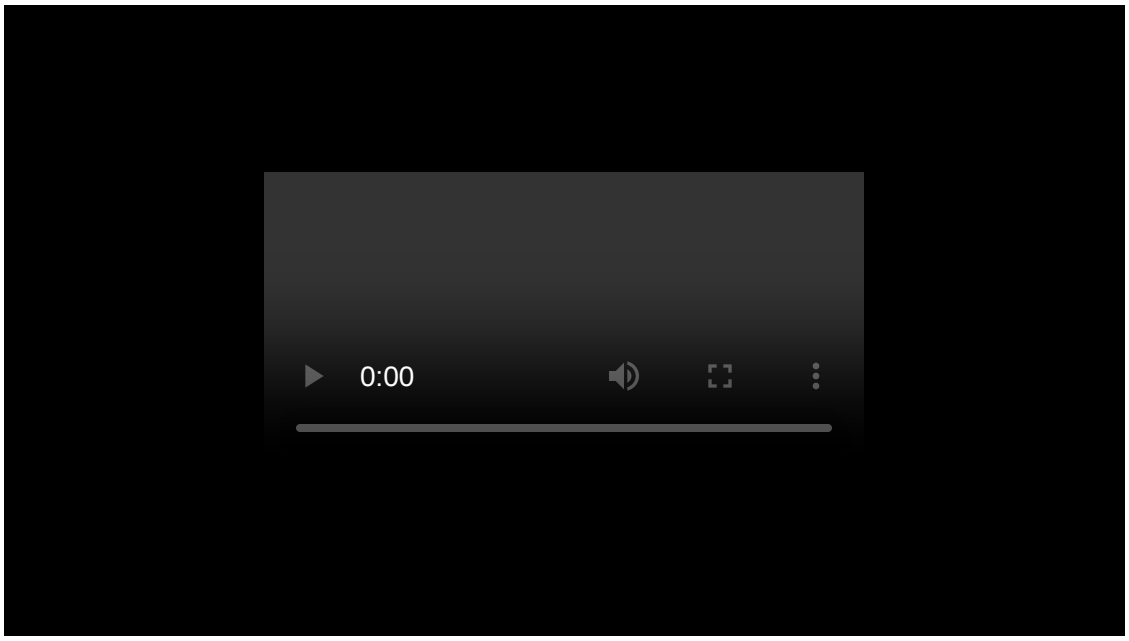
Since the head is tilted in BED, the absolute orientation of the palm and fingers in overall space is diagonal, but in signs like this, what matters is the relative orientation with respect to a specific body part, since the absolute orientation would depend on just how much the head is tilted.

Location

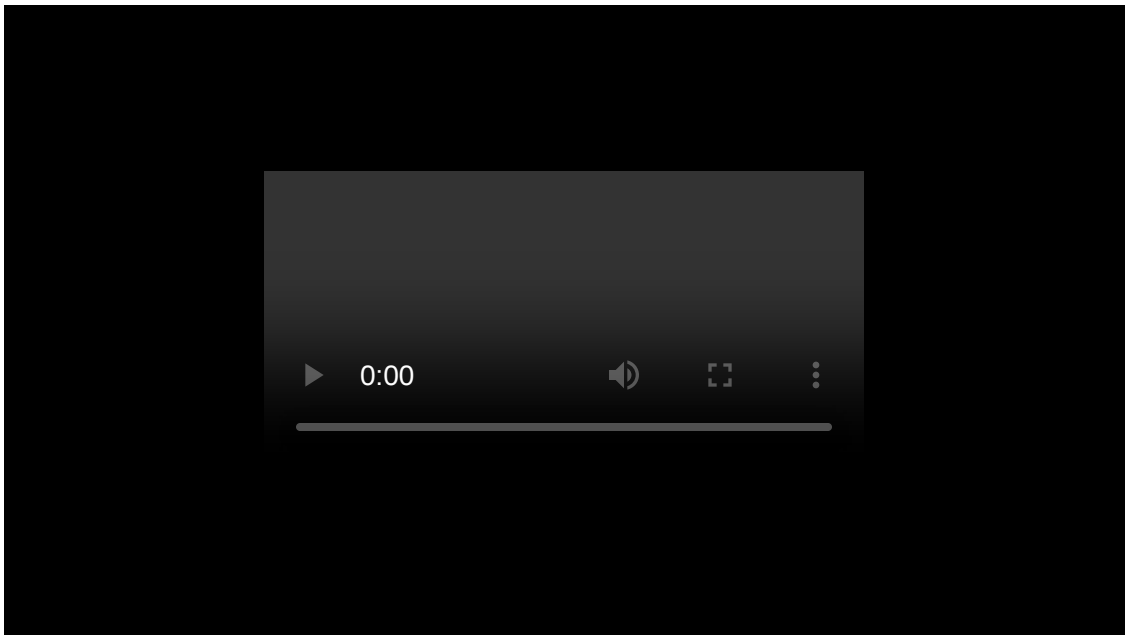
The location of a sign is where in space or on the body it is articulated. Signs can be articulated in a variety of locations. The default location is **neutral signing space**, the area just in front of the signer's torso (as in ASL YOUR), but locations can be nearly anywhere on the body. They tend to be around some specific part of the head (like the chin in ASL THANK-YOU or the side of the face in ASL BED), but other body parts are also possible locations. For example, the chest is the location for the ASL sign MY in the following video clip.



The side of the forehead is the location for the ASL sign KNOW in the following video clip.



And the left hand is used as the location for the ASL sign WARN in the following video clip.



It is very rare for signs to have a location below the waist or behind the body, but these are still possible locations in some signed languages (Nyst 2012).

Movement

All signs have a handshape, an orientation, and a location, and many signs also have movement, which is divided into two types: **path** and **local movement**. Path movement involves articulation at the elbow and/or shoulder, as in THANK-YOU, which starts off on the chin but moves outward along a path into neutral signing space by extending the elbow. Local movement involves articulation at the radioulnar joint, wrist, base knuckles, and/or interphalangeal joints, as in WARN, in which the signer's right hand taps the back of the left hand twice by flexing and extending the wrist.

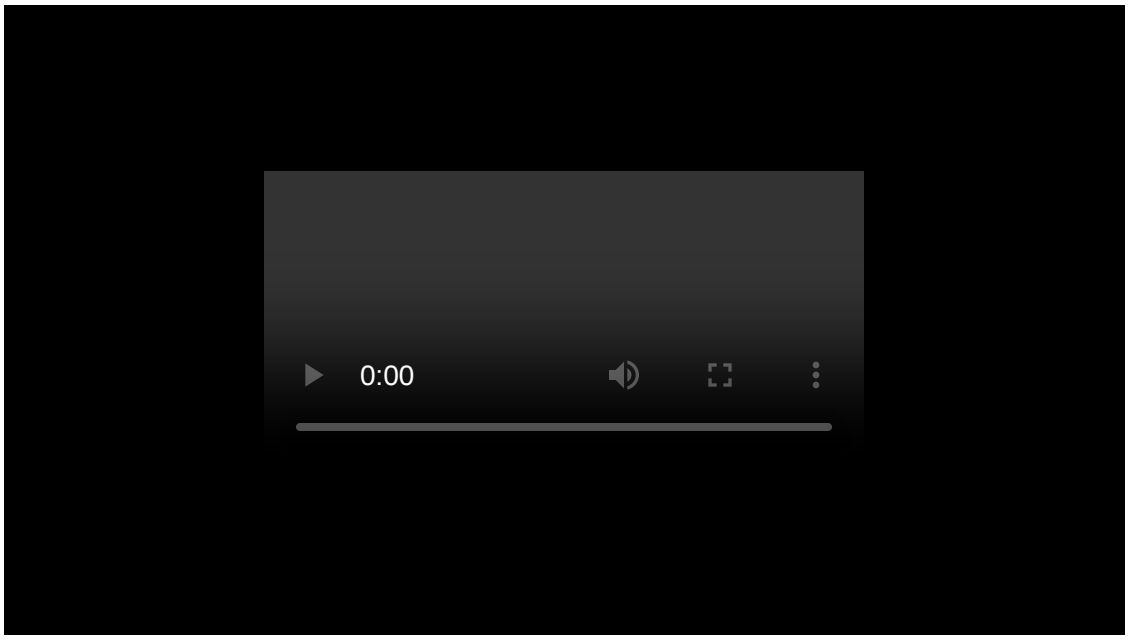
For one-handed signs, like most of those shown in this chapter so far, signers typically use their **dominant** hand, which is the hand used more than the other for many ordinary daily activities like writing and brushing teeth. The signer in these videos uses his right hand. The other hand is called the **nondominant** hand. In two-handed signs, both the dominant and nondominant hands are used. They may be used equally (for example, both moving at the same time in the same way), but in many two-handed signs, like ASL WARN, only the dominant hand moves, while the nondominant hand remains still, usually acting as the location for the sign.

Note that the base knuckles and interphalangeal joints are used for handshape, so any movement at those joints can also change the handshape of a sign. Similarly, any movement of the other four joints can change the sign's orientation or location. Thus, movement is intertwined with the other three parameters, so it can sometimes be difficult to single out how to analyze a given movement.

For example, in ASL THANK-YOU, there is outward movement due to elbow extension as well as a change in location from the chin to neutral signing space. Normally, we describe this by giving the starting location as the actual location, and describe the ending location as part of the movement. Thus, we would say that the location of THANK-YOU is the chin, and that it has an outward path movement to neutral signing space.

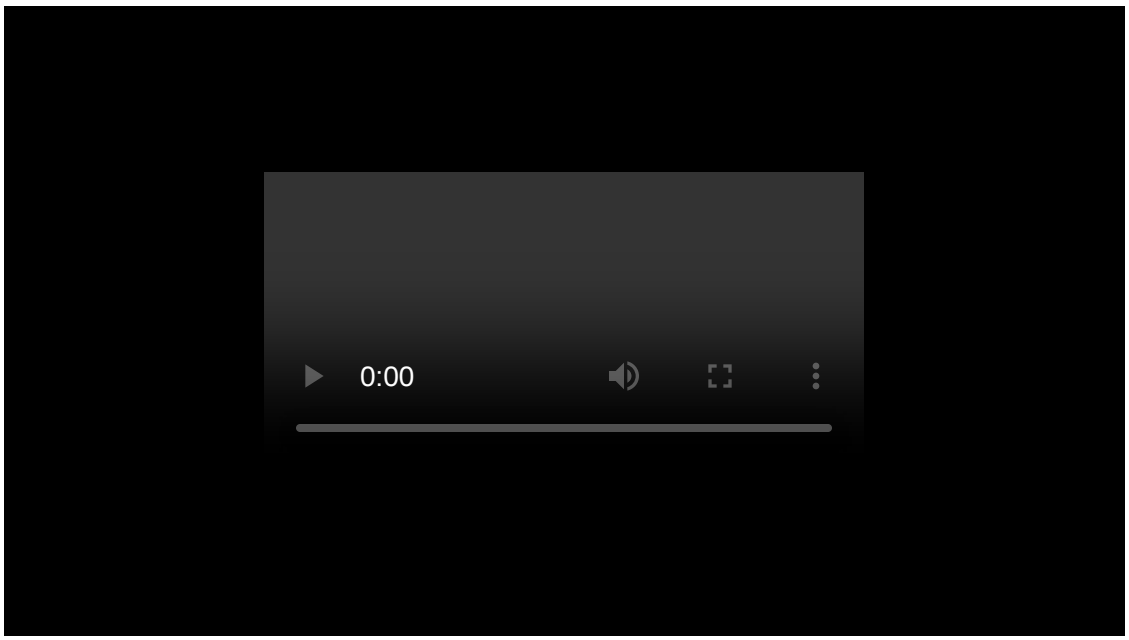
Minimal pairs

Signs which differ in just one parameter are called **minimal pairs**,. An example of a minimal pair in ASL is SORRY and PLEASE, as shown in the video clips below. Note for each how they have roughly the same orientation, location, and movement, but different handshapes. In SORRY, the open-A handshape is used.

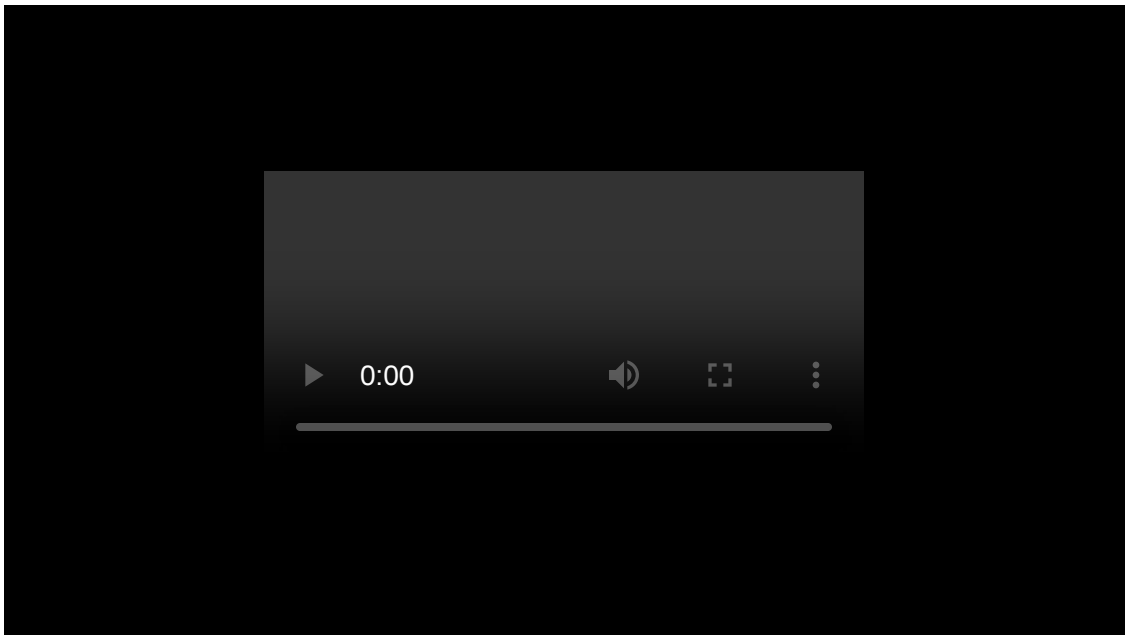


But in PLEASE, the open-B handshape is used, as seen in this linked description and video from the online Handspeak ASL dictionary (Lapiak 1995–2022).

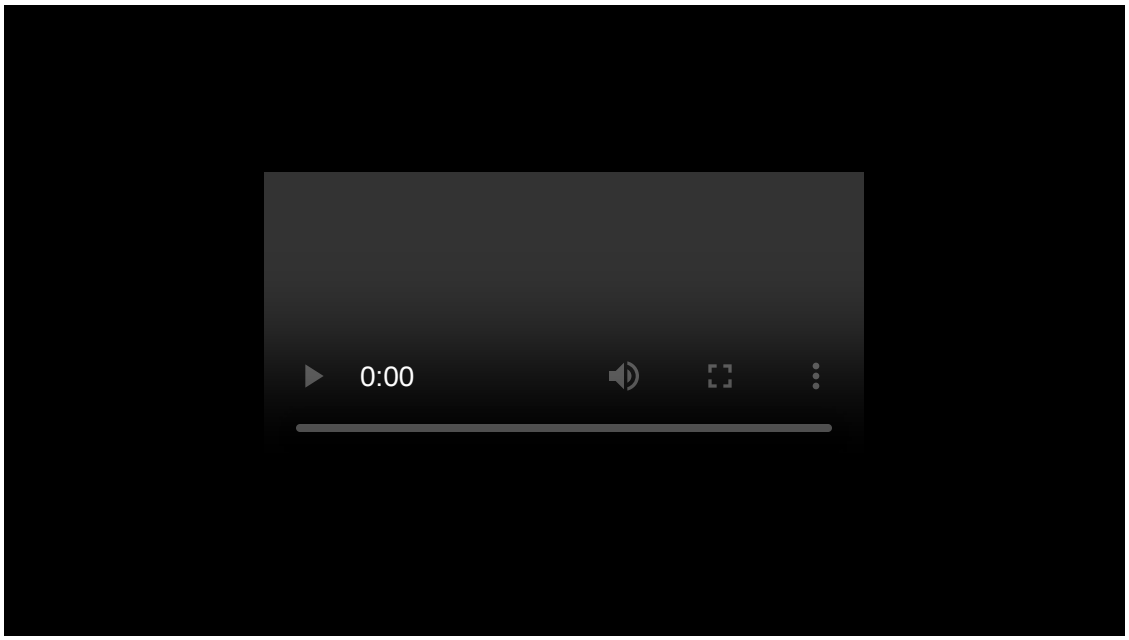
Similarly, minimal pairs also exist for differences in orientation only, such as PROOF versus STOP in ASL, as shown in the following video clips. Note that there is also a slight difference in movement due to the dominant hand bouncing back in PROOF, but otherwise, the two signs have the same handshape, the same location, and mostly the same movement. In PROOF, the dominant hand is oriented with the palm facing up.



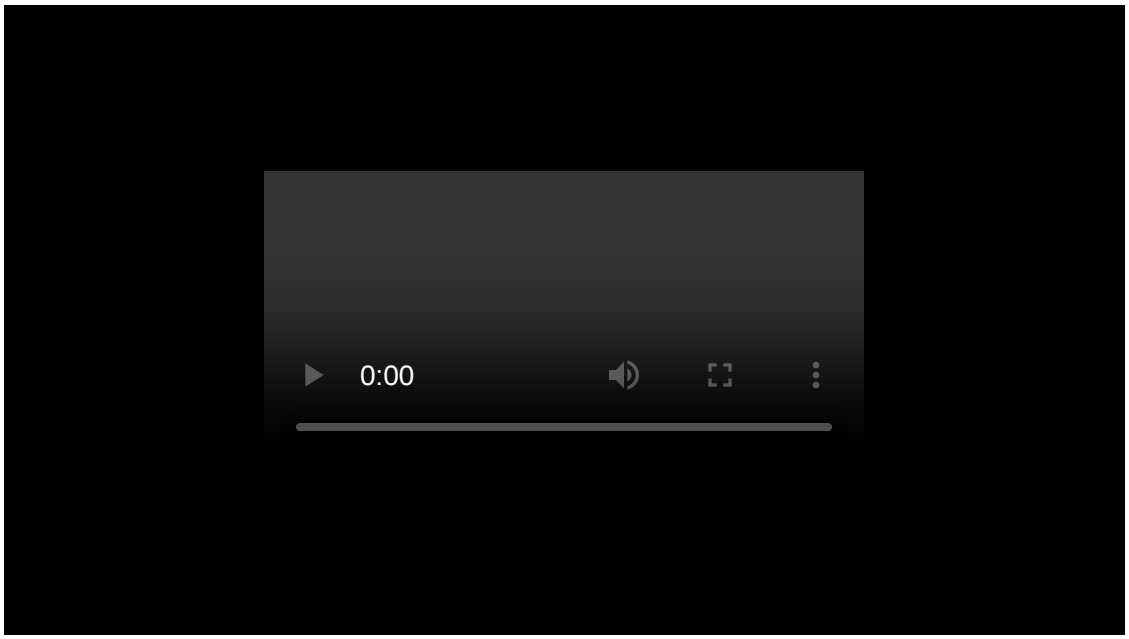
But in STOP, the dominant palm is facing to the signer's left.



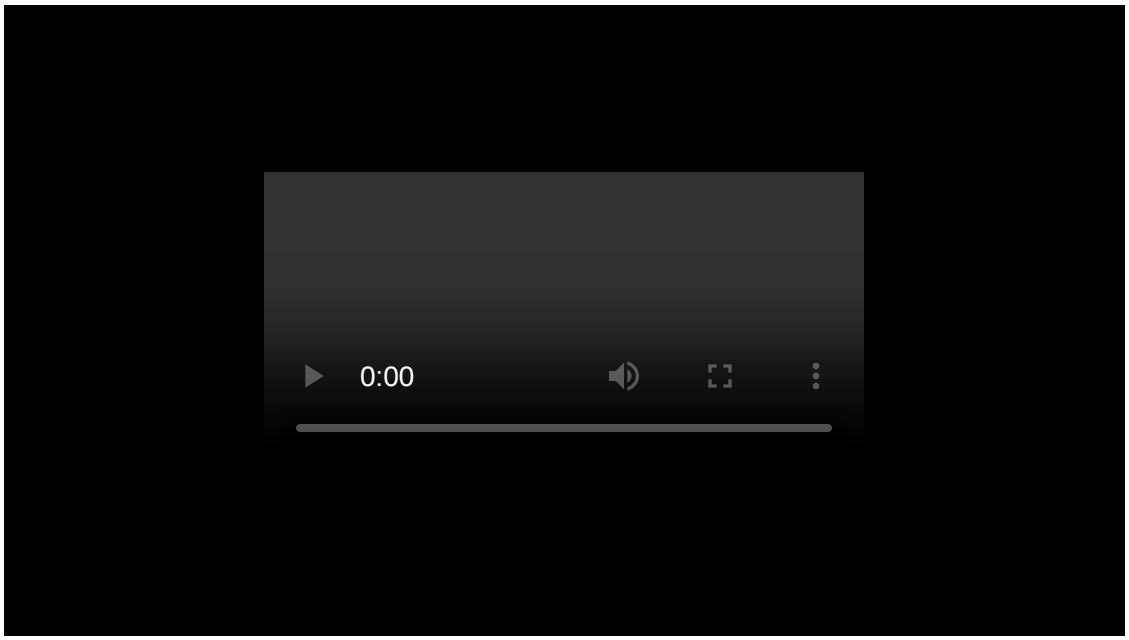
Location can also be a distinguishing factor in minimal pairs, such as with APPLE versus ONION in ASL, as shown in the following video clips. These two signs have the same handshape, the same orientation, and the same movement, but they are articulated at different locations. APPLE is articulated on the cheek.



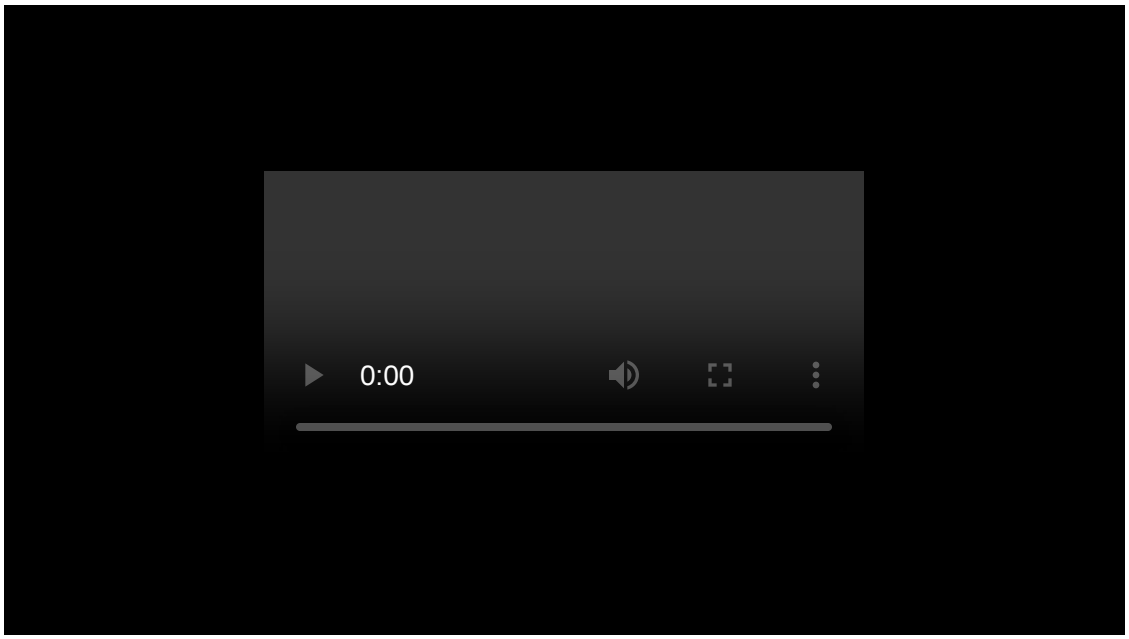
In comparison, ONION is articulated on the side of the head near the eye.



Finally, minimal pairs also exist for movement, such as with THINK versus WONDER in ASL, as shown in the following video clips. These two signs have the same handshape, the same orientation, and the same location, but they differ in how the hand moves. For THINK, the hand moves inward toward the head.



But in WONDER, the hand instead traces a circle near the head.



We will see in Chapter 4 that the concept of minimal pair can be extended to spoken languages, too.

Check your understanding

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3.9: Signed language notation

There is no commonly accepted equivalent of the IPA for transcribing signs. The most historically significant notation system for signs was developed by **William Stokoe** (pronounced [stoki]), whose work (1960, 1965) is also notable for having demonstrated that signed languages have the same kinds of linguistic structures that spoken languages do, effectively kickstarting the entire field of signed language linguistics.

Stokoe's system of symbols, popularly called **Stokoe notation**, divides signs based on the four parameters discussed in Section 3.8, though he originally considered orientation to be a subcomponent of the handshape parameter. Battison (1978) argued that orientation should be its own distinct parameter, and this has become the standard analysis of the internal structure of signs, with nonmanual articulations sometimes considered a fifth parameter.

The Stokoe notation for a basic one-handed sign has the structure LH_O^M where L is the symbol for the location, H is the symbol for the handshape, $_O$ is a subscripted symbol for the orientation, and ^{M} is a superscripted symbol for the movement. Various other marks and symbols can be used to indicate more complex signs (two-handed, changing handshapes, compounds, etc.). A partial list of Stokoe's original symbols is given in Figure **3.9.1**.



Figure **3.9.1**: Sample symbols from Stoke notation.

For example, the ASL sign THANK-YOU could be notated as in Figure **3.9.2**, with the initial curved shape indicating the chin as the location, Ḃ indicating the B handshape with the thumb extended, the downward tick mark ⊤ indicating a palm orientation toward the signer, and an upward tick mark ⊥ indicated movement away from the signer.



Figure **3.9.2**: One possible use of Stokoe notation for ASL THANK-YOU.

Stokoe notation was designed for ASL, so it is not suited for signed languages generally, but the concept of analyzing signs into distinct parameters that underlies this system has influenced all remotely successful subsequent notation systems, such as **SignWriting** (Sutton 1981, 1990) and **Hamburg Notation System (HamNoSys)** (Prillwitz and Schulmeister 1987, Prillwitz et al. 1987, 1989). These two systems have more iconic symbols than Stokoe notation (making them somewhat easier to understand), and they have no inherent ties to ASL (making them more universally applicable).

For example, the SignWriting and HamNoSys symbols in Figure **3.9.3** both represent the same handshape, also shown in Figure **3.9.3**



Figure **3.9.3**:Notation from SignWriting (left) and HamNoSys (centre) for the U handshape (right).

Note how both the SignWriting and HamNoSys symbols iconically represent the extension of the middle and index fingers, as lines pointing out from the closed fist (represented as a square in SignWriting and an oval in HamNoSys). HamNoSys also shows the extra detail of the thumb crossing over the palm, while SignWriting shows the difference in length between the middle and index fingers.

This handshape is used to represent the English letter <U> in ASL, so it is notated by U in Stokoe notation. This relationship between letter and handshape would not transfer to other signed languages, such as Jordanian Sign Language, in which the same handshape is used for the Arabic letter <ت> (Hendriks 2008), which represents the phone [t]. This phone has no relationship to the English letter <U>, so the more iconic SignWriting or HamNoSys symbols would be more meaningful notation than Stokoe notation for representing this handshape when describing languages like Jordanian Sign Language.

Other notation systems for signed languages have been constructed (see Hochgesang 2014 for an overview), but no single consistent standard has emerged, and the systems that do exist can be difficult to work with. For example, they typically require special symbols not available in most fonts, so many people wanting to describe signed languages may not have access to the relevant symbols, and documents describing signed languages may not be reliably readable on different computers. This lack of a consistent standard notation makes the study of signed language phonetics and phonology more difficult.

Check your understanding

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3.10: Syllables

Spoken language syllables

While spoken language words can be decomposed into phones, there seem to be other layers of structure that are relevant to how spoken languages function. One such layer is made up of units called **syllables**. Thus, words can contain multiple syllables, and each syllable can contain multiple phones. Of course, some words may have only one syllable, such as the English words [bæt] *bat* and [prɪnts] *prints*, and some syllables may have only one phone, such as the English words [o] *owe* and [ɔ] *awe*.

As a unit of structure, syllables are often abbreviated with the Greek letter **sigma σ**, and within a transcription, the boundaries between syllables are notated with the IPA symbol [.], as in the transcription [kæ.nə.də] *Canada*. Note that the syllable boundary mark [.] is only needed between syllables; nothing extra is needed to mark the beginning of the first syllable or the end of the last syllable.

The loudest, most prominent position within a syllable is called the **nucleus** (abbreviated here as **Nuc**), which is usually filled by a vowel in most languages. However, some languages, like English, allow **syllabic consonants** in the nucleus, as in the English word [bɹ̩d] *bird* and the second syllables of [bɒ.tl̩] *bottle* and [bɒ.tm̩] *bottom*. Some languages make more extensive use of syllabic consonants, such as Tashlhiyt Berber (a.k.a. Shilha, a Northern Berber language of the Afro-Asiatic family, spoken in Morocco), which allows syllabic sonorants (fairly typical in the world's languages) as well as syllabic obstruents (quite rare in the world's languages), as in the words [tɤ.fl̩] 'she surprised', [tṣ.kr̩] 'she did', [tḇ.dg̬̩] 'it was wet', and [tḵ.ti] 'she remembered (Ridouane 2014).

The remaining phones in the syllable (if any) make up the **margins**: the **onset (Ons)** on the left of the nucleus and the **coda (Cod)** on the right. The margins of the syllable can each be empty, or they may contain one or more consonant phones. A margin with only one phone is called **simple**, and a margin with two or more phones is called **complex**.

Thus, in the English word [ə.proʧ] *approach*, the first syllable [ə] has no onset or coda, while the second syllable [proʧ] has a complex onset [pr] and a simple coda [ʧ] (recall that an affricate counts as a single phone not two).

Syllable structure is often shown graphically in a tree diagram, as in Figure **3.10.1**, with each syllable having its own σ node, connected down to the next level of onsets, nuclei, and codas, which are in turn connected down to the level of the phones that they contain. Sometimes, the word level is also shown explicitly above the syllables, abbreviated here as **Wd**.

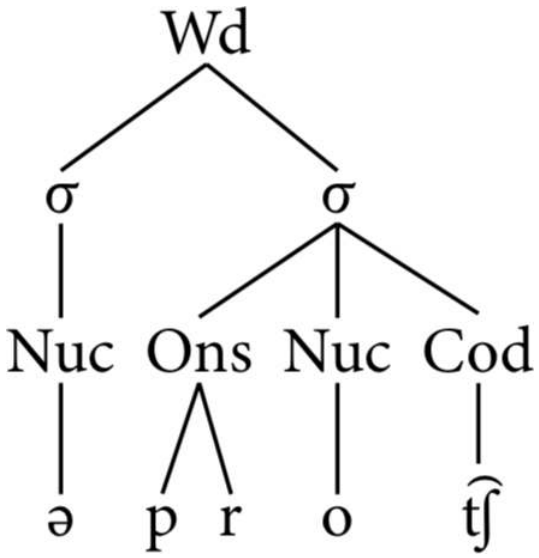


Figure **3.10.1**: Syllable structure for the English word *approach*.

The most common analysis of syllables is that every syllable must have a nucleus, which always contains at least one phone. Though affricates count as a single phone in margins, diphthongs usually count as two phones, but the details of how to treat such complex phones depend on the language and the assumptions underlying the analysis.

Note that while speakers often have consistent intuitions about how many syllables a word has and where the boundaries are, the physical reality of their speech does not always match these intuitions. For example, some English speakers claim that the word *hire* has one syllable [haɪr], while *higher* has two [haɪ.r̩], and yet, when these speakers hear recorded samples of their own pronunciation of these two words, they often cannot reliably distinguish one from the other. Many other English speakers think both words have one syllable or both have two syllables. There are lots of similar English words with this murky behaviour, mostly words with a diphthong followed by an approximant: [aʊr]/[paʊr] *hour/power*, [aʊl]/[taʊl] *owl/towel*, [vaɪl] *vile/vial*, etc.

Because of these and other issues, syllables have a somewhat questionable status. It seems that they are more abstract and conceptual rather than concrete and physical. They seem to be a way for speakers to organize phones into useful linguistic units for the purposes of production or processing, which may not necessarily have a consistent measurable impact on the actual pronunciation. That is, syllables may have psychological reality without having physical reality.

Syllable structure can be notated in plain text without tree diagrams using **CV-notation**, with one C for each phone in the margins and one V for each phone in the nucleus (note that V is typically used in the nucleus even if it represents a syllabic consonant). Thus, the syllable structure of [ə.proʧ] could be represented as V.CCVC rather than with a full tree diagram like Figure 3.38.

A syllable with no coda, such as a CV or V syllable, like English [si] *see* and [o] *owe*, is often referred to as an **open syllable**, while a syllable with a coda, such as CVC or VC, like English [hæt] *hat* and [it] *eat*, is a **closed syllable**. A syllable with no onset, such as V or VC, like English [o] owe and [it] eat, is called **onsetless**. There is no special term for a syllable with an onset.

Crosslinguistic patterns in spoken language syllable types

Spoken languages generally prefer onsets and disprefer codas. This means that it is common for languages to require onsets, but it seems like there are no languages that require codas. Conversely, it is common for languages to prohibit codas, but there are no languages that prohibit onsets. These possibilities can be notated using parentheses to show what is allowed but not required. So we find languages whose syllables are all of the type CV(C); that is, they have a required onset and nucleus but an optional coda. However, there seem to be no mirror image languages whose syllables can all be classified as (C)VC, with an optional onset but a required nucleus and coda.

In addition, spoken languages generally prefer simple margins to complex margins. Thus, in languages that allow codas, some allow only simple codas and prohibit complex codas; if a language allows complex codas, it also allows simple codas. Similarly for onsets: some languages prohibit complex onsets, and if a language allows complex onsets, it also allows simple onsets.

Finally, there seems to be no strong relationships between complex onsets and complex codas: some languages allow complex onsets, some allow complex codas, some allow both, and some allow neither. All together, these trends give us a range of possible languages based on what kinds of syllable structures they allow and prohibit.

Syllabification and sonority

The way that phones are associated to appropriate positions in syllable structure is called **syllabification**. Syllabification is often based at least partially on the **sonority** of the phones, which is an abstract measure of their relative prominence that corresponds roughly to loudness. A **sonority hierarchy** is an ordering of phones by their sonority. Vowels are at the top of scale as the most sonorous phones, which is why they can occupy the privileged nucleus position in a syllable, while obstruents are at the bottom of the scale as the least sonorous, so they are typically relegated to the margins of a syllable.

There are some crosslinguistic patterns in sonority, but languages can differ in how they categorize some phones by sonority, so there is no one true universal sonority hierarchy. Some languages may use sonority to distinguish plosives from fricatives, or voiceless from voiced obstruents, or nasal stops from lateral approximants, and some languages may even have some sonority categories reversed from other languages.

Based on a language's own sonority hierarchy, its syllables usually obey the **sonority sequencing principle (SSP)**, which requires sonority to rise through the onset of a syllable, hit its peak in the nucleus, and then fall through the coda. Thus, the English syllable [plænt] *plant* is a well-formed syllable according to the SSP, because obstruents have the lowest sonority in English, followed by nasal stops, followed by other sonorants, followed by vowels at the top of the sonority hierarchy. Reversing the segments in the onset and coda, to create the attempted syllable *[lpætn], violates the SSP, because the onset has falling sonority rather than rising, and the coda has rising sonority rather than falling. The difference in sonority between these two words is graphed in Figure **3.10.2**.

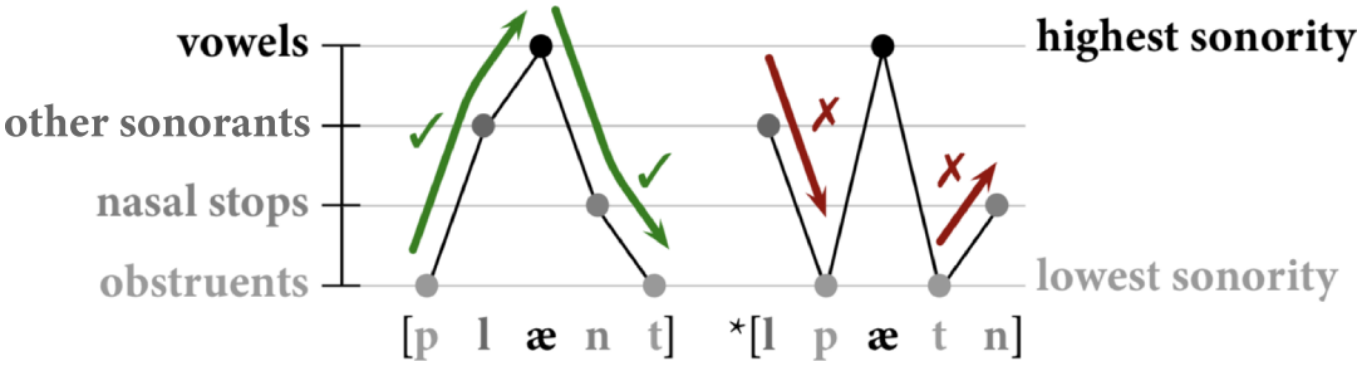


Figure **3.10.2**: Representations of sonority patterns in the English word [plænt] and the attempted English word *[lpætn].

However, the SSP is not absolute. Many languages allow portions of a syllable to have a **sonority plateau** (when two adjacent segments have the same sonority, as in English [ækt] *act*, with two voiceless plosives in the coda), and some may have even looser syllable structure, allowing one or more **sonority reversals**, as in Georgian [ɡvphr͡tskhvni] გვფრცქვნი 'you (singular) are peeling us', which has a single complex onset [ɡvphr͡tskhvn-] which rises from obstruents to the rhotic [r] and then reverses direction to fall back to obstruents before rising again to the nasal stop.

Signed language syllables

As discussed at the beginning of Section 3.8, signs may be able to similarly be decomposed into syllable-like structures. However, it is important to note that the actual structure of signs and signed languages is not derived from spoken languages. Whatever parallels or analogies we might find between the two modalities are incidental, or perhaps derived from some deeper, more abstract cognitive principles of linguistic organization. Crucially, we cannot just directly import the theories and structures of spoken languages into the analysis of signed languages. We have to take into account the differences in modality.

A common analysis of the internal structure of signs is to treat them as sequences of two types of units: **static states** (sometimes called **holds**, **positions**, or **postures**, roughly equivalent to a combination of the location and orientation parameters) and **dynamic states** (essentially the movement parameter) (Liddell 1984, Liddell and Johnson 1986, 1989, Johnson and Liddell 2010, Sandler 1986, 1989, 1993, Perlmutter 1992, van der Hulst 1993), with handshape often being a relatively stable property over an entire syllable (Mandel 1981). The exact nature and composition of these units varies from model to model, but they generally share the same basic division between some type of static unit and some type of dynamic unit.

Many linguists additionally argue that the dynamic units are more sonorous than the static units (Brentari 1990, Corina 1990, Perlmutter 1992, Sandler 1993). In this view, the less sonorous static units are like syllable margins (and thus, comparable to consonants), while the more sonorous dynamic units are like syllable nuclei (and thus, comparable to vowels).

However, there is a lot of disagreement about what kind of syllabic model (if any) is appropriate for the analysis of signed languages. Linguists might just be forcing signed languages to fit within their understanding of how spoken languages work, or maybe there could genuinely be something more fundamental that underlies both signed and spoken languages that results in something like syllables as a natural organizational unit in both modalities. This is still a rich and open area of study in linguistics with many unanswered questions.

Check your understanding

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3.11: Stress

The phonetics of stressed syllables

As an organization unit, syllables play a role in the overall rhythm and flow of language, especially by having some syllables be **stressed**, which gives them more prominence in the linguistic signal. In spoken languages, stressed syllables are often articulated with some combination of increased loudness, longer duration, and/or higher pitch. To the extent that signed languages have syllables, they also seem to have stressed syllables, which are typically articulated with greater muscular tension, quicker movements, and/or longer holds (Supalla and Newport 1978, Klima and Bellugi 1979). However, languages can vary quite a lot in exactly which phonetic properties are used for stressed syllables.

Spoken languages are sometimes classified based on whether they are “stress-timed” or “syllable-timed”, which means that roughly the same amount of time passes between stresses or between syllables, respectively. However, despite widespread belief in this classification among non-linguists and even many linguists, it does not in fact appear to be supported by any phonetic reality, so it is best avoided. See Pamies Bertrán 1999 for an overview of the issue and data that contradict this classification.

Degrees of stress

Stress in signed languages is still under-researched, but since signs typically only have one or two syllables, there is not much room for complex stress patterns in signed languages. However, in spoken languages, words can easily have many syllables, such as the English word *internationalization*, which has eight syllables, or the German word *Kraftfahrzeughaftpflichtversicherung* ‘motor vehicle indemnity insurance’, which has nine syllables. Even with just three or four syllables, there is room for multiple degrees of stress within a single word. In most spoken languages, usually there is exactly one syllable per word with the highest degree of stress, which is called **primary stress** and is marked in the IPA with an **upper tick mark [ˈ]** before the onset of the syllable with primary stress.

All other stressed syllables can be said to have **secondary stress**, which marked in the IPA with a **lower tick mark [ˌ]** before the onset of the stressed syllable (note that this diacritic is distinct from the syllabic diacritic [ˌ] which always goes *under* a symbol; the secondary stress mark [ˌ] always goes *before* a symbol). The remaining syllables are **unstressed**, which has no dedicated IPA symbol.

We can see all three levels of stress in the word [ˈbʌ.niˌhʌg] *bunny hug*, which is used in Saskatchewan English to refer to a hoodie. Note that the stress marks are used at syllable boundaries, so no [.] is needed to mark a syllable boundary in a position where [ˈ] or [ˌ] are used.

Stress is commonly marked instead with non-IPA diacritics, with accent marks over the nucleus (or over σ when discussing stress patterns across syllables generally): the **acute accent [ˊ]** for primary and the **grave accent [ˋ]** for secondary, and sometimes also the **breve accent [˘]** for unstressed, if it needs to be explicitly marked. Using this system, *bunny hug* could be transcribed as [bʌ́nihʌ̀g] or [bʌ́nĭhʌ̀g]. However, since these diacritics have other uses in the (see Section 3.12 for the use of [ˊ] and [ˋ] as tone diacritics), they must be used carefully to avoid ambiguity.

Lexical versus predictable stress

Many spoken languages have **lexical stress**, which means that the placement of stress is mostly unpredictable and must be memorized for each word. This can create minimal pairs, such as [ˈtɑɾu] ‘fast runner’ versus [tɑˈɾu] ‘batter’ and [ˈbɛɬu] ‘basket’ versus [bɛˈɬu] ‘flute’ in Khowar, a Dardic language of the Indo-European family, spoken in Pakistan (Liljegren and Khan 2017).

In other spoken languages, stress is fully predictable based on the structure of the syllables in a word, so that two words with the same syllable structures but different phones would always have the same stress pattern. In such languages, the rules governing stress assignment can be quite complicated, and a full analysis is beyond the scope of this textbook. However, there are a few broad patterns for predictable stress in spoken languages.

First, although most words usually have one and only one primary stress, short function words like prepositions or conjunctions might be unstressed within a sentence or larger conversation, as in *I’m going to the store to buy milk and eggs*, where the preposition *to* and the conjunction *and* are usually unstressed. In contrast, some complex words might have multiple syllables with

roughly equal primary stress, as in ['klin'ʃevn̩] *clean-shaven*, which sounds a bit odd if you try to use secondary stress on one of the first two syllables.

Second, primary stress is nearly always on one of the first two or the last two syllables in a word. Stress on the first syllable is called **initial stress**, stress on the second syllable is called **peninitial stress**, stress on the final syllable is called **ultimate stress**, and stress on the second syllable from the end is called **penultimate stress**. In some languages, primary stress may be **antepenultimate**, on the third syllable from the end, allow the final syllable to be invisible to stress, as if it were not there. Interestingly, we do not seem to find the equivalent of third stress from the beginning, likely because the first syllable is very psychologically prominent, and so it cannot be ignored in the same way the final syllable can be.

Finally, secondary stress in longer words often occurs in a regular rhythm, skipping every other syllable, so that stressed and unstressed syllables generally alternate with each other. However, there is a great deal of complexity across the world's spoken languages in how secondary stress is assigned.

But despite all the complexity, there are still some consistent generalizations. We do not seem to find spoken languages that consistently have primary stress on, say, the middle syllable of every word or the fifth syllable of every long word, nor do we find languages that consistently alternate two stressed syllables with two unstressed syllables throughout every word. This suggests that there are deeper underlying principles that govern how stress is assigned, perhaps relating to the purpose of stress.

For example, stress might help with processing of the linguistic signal, so it should be relatively regular (to be more easily recognizable) and anchored to the boundaries of words (which are otherwise hard to determine in ordinary conversation). In other words, not all imaginable stress patterns are possible. Instead, there seems to be a small set of very specific restrictions on how stress works.

Check your understanding

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3.12: Tone and intonation

Pitch

During voicing, the vocal folds vibrate at some rate, which is normally called the **fundamental frequency** (typically abbreviated **F0**) when talking specifically about the actual physical vibration and **pitch** when talking about the auditory perception of that vibration. For the purposes of this discussion, we will use *pitch*, since we are usually more concerned with the more abstract, cognitive categorization rather than the actual physical implementation, which can vary quite a bit from speaker to speaker.

Pitch is often intertwined with duration and intensity for stress systems in spoken languages, but it can also be manipulated separately as part of its own system. Roughly speaking, if pitch is manipulated at the level of the word or syllable to make completely different meanings, it is called **tone**, whereas if it is manipulated at larger combinations of words (phrases and sentences) to have different kinds of conversational functions (statements versus questions, for example), it is called **intonation**. Languages with a tone system are often called **tone languages** or **tonal languages**, while languages with an intonation system are called **intonational languages**. There are some problematic cases that are not easily classified in either category or seem to be a mixture of both, but they are useful basic categories for describing how spoken languages can manipulate pitch.

Tone notation

Many tone languages have only two tones, normally identified as a **high tone (H)** and a **low tone (L)**. High tones have a higher pitch (with the vocal folds vibrating faster), and low tones have a lower pitch (with the vocal folds vibrating slower). There is no single consistent rate of vibration for high or low tones. A high tone in one language may consistently have faster vocal fold vibration than a high tone is a different language, and even within the same language, different speakers may have different rates of vibration for the same tone.

The IPA has two different systems for notating tone: **tone diacritics** placed above the relevant phone and separate **tone letters** placed after the entire syllable.

For languages with simple tone systems, the tone diacritics are normally used, with the **acute accent [ˊ]** representing a high tone and the **grave accent [ˋ]** representing a low tone. Tone letters iconically represent the height of the tone with a horizontal line connected to a vertical supporting base, with [˥] representing a high tone and [˩] representing a low tone.

In addition, non-IPA superscript numbers on a 1–5 scale are sometimes used instead, with the highest number [⁵] representing a high tone and the lowest number [¹] representing a low tone.

All three of these notation systems are shown in Table 3.2 for the example words [lúk] ‘vomit’ (with a high tone) and [lùk] ‘weave’ (with a low tone) from Bemba, a southern Bantoid language of the Niger-Congo family, spoken in Zambia and nearby areas (Hamann and Kula 2015).

Table 3.2. Tone patterns in one-syllable Bemba words.

tone	example with IPA tone diacritics	example with IPA tone letters	example with non-IPA tone numbers	gloss
H	[lúk]	[luk˥]	[luk⁵]	‘vomit’
L	[lùk]	[luk˩]	[luk¹]	‘weave’

The choice of notation depends on a combination of factors, including legibility, the complexity of the language’s tone system, the intended purpose of the transcription, and historical tradition.

Each system has problems. Tone numbers are problematic because there are many traditional tone numbering systems that differ from the tone number system presented here. For example, the high tone in Mandarin is traditionally called “tone 1”, and this traditional numbering is used in some romanizations of Chinese, such as the Wade-Giles system, in which 媽/妈 [ma⁵] ‘mother’ is written *ma¹* or *ma1*. If you are familiar with the 1–5 tone numbers presented here, you could be confused by seeing Wade-Giles *ma¹*, since that looks like a low tone rather than a high tone.

Diacritics can also be problematic for similar reasons, since [má] ‘mother’ is written *mā* in a different romanization of Chinese called pinyin. This is not the IPA diacritic [ˊ] for a high tone, so again, if you know the IPA system but not pinyin, you could be confused into thinking this word does not have a high tone. Furthermore, recall from Section 3.11 that the diacritics [ˊ] and [ˋ] are also sometimes used to represent primary and secondary stress rather than tone, which creates a completely different kind of confusion!

Tone letters are generally more reliably unambiguous in how they represent tone, since they are not normally used with any other meaning, but they do not have widespread font support, so like we saw with the signed language notation systems, it can be difficult to get access to the relevant characters, and we cannot be guaranteed that the symbols will be readable by someone else on a different computer.

Thus, different linguists use different systems for notating tone, and it is important to understand all three notation systems presented here, since you may encounter any of them in the linguistics literature.

Tone as a phonemic property

In many tone languages, each syllable can in principle have its own independent tone, as in the various tone patterns seen in the Bemba words in Table 3.3.

Table 3.3. Tone patterns in longer Bemba words.

tone pattern	example with IPA tone diacritics	example with IPA tone letters	example with non-IPA tone numbers	gloss
LH	[kùːlá]	[kuː˩la˥]	[kuː¹la⁵]	‘build’
HH	[βúːlá]	[βuː˥la˥]	[βuː⁵la⁵]	‘take’
HL	[péːlà]	[peː˥la˩]	[peː⁵la¹]	‘give’
LHL	[ùkúwà]	[u˩ku˥wa˩]	[u1ku⁵wa¹]	‘fall’
LLH	[ìnùmá]	[i˩nu˩ma˥]	[i¹nu¹ma⁵]	‘back’
HLH	[íŋòmá]	[i˥ŋo˩ma˥]	[i⁵ŋo¹ma⁵]	‘drum’
HHL	[íːn͡tʃítò]	[iː˥n͡tʃi˥to˩]	[iː˥n͡tʃi⁵to¹]	‘work’

Here, we see that the first syllable of a word could have either a high tone, as in [βúːlá] ‘take’, or a low tone, as in [ùkúwà] ‘fall’. Then, regardless of what tone the first syllable has, the second syllable could also have a high tone, as in [βúːlá] ‘take’ and [ùkúwà] ‘fall’, or a low tone, as in [péːlà] ‘give’ and [ìnùmá] ‘back’, and so on. While not all tone languages behave this way, in general, they often allow for a wide range of possible tone combinations across syllables.

More tones

One of the ways that tones can be more complex is that they are often not simply binary, with just a high versus low distinction. Many tone languages have an intermediate **mid tone (M)** between high and low, such as Igala, a Yoruboid language of the Niger-Congo family, spoken in Nigeria, which has minimal triplets like those in Table 3.4, which all have a low tone on the first syllable but then one of three different tones on the second (Welmers 1973). Mid tones are represented with an IPA diacritic, the **macron accent [ˉ]**, with the IPA tone letter [˧], or with an intermediate superscript number (usually [³]).

Table 3.4. Tone patterns in Igala.

tone pattern	example with IPA tone diacritics	example with IPA tone letters	example with non-IPA tone numbers	gloss
LH	[àwó]	[a˩wo˥]	[a¹wo⁵]	‘slap’
LM	[àwō]	[a˩wo˧]	[a¹wo³]	‘comb’
LL	[àwò]	[a˩wo˩]	[a¹wo¹]	‘star’

Other intermediate tones are also possible, especially when describing more fine-grained details in how a given language's tone system works.

Contour tones

So far, we have only looked at **level tones** (high, mid, low), which are relatively stable from beginning to end. However, many tone languages also have **contour tones**, which change in pitch during the course of the syllable. For example, Awa (a Kainantu-Goroka language of the Trans-New Guinea family, spoken in Papua New Guinea) has two level tones (H and L) plus two contour tones, a **falling tone (F)** that starts high and ends low, and a **rising tone (R)** that starts low and ends high (Loving 1966), as shown in the data in Table 3.5.

Falling tones are represented with an IPA diacritic, the **caret accent [ˆ]**, with a sequence of a high IPA tone letter followed by a low tone letter (usually [˥˩]), or with a sequence of superscript numbers that starts high and goes low (usually [^{51}]). Similarly, rising tones are represented with an IPA diacritic, the **hačekaccent [ˇ]**, with a sequence of a low IPA tone letter followed by a high tone letter (usually [˩˥]), or with a sequence of superscript numbers that starts low and goes high (usually [^{15}]). More complicated tones are possible, including using more intermediate tones and more than two component tones in a contour, but they are beyond the scope of this textbook.

Table 3.5. Tone patterns in Awa.

tone pattern	example with IPA tone diacritics	example with IPA tone letters	example with non-IPA tone numbers	gloss
H	[ná]	[na˥]	[na^{5}]	'breast'
L	[nà]	[na˩]	[na^{1}]	'house'
F	[nâ]	[na˥˩]	[na^{51}]	'taro'
R	[pǎ]	[pa˩˥]	[pa^{15}]	'fish'

Tone letters for contour tones are sometimes displayed as a single combined character rather than a sequence of separate tone letters, as shown in Figure 3.40. However, this requires a font with the combined characters properly encoded, and this is not always available.

[˥˩] = [꜒] (falling)
[˩˥] = [꜓] (rising)

Figure 3.40. Contour tones as sequences of separate tone letters (on the left of the equals sign) and as combined characters (on the right of the equals sign).

Intonation

Finally, we can also see changes in pitch over entire sentences as intonation, with the purpose of conveying information about the function of the sentences rather than information of which word is being used. For example, the English sentence *this is vegetarian chili* has many different possible intonation patterns, as in the examples in sentences 1–8, depending on whether it is a declarative statement (1–4) or a question (5–8), and whether there is emphasis on a particular word (indicated with italicized capitals in 1–8). Each of these sentences is appropriate in different contexts; a sample context is provided in parentheses for each sentence.

1. (What are you eating?) This is vegetarian chili.
2. *THIS* is vegetarian chili (and *THAT* is shrimp étouffée).
3. This is *VEGETARIAN* chili (not *BEEF* chili).
4. This is vegetarian *CHILI* (not vegetarian *STEW*).
5. This is vegetarian chili? (I didn't hear exactly what you said.)
6. *THIS* is vegetarian chili? (It tastes like shrimp étouffée!)
7. This is *VEGETARIAN* chili? (I'm sure I tasted meat in it!)

8. This is vegetarian *CHILI*? (It seems more like a stew.)

Intonation is very complex, as it depends on the syntactic structure of what is being said, as well as the function of the sentence in the larger conversation. It can also interact with word-level stress or tone in various interesting ways. Intonation lies at the intersection of many different aspects of language, and a proper analysis requires a solid understanding of phonetics, phonology, syntax, semantics, and pragmatics.

Check your understanding

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CHAPTER OVERVIEW

Chapter 4: Phonology

Learning Objectives

- When you've completed this chapter, you'll be able to:
- Analyze linguistic data to determine the distributions of phones in a spoken language and phonological processes in signed languages,
- Categorize phones into phonemes based on their distributions, and
- Write phonological rules that show how to map phonemes and underlying representations to allophones and surface representations.

The phonetic properties of language are not entirely random. There are many repeated patterns and categories that give more abstract structure to the physical reality of the linguistic signal, both within a particular language and across languages. This chapter explores this abstract structure by looking at patterns in how the physical units of language can be combined, how they affect each other in patterned ways when they are combined, and the methods linguists can use to discover these patterns.

4.1: Phonemes and allophones
4.2: Phonotactics and natural classes
4.3: Contrastive distribution and minimal pairs
4.4: Complementary distribution
4.5: Phonemic analysis
4.6: Another example of phonemic analysis
4.7: Phonological rules
4.8: Phonological derivations
4.9: Types of phonological rules
4.10: Signed language phonology

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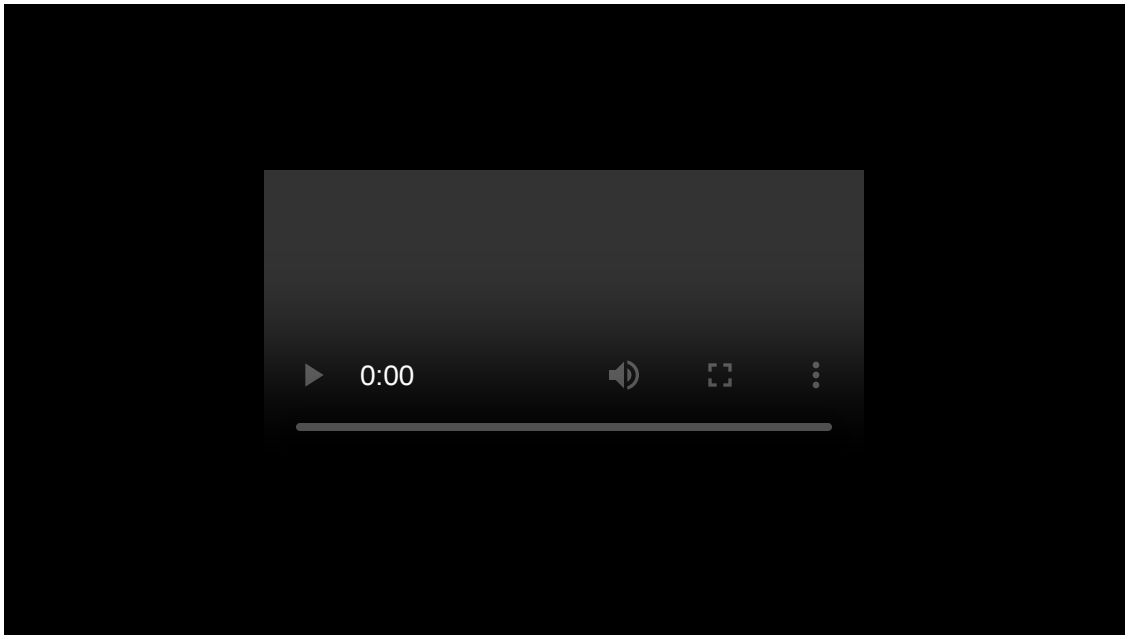
4.1: Phonemes and allophones

The essence of phonology

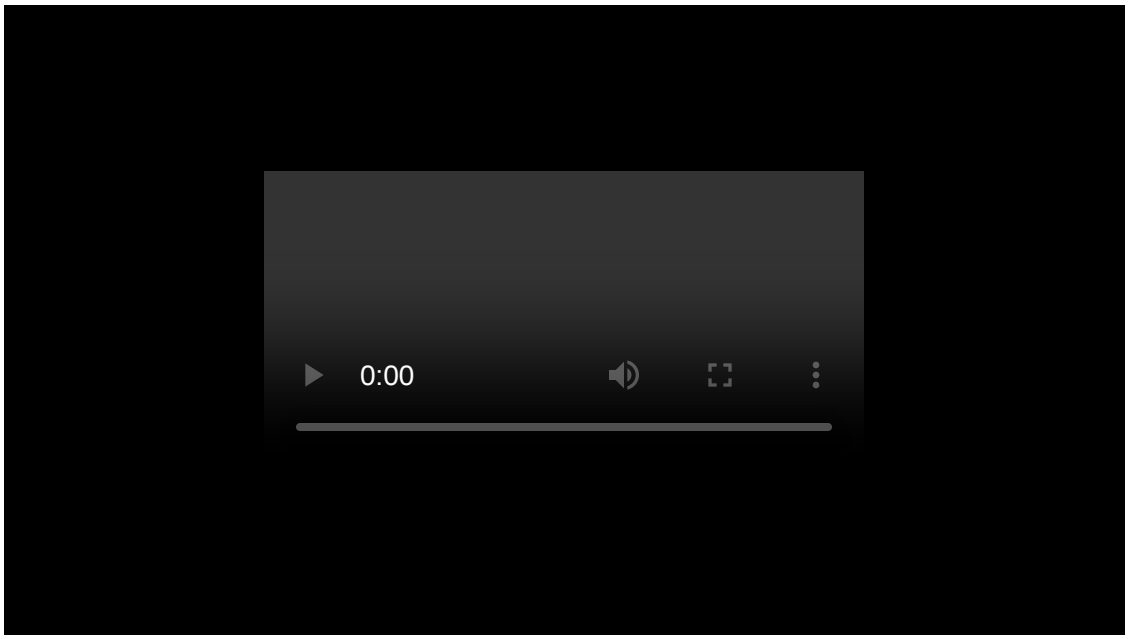
As discussed in Chapter 3, a linguistic signal is composed of smaller physical units: phones, handshapes, movements, etc. These are not combined in purely random ways. For example, the three phones [m], [i], and [k] can be combined to form the English word [mik] *meek*, but the other five possible combinations are not words of English. Four of these are normally unpronounceable by English speakers: [imk], [ikm], [mki], and [kmi]. However, the fifth, [kim], could easily be integrated into English as a new word. It is just an accident of the history of English that we do not yet have this as an actual word.

Additionally, when some of these physical units are pronounced near each other, they may affect each other's articulation. For example, in American Sign Language (ASL), the two signs FOOD and BED can be compounded to form the sign HOME, but not as a strict sequence of FOOD followed by BED. Instead, the two signs are merged into a single sign that contains properties of both of its components.

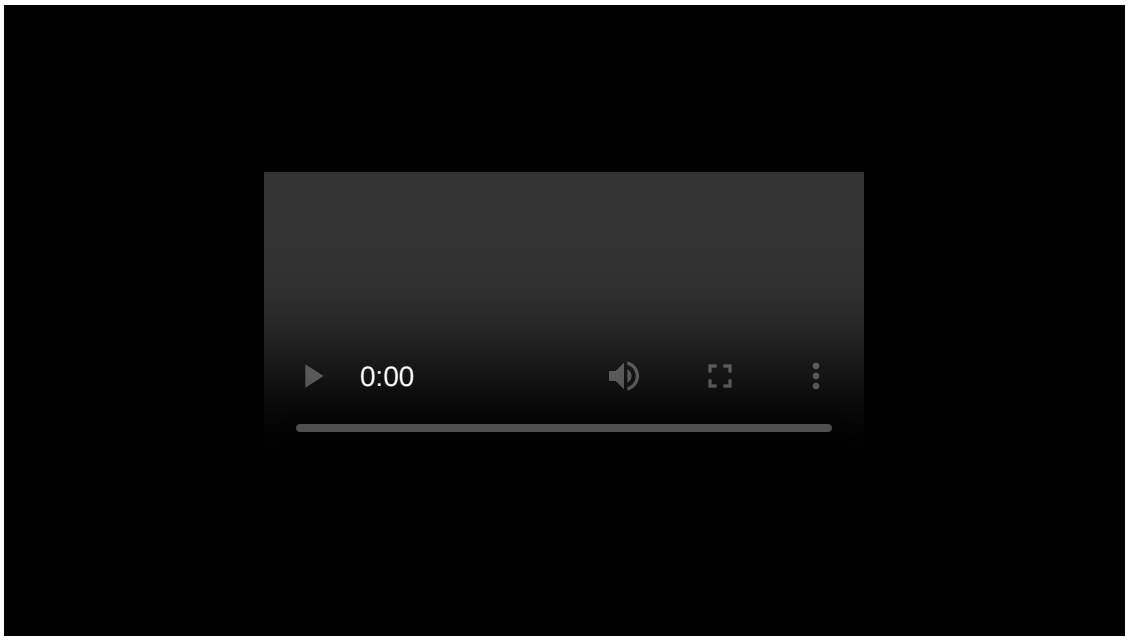
The following video clip shows the ASL sign for FOOD, with repeated tapping at the mouth with a flat-O handshape.



The following video clip shows the ASL sign for BED, with a single articulation of the open-B handshape on the side of the face, with a nonmanual head tilt.



The following video clip shows two variants of the ASL sign for HOME (note how the signer numbers each variant before signing it, by pointing to an extended finger on his nondominant hand).



Both variants of HOME blend different parameters of FOOD and BED. For example, both variants use only the flat-O handshape from FOOD, eliminating the open-B handshape from BED. However, both variants use the location at the side of the face from BED, either as a second location after movement (in the first variant) or as the only location with the mouth location of FOOD being lost (in the second variant). Additionally, the repetition from HOME is reduced, resulting in only two total touches in both variants, fewer than what is used in HOME. Finally, the nonmanual head tilt for BED is not used in HOME.

There are underlying patterns in all languages that determine which combinations of physical units are valid or invalid, as well as what kinds of articulatory changes occur when these physical units are combined. The study of these patterns is called **phonology**.

The phonological units of spoken language

In spoken language, one important pattern is how certain phones are pronounced differently, yet are treated as the same conceptual object by speakers. For example, consider the English words atom and atomic. In most varieties of North American English, the consonant phone in the middle of *atom* is pronounced as an alveolar flap; recall from Section 3.4 that the alveolar flap is symbolized in the IPA by [ɾ]. But in the word *atomic*, the corresponding phone is a voiceless alveolar plosive followed by a notable puff of air, symbolized in the IPA as [tʰ], where the superscript [ʰ] represents the puff of air (called **aspiration**). However, these two words are clearly related: *atomic* is built from the word *atom*, both in pronunciation and in meaning (see Chapter 5 for more on the topic of word-building). Because of this, it is convenient to think of these two phones as being the same object on some abstract conceptual level, despite being physically different.

This object is called a **phoneme**, and its various physical realities as phones are called its **allophones**. We can think of a phoneme as a set of allophones, with each one connected to certain specific positions. So in this case, we might say that the set {[ɾ], [tʰ]} is a phoneme, with [ɾ] and [tʰ] each being allophones of that phoneme, used in different situations, called **environments**.

The most common types of environments require one or more specific phonetic properties immediately to the left, one or more specific phonetic properties immediately to the right, or a combination of both. As with most aspects of linguistics, the environments for allophones can be more complex than what is presented in the simpler cases discussed in this textbook.

By convention, phonemes are often notated with just a single symbol in **slashes / /**, because the number of allophones can get quite large, and it would be too cumbersome to continue listing out all of the allophones as a set. The choice of symbol depends on certain assumptions, but for now, we can represent this phoneme with /t/.

Both of these allophones of /t/ occur between two vowels or syllabic consonants, but the flap [ɾ] is followed by an unstressed vowel or syllabic consonant, while the aspirated [tʰ] is followed by a stressed vowel or syllabic consonant (recall from Section 3.11 that stressed syllables are typically louder, longer, and/or higher pitched than unstressed syllables). So we might conjecture that stress is at least partially responsible for determining which allophone to use for /t/.

We can test that conjecture by looking at other words where this phoneme occurs (fortunately, it is often spelled with the letter <t> in English) and seeing which allophone is used. In [ˈmɛɾ̩] *metal* and [məˈtʰælək] *metallic*, we see the same pattern as in *atom* and *atomic*, so our conjecture holds. There are other pairs of related words that show the same pattern: [ˈbæɾ̩] *battle* and [bəˈtʰæljn̩] *battalion*, [ˈkrɪɾək] *critic* and [kraɪˈtʰiriə] *criteria*, etc.

If we look beyond related words, we see the same pattern. English words with /t/ between two vowels or syllabic consonants tend to have the flap [ɾ] if the second is unstressed but aspirated [tʰ] if the second is stressed. That is, words like *data*, *writer*, and *Ottawa* have [ɾ], while words like *attack*, *return*, and *Saskatoon* have [tʰ].

The aim of phonology

We as linguists do not have immediate access to phonemes. They are abstractions, not concrete reality that can be directly measured in the linguistic signal. We have to look at patterns in where we find various phones and figure out whether or not they belong together as allophones of the same phoneme. This is an important part of phonology: determining what the phonemes of a language are, what each phoneme's allophones are, and which allophones are used in which environments.

Phonologists are not just concerned with the phonology of just one particular language. We also want to uncover any general universal phonological principles that might underlie all of human language. However, this is difficult. Most importantly, modality matters a great deal in phonology, because the kinds of basic units and patterns are just fundamentally different between different modalities. The parts of the vocal tract used for spoken languages behave differently than the manual and nonmanual articulators used for signed languages.

Thus, whatever universal phonological principles there may be, they must be quite abstract and independent of specific modalities. Yet, we do find some common principles specific to each modality, so it is useful to consider spoken language phonology separately from signed language phonology, as is done in this textbook.

Finally, note that different linguists may come to different conclusions about the phonology of a language, because phonemes and other phonological units are abstract theoretical constructs, which means they are sensitive to the starting assumptions we make and

the theoretical framework we are using. The examples given to you here have straightforward analyses with very few assumptions, but these are not the only possible analyses, especially in more advanced theories of phonology.

Check your understanding

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4.2: Phonotactics and natural classes

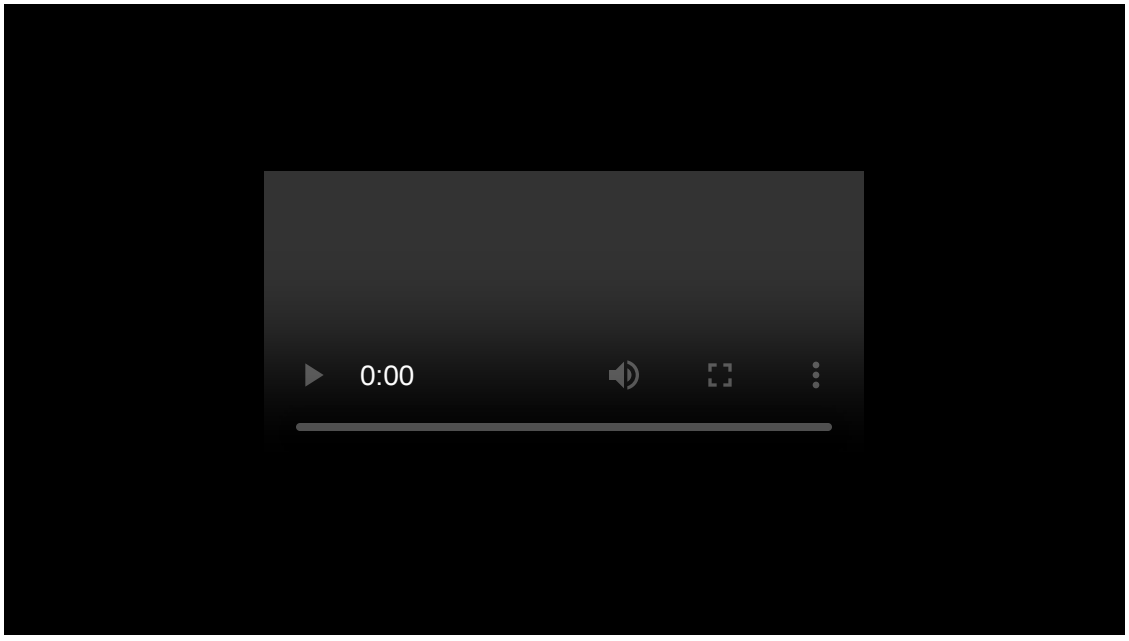
Phonotactics

While physical units may change their pronunciation in some environments, it is also possible that certain physical units cannot be used in some environments at all. Each language has its own set of **phonotactics**, which are language-specific restrictions on what combinations of physical units are allowed in which environments. For example, English has phonotactic restrictions that ban [tl] and [dl] in onsets, but this is not a universal restriction. Plenty of languages allow onsets with [tl] and [dl], such as Ngizim, which has words like [tlà] ‘cow’ (Schuh 1977), and Hebrew, which has words like [dli] ‘bucket’ (Klein 2020).

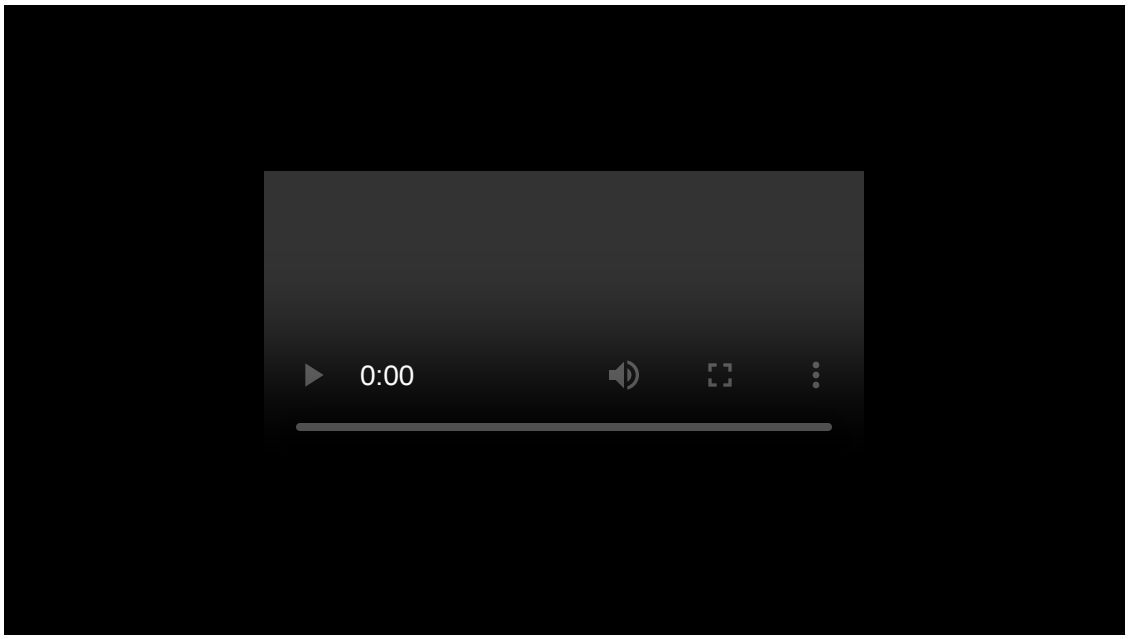
Some phonotactic restrictions may be somewhat looser than others. English generally does not have onsets containing [pw] or [vl], yet English speakers generally have no trouble pronouncing loanwords like *pueblo* [pwɛblo] and proper names like *Vladimir* [vlædəmir].

In ASL, there is a general phonotactic restriction called the **Symmetry Condition** that affects signs that have movement in both hands. The Symmetry Condition requires such signs to have the same handshape and to move in the same way (Battison 1978; see Napoli and Wu 2003 for extensive discussion and elaboration of the Symmetry Condition). That is, the two moving hands cannot generally do completely different things, which is something you may have noticed for yourself in the popular childhood challenge of trying to rub your stomach while patting your head.

The Symmetry Condition is evident in the ASL sign SENTENCE in the following video clip, in which both hands have the same F handshape and are moving in the same way, with slight radioulnar wiggling and an overall path out to the sides away from the centre of the body.



Exceptions to the Symmetry Condition are rare, but possible, such as the sign OPPRESS in the following video clip, in which both hands are moving, but with different handshapes (a 5 handshape on the dominant hand and an S handshape on the non-dominant hand) and different orientations (dominant palm facing out, non-dominant palm facing to the signer’s right).



Distribution and natural classes

The overall pattern of environments where a given physical unit can occur is called its **distribution**, and one of the most fundamental skills in phonology is being able to determine what the distributions are for the physical units of a language.

This may seem like a daunting task, but we can use our understanding of phonology and typology to help narrow down the options. In spoken languages, phones share various phonetic properties that are often relevant to distributions. For example, the restriction on [tl] and [dl] in English onsets is not random; [t] and [d] are both alveolar plosives. They form what we call a **natural class**, which is a set of phones that share some phonetic properties (in this case, place and manner of articulation) and also share some phonological behaviour (in this case, being governed by the same phonotactic restriction).

Using natural classes, we can more easily describe some of the other patterns in English phonotactics. English allows up to three consonants in an onset, but when there are three, the first must always be [s], the second must be one of [p], [t], or [k], and the third must be one of [r], [l], [j], or [w]. Again, these are not random: [p], [t], and [k] are the natural class of voiceless plosives, while [r], [l], [j], and [w] are the natural class of approximants. It would be unusual if instead of this pattern, English consonant clusters could contain [s], followed by one of some set that is not a natural class (such as [f], [n], [k]), followed by one of some other set that is also not a natural class (such as [r], [t], [h], [m]).

Note that the members of a natural class are language-specific, not universal. So while [p], [t], [k] form a natural class in English, they do form not a natural class in Kalaallisut (a.k.a. Greenlandic, an Inuit language of the Inuit-Yupik-Unangan family, spoken in Greenland). Kalaallisut has [p], [t], and [k], but it also has a voiceless uvular plosive [q], as in words like [iseʁaq] ‘goose’ (Schultz-Lorentzen 1945). Thus, the natural class of voiceless plosives in Kalaallisut would be [p] [t], [k], and [q], because natural classes are exhaustive, including every relevant phone in the language

Check your understanding

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4.3: Contrastive distribution and minimal pairs

Comparing distributions with minimal pairs

In addition to the individual distribution of a single phone, we are also often interested in the relative distribution of two phones. If they have overlapping distributions, such that there are at least some environments where they both can occur, the two phones are said to **contrast** with each other, and thus, they have **contrastive distribution**.

This relates to the concept of **minimal pair** from Section 3.8. Recall that for signed languages, a minimal pair is two signs that have the same articulation except for one parameter. These two signs can be said to contrast with each for that parameter. We can adapt this concept to words in spoken languages.

For example, in English, the phones [p] and [k] occur in many of the same environments, creating pairs such as [pɪl] *pill* and [kɪl] *kill*, [lɪp] *lip* and [lɪk] *lick*, and [spɪl] *spill* and [skɪl] *skill*. Each of these pairs is a minimal pair that have all the same phones in the same order, except for one position. So [pɪl] *pill* and [kɪl] *kill* both have the form [_ɪl], with [p] in one word and [k] in the other.

The existence of just one such minimal pair is all it takes to prove that two phones have contrastive distribution, so minimal pairs play an important role in figuring out the distribution of phones in a language and how they may be grouped into the same or different phonemes.

However, in many cases, it may be difficult or even impossible to find minimal pairs. In English, the phone [ʒ] is the rarest consonant and has a limited distribution, occurring in words like [ruʒ] *rouge*, [gərɑʒ] *garage*, [vɪʒn̩] *vision*, and [mɛʒr̩] *measure*. It is almost never word-initial in English, except in some proper names (perhaps most famously, Hungarian-American actress Zsa Zsa Gabor) and in the neologism [ʒʊʒ] *zhoozh* ‘improve the appearance of someone or something with a small change’. This makes it difficult to find minimal pairs where [ʒ] is a crucial phone, especially when comparing it to another relatively rare phone like [ʃ], though there are a few examples of minimal pairs for [ʒ] and [ʃ] involving unusual or rare words, such as [əluʒn̩] *allusion* versus [əluʃn̩] *Aleutian* and [mɛʒr̩] *measure* versus [mɛʃr̩] *mesher*.

Near-minimal pairs and nonce words

But if no minimal pairs can be found, we usually have to rely on **near-minimal pairs** instead. A near-minimal pair looks almost like a minimal pair, except there are one or more additional differences elsewhere in the word besides the crucial position. For example, the English pair [plɛʒr̩] *pleasure* and [prɛʃr̩] *pressure* form a near-minimal pair for [ʒ] and [ʃ]. In the position of interest, we have [ʒ] versus [ʃ], which seem to be contrastive because nearly all of the rest of the phones are the same in both words, except for [l] versus [r], which prevents these words from being a true minimal pair.

While a single minimal pair is very powerful, a single near-minimal pair is not. We may have simply stumbled upon a weird example where the apparent meaningless difference is actually relevant to the distribution of the phones we are interested in. We cannot immediately determine whether or not a given near-minimal pair is useful, so it is important to find multiple examples. As we collect more near-minimal pairs, we can be more confident that the small differences are incidental rather than crucial to the distribution of the phones in question.

This is where speaker competence can also be useful, by asking them to evaluate **nonce words**, which are words that we make up for one-time use, such as for linguistic experimentation. We can construct nonce words that fill in minimal pair gaps, and if speakers agree that the nonce word is a valid hypothetical word of the language, then we can be more sure that the phones in question do in fact contrast with each other.

For example, rather than looking for more near-minimal pairs for [ʒ] and [ʃ], we could instead take an existing word with [ʒ] in it, like [beʒ] *beige*, then create a nonce word that is the same, except replacing [ʒ] with [ʃ], giving us a pair like [beʒ]-[beʃ]. Then we could ask English speakers whether the nonce word [beʃ] could be used as a completely different word with a different meaning from [beʒ]. Most speakers would agree, so we would be reasonably sure that [ʒ] and [ʃ] do indeed contrast with each other, despite not having a true minimal pair of actual existing English words.

Depending on the structure of the language and what resources we have access to, we may use one or more of these three tools (minimal pairs, near-minimal pairs, nonce words) to determine whether two phones contrast with each other. We would also need to

do this work for every pair of phones in the language, but in some cases, we may get lucky, and there may be minimal triplets, minimal quadruplets, or even larger minimal n-tuplets.

For many speakers, English *beet*, *bit*, *bait*, *bet*, *bat*, *but*, *bot*, *bought*, *boat*, and *boot* form a minimal 10-tuplet (a decuplet!), showing simultaneously that the ten vowels [i], [ɪ], [e], [ɛ], [æ], [ʌ], [ɒ], [ɔ], [o], and [u] all contrast with each other. This cuts down on the work needed to demonstrate patterns of contrast in the language. But in many languages, even minimal pairs can be hard to find, so finding near-minimal pairs and testing nonce words may be the only options.

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4.4: Complementary distribution

Phones without contrastive distribution

Two phones may instead have **complementary distribution**, with environments that never overlap. This means there is one set of environments for one phone and a completely different set of environments for the other.

For example, the phones [h] and [ŋ] are in complementary distribution in English for many speakers. For these speakers, [h] can only appear at the beginning of a word, as in [həˈræs] *harass*, or at the beginning of a stressed syllable, as in [ˌkɒmprəˈhɛnd] *comprehend* and [ˈt͡ʃaɪldˌhʊd] *childhood*. We can even see [h] appear and disappear in related words that have different stress patterns: there is an [h] in the stressed syllable of [vəˈhɪkjulɚ] *vehicular*, but there is no [h] in the corresponding unstressed syllable in [ˈviəkl̩] *vehicle*.

Conversely, for the same speakers, [ŋ] can never appear in those positions. It can only appear exactly where [h] cannot, such as in a coda, as in [lɒŋ] *long* and [fɪŋ.gɚ] *finger*, or at the beginning of an unstressed syllable, as in [ˈsɪ.ŋɚ] *singer*.

Further, if we try to replace [h] or [ŋ] with each other in any word, the resulting nonce words would be judged ungrammatical: *[ŋəræs], *[kɒmprəŋɛnd], *[lɒh], *[fɪhgɚ], etc. Thus, we can never find or create minimal pairs for [h] and [ŋ], so they appear not to contrast with each other.

And yet, [h] and [ŋ] still seem to function as fundamentally different consonants in English, because they seem to belong to different phonemes, despite being in complementary distribution. No one would confuse one for the other, and in a broad transcription, we would notate them with different symbols. Thus, while contrastive distribution is enough to determine that two phones are allophones of separate phonemes, it is not a requirement.

Now consider the vowels in most North American pronunciations of English [bid] *bead* and [bit] *beat*. In broad transcription, we would normally use the same symbol [i] for both vowels, but in a more narrow transcription, we might want to indicate that the vowel of *bead* is longer, with [biːd] versus [bit]. Long [iː] and short [i] are different phones in English, with [iː] consistently being about 1.2–1.5 times as long as [i], and if we swap them, pronouncing *bead* as [bid] and *beat* as [biːt], it sounds very odd.

Like [h] and [ŋ], [iː] and [i] are in complementary distribution. Long [iː] must be followed by a coda with only voiced consonants, as in [biːd] *bead*, [fliːz] *fleas*, and [biːrd] *beard*. Compare these to words where one or more of the following consonants in the following coda is voiceless, where we instead find short [i]: [bit] *beat*, [flis] *fleece*, and [pirs] *pierce*.

So we have two pairs of phones, [h] and [ŋ] versus [iː] and [i]. In each pair, the two phones have complementary distribution, but the pairs behave differently. Despite the complementary distribution, we conceive of [h] and [ŋ] as somehow completely different consonants, needing to be represented differently even in broad transcription, just like any pair of contrasting phones: [p] and [b], [i] and [ɪ], etc. However, [iː] and [i] just seem to be variants of the same fundamental vowel phoneme.

That is, we want to treat [h] as belonging to a phoneme distinct from [ŋ], while treating [iː] and [i] as two allophones of the same phoneme. So, the phoneme corresponding to [h] would be notated as /h/, the phoneme corresponding to [ŋ] would be notated as /ŋ/, and the single phoneme corresponding to both [iː] and [i] would be notated as /i/.

Phonetic similarity of allophones

Why should we treat these two pairs differently? We often make the decision based on **phonetic similarity**, which is how much the relevant phones have in common in terms of their articulation. The phones [h] and [ŋ] are both consonants, but that is where their phonetic similarity ends: they differ in phonation, place of articulation, and manner of articulation, which are the main properties that define a consonant. This lack of phonetic similarity is a good reason to think that [h] and [ŋ] belong to different phonemes, despite being in complementary distribution.

In comparison, [iː] and [i] have a lot of phonetic similarity: they have the same vowel quality in all four respects (height, backness, rounding, and tenseness), and they differ only in vowel length. Complementary distribution and phonetic similarity together are strong evidence that [iː] and [i] are allophones of the same phoneme.

Of course, we have to be careful when looking at phonetic similarity. The two allophones [ɾ] and [tʰ] of the phoneme /t/ discussed in Section 4.1 are both alveolar consonants, but they are other wise very different in phonation and manner of articulation.

A key result of phonology is that if two phones are in contrastive distribution, then they are allophones of different phonemes. But as we see here, if two phones are in complementary distribution, they could be allophones of different phonemes, as with [h] and [ŋ], or the same phoneme, as with [iː] and [i]. Knowing how to decide which is which is another fundamental skill in phonology.

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4.5: Phonemic analysis

Phonemecization

Phonemic analysis is the process of analyzing a spoken language to figure out what its phonemes are, what the allophones are of those phonemes, and what each allophone's distribution is. The resulting overall analysis is called a **phonemicization** of the language.

Note that a given phonemicization represents only one of many possible analyses. Languages do not generally have one single unique phonemicization, because there are many possible ways of dividing up the phones of a language into phonemes.

In addition, since phonemes are theoretical, abstract concepts, we have no direct way to see if our analysis is correct. Indeed, some linguists reject the notion of phonemes completely, since it is possible to analyze the phonology of a language without them. However, there is experimental evidence that speakers do make use of something phoneme-like, and until we are able to open up the human brain and find exactly how language is represented, phonemes are a reasonable analysis (see Chapter 13 for more information).

Simplicity

Even though we cannot know whether a given phonemicization, or any phonemicization at all, is correct, we can still compare different analyses and see which one is a better fit for the data and our assumptions.

In particular, if we have two competing phonemicizations that both account for all of the available data, we will generally prefer the simpler analysis (if there is one). This is the **principle of simplicity**. However, there is no single objective measure of simplicity, and it is sometimes possible to come up with two competing analyses that are seemingly equal in simplicity. In such cases, we might rely on other factors, but ultimately, we would normally be left in an ambiguous state.

Fortunately, the data sets you typically see in an introductory linguistics course have been carefully selected to have one obvious optimal phonemicization. But out in the real world, when we are working with raw linguistic data, there are often no obvious optimal analyses, so we may be less confident in whatever analyses we do come up with.

An example of phonemic analysis: Georgian laterals

To demonstrate phonemic analysis, consider the following data from Georgian, a Karto-Zan language of the Kartvelian family, spoken in Georgia (data adapted from Kenstowicz and Kisseberth 1979).

[vxle͡tʃh]	'I split'	[saxɬʃi]	'at home'
[t͡ʃe͡tʃxli]	'fire'	[kaɬa]	'tin'
[zarali]	'loss'	[pepeɬa]	'butterfly'
[t͡ʃoli]	'wife'	[kbiɬs]	'tooth'
[xeli]	'hand'	[ɬxena]	'joy'
[kleba]	'reduce'	[erthxeɬ]	'once'
[leɬo]	'goal'	[xoɬo]	'however'
[ɬamazad]	'prettily'		

Step 1: Identify and organize the phones of interest

If we don't have a particular set of phones in mind or want to phonemicize the entire language, we can start by searching for minimal pairs, or begin analyzing some small, simple natural class, such as the voiceless plosives or the front vowels. In introductory phonology assignments, you will normally be given the specific phones of interest.

For this demonstration, we have two specific phones of interest: an alveolar lateral approximant [l] (often called **clear** or **light** [l]) and a velarized alveolar lateral approximant [ɬ] (often called **dark** [ɬ]), which has the tongue back raised somewhat towards the

velum as a secondary articulation along with the normal primary alveolar articulation. Many speakers of English have both of these two phones, with clear [l] at the beginning of a word and dark [ɬ] at the end, as in [lif] *leaf* versus [fiɬ] *feel*. For English, these two phones can be shown to be allophones of a single lateral approximant phoneme due to their complementary distribution and phonetic similarity, so we might wonder if the same holds true for Georgian.

Once we have selected a set of phones to study, we may want to organize them by natural classes. With only two or three, no grouping is normally necessary. But if we have four or more, we may find it helpful (we need to do this in Section 4.6 for an example from French).

For the Georgian lateral approximants, we should also keep in mind what makes them different. Here, the difference is between a raised tongue back for dark [ɬ], and no tongue back raising for clear [l]. Very often, we find that the distribution of a phone depends on properties related to its articulation, so if [l] and [ɬ] have complementary distribution, we might expect tongue backness of neighbouring phones to matter. Sometimes, however, there is no apparent phonetic relationship between phones and their environment, so we cannot rely on this as a universal strategy. Thus, while we should keep an eye on tongue backness in the environment, we should be open to other factors.

Step 2: Identify the individual environments of the phones of interest

With an understanding of how the phones of interest are related to each phonetically, we can create a diagram with the phones of interest listed across the top, and then, under each phone, we list out the individual environments it occurs in, word by word.

Most of the time, we can just look at what occurs immediately to the left and right of a phone to determine its environment, though sometimes, we may need to consider other information, such as syllabic position, stress, tone, or even phones that are farther away. The vast majority of the time, however, just looking at the immediate right and left will work.

For the purposes of compactness in notation when building such lists of environments, it is common to use the **hash symbol #** (a.k.a. number sign, pound sign, octothorpe, etc.) to mark a word boundary and an **underline _** to represent the position of the phone of interest. Thus, "#_a" for [ɬ] indicates that there is some word in the data in which [ɬ] is at the beginning of the word and is followed by [a], in this case, [ɬamazad] 'prettily'. Using this method for [l] and [ɬ] in Georgian, we would get the following lists of environments.

[l]	[ɬ]
x_e	e_o
x_i	#_a
a_i	x_ʃ
o_i	a_a
e_i	e_a
k_e	i_s
#_e	#_x
	e_#
	o_o

Each entry in these lists comes from one or more words. The very first word in the data is [vxleʦ͡ʃh] 'I split', which contains [l] in the environment x_e, that is, it occurs between [x] and [e], so we enter x_e in the column under [l]. The second word in the data is [ʧ͡ʃeʧ͡ʃxli] 'fire', which contains [l] in the environment x_i, so we enter x_i in the same column.

We continue in this way, word by word, entering all of the environments where we find each of the phones of interest. Note that if a word contains multiple instances of any of the phones of interest, we enter all relevant environments in the appropriate column. We see this with the word [leɬo] 'goal', which has the environment #_e for [l] and e_o for [ɬ], so both of those get entered into their respective lists.

Step 3: Determine overlap in environments

We first want to make sure that the phones are not in obvious contrastive distribution. If both phones have some of the exact same environments, then there is a good chance they are allophones of separate phonemes. Consider instead if we have constructed similar lists for English [p] and [k]. At some point, we would likely have entries like #_ɪ and s_u for both of them, due to words like *pit*, *kit*, *spoon*, and *school*. In that case, we would likely conclude that the phones are contrastive and should be analyzed as allophones of separate phonemes. We could then stop our analysis of those phones!

But for Georgian, we have to keep going, because there is no apparent overlap. We could still come to the conclusion that [l] and [ɬ] all allophones of separate phonemes, but we cannot base that decision on any overlap in environments in the data we have here.

Step 4: Simplify the environments

Looking at the left side of the environments for both phones, we see many of the same symbols: [x], [a], [e], [o], and #. There is not a lot of consistency on the left side, with no obvious natural classes in the left environment of one phone versus the other. However, on the right side of these phones, we see some repetition of phones and some natural classes within each phone's list, rather than between the two lists, so it looks like the right environment may be crucial for discovering complementary distribution. Thus, we can simplify our analysis by ignoring the left environment. We can rewrite the lists by leaving off the left environment and removing any repeated entries, which gives us the following much simpler list of environments.

[l]	[ɬ]
_e	_o
_i	_a
	_ʃ
	_s
	_x
	_#

Now it is much easier to see what the distributions of these two phones are: [l] occurs only before the front vowels [e] and [i], while [ɬ] occurs only before the back vowel [o], the central vowel [a], the voiceless fricatives [ʃ], [s], and [x], and the end of the word. This is classic complementary distribution, because these are exactly opposite environments: front vowels are not back or central vowels, they are not voiceless fricatives, and they are not word boundaries. Neither phone of interest seems able to appear in the environment of the other.

Note how this pattern also fits our preliminary conjecture in Step 1 that the distribution of these two phones might have something to do with tongue backness, since that is precisely the property some of these environments differ in, specifically front versus back vowels.

Step 5: Organize the phones into phonemes

Since [l] and [ɬ] seem to be in complementary distribution, we might suspect they are allophones of the same phoneme. The question is, do they behave more like English [h] and [ŋ] (which speakers would normally conceptualize as belonging to different phonemes) or like English [iː] and [i] (which speakers would conceptualize as belonging to the same phoneme)? It is not always clear what to do in a given case, but we typically want to look for phonetic similarity.

The Georgian laterals have a lot of phonetic similarity: they have the same phonation (voiced), the same place of articulation (alveolar), and the same manner of articulation (lateral approximant); they differ only in secondary articulation (velarized or not). Thus, we have both complementary distribution and a high degree of phonetic similarity, so it seems reasonable to analyze [l] and [ɬ] as allophones of the same phoneme.

Step 6: Identify the default allophone and finalize the analysis

The **default** allophone of a phoneme is the one that occurs in the widest variety of environments, what we sometimes call the **elsewhere case**. For Georgian lateral approximants, the default is clearly [ɬ], since it occurs in many distinct environments that are all dissimilar from each other. By convention, we normally use the symbol of the default allophone to represent the phoneme unless there is good reason to do otherwise, so here, we would represent the phoneme containing [l] and [ɬ] as /ɬ/, since [ɬ] is the default allophone.

Note that the phoneme /ɬ/ and the phone [ɬ] are different kinds of objects, so this notation difference is crucial. Phonemes are theoretical abstractions that might also correspond to some kind of mental representation, while allophones are phones, which means they are concrete measurable sounds that are physically produced. The phoneme /ɬ/ corresponds to the set of allophones [l] and [ɬ], with [l] occurring before front vowels and the default [ɬ] occurring elsewhere.

Phonemes and their allophones are often depicted graphically in a tree-like diagram like the diagram for /ɬ/ in Figure 4.5.1. Here, we informally abbreviate "before front vowels" as _front V to save space in the tree.

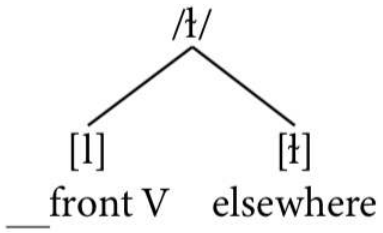


Figure 4.5.1: Phoneme diagram for/ɬ/ in Georgian.

Predictions

This analysis makes predictions about laterals in Georgian beyond what we see in the given data. We would expect every clear [l] in Georgian to be followed by a front vowel, and we would expect every dark [ɬ] in Georgian to be followed by something other than a front vowel. All of the data we looked at agrees with these predictions, though we could still be wrong if we find new evidence that contradicts our analysis.

For example, we predict that [ɬ] should be able to occur before any consonant, not just voiceless fricatives, because it is the default case and should be appear in the widest variety of environment, while clear [l] is restricted to only appearing before front vowels. This is a testable prediction! We can look for more Georgian words and see what kind of lateral we find before other consonants. Fitting our prediction, we find only dark [ɬ] before consonants, as in [aɬq'a] 'siege', which cannot be pronounced *[alq'a] with a light [l].

Check your understanding

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4.6: Another example of phonemic analysis

More than two phones of interest

The Georgian case is a pretty straightforward example, with only two phones of interest and fairly obvious distributions and phonetic similarity. However, we often encounter more difficult cases, maybe because there are many phones of interest or because the distributions and/or phonetic similarity may be less clear.

Consider the following data for how some speakers pronounce French (a Western Romance language of the Indo-European family, spoken in France and elsewhere in the world; data adapted from Katamba 1989). The phones of interest are the voiced sonorants [m], [l], and [ʀ] and the voiceless sonorants [m̥], [l̥], and [ʀ̥]. Note that [ʀ] represents a voiced uvular trill and the diacritic [̥] indicates that the phone is voiceless rather than voiced.

[ʀym]	‘cold/flu’	[il]	‘island’
[mɛʀ]	‘mother’	[tabl]	‘table’
[tɛʀm]	‘term’	[kasabl]	‘breakable’
[film]	‘film’	[ɛl]	‘she’
[limite]	‘limited’	[klemã]	‘merciful’
[liʀ]	‘to read’	[simetʀikmã]	‘symmetrically’
[lɛvʀ]	‘lip’	[ɛtʀ̥]	‘to be’
[plɛziʀ]	‘pleasure’	[ʃifʀ̥]	‘number/figure’
[tʀivjal]	‘trivial’	[mɛtʀ̥]	‘to put’
[ʀali]	‘race-meeting’	[mɛkɔnɛtʀ̥]	‘to fail to recognize’
[ʀymatismal]	‘rheumatic’	[pœpl̥]	‘people’
[ʀɔ̃fle]	‘to snore’	[ɔ̃kl̥]	‘uncle’
[ekʀiʀ]	‘to write’	[tãpl̥]	‘temple’
[tɔʀdʀ]	‘to wring’	[ʀitm̥]	‘rhythm’
[pɛʀs]	‘Persian’	[ʀymatism̥]	‘rheumatism’

Now we just follow the same steps we did for Georgian.

Step 1: Identify and organize the phones of interest

Here, we have a lot of data to sort through, and six phones to consider. But the phones neatly separate into either three pairs ([m]-[m̥], [l]-[l̥], and [ʀ]-[ʀ̥]) or two triplets ([m]-[l]-[ʀ] and [m̥]-[l̥]-[ʀ̥]). Since it’s usually easiest to analyze a pair, we can start with just one pair and see if we can find any patterns. We will choose [m] and [m̥] first.

Step 2: Identify the individual environments of the phones of interest

For each phone in our chosen pair, we write down the individual environments it occurs in, word by word (again, at an introductory level, we will normally only ever need to consider the immediate right and left environment). So for [ʀym] ‘cold/flu’, we would write down y_# in the column for [m], because [ʀym] has [m] between [y] and the end of the word. Then for the next word [mɛʀ] ‘mother’, we would down #_ɛ in the column for [m]. And so on, until we have the following full list of environments:

[m]	[m̥]
y_#	t_#
#_ɛ	s_#
ʀ_#	
l_#	
i_i	
y_a	
s_a	
e_ã	
i_e	
k_ã	

Step 3: Determine overlap in environments

To check whether the phones are in contrastive distribution, we need to see if there is any overlap in the environments on the two lists. If both phones have some of the exact same environments, then there is a good chance they are allophones of separate phonemes.

There are no exact matches, but we do see some similarities in some left and right right environments. For example, we see that both [m] and [m̥] occur after [s]. However, voiced [m] only does so when followed by the vowel [a], as in [ʀymatismal] ‘rheumatic’, while voiceless [m̥] only does so at the end of the word, as in [ʀymatism̥] ‘rheumatism’.

Similarly, we see that both [m] and [m̥] occur at the end of the word, but with restrictions. Voiced [m] is only word-final when it is preceded by [y] or [l], as in [ʀym] ‘cold/flu’ and [film] ‘film’, while voiceless [m̥] is only word final when preceded by [t] or [s], as in [ʀitm̥] ‘rhythm’ and [ʀymatism̥] ‘rheumatism’. It is probably no coincidence that the difference in the voicing of the two phones of interest happens to match the voicing on the phone on its left in these cases.

Since there are apparent patterns to how these two phones are distributed, rather than them being able to occur in the same environments, they appear not to be in contrastive distribution, so we would continue on to Step 4.

Step 4: Simplify the environments

This is not a lot to go on, because there is so little data for [m̥], but it seems like both the left and right sides matter for the distribution of [m̥], since it consistently has a natural class on the left (voiceless obstruents) and a word boundary on the right. There is not much of a pattern to the distribution of [m], since it has a mix of various natural classes on both sides. So as a first guess, we might say that [m̥] occurs only word-finally when immediately preceded by a voiceless obstruent, while [m] occurs instead either after voiced phones (regardless of what comes after) or before any phone at all (that is, it is not word-final). This is complementary distribution.

Step 5: Organize the phones into phonemes

Since [m̥] and [m] seem to be in complementary distribution and are phonetically similar (they are both bilabial nasal stops, differing only in phonation), it seems reasonable to analyze [m̥] and [m] as allophones of the same phoneme.

Step 6: Identify the default allophone and finalize the analysis

The default allophone appears to be [m], since it occurs in two distinctly different environments, while [m̥] only occurs in one. Thus, we would propose a single phoneme /m/ with two allophones: [m̥] occurring word-finally when immediately preceded by a voiceless obstruent (abbreviated vls obs_# here) and [m] occurring elsewhere as the default.

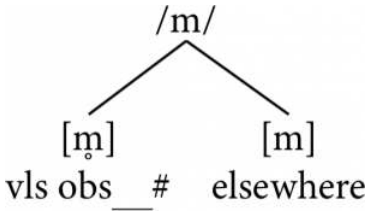


Figure **4.6.1**: Phoneme diagram for /m/ in French.

Repeat Steps 2–6 for [l] and [l̥]

This seems like a reasonable analysis, so we can continue working through the phones of interest in pairs. The next pair to analyze is [l] and [l̥], so we cycle back and repeats Steps 2–6. This gives us the following list of environments for [l] and [l̥]:

[l]	[l̥]
i_m	p_#
#_i	k_#
#_ɛ	
p_ɛ	
a_#	
a_i	
i_#	
b_#	
ɛ_#	
k_e	
f_e	

We see the same pattern of complementary distribution as for the bilabial nasals: the voiceless lateral [l̥] occurs word-finally when immediately preceded by a voiceless obstruent, while the voiced lateral occurs everywhere else, either after any voiced phone, or before any phone (to prevent it from being word-final). We would end up with a parallel analysis to the nasals, with /l/ as the phoneme, having a voiceless allophone [l̥] in one environment (word-final while immediately after a voiceless obstruent) and a default voiced allophone [l] everywhere else:

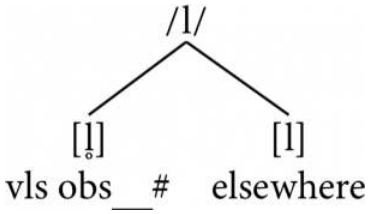


Figure **4.6.2**: Phoneme diagram for /l/ in French.

Repeat Steps 2–6 for [ʀ] and [ʀ̥]

Then we do the same for [ʀ] and [ʀ̥], but first, note how /m/ and /l/ have the same basic pattern: one exact same kind of allophone (voiceless) in the exact same environment (word-final immediately after a voiceless consonant), and the exact same kind of default allophone (voiced). Note only that, /m/ and /l/ are part of a natural class: they are both sonorant consonants. But the remaining pair of phones we need to analyze, [ʀ] and [ʀ̥], are also sonorant consonants.

This is unlikely to be a coincidence, so we can make a prediction, even before we look at the data. We predict that [ʀ] and [ʀ̥] should pattern just like the other two pairs of sonorants, with the two phones being in complementary distribution, and with the

voiceless phone occurring only word-finally immediately after a voiceless obstruent and the voiced phone occurring elsewhere (after a voiced phone or before any phone at all). In the following list of environments for [ʀ] and [ʀ̥], the predicted pattern is exactly what we find:

[ʀ]	[ʀ̥]
#_y	t_#
ɛ_#	f_#
ɛ_m	
i_#	
v_#	
t_i	
#_a	
#_ɔ̃	
k_i	
ɔ_d	
d_#	
ɛ_s	

Thus, we end up with the same basic analysis as for the previous pairs: the two phones of interest [ʀ] and [ʀ̥] are allophones of /ʀ/, with the voiceless allophone occurring word-finally immediately after a voiceless obstruent and the voiced allophone as the default, occurring everywhere else:

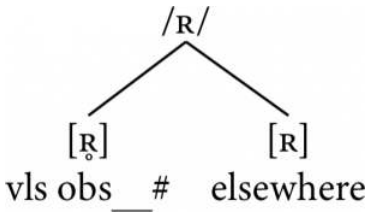


Figure **4.6.3**: Phoneme diagram for /ʀ/ in French.

Is there more?

This analysis is nice, but it still seems like we are missing something. Why do these three phonemes have the same basic pattern for their allophones? Why do they have a voiceless allophone in this particular environment and not somewhere else? Is there a reason the environment for the voiceless allophone also mentions voicelessness? Recall how the environment for one of the Georgian laterals similarly shared a phonetic property with the allophone that occurred there. Can we somehow represent the larger pattern in the overall distribution of French sonorants generally? Right now, the distributions are still specified for each individual phoneme separately, creating a lot of redundancy in our analysis. The next stage of our phonological analysis in Section 4.7 will help answer these questions!

Check your understanding

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4.7: Phonological rules

Eliminating redundancy with faithfulness

If we write out our analysis of the French sonorants as descriptions of how to pronounce the three phonemes, we get statements like the following:

- /m/ is pronounced as [m̥] word-finally after a voiceless obstruent
- /m/ is pronounced as [m] elsewhere
- /l/ is pronounced as [l̥] word-finally after a voiceless obstruent
- /l/ is pronounced as [l] elsewhere
- /ʀ/ is pronounced as [ʀ̥] word-finally after a voiceless obstruent
- /ʀ/ is pronounced as [ʀ] elsewhere

Note the massive amount of redundancy in these statements. First, every phoneme /X/ has a statement of the same exact form: "/X/ is pronounced [X] elsewhere". This is because of how we chose to represent the phoneme, using the same symbol as the default allophone. If we consistently do this for every phonemicization, then we will always have this kind of statement for the default pronunciation for every phoneme.

Since we will always have this default statement, we don't need to list it explicitly. Instead, we can simply treat it as an inherent part of how phonology works: every phoneme is always pronounced as its matching default allophone "elsewhere". This is sometimes called the **principle of faithfulness**: if a phoneme occurs in an environment not covered by any other statement for the pronunciation of that phoneme, then it is pronounced the same (its pronunciation is "faithful" to its phoneme). Thus, we can remove every instance of this default statement, relying instead on the principle of faithfulness to universally give us the default allophones for every phoneme in every spoken language. This leaves us with the following three statements for French:

- /m/ is pronounced as [m̥] word-finally after a voiceless obstruent
- /l/ is pronounced as [l̥] word-finally after a voiceless obstruent
- /ʀ/ is pronounced as [ʀ̥] word-finally after a voiceless obstruent

Eliminating redundancy with natural classes

There is still some remaining redundancy. All three of these statements have the same form: "/X/ is pronounced [X̥] word-finally after a voiceless obstruent". This is another pattern, and part of phonology (and linguistics in general) is finding patterns and reducing them down to simpler descriptions and explanations.

Note that /m/, /l/, and /ʀ/ are all sonorants. This has the beginnings of a natural class, but natural classes need to be exhaustive, and there are other sonorants in French. For example, we see [n] and [j] in the data, and these are presumably allophones of /n/ and /j/, which would need to be included in any natural class of sonorant phonemes. This leaves us with two options: either there are three independent statements about some sonorants as above, one for each of /m/, /l/, and /ʀ/, that coincidentally all have the exact same basic form, or there is a single statement we can construct that covers all sonorants, including /n/ and /j/.

Each option makes a different prediction about the pronunciation of French. If /m/, /l/, and /ʀ/ behave completely independent of /n/ and /j/, then we predict that /n/ and /j/ would not have voiceless allophones if they are word-final after a voiceless obstruent. If instead there is a single pattern that applies to all sonorants, we predict that /n/ and /j/ should have voiceless allophones in exactly the same environments that /m/, /l/, and /ʀ/ do.

Nothing in the given data can help us decide between these two options, because there are no words with /n/ or /j/ in the relevant environment in data. In fact, French phonotactics prevent that from ever happening anyway, so can unfortunately never test our predictions!

Eliminating redundancy with simplicity

Since we have two competing analyses that both account for the given data, and no other data can be found to contradict either analysis, we can follow the principle of simplicity and pick the analysis with the fewest statements. This allows us to simplify our three statements down to just one, something like the following:

- a sonorant is pronounced as voiceless word-finally after a voiceless obstruent

Note that this says nothing about what happens to the place and manner of articulation of the sonorants, just their phonation. We should assume that statements like these only affect exactly what they say; everything else must remain faithful (unchanged). We do not want /m/ turning into any random voiceless phone! We specifically want it to be pronounced as [m̥], so only its phonation differs.

Writing phonological rules

→ (4.7.1)

This gives us the following shorthand rule:

- sonorant → voiceless / voiceless obstruent _ #

There are more advanced ways we can simplify phonological rules, but for the purposes of this textbook, this form will be sufficient. We now have the following basic template for a phonological rule, containing three key components: the target (indicated here by *A*), the change (*B*), and the environment (*C* _ *D*).

→ (4.7.2)

The **target** of a phonological rule is the natural class of phonemes that are changed into their appropriate allophones. The **change** caused by a phonological rule is the list of all phonetic properties that describe how the allophones consistently differ from the target phonemes. Finally, the **environment** is the same as what we used for talking about the distribution of allophones. As we have seen, most environments typically only reference something on the immediate left and/or immediate right, though more complicated environments are possible.

Generative phonology and levels of representation

In some versions of phonology, phonemes, allophones, and phonological rules are not just convenient descriptions of patterns, but crucial objects in the theory, sometimes proposed to represent some aspect of cognitive reality. One of the most common such versions of phonology is **generative phonology**, initially developed in the 1950s and 1960s (Chomsky 1951, Chomsky et al. 1956, Halle 1959, Chomsky and Halle 1968), building upon ideas developed in the first half of the 20th century (Saussure 1916, Bloomfield 1939, Swadesh and Voegelin 1939, Trubetzkoy 1939, Jakobson 1942, Harris 1946/1951, Wells 1949) and ultimately reflecting ideas from the work of Dakṣiputra Pāṇini, a grammarian in ancient India (ca. 500 BC) who developed concepts and methods for the analysis of Sanskrit that can still be seen in modern linguistics.

In generative phonology, words have at least two distinct phonological forms. One is an approximation of the pronunciation (narrow or broad, as needed), which we have been representing in square brackets with phones. This representation is called the **surface representation (SR)** or **phonetic representation**. Because it is made up of phones, the SR is a relatively concrete representation, something directly observable and measurable. Here, all of the data we have been looking at are given SRs.

The second representation is made up of phonemes and is called the **underlying representation (UR)** or **phonemic representation**. Because the UR is made up of phonemes, it is an abstract object in our theoretical analyses of a language. As with phonemes, there is debate about whether URs also correspond to any sort of cognitive reality, but whether or not they do, they are useful tools for describing the phonology of a language. Here, we would have to rewrite all of our data using phonemes instead of allophones.

Thus, for every word in Georgian, we would replace every clear [l] with its phoneme /ɬ/. So the URs for [t͡ʃoli] ‘wife’ and [xeli] ‘hand’ would be /t͡ʃoɬi/ and /xeɬi/.

Similarly, to get the URs for the French data, we would replace all of the voiceless sonorants with their corresponding phonemes: the UR of [ɛtʁ̥] ‘to be’ would be /ɛtʁ/, the UR of [pœpl̥] ‘people’ would be /pœpl/, and the UR [ʁitm̥] ‘rhythm’ would be /ʁitm/. Note URs are enclosed with slashes, because they are made up of phonemes.

In generative phonology, the relationship between URs and SRs is not just a static link. Instead, URs are treated as inputs to a process that “generates” the SRs as output, by actively changing the phonemes into their appropriate allophones. This model is designed to mimic how language presumably works: we begin with some mental representation of a word in our mind, and then

sometime later, we articulate that word. This overall process is called a **phonological derivation**, and the individual components of this process that change the phonemes are our phonological rules. This model is represented graphically in the following diagram.

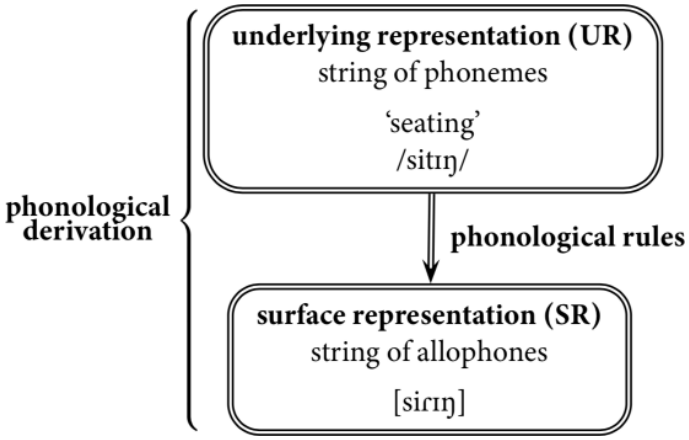


Figure **4.7.1**: Model of generative phonology.

Check your understanding

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4.8: Phonological derivations

Choose examples showing rule application

Once we have finished the phonemic analysis of a language and determined what phonological rules we need, we can demonstrate how the analysis works by showing sample derivations of a few critical words. When doing this, it is important to demonstrate a few things. First, we should give examples showing how the rule correctly applies when the target is in the environment, and we should do so for a representative set of phonemes in the target natural class.

For French, this means we should demonstrate the rule applying to at least three words, one with /m/, one with /l/, and one with /ʀ/. We could pick [ʀitm̩] 'rhythm', [ɔ̃kl̩] 'uncle', and [ɛtʀ̥] 'to be'. If we are dealing with a particularly large target natural class (for example, all obstruents or all vowels), we usually only need to show a few examples, with enough diversity that they can be taken to be representative of the full natural class. Do not pick /t/, /s/, and /ʃ/ to represent all obstruents! Use something like /p/, /z/, and /ɡ/ instead.

Choose examples showing lack of rule application

We should also show a few examples of how the rule will not apply when the target phonemes are in the wrong environment. So we might want to show an example with a word-final sonorant preceded by something voiced, such as [tabl] 'table', as well as an example with a sonorant after a voiceless obstruent but not at the end of the word, such as [ekʀiʀ] 'to write'.

Finally, we often might want to also show examples with phonemes that are similar to the target natural class and which are in the right environment but are not affected by the rule. The only similar phonemes that we can find in the right environment are vowels, so we could pick an example like [limite] 'limited', which has a vowel in the correct environment of the rule, but which does not change, because vowels are not sonorant consonants.

Determine URs

Then for each of the example words we are going to use in our demonstration, we need to determine their URs. Because of the principle of faithfulness, we know that the UR and SR should look the same, except specifically only in those places where a rule applies. In this case, the only rule we have creates voiceless sonorants, so to build the URs for our sample words, we should replace all the voiceless sonorants in the SRs with the underlying voiced phonemes they are derived from. This gives us the following set of example URs:

/ʀitm/	'rhythm'
/ɔ̃kl/	'uncle'
/ɛtʀ/	'to be'
/tabl/	'table'
/ekʀiʀ/	'to write'
/limite/	'limited'

Demonstrate the derivation

Finally, we can construct a **derivation table** which visually demonstrates the the phonological derivation of one or more words. Derivations are commonly formatted as follows, with the URs and glosses of the example words listed horizontally across the top, all of the relevant phonological rules listed vertically down the left, and the SRs listed horizontally across the bottom. In each column, the output of each phonological rule is given, showing how the word changes. We can use a **dash —** to indicate that the

rule does not apply to a particular word. It is also useful to give rules a meaningful name as a reminder of what the rule is. Here, we will call the rule for French sonorants “devoicing”.

gloss UR	‘rhythm’ /ʁitm/	‘uncle’ /ɔ̃kl/	‘to be’ /ɛtʁ/	‘table’ /tabl/	‘to write’ /ekʁiʁ/	‘limited’ /limite/
devoicing	ʁitm̥	ɔ̃kl̥	ɛtʁ̥	—	—	—
SR	[ʁitm̥]	[ɔ̃kl̥]	[ɛtʁ̥]	[tabl]	[ekʁiʁ]	[limite]

Check your understanding

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4.9: Types of phonological rules

Phonation assimilation

There are many types of rules that languages may have. Perhaps the most common general type of phonological rule we find is **assimilation**, when a phoneme changes to an allophone that matches some aspect of its environment. That is, one or more of the properties in the rule's change are also present somewhere in the rule's environment. We see this with French devoicing, where the sonorants become voiceless in an environment that also involves voicelessness.

Phonation assimilation can also cause voicing rather than devoicing, as in Wemba Wemba (an extinct Kulinic language of the Pama–Nyungan family, formerly spoken in Australia), in which voiceless plosives are voiced after nasal stops, as in the following data (adapted from Hercus 1986).

/panpar/ → [panbar] 'shovel'

/jantaŋ/ → [jandaŋ] 'I'

/taɳʈa/ → [taɳɖa] 'touch'

We can write the relevant rule as follows:

- plosive → voiced / voiced nasal stop _

In both the French and Wemba Wemba assimilation rules, the crucial part of the environment containing the assimilating property is on the left, but phonation assimilation can also depend on the right side of the environment, as in Polish (a West Slavic language of the Indo-European family, spoken in Poland). In Polish, voiced obstruents become voiceless if followed by a voiceless obstruent (data adapted from Stanisławski 1978 and Rubach 1996).

/dxu/ → [txu] 'of breath'

/rɪbka/ → [rɪpka] 'little fish'

/vçi/ → [fçi] 'of village'

/vɪkaz pism/ → [vɪkas pism] 'list of journals'

The relevant phonological rule can be written as follows:

- obstruent → voiceless / _ voiceless obstruent

Place assimilation

Phonation is not the only phonetic property that can assimilate. In Persian (a Southwestern Iranian language of the Indo-European family, spoken in Iran and surrounding areas), we see assimilation of place, with alveolar stops becoming postalveolar before a postalveolar (data adapted from Bijankhan 2018).

/ʔætʃɒn/ → [ʔæʧʃɒn] 'parched'

/χædʃe/ → [χæʤʃe] 'flaw'

/ʔenʃɒ/ → [ʔeɲʃɒ] 'essay'

The relevant phonological rule can be written as follows:

- alveolar stop → postalveolar / _ postalveolar

Nasality assimilation

Nasality is also another common property that assimilates, as in Ka'apor (a.k.a. Urubú-Kaapor, a Wayampí language of the Tupian family, spoken in Brazil). In Ka'apor, vowels are nasalized after a nasal stop (data adapted from Kakumasu 1986).

/uruma/ → [urumã] 'duck'

/tamui/ → [tamũi] 'old man'

/mɬra/ → [mɬ̃ra] ‘wood’

/nino/ → [nĩnõ] ‘lie down’

/niʃoi/ → [nĩʃoi] ‘none’

/ne/ → [nẽ] ‘you (sing.)’

The relevant phonological rule can be written as follows:

- V → nasal / nasal stop _

Other kinds of rules

Most any phonetic property can assimilate, and there are also many rules that do not involve assimilation at all.

[more examples coming soon!

Using common rules types

Knowing what kinds of phonological rules we are likely to find helps narrow down our options when trying to determine what phones are allophones of the same or different phonemes. For example, for the French sonorants, we see that there are natural pairs of voiced and voiceless sonorants, so it would be reasonable to see if the distribution of these match what we know about rules that affect voicing, such as assimilation.

By taking advantage of our knowledge of common types of rules, this allows us to avoid focusing on likely irrelevant factors. For example, for French, we would know not to worry too much about vowel rounding or place of articulation, since these are not normally triggers for changing phonation. We can also begin looking for patterns based on common rules without even knowing which phones of interest we should examine: maybe there is a pattern in vowel nasality based on the presence or absence of an adjacent nasal stop (indicating assimilation of nasality). Of course, the language we are analyzing won’t have all of these rules, but it might have one, so we can get a head start on analyzing its phonology.

This means that phonemic analysis and rule discovery go hand in hand. Sometimes, we may use known phonological rules to help uncover distributional patterns in phones, and other times, we may find the distributional patterns first, leading us to posit a phonological rule. Working on a language from both directions can be much more productive than trying to do phonemic analysis directly. This is a method that permeates all of linguistics, not just phonology. Every language we analyze tells us something about how language itself works, and that broader knowledge of how language works helps us to analyze the next language.

Check your understanding

Coming soon!

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4.10: Signed language phonology

Modality differences in phonological rules

Finally, we might wonder whether signed languages have phonological rules, since they have fundamentally different modalities. In some sense, signed languages do have phonological rules, but not quite in the same way that spoken languages do. Phonological rules in spoken languages are typically fully **productive**, which means they apply to every word that satisfies the target and environment. So French devoicing of sonorants applies to absolutely every single sonorant that is in the correct environment; there are no exceptions.

But signed languages do not seem to have these kinds of productive phonological rules. There are many theories why this might be the case. Perhaps it is because signed languages do not have levels of analysis equivalent to phonemes or phones. There are parameters (handshape, movement, etc.) and syllable-like structures, but maybe there is nothing in between. A combination of phonetic properties in signed languages yields a syllable or even an entire sign, while in a spoken language, a combination of phonetic properties just yields a phone. This may mean that there simply is not the right kind of phonological unit to be targeted by phonological rules in signed languages the way we have seen for spoken languages.

It should not be a surprise that something so intimately connected to modality might differ between spoken and signed languages, and this is a good reminder that we cannot simply import spoken language linguistic analysis into signed languages. They need to be analyzed in their own right.

Weak hand freeze

Regardless, there are phonological processes in signed languages that are somewhat rule-like, they just only affect individual signs rather than all signs that match the requirements for the rule. Two-handed signs in particular are often subject to phonological processes because they involve so much articulatory complexity and effort. If both hands are moving, the nondominant hand may undergo **weak hand freeze**, which causes it not to move. We can see this in the ASL sign SENTENCE, which has two two-handed forms, one in which the nondominant hand moves and one in which the nondominant hand has been frozen.

SENTENCE (two-handed movement) https://www.signingsavvy.com/media2/mp4-ld/8/8611.mp4

SENTENCE (with weak hand freeze) https://www.signingsavvy.com/media2/mp4-ld/8/8612.mp4

Weak hand drop

Another phonological process that can affect two-handed signs is **weak hand drop**, in which an immobile nondominant hand is simply not used at all. We can see this in the ASL sign CHOOSE, which has two forms, a two-handed version with an immobile nondominant hand and a one-handed version in which the nondominant hand has been dropped.

CHOOSE (two-handed) https://www.signingsavvy.com/media2/mp4-ld/22/22784.mp4

CHOOSE (with weak hand drop) https://www.signingsavvy.com/media2/mp4-ld/30/30828.mp4

Lowering

Signs may also undergo **lowering**, in which the sign is articulated at a lower location to reduce the effort of moving the hands all the way to the original higher position. Lowering can be seen in the ASL sign KNOW, which is sometimes articulated at the forehead but can instead be lowered to a location under the eyes.

KNOW (at forehead) https://www.signingsavvy.com/media2/mp4-ld/21/21554.mp4

KNOW (with lowering) https://www.signingsavvy.com/media2/mp4-ld/30/30441.mp4

Distalization and proximalization

Signs can also shift which joints are used. If the joints shift down the arm towards the fingers, the sign has undergone **distalization**, while if they shift up the arm towards the shoulder, the sign has undergone **proximalization**. Without knowing the original version of a sign, it may be difficult to tell whether two variants represent distalization or proximalization. The ASL sign CHAT has two

variants, one that is more proximal (with elbow and a bit of shoulder movement) and one that is more distal (with radioulnar movement).

CHAT (proximal) https://www.signingsavvy.com/media2/mp4-ld/22/22579.mp4

CHAT (distal) https://www.signingsavvy.com/media2/mp4-ld/22/22578.mp4

Check your understanding

Coming soon!

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CHAPTER OVERVIEW

Chapter 5: Morphology

Learning Objectives

When you've completed this chapter, you'll be able to:

- Identify morphologically complex words, and the morphemes within them
- Distinguish between inflectional morphology, derivational morphology, and compounds
- Explain how a word's morphology interacts with its lexical category
- Analyze the structure of complex words

In this chapter, we look at words and at the meaningful pieces that combine to create words. We will see that languages vary in how words are built, but that nonetheless we can find **structure** inside of words in all languages. In linguistics, the study of word forms is known as **morphology**.

5.1: What is morphology?
5.2: Roots, bases, and affixes
5.3: Morphology beyond affixes
5.4: Allomorphy
5.5: Lexical categories
5.6: Derivational morphology
5.7: Inflectional morphology
5.8: Compounding
5.9: Structural ambiguity in morphology
5.10: How to draw morphological trees
5.11: How to solve morphology problems
5.12: Exercise your linguistics skills

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5.1: What is morphology?

In linguistics, **morphology** is the study of how words are put together. For example, the word cats is put together from two parts: *cat*, which refers to a particular type of furry four-legged animal (🐈), and -s, which indicates that there's more than one such animal (🐈🐈).

Most words in English have only one or two pieces in them, but some technical words can have many more, like *non-renewability*, which has at least five (*non-*, *re-*, *new*, *-abil*, and *-ity*). In many languages, however, words are often made up of many parts, and a single word can express a meaning that would require a whole sentence in English.

For example, in the Harvaqtuurmiutut variety of Inuktitut, the word *iglujjualiulauqtuq* has 5 pieces, and expresses a meaning that could be translated by the full English sentence "They (sg) made a big house." (*iglu* = house, *–jjua* = big, *–liu* = make, *–lauq* = distant past, *–tuq* = declarative; this example is from a 2010 paper by Compton and Pittman).

Not all combinations of pieces are possible, however. To go back to the simple example of *cat* and *-s*, in English we can't put those two pieces in the opposite order and still get the same meeting—*scat* is a word in English, but it doesn't mean "more than one cat", and it doesn't have the pieces *cat* and *-s* in it, instead it's an entirely different word.

One of the things we know when we know a language is how to create new words out of existing pieces, and how to understand new words that other people use as long as the new words are made of pieces we've encountered before. We also know what combinations of pieces are not possible. In this chapter we'll learn about the different ways that human languages can build words, as well as about the structure that can be found inside words.

What is a word?

If morphology is the investigation of how words are put together, we first need a working definition of what a **word** is.

For the purposes of linguistic investigation of grammar we can say that a word is the **smallest separable unit in language**.

What this means is that a word is the smallest unit that can stand on its own in an utterance. For example, content words in English (**nouns**, **verbs**, **adjectives**, and **adverbs**) can stand by themselves as one-word utterances when you're answering a question:

(1)	a.	What do you like to eat?
		Answer: cake (noun)
	b.	What did you do last night?
		Answer: sleep (verb)
	c.	What colour is the sky today?
		Answer: orange (adjective)
	d.	How did you wake up this morning?
		Answer: slowly (adverb)

Words are also **syntactically independent**, which means they can appear in different positions in a sentence, changing their order with respect to other elements even while the order of elements inside each word stays the same.

In everyday life, in English we might think of a word as something that's written with spaces on either side. This is an **orthographic** (or spelling-based) definition of what a word is. But just as writing isn't necessarily a reliable guide to a language's phonetics or phonology, it doesn't always identify words in the sense that is relevant for linguistics. And not all languages are written with spaces in the way English is—not all languages have a standard written form at all. So we need a definition of "word" that doesn't rely on writing.

The definition of "word" is actually a hotly debated topic in linguistics! Linguists might distinguish **phonological words** (words for the purposes of sound patterns), **morphological words** (words for the purposes of morphology), and **syntactic words** (words for the purposes of sentence structure), and might sometimes disagree about the boundaries between some of these.

Though words are the smallest *separable* units, that doesn't mean that words are the smallest unit of language overall. As we already saw earlier in this section, words themselves can have smaller pieces inside them, as in the simple cases of *cats* (*cat–s*) or *international* (*inter–nation–al*)—but these smaller pieces can't stand on their own.

To refer to these smaller pieces within words, we use the technical term **morpheme**. A morpheme is the smallest systematic pairing of both form (sign or sound) and meaning or grammatical function. (We say "meaning or grammatical function" instead of just "meaning" because while some morphemes have clear meanings, of the type that will be discussed in Chapter 7 in the context of lexical semantics, other morphemes express more abstract grammatical information.)

Words that contain more than one morpheme are **morphologically complex**. Words with only a single morpheme are **morphologically simple**.

Ask yourself if the word "morphology" is morphologically complex. Can you identify morphemes within this word, systematic pairs of form and meaning? Historically, this word is built from two morphemes borrowed from Classical Greek: *morph-* "shape" and *-ology* "study of". People who know English don't necessarily know Classical Greek, though. Regardless of a word's etymology (the history of a word), the question of whether it is morphologically complex is a question about how people who know that word use it today. A word might be morphologically complex for some people, but morphologically simple for others. Neither of those options is "correct" or "incorrect", they just represent different grammars.

In linguistics *morphology* is the study of word shapes. In biology, *morphology* is the study of the shape of animals and other organisms, and if you do an internet search for "morphology", the first hits often relate to the biological meaning.

Our goal in morphology is to understand how words can be built out of morphemes in a given language. In the this chapter we will first look at the shapes of different morphemes (and morphological processes); in later sections we will review different functions that morphology can have, looking at divisions between **derivational** morphology, **inflectional** morphology, and **compounding**.

Check your understanding

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5.2: Roots, bases, and affixes

Affixes vs roots

Morphemes can be of different types, and can come in different shapes. Some morphemes are **affixes**: they can't stand on their own, and have to attach to something. The morphemes *-s* (in *cats*) and *inter–* and *-al* (in international) are all affixes.

The thing an affix attaches to is called a **base**. Just like whole words, some bases are morphologically simple, while others are morphologically complex.

For example, consider the word *librarian*. This word is formed by attaching the affix *-ian* to the base *library*.

We can ignore the fact that 'y' turns into an 'i' when a suffix attaches to *library*. There's a convention of English spelling that 'y' becomes 'i' before an affix; it doesn't reflect any change in phonological shape.

Librarian can then itself be the base for another affix: for example, the word *librarianship*, the state or role of being a librarian, is formed by attaching the affix *-ship* to the base *librarian*.

There is a special name for simple bases: **root**. A root is the smallest possible base, which cannot be divided, what we might think of as the *core* of a word. Roots in English we've seen so far in this chapter include *cat*, *library*, and *nation*.

If you look at the history of the words *library* and *nation*, they both trace back to Latin (by way of French), and in Latin the relevant words were morphologically complex: *library* traces back to the Latin root *libr-* (meaning "book"), and *nation* traces back to the Latin root *nat-* (meaning "be born"). When a child first encounters a word like *library* or *nation*, however, the word doesn't come annotated with this historical information! In the minds of most contemporary English speakers, it is likely that *library* and *nation* are treated as simple roots; in Chapter 13, you'll learn about how this kind of hypothesis could be tested experimentally.

Turning back to affixes, an affix is any morpheme that needs to attach to a base. We use the term "affix" when we want to refer to all of these together, but we often specify what *type* of affix we're talking about.

A **prefix** is an affix that attaches **before** its base, like *inter-* in *international*.

A **suffix** is an affix that **follows** its base, like *-s* in *cats*.

A **circumfix** is an affix that attaches **around** its base.

An **infix** is an affix that attaches **inside** its base.

A **simultaneous affix** is an affix that takes place at the **same time as** its base.

Prefixes and suffixes are very common, not only in English but also in other languages. Circumfixes, infixes, and simultaneous affixes are less common, and so we'll look at examples of each in order.

Circumfix

An example of a **circumfix** can be found in the marking of **plural possessors** in many Algonquian languages. The following examples are from Meskwaki, spoken in parts of the Midwest of the US and in Northern Mexico; the source of these examples is Oxford (2020), who adapted them from an in-preparation grammar by Amy Dahlstrom (*A grammar of Meskwaki, an Algonquian language*). These examples are presented in Meskwaki orthographi; "a·" indicates a long vowel.

(2)	a.	ne-ta·nes-aki
		1-daughter-AN.PL
		"my daughters"
(2)	b.	**ne**-ta·nes-**ena·n**-aki
		1-daughter-**1PL**-AN.PL
		"**our** daughters"

What you can see here is that the singular possessor in “my daughters” is marked only by a prefix, but the plural possessor in “our daughters” is marked by the combination of the prefix *ni-* and the suffix *-ena·n*—or, in other words, by a **circumfix**.

These examples have **morpheme-by-morpheme glosses**, which means that the morphological analysis has been done for you; in Section 5.11 we’ll discuss how we figure out the boundaries between morphemes in a language we aren’t already familiar with.

Glossed examples include at least three lines: the first line gives the example in the original language, usually in either a phonetic transcription or the language’s own orthography. The second line gives the meaning or function of each word or each morpheme (if the words are divided into morphemes). The third line gives a translation of the whole example into the language the author is writing in, which in this textbook is English.

Morpheme-by-morpheme glosses use standard abbreviations:

- **1** stands for “first person” (I, me, my / we, us, our)
- **PL** stands for “plural” (so **1PL** means “we, us, our”)
- **AN** stands for “animate”. Algonquian languages distinguish all nouns as “animate” or “inanimate”, and this is reflected in its morphology.

Infix

Infixes are affixes that appear **in the middle of another morpheme**. For example, in Tagalog (a language with about 24 million speakers, most of them in the Philippines) the infix -um- appears immediately after the first consonant of the base to which it attaches. This infix expresses perfective aspect for verbs. Perfective aspect indicates completed action, usually translated with the English simple past:

(3)	a.	[takbuh]	*run*	[tumakbuh]	*ran*
	b.	[lakad]	*walk*	[lumakad]	*walked*
	c.	[bili]	*buy*	[bumili]	*bought*
	d.	[kain]	*eat*	[kumain]	*ate*

For an affix to be an infix, it must appear inside another another morpheme, not just in the middle of a word. If you look at the word *unluckiness* (*un-luck-y-ness*), for example, *-y* is a suffix that just happens to appear in the middle of the word because another suffix (*-ness*) attaches after it. But *-y* still isn’t an infix, because it attaches after its base (*luck*), not inside its base.

Simultaneous affix

Simultaneous affixes are common in signed languages and in languages with tone. When signing, it’s possible to do things with multiple articulators (a second hand, or your face), or to add motion on top of a sign, in a way that is not possible with oral articulations in spoken languages.

For example, in ASL there is a morpheme that attaches to verbs to express **continuative aspect** (the meaning that something happens continuously for a while, or for a long time). This morpheme involves adding a particular circular motion to the base sign for the verb; this circular motion doesn’t happen before or after the verb, but simultaneously with it. You can see the application of this affix in the first and last videos for the verb STUDY in this linked article from the online Handspeak ASL dictionary (Lapiak 1995–2022) (the second video in that post shows the application of a different simultaneous affix, one for iterative aspect).

There is morphology in some spoken languages that has a similar profile. For example, languages with tone sometimes have tonal morphemes, where a change in tone expresses grammatical information, while the consonants and vowels of the base stay the same.

English isn't a tonal language, but we have some pairs of words that clearly involve the same root, but where the stress has shifted. These are noun-verb pairs where the noun has stress on the first syllable, but the verb has stress on the second syllable.

(4)	a.	They used to use **ré**cords to re**córd** music.
	b.	I have a **pér**mit that per**míts** me to drive.
	c.	I receive mail at my home **ádd**ress, at least when it's add**réssed** properly.

Not all English speakers have stress shift in the same pairs of words. For example, while I pronounce *address* with stress on the first syllable when it's a noun, many people pronounce it with stress on the second syllable (*addréss*) for both the noun and the verb.

Free and bound morphemes

Another way to divide morphemes is by whether they are **free** or **bound**. A **free** morpheme is one that can occur as a word on its own. For example, *cat* is a free morpheme. A **bound** morpheme, by contrast, can only occur in words if it's accompanied by one or more other morphemes.

Because affixes by definition need to attach to a base, only **roots** can be free. In English most roots are free, but we do have a few roots that can't occur on their own. For example, the root *-whelmed*, which occurs in *overwhelmed* and *underwhelmed*, can't occur on its own as **whelmed*.

By contrast, in many other languages all (or most) roots are **bound**, because they always have to occur with at least some morphology. This is the case for verbs in French and the other Romance languages, for example; it was also the case for Latin, which is why the roots *nat-* and *libr-* were shown with hyphens above.

We show that morphemes are bound by putting hyphens either before or after them, on the side that they attach to other morphemes. This applies to bound roots as well as to affixes.

Check your understanding

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5.3: Morphology beyond affixes

There are some morphological patterns that don't obviously involve affixes at all. In this section we discuss a few examples: **internal change**, **suppletion**, and **reduplication**.

Internal change

Internal change is one name for the type of change found in many **irregular** English noun plurals and verb past tenses.

For example, for many speakers of English the plural of *mouse* is *mice*; the plural of *goose* is *geese*. The past tense of *sit* is *sat*, and the past tense of *write* is *wrote*

These are all relics of what used to be a regular pattern in English. By **regular** we mean that they were phonologically predictable based on the general pattern of the language, and automatically applied to new words. For speakers of English today, changes like "*mouse* becomes *mice* when it's plural" have to be memorized, and are therefore **irregular**.

Suppletion

Suppletion is an even more irregular pattern, where a particular morphological form involves entirely *replacing* the form of a morpheme, and is always irregular—you can never predict what the result of suppletion will be, it always has to be memorized. For example, the past tense of the verb *go* is *went*—there is no amount of affixation or internal change that will get you from one to the other. This type of total replacement is also found in English in the comparatives and superlatives of *good ~ better ~ best* and *bad ~ worse ~ worst*, throughout the paradigm of the verb *to be*, and on some pronouns.

If a language has suppletion (and not all languages do!) it is commonly found on some of the most frequent words in the language, just as we see in English. The reason for this is that children acquiring a language tend to assume patterns are regular and predictable until the weight of the evidence convinces them otherwise—and they're more likely to get enough evidence to reach the conclusion that something is suppletive if a word is incredibly common. The relevance of frequency for certain types of patterns in language is something we'll see again in Chapter 11 on Child Language Acquisition and Chapter 13 on Psycholinguistics and Neurolinguistics.

Suppletion is a type of **allomorphy**, which we will learn more about in the next section of this chapter

Reduplication

Finally, **reduplication** involves repeating part or all of a word as part of a morphological pattern. In Halq'eméylem, a Salish language spoken in British Columbia, one pattern of reduplicating a verb produces an adjective meaning that something or someone is likely or disposed to do the action. The examples below come from Shaw (2008), and the links go to pages on FirstVoices, an online platform for community-based language resources, where you can listen to recordings of the unreduplicated verbs pronounced.

(1)	a.	kw'élh	'to capsize'	[kʼʷə́ɬ]	→	[kʼʷə́ɬkʼʷəɬ]	'likely to capsize'
	b.	qwà:l	'to speak'	[qʷél]	→	[qʷélqʷel]	'talkative'

This is not the only pattern of reduplication in Halq'eméylem; languages in the Salish family have many patterns of reduplication, which are associated with several patterns of meaning and grammatical function.

English does have one pattern of reduplication, which can apply to phrases as well as words. This type of reduplication carries the meaning of something being a prototypical example of the type; it is often called *salad-salad* reduplication by linguists. For example, in my variety of English I can say: "Tuna salad is a salad, but it's not a *salad-salad*."—in other words, tuna salad isn't a prototypical salad because it doesn't involve lettuce or other leafy green vegetables.

Morphological typology

Looking at different languages, we can divide them **typologically** into different morphological types.

At one end we have what are called **isolating** or **analytic** languages. No human language is *perfectly** isolating—this would be a language where **all** words are morphologically simple. Chinese languages like Mandarin and Cantonese are highly isolating, because in these languages inflectional information is typically expressed by small function words ("particles") rather than by affixes. However there are nonetheless many **compound** words in the language—compounds are words built out of more than one root, discussed more below in Section 5.7.

English is less isolating than Mandarin, but still very analytic.

The opposite of analytic is **synthetic**. Synthetic languages have a lot of morphological complexity in words, and are often characterized by having no (or very few) free roots.

Languages that are more synthetic fall into different types. The main division is between **agglutinative** and **fusional** languages. In highly **agglutinative** languages, words are built from many easily separated affixes, each of which is associated with a consistent piece of meaning. Japanese is a somewhat agglutinative language, as in the following example where the verb has a string of suffixes corresponding to the English passive ("was *verb*-ed") and causative ("made X *verb*").

(2)		Watasi-wa	natto-o	tabe-sase-rare-ta
		I-TOPIC	natto-ACC	eat-CAUS-PASS-PAST
		"I was made to eat natto."		

By contrast, a **fusional** language is one where many inflectional meanings are combined into single affixes. The Romance languages are a good example of fusional languages: the suffix on a verb expresses tense, aspect, and subject agreement, and is difficult to break down into smaller affixes. For example, in the Spanish word *estudiáramos*, the root *estud-* means "study" and the suffix *-iáramos* expresses subject agreement (first person plural), tense (past), aspect (imperfective), and mood (subjunctive).

Check your understanding

Shaw, P. (2008). Inside Access: The Prosodic Role of Internal Morphological Constituency. In *The Nature of the Word: Studies in Honor of Paul Kiparsky.* ed. Kristin Hanson and Sharon Inkelas. The MIT Press.

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5.4: Allomorphy

Some morphemes have a consistent meaning, but appear in different forms depending on the environment where they occur. This is **allomorphy**. In English, for example, the indefinite article shows up as *a* when it occurs before a consonant (*a book*), but as *an* when it occurs before a vowel (*an apple*). This is an example of allomorphy based on the *phonology* (sounds) that appear before or after the morpheme (the phonological environment). This is called **phonologically conditioned allomorphy**.

Another example of allomorphy can be found in the plural forms of English nouns. First, consider the pairs of singular and plural nouns in (1).

(1)			*singular*	*plural*
	a.	[s]	book	books
			cat	cats
			nap	naps
	b.	[z]	paper	papers
			dog	dogs
			meal	meals
	c.	[ɪz] or [əz]	niece	niece
			horse	horses
			eyelash	eyelashes

The plural in all these words is spelled as “s” (or “es”), but it isn’t always pronounced the same way. If you pay attention, the plural adds the sound [s] in (1a), the sound [z] in (1b), and the sound [ɪz] or [əz] in (1c). Just like the alternation between *a* and *an*, this is predictable phonologically conditioned allomorphy, based on the last sound in the noun root. See if you can come up with a generalization about when you see each of the allomorphs in (1). (The answer appears in the Check Your Understanding questions at the end of this section.)

Now look at the singular-plural pairs in (2). These examples show more allomorphs of the plural in English, but they are **not** predictable: the allomorph of the plural used with these roots has to be remembered as a list.

One way of describing nouns that have no change in the plural is to say that they take an empty affix or zero affix. We use the symbol ∅ (the symbol for an empty set in mathematics) to indicate a morpheme that has no overt form.

(2)			*singular*	*plural*
	a.	-(r)en	child	children
			ox	oxen
			nap	naps
	b.	*internal change*	mouse	mice
			goose	geese
			woman	women
	c.	no change (-∅)	fish	fish
			sheep	sheep
			deer	deer

Allomorphy that is determined by the root, like in (2), is called **lexically conditioned allomorphy**.

When a morpheme can be realized in more than one way, we refer to its different forms as **allomorphs** of the morpheme.

(3) lists all the allomorphs of the English plural seen in this section.

(3)		***Plural:*** -s, -z, -ɪz, -(r)en, internal change, -∅

There are more allomorphs of the plural in English than we've seen here. Can you think of any others? For any other language that you know, are there allomorphs of the plural in that language? What about other affixes, in English or in other languages, can you think of further examples of allomorphy?

Check your understanding

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5.5: Lexical categories

Derivation vs inflection and lexical categories

Morphology is often divided into two types:

- **Derivational** morphology: Morphology that changes the meaning or category of its base
- **Inflectional** morphology: Morphology that expresses grammatical information appropriate to a word's category

We can also distinguish **compounds**, which are words that contain multiple roots into a single word.

The definitions of derivation and inflection above both refer to to the **category** of the base to which morphology applies. What do we mean by "category"? The category of a word is often referred to in traditional grammar as its **part of speech**. In the context of morphology we are often interested in the **lexical categories**, which is to say **nouns**, **verbs**, **adjectives**, and **adverbs**. The rest of this section gives an overview of what lexical categories are, and how we can identify them.

Lexical Categories, aka "Parts of Speech"

Determining the category of a word is an important part of morphological and syntactic analysis. A category of words or morphemes is a group that behave the same way as one another, for grammatical purposes.

You might be familiar with traditional **semantic** definitions for the parts of speech—definitions that are based on a word's meaning. If you ever learned that a noun is a "person, place or thing", or that a verb is an "action word", these are semantic tests. However, semantic tests don't always identify the categories that are relevant for linguistic analysis. They can also be hard to apply in borderline cases, and sometimes yield inconsistent results; for example, surely *action* and *event* are "action" words, so according to the semantic definition we might think they're verbs, but in fact these are both nouns!

In linguistics we're interested in making generalizations about where different categories of words or morphemes can occur, and how they can combine with each other. We therefore define categories based on the grammatical contexts in which words or morphemes are used—their **distribution**. The distribution of different categories varies from language to language. The remainder of this section reviews some of the main distributional tests for lexical categories (nouns, verbs, adjectives, and adverbs) in English (distributional tests for non-lexical categories appears in Chapter 6.5).

If you know any other language, think about whether any of these tests can be adapted to identify lexical categories in that language, or if there are other morphological or syntactic cues that can be used to distinguish lexical categories in that language.

Nouns (N)

- Syntactic tests for nouns:
  - Can follow a determiner
    - As in: *an event* or *the proposal*
  - Can be modified by **adjectives**
    - As in: *a happy event* or *the new proposal*
  - Can be the subject or object of a verb
    - As in: *Events occurred.* or *We made proposals.*
  - Can be replaced by a pronoun
    - As in: *Events occurred.* becoming *They occurred.*
  - Do not allow objects (without a preposition).
- Morphological tests for nouns:
  - Have singular and plural forms: e.g. *books*, *governments*, *happinesses*
    - Note: The plurals of some abstract nouns can seem odd! Think outside the box to find contexts where they might naturally occur.

Verbs (V)

- Syntactic tests
  - Can combine with auxiliary verbs (e.g. *can*, *will*, *have*, *be*)
  - Can follow the infinitive marker *to*.
  - Can take an object (without a preposition):
    - As in: *kick the ball*.
- Morphological tests
  - Have a third person singular present tense form with *-s*
    - As in: (*she/he/it*) *kicks*, *goes*, *proposes*
  - Have a past tense form, usually (but not always) with *-ed*
    - As in: (*she/he/it*) *kicked*, *went*, *proposed*
  - Have a perfect / passive form, usually with *-ed* or *-en*
    - As in: (*she/he/it*) *has kicked*, *gone*, *proposed*
  - Have a progressive form with *-ing*.
    - As in: *kicking*, *going*, *proposing*

Adjectives (Adj)

- Syntactic tests:
  - Modify nouns (occur between a determiner and a noun)
    - As in: *a happy event* or *the new proposal*
  - Can be modified by *very* (but so can many adverbs!)
    - As in: *very happy*, *very new*
  - Do not allow noun phrase objects (if objects are possible, they must be introduced in a prepositional phrase)
    - There are a handful of exceptions to the generalization that adjectives only take prepositional phrase objects, depending on your variety of English. Noun phrase objects of adjectives are discussed a bit more in Section 6.13.
- Morphological tests:
  - Can often be suffixed by *-ish*
  - May have comparative and superlative forms (e.g. *happier*, *happiest*)

Adverbs (Adv)

- Syntactic tests:
  - Modify verbs, adjectives, and other adverbs (anything but nouns!)
  - Cannot appear alone between a determiner and a noun.
  - Can be modified by *very* (but so can adjectives!)
- Morphological tests:
  - Many (not all) adverbs end in *-ly*

Using derivational affixes to identify category

In addition to the morphological tests above, you can also use derivational affixes to help determine the category of a word. For example:

- Suffixes like *-ment* and *-ness* always create nouns; the base that *-ment* attaches to is always a verb (if it's a free form), and the base of *-ness* is usually an adjective.
- Suffixes like *-ify* and *-ize* always create verbs; their bases are nouns (if they're free forms).

The property of derivational affixes to not only create particular categories, but also to *attach* to specific categories, is called **selection**. We discuss selection by derivational morphology further in Section 5.6.

Check your understanding

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5.6: Derivational morphology

Derivational morphology and selection

Derivational morphemes are typically choosy about the types of bases they combine with—another word for "choosy" is *selective*, and so we talk about how derivational affixes **select** the category of their base.

For example, the suffix *-able* combines only with verbs, and always creates adjectives meaning "able to be *verb*-ed": *readable*, *writeable*, *playable*, *employable*, and *googleable* are all possible adjectives in English, even if they don't appear in a dictionary—while the other words in this list probably do show up in most dictionaries, *googleable* might not, because *google* a relatively recent verb (adapted from the name of the company). But as an English speaker I don't need to check the dictionary to find out if something is a possible English word—if I'm talking to someone and I say that something is "googleable", I can be confident that they'll understand me even if they've never heard someone use that verb before.

Here is a very incomplete sample of derivational affixes in English, with the category they **select** on the left side of the arrow, and the category they **create** on the right side.

(1)		*-tion*	V	→	N
		-able	V	→	Adj
		-en	V	→	Adj
		-ed	V	→	Adj
		-ing	V	→	Adj or N
		-ment	V	→	N
		-ness	Adj	→	N
		-ity	Adj	→	N
		-ous	N	→	Adj
		-hood	N	→	N
		-ize	N	→	V
		-ly	Adj	→	Adj
		-ish	Adj	→	Adj

There are many more than this! You'll see them inside many words if you start paying attention.

Prefixes in English never change the category of the base they attach to, but they express clear meanings, like negation, repetition, order (e.g. *pre-* and *post-*), etc. Examples of English derivational prefixes and the categories they select appear in (2):

(2)		*non-*	N	→	N	*non-issue*
			Adj	→	Adj	*non-distinct*
		un-	V	→	V	*undo*
			Adj	→	Adj	*unhappy*
		re-	V	→	V	*redo*

Derivational morphology can also be even more selective, requiring not only a base that has a certain category, but only attaching to *specific* roots or bases. A lot of derivational morphology in English was acquired from borrowing words from French and Latin;

these “latinate” affixes often prefer to combine with each other, and sometimes only with roots that are also latinate. Such affixes are less productive than other affixes, which combine freely with most bases.

Some of the most productive derivational suffixes in English are *-ish*, which can attach to most adjectives, *-ness*, *-able*, and *-ing*.

-ing is particularly productive: it can attach to all verbs in English to form adjectives (traditionally called “participles”) or nouns (traditionally called “gerunds”). It is very unusual for a derivational affix to be that productive; usually there are at least a few roots that don’t occur with a derivational affix, for whatever reason.

Order of Affixation

Because derivational affixes care about the category of the base they attach to, *and* they can result in a change to a new category for the whole word, the order in which they are added to a word can matter!

Prefixes, suffixes, and circumfixes always attach to the outer edge of their base. That means that if a word has only suffixes, or only prefixes, there is only one order those affixes could have attached in. It will never be the case that the suffix that was added last appears closer to the root than suffixes that attached earlier.

Consider the word *foolishly*. This has the root *fool* (a noun), the suffix *-ish* (which attaches to nouns to form adjectives), and the suffix *-ly* (which attaches to adjectives to form adverbs). The only way to build this word is to first attach *-ish* to the root *fool*, and then attach *-ly* to the new base *foolish*. This structure is illustrated in Figure **5.6.1**

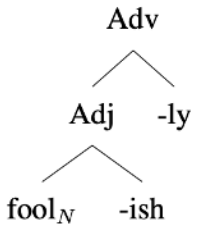


Figure **5.6.1**: Tree diagram for *foolishness*

But if a word has both prefixes and suffixes, then it’s slightly more work to figure out what order they attached in. Sometimes the selectional properties of the affixes means that there is only one option. Consider the word *unkindness*. Here we have one prefix and one suffix. So in principle there are two orders in which we could build the word:

- Option 1 would be to first attach *un-* to the Adjective root *kind*, building the Adjective *unkind*, then attach *-ness* to *unkind* to get the Noun *unkindness*
- Option 2 would be to first attach *-ness* to the Adjective root *kind*, building the Noun *kindness*, then attach *un-* to *kindness* to get the Noun unkindness

In both these hypothetical derivations the intermediate base—*unkind* in Option 1 and *kindness* in Option 2—is a possible word of English, so from that perspective both derivations seem equally plausible.

But only one of these options matches the selectional properties of the affixes involved.

- If we look at *un-*, we find that it only attaches to verbs (with a reversal reading, like *undo*) and adjectives (with a negative meaning, like *unkind*). It cannot attach to nouns.
- If we look at *-ness*, by contrast, it attaches to adjectives to *create* nouns.
- So if *-ness* attached first in this word, as in 2, it would turn the adjective *kind* into a noun, and *un-* would no longer have the right kind of base to attach to.

This means that it can only be the order in 1, where *un-* attaches before *-ness*, while its potential base is still an adjective, that is the correct one.

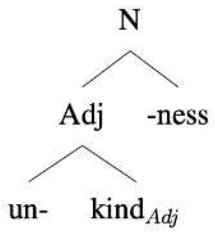


Figure **5.6.1**: Tree diagram for *unkindness*

Check your understanding

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5.7: Inflectional morphology

So far we've focused on derivational morphology. The next kind of morphology we'll discuss is **inflectional morphology**.

Unlike derivational morphology, inflectional morphology never changes the category of its base. Instead it simply *suits* the category of its base, expressing grammatical information that's required in a particular language.

In English we find a very limited system of inflectional morphology:

- **Nouns**
  - Number: singular vs. plural
  - Case (only on pronouns)
    - Nominative: I, we, you, he, she, it, they
    - Accusative: me, us, you, him, her, it, them
    - Possessive: my, our, your, his, her, its, their
- **Verbs**
  - Agreement: most verbs agree with third person singular subjects only in the present tense (-s), but the verb *to be* has more forms.
  - Tense: Past vs. Present
  - Perfect/Passive Participle: -ed or -en (Perfect after auxiliary have, Passive after auxiliary be)
  - Progressive -ing (after auxiliary be)
- **Adjectives**
  - Comparative -er, Superlative -est (Arguable! Some people might treat this as derivational)

That's all of it! But if we look at other languages, we find more types of inflectional morphology.

One thing about inflectional morphology is that lots of it can be expressed **syntactically** instead of morphologically. So some languages have tense, but express it with a particle (a separate word) rather than with an affix on the verb. This is still tense, but it's not part of inflectional morphology.

The rest of this section gives a general survey of types of inflectional distinctions commonly made in the world's languages, but there are many types of inflection that aren't mentioned here.

Number

Most languages, if they have grammatical number, just distinguish singular and plural, but number systems can be more complex as well.

For example, many languages have **dual** in addition to singular and plural. Dual number is used for groups of exactly two things; we have a tiny bit of dual in English with determiners like *both*, which means strictly two. You have to replace *both* with *all* if a group has three or more things in it.

An example of a language that distinguishes dual morphologically is Inuktitut, one of the languages spoken by the Inuit people who live in the Arctic region. There is a good deal of dialect variation across the Inuit languages; examples here are drawn from Inuktut Tusaalangaa, and represent the dialect South Qikiqtaaluk, spoken in parts of Nunavut that include the city Iqaluit.

(1)		*gloss*	*singular*	dual (2)	plural (3+)
		"pen"	titiraut	titirautiik	titirautit
		"cloud"	nuvuja	nuvujaak	nuvujait
		"computer"	qaritaujaq	qaritaujaak	qaritaujait

The three-way distinction between singular, dual, and plural in Inuktitut applies not only to nouns but also to verbs that agree with their noun subjects. The examples in (2) are from the Inuktitut Reference Grammar produced by Inuit Uqausinginnik

Taiguusiliuqtiit.

(2)	first person	singular	anijunga	“I go out”
		dual	anijuguk	“the two of us go out”
		plural	anijugut	“we (three or more) go out”
	second person	singular	anijutit	“you (one of you) go out”
		dual	anijusik	“you two go out”
		plural	anijusi	“you (three or more) go out”
	third person	singular	anijuq	“they (sg) go out”
		dual	anijuuk	“the two of them go out”
		plural	anijut	“they (three or more) go out”

A small number of languages go further and also have a **trial** (pronounced “try-ull”), usually only on pronouns. This is used for groups of exactly three.

A language can also have **paucal** number, used for small groups.

Person

Person distinctions are those between first person (*I, we*), second person (*you*), and third person (*he, she, it, they*).

Some languages make a distinction in the first person plural between a first person inclusive (me + you, and maybe some other people) and a first person exclusive (me + one or more other people, not you). Anishnaabemowin (Ojibwe), which has about 20,000 speakers, makes this kind of distinction. The pronoun *niinawind* refers to the speaker plus other people but not the person being addressed (that is, “we excluding you”). This is known as the **exclusive** we. The pronoun for **inclusive** we (“we including you”) is *giinawind*. The distinction between inclusive and exclusive we is sometimes referred to as **clusivity**.

In Odawa and Algonquin varieties of Anishinaabemowin, spoken near Lake Huron and in Eastern Ontario and Quebec, these pronouns are *niinwi* and *giinwi*, respectively, but make the same contrast in meaning. Cree, which belongs to the same language family as Ojibwe (the Algonquian family), also makes an inclusive/exclusive distinction in the first-person plural. The inclusive form is *niyanân* and the exclusive form is *kiyânaw*. (Ojibwe examples from Valentine 2001.)

Case

Case refers to marking on nouns that reflects their grammatical role in the sentence. Most case systems have ways to distinguish the **subject** from the **object** of a sentence, as well as special marking for **possessors** and **indirect objects**.

Some languages have many more case distinctions than this; usually many of the case forms express meanings that in languages like English we express using prepositions. Estonian and Finnish are known for having especially many cases (14 in Estonian and 15 in Finnish): the Wikipedia article on Finnish cases is a good source if you’d like to learn more.

Agreement

Agreement refers to any inflectional morphology that reflects the properties of a different word in a sentence, usually a noun.

The most common type of agreement is **verbs** agreeing with their subject, though verbs in some languages might also agree with their object (or might sometimes agree with their object instead of their subject). Verbs usually agree with nouns for their **number** and **person**.

Determiners, **numerals**, and **adjectives** often agree with the noun they modify, usually for **number**, **case**, and **gender** (assuming a language has some or all of these types of inflection in the first place!).

Tense and Aspect

Tense refers to the contrast between **present** and **past** (or sometimes between future and non-future) and is typically marked on verbs.

Aspect is a bit harder to define, but is usually characterized as the perspective we take on an event: do we describe it as complete, or as ongoing? In English we have progressive (marked with *be* + *–ing*) and perfect aspect (*have* + *–ed*/*-en*).

French has a slightly different contrast in the past tense between the *imparfait* and the *passé composé*—these both locate things in the past, but the *imparfait* describes them as habitual or ongoing (**imperfective** aspect), while the other describes them as complete (**perfective** aspect).

The Mandarin particle le (了) also expresses perfective aspect, describing an event as complete, and zài (在) expresses progressive aspect, describing an event as in progress. But these are not examples of inflectional morphology, because these particles (=small words) are separate from the verb and do not act as affixes.

Terminology for aspectual distinctions can be confusing. In particular, the English perfect is not quite the same as the French or Mandarin perfective—though just as their names overlap, some of their uses are also similar.

Negation

In English we have derivational negative morphology (as in the prefixes *in-* or *non-*), which negates the meaning of a base or root.

Inflectional negation, by contrast, makes a whole sentence negative. In English we express inflectional negation syntactically, with either the word *not* (or its contracted clitic form *n't*). In other languages, however, negation can be expressed by inflectional affixes.

Other inflectional distinctions

What other types of distinctions can be marked in the verbal inflection of a language? Here we review a non-exhaustive set of inflectional distinctions made in some of the languages of the world.

Obviation: Algonquian languages, including Cree and Anishinaabemowin, make a distinction between proximate and obviative third person. You might think of this distinction as something similar to the near/far distinction between this and that in English, where this is used for something that is closer to the speaker and that is for something farther away. But, like in English, the proximate/obviative distinction is not just about physical distance; it can also allude to distance in time, or within a conversation, to someone that is the topic of discussion (proximate) versus someone that is a secondary character (obviative). The distinction is marked on the verbal morphology, as illustrated below with examples from Cree:Obviation

(3)		*proximate*		*obviative*
	a.	Regina wîkiwak.		Regina wîkiyiwa.
		“They live in Regina.”		“Their friend/someone else lives in Regina.”
	a.	kiskinwahamâkosiwak.		kiskinwahamâkosiyiwa.
		“They are in school.”		“Their friend/someone else is in school.”

CAUSATIVES: A causative is a construction that expresses that an event was caused by an outside actor. In English we have a few constructions that express causativity, using verbs like *make*, *have*, and *get*:

(4)	a.	English causative with *make*:		
		The tree fell.	→	I made the tree fall.
	b.	English causative with *have*:		
		The actors exited stage right.	→	The director had the actors exit stage right.
	c.	English causative with *get*:		
		The teacher cancelled the exam.	→	The students got the teacher to cancel the exam.

When a language has a morphological causative, it expresses these types of meanings by adding a morpheme onto the main verb. For example, in Kinande, a Bantu language spoken in the Democratic Republic of the Congo, the verb *erisóma* means "to read", but *erisómesya* means "to make (someone) read".

This is a type of morphology that changes the argument structure of a verb—the pattern of arguments (subjects, objects, indirect objects) that it combines with. Other types of argument changing morphology are applicative or benefactive (to do something *to* or *for* someone) and passive. We discuss the syntax of argument changing in Section 6.11, which also gives an example of a morphological causative in Japanese.

Causative morphology is often classified as derivational, rather than inflectional, because it changes the meaning of a verb. It's included in this section because it fits into the general discussion of types of morphology you might encounter in the analysis of other languages.

EVIDENTIALS: Many languages use morphology to indicate a speaker's certainty about what they're saying, or the source of their evidence for what they say. This is called evidential marking.

For example, in Turkish there is a distinction between the "direct past" -di, used to mark things you are certain of or that you directly witnessed, and the "indirect past" -miš, used to mark things you have only indirect evidence for.

(5)	a.	gel-di
		come-PAST
		"came"
	b.	gel-miš
		come-INDIRECT.PAST
		"came, evidently"

In English we don't have any grammatical marking of evidentiality. We can still express our evidence or certainty, but we do this with the lexical meanings of nouns, verbs, adjectives, and adverbs. For example, "I saw that…" would express that the source of your evidence is something you saw; "Apparently" would express that you aren't 100% certain, etc.

MODALITY: Many languages express the possibility or necessity of something happening via morphology on the main verb. This is called modality. Examples of this include categories like the *conditionnel* or the *futur* in French.

GENDER: In English we mark gender on third person pronouns, and we also have some words that have derivational gender suffixes (like *–ess* on *actress* or *waitress*).

By contrast, gender in a language like French is best treated as inflectional: not only do all nouns have a semantically arbitrary gender, determiners and adjectives (and sometimes verbs) show agreement with the grammatical gender of the noun they're associated with to. For example, the noun *chat* "cat" in French is masculine (abbreviated M), and so it appears with a masculine determiner and adjective; the noun *abeille* "bee" is feminine (abbreviated F), so it appears with a feminine determiner and adjective. This is independent of the actual sex of a cat or bee.

(6)	a.	le	petit	chat
		the.M	small.M	cat(M)
		"the small cat"		
	b.	la	petite	abeille
		the.F	small.F	bee(F)
		"the small bee"		

Many European languages have this type of gender system, which divides nouns into masculine, feminine, and sometimes neuter. It's also found elsewhere in the world: for example, Kanien'kéha (Mohawk), spoken by about 3,500 people in Ontario, Quebec, and New York, has a gender system that includes masculine, feminine/indefinite, and feminine/neuter.

Other languages of the world have different noun class or noun classification systems, which also divide nouns into somewhat arbitrary classes, but categories that don't match the gender categories used for humans.

For example, the languages in the Bantu family of languages (a subgroup of the Niger-Congo language family spoken across the southern half of Africa, and which includes Kinande, Zulu, and Swahili, among many others) put all humans into one class, but have somewhere between 4 and 10 classes in total, which (just like gender in French) can be reflected by agreement on other words in a sentence.

Algonquian languages, including Cree and Anishinaabemowin, divide nouns into animate and inanimate. Animate nouns are usually those that are alive, whether animals or plants, or spiritually important things like asemaa (tobacco). Inanimate nouns usually refer to physical objects that aren't alive. Sometimes the same noun can be animate or inanimate with slightly different meanings: for example mitig means "tree" when it's animate but "stick" when it's inanimate. There are other nouns that are less predictable: for example, miskomin "raspberry" is animate, but ode'imin "strawberry" is inanimate.

Check your understanding

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5.8: Compounding

Compounds: Putting roots together

The last main “type” of morphology is **compounding**. Compounds are words built from more than one root (though they can also be built from derived words): if you find a word that contains more than one root in it, you are definitely dealing with a compound. Compounding differs from both derivation and inflection in that it doesn’t involve combinations of roots and affixes, but instead roots with roots.

English is a language that builds compounds very freely—this is like other languages in the Germanic language family, like German and Dutch. For almost any two categories, you can find examples of compounds in English.

- **Noun-Noun** compounds include:
  - doghouse
  - website
  - basketball
  - sunflower
  - moonlight
  - beekeeper
  - heartburn
  - spaceship
- **Adjective-Noun** compounds include:
  - greenhouse
  - bluebird
- **Verb-Noun** compounds include:
  - breakwater
  - baby-sit
- **Noun-Adjective** compounds include:
  - trustworthy
  - watertight
- **Adjective-Adjective** compounds include:
  - purebred
  - kind-hearted
  - blue-green
- **Noun-Verb** compounds include:
  - browbeat
  - manhandle
  - sidestep
- **Adjective-Verb** compounds include:
  - blacklist

Compounds and Spelling

In English we don’t spell compounds in a consistent way. Some compounds—typically older ones—are spelled without a space, while others are spelled with a hyphen, and many new compounds are spelled with spaces, as though they are separate words.

We can tell that some sequences of “words” are compounds, though, in a few different ways. First of all, there is a difference in pronunciation. Compounds are always stressed (given emphasis) on their first member, while phrases (sequence of words) get stress on their last member.

So the compounds:

- blácklbeard

- blackboard
- greenhouse
- blúebird

Are pronounced differently than the corresponding phrases with adjectives followed by nouns:

- black bóard
- green hóuse
- blue bírd

Another difference is in the interpretation: a blackboard need not be black, and a greenhouse usually isn't green (though you grow green things in it).

Finally, there's a *syntactic* difference. Something we'll see when we get to Chapter 6 is that there's no way to string nouns together in English syntax, without connecting them with prepositions or verbs. So any time you see a string of "words" in English that all look like nouns, you have to be dealing with a compound.

English really likes building very long compounds out of nouns, though this is something many English users associate with German. In German, unlike in English, compounds are always spelled without spaces. So you get words like:

(1)		Donaudampfschiffahrtsgesellschaftskapitän
		Donau-dampf-schiffahrts-gesellschafts-kapitän
		"Danube steam shipping company captain"

The second row in (1) inserts the hyphens in this German compound so that you can see the roots more clearly—but if you look at the English translation, it actually tracks all the same nouns in the German example. English writing has just adopted the convention of writing long or novel compounds with spaces. Structurally, English compounds work just like their German counterparts.

Compounds and Headedness

If compounds have more than one root in them, which root determines the category of the word?

Most compounds—especially new compounds you might invent on the spot—have a **head**. The head of a compound determines its interpretation (a sunflower is a type of flower, a bluebird is a type of bird, etc.) as well as its category.

In English, the head of a compound is always on its right: English is a **right-headed** compound language.

Compounds that have a head are called **endocentric**. This is the same *endo–* morpheme you find in *endo-skeleton*. An animal (like a human) with a skeleton inside of it is endoskeletal, and a compound with a head inside of it is endocentric.

What about the compound equivalent of *exo-skeletal*, animals that have a carapace instead of a skeleton (like insects or crabs)? Compounds that are **exocentric** don't have a head inside of them—they don't describe either of their members.

Some exocentric compounds don't have an interpretive head, but still have what we might call a category head, in that the root on the right matches the category of the whole compound. For example, *redhead* ("person with red hair") is often listed as an exocentric compound, because it does not describe a type of head. Similarly *sabretooth* is exocentric because it doesn't describe a type of tooth. But both of these are noun-noun compounds that are themselves nouns, so their right-hand member is almost a head. A *spoilsport* ("person who spoils other people's fun") is not a type of sport, but it is still a noun.

But other exocentric compounds don't even have a head in this sense. For example, *outcome* looks like a compound of a preposition and a verb, but is a noun. *Dust-up* is a compound of a noun and a preposition, but is a noun. *Tell-all* is a compound of a verb and a determiner (all), but is an adjective.

Finally, there is a special kind of compound usually called **dvandva** compounds. This term comes from Sanskrit, where *dvandva* means "pair". Dvandva compounds can be thought of as "co-headed"—they can be paraphrased with an "and" between the two members. Many dvandva compounds in English involve two roots that only occur in the compound, and that mirror each other's sounds. These are sometimes called reduplicatives.

- zigzag
- helter skelter
- flip flop
- riff raff
- hocus pocus

But we also have some other dvandva compounds:

- bittersweet
- secretary-treasurer
- parent-child (as in “a parent-child bond”)
- blue-green (and many other terms for intermediate colours)

Overall, dvandva compounds are less common than other types of compounds in English.

Check your understanding

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5.9: Structural ambiguity in morphology

Ambiguity in derivation

It isn't always the case that affixes can only attach in one order. Sometimes both orders (or all orders, if there are more than two) meet the selectional requirements of all affixes involved.

When a string is compatible with more than one structural representation, it is **structurally ambiguous**—but not only are both trees potentially correct, they're often associated with different **meanings**.

Consider again the prefix *un-* but now in a word like *untieable*.

The word *untieable* is ambiguous. Pause for a moment and try to come up with its two interpretations.

The two interpretations of *untieable* are:

1. Able to be untied.
   For example: *the knot most people use for their shoelaces is chosen because it's easily untieable.*
2. Not able to be tied.
   For example: *if you haven't learned to tie knots, a celtic knot might seem untieable.*

As you might be able to see from the **paraphrases** I've given here—a paraphrase is a different way of saying the same thing—we can account for the ambiguity of *untieable* by attaching the two affixes in different orders.

For meaning 1 "able to be untied", we first attach the prefix *un-* to the verb *tie*, producing the verb *untie* (to undo a knot). Then we attach the suffix *-able* to *untie* to turn it into the adjective *untieable*.

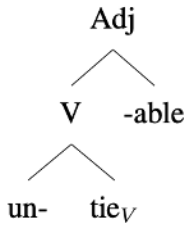


Figure 5.9.1: Tree diagram for *untieable*, on the interpretation "able to be untied"

For meaning 2 "not able to be tied", by contrast, first we attach the suffix *-able* to the verb *tie*, producing the adjective *tieable* (capable of being tied). Then we attach the prefix *un-* to this adjective. Now *un-* has its adjectival meaning, so we end up with an adjective meaning "not capable of being tied".

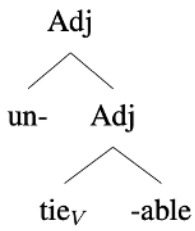


Figure 5.9.2: Tree diagram for *untieable*, on the interpretation "not able to be tied"

This type of ambiguity in derivational morphology requires that at least one affix be able to attach to bases of more than one category. We'll see that structural ambiguity is even more common in the case of compounds.

Structural ambiguity is different from the type of ambiguity we find with **homophones**—words that sound the same but have different meanings. If I say that I went to the *bank*, without more context you don't know if I went to the kind of bank that's a financial institution or the kind of bank that's the edge of a river. There's nothing *structural* in this ambiguity, instead there are just two different roots that sound the same.

Ambiguity in Compounding

Just as words created via derivational morphology can be ambiguous, so can compounds. In fact, in English it's often easier to create new examples of structural ambiguity with compounds than it is with derivational morphology, because any string of noun roots can hypothetically combine into a compound in multiple ways.

Consider the compound *river boat race*. This compound contains three roots: *river*, *boat*, and *race*. These could combine in two different orders, which correspond to two different meanings.

- Option 1 would be to first create the compound *river boat*, which refers to a particular kind of boat. Then if we add the root *race* to create the compound [*river boat*] *race*, the full compound describes any race between boats of that type—even if the race is held in a lake or on the ocean.



Figure 5.9.3: A race between two steamships, also calledriverboats. Source: Public domain via Wikimedia Commons

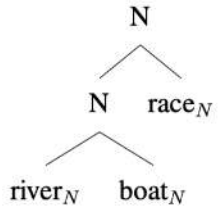


Figure 5.9.4: Tree diagram for *river boat race*, on the interpretation "a race involving river boats"

- Option 2 would be to first create the compound *boat race*, which would describe any race between boats. Then if we add the root *river* to create the compound *river* [*boat race*], the full compound would describe a race (with any type of boats) that takes place on a river.



Figure 5.9.5:A boat race held on the Kallada River. Source: Arun Sinha from India, CC BY 2.0, via Wikimedia Commons

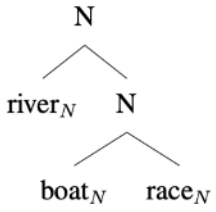


Figure 5.9.6:Tree diagram for *river boat race*, on the interpretation"a boat race taking place on a river"

Phonology sometimes makes compounds less ambiguous than they appear in writing. For some English speakers, for example, the first meaning above may be pronounced with primary stress on *ríver*, while the second meaning may be pronounced with primary stress on *bóat*.

In summary, some words are ambiguous because the morphemes they are composed from can combine in more than one order. This is the case for both derivational morphology and compounds. We can use tree diagrams to represent the different orders in which morphemes combine; in section 5.10 we will review in more detail how to draw morphological trees.

Check your understanding

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5.10: How to draw morphological trees

In Section 5.9 we saw that the order in which we attach derivational affixes, or the order in which we build compound words, sometimes matters. So a word like "governmental", isn't just a string of the root *govern* + the suffix *–ment* + the suffix *–al*. Instead, it's the result of first combining *govern* and *–ment*, and then combining the result of that with a further suffix *–al*.

In linguistics, we often represent this type of structure with a **tree diagram**. Trees are used to represent the **constituency** of language, the subgroupings of pieces within a larger word or phrase. One of the big insights of linguistics is that constituency is always relevant when describing how pieces combine together, whether we're looking at morphemes within a word or words within a sentence. (though different theories in linguistics often take different views of what range of hierarchical structures are possible in natural languages.)

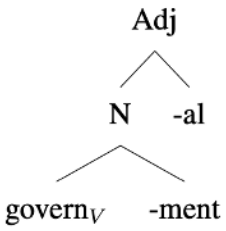


Figure 5.10.1: Tree diagram for *governmental*

When drawing a morphological tree, we can follow these steps:

1. Identify the root and any affixes
   - 1 root: non-compound word
   - 2 roots: compound word
2. Determine the category of the root
3. Determine the order in which affixes attach
4. Determine the category of any intervening bases, and of the whole word.

You might find that it makes sense to do these in different orders, or in different orders in different words. The best way to find out what works for you is to practice.

Linguistic trees also represent the order of their elements—you should be able to read along the bottom of the tree, and get the order of morphemes in the word (or words in a sentence, as we'll see in Chapter 6). This means that prefixes should always go on the left of the constituent they attach to, and suffixes should always go on the right (assuming we read left-to-right).

Check your understanding

Coming soon!

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5.11: How to solve morphology problems

An important skill when it comes to morphology is being able to **segment** words in another language into their individual morphemes—in other words, being able to identify roots and affixes in complex words.

Remember that a morpheme is a consistent pairing of **form** (sound or sign) with **meaning or function**. Finding morphemes requires comparing words whose meanings you know, to see if the shared parts of their meanings correspond to shared parts of their forms.

Consider the example of singular, dual, and plural nouns in Inuktut:

(1)		*gloss*	*singular*	dual (2)	plural (3+)
		"door"	matu	matuuk	matuit
		"cloud"	nuvuja	nuvujaak	nuvujait

How can we find the **plural** morpheme in these examples? If we just start with a single plural word, like *matuit* "doors (three or more)", there's no way to figure out how to divide it (or even if it can be divided). But if we compare words that share **only one** aspect of their meaning/grammatical function, we can start to divide words:

matu**it** : nuvuja**it**
door.**PL** : cloud.**PL**

The words *matuit* and *nuvujait* are both plural. Their sounds don't overlap very much, but they do share the final *-it*. This is a consistent pairing of form and meaning, so we can hypothesize that *-it* is the suffix meaning PLURAL.

Next we can compare *matuit* with another word with the meaning "door".

matuit : **matu**
door.PL : **door**.SG

The words *matuit* and *matu* both have "door" as part of their meaning; they also both contain the string *matu*. This is a consistent pairing of form and meaning, so we can identify *matu* as the root meaning "door". (This means that *matu* doesn't have any suffix meaning singular—that's common for singular nouns across languages, but note that you will sometimes find a singular suffix. We could also say that there's a -∅ singular suffix, but that's not necessary.)

We can also go back to *nuvujait*, and see that once we've identified the suffix *-it* we're left with the string *nuvuja*, which by hypothesis would be the root meaning "cloud"—and indeed, *nuvuja* appears in our data with that meaning!

So far we have three morphemes:

- **matu**: "door", root
- **nuvuja**: "cloud", root
- **-it**: PLURAL, suffix

What about the dual? We have two dual nouns in the data set above.

- matuuk *door. (two)*
- nuvujaak *clouds (two)*

We can separate out the roots that we've already identified:

- matu-uk *door. (two)*
- nuvuja-ak *clouds (two)*

We're now left with two slightly different suffixes: *–uk* and *–ak*. Because we've already identified the roots, we can be pretty confident that these suffixes both express the meaning DUAL. They would be **allomorphs**:

- **-uk/-ak**: DUAL, suffix

If we had more data, our next step would be to try to find out if the choice of *-uk* vs. *-ak* is predictable in Inuktitut. Based on these two words, we might hypothesize that *-uk* occurs after [u] and *-ak* occurs after [a] (an example of phonologically-determined allomorphy), but we would need to check more words to see if that prediction is correct.

In summary, to segment data from an unfamiliar language into morphemes, start by comparing words that differ in a single aspect of their meaning, and see if you can match the difference in meaning to a difference in form. If you ever get stuck, go back and see if you can change your earlier hypotheses about the boundaries between morphemes in earlier words.

You can practice segmenting morphemes in an unfamiliar language in the exercises at the end of this chapter.

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5.12: Exercise your linguistics skills

Exercise 1. *Basic; 5.2, 5.11.* Below is a list of words from Turkish, the most widely-spoken member of the Turkic language family, and the national language of Turkey and Northern Cyprus (also spoken as a minority language in many other countries). of examples taken from Turkish. All words are transcribed in the International Phonetic Alphabet. List all the morphemes that occur in the Turkish data, and give their *glosses* (that is: state their meaning or grammatical function). For each morpheme, state whether it is a root, a prefix, or a suffix. Paying attention to the order of morphemes in these examples, how would you say "in our little hands" in Turkish?

- [deniz] 'an ocean'
- [elim] 'my hand'
- [denize] 'to an ocean'
- [eller] 'hands'
- [denizin] 'of an ocean'
- [diʃler] 'teeth'
- [eve] 'to a house'
- [diʃimizin] 'of our tooth'
- [evden] 'from a house'
- [diʃlerimizin] 'of our teeth'
- [evdʒıkden] 'from a little house'
- [eldʒıke] 'to a little hand'
- [denizdʒıkde] 'in a little ocean'
- [denizlerimizde] 'in our oceans'
- [elde] 'in a hand'
- [evdʒıklerimizde] 'in our little houses'

Exercise 2. *Intermediate; 5.4.* Examine the following pairs of words from Kreyòl (also known as Hatian Creole), a Romance language spoken in Haiti. List all the morphemes that occur in these examples. For any morpheme with two or more allomorphs, make a generalization about the environment in which each one occurs, and state whether the allomorphy is lexically or phonologically conditioned. (Note: a tilde over a vowel indicates that the vowel is nasalized.)

- panie 'basket' ~ paniea 'the basket'
- trou 'hole' ~ troua 'the hole'
- chẽ 'dog' ~ chẽã 'the dog'
- pitit 'child' ~ pititla 'the child'
- ãj 'angel' ~ ãjla 'the angel'
- madãm 'lady' ~ madãmla 'the lady'

Exercise 3. *Basic; 5.6–5.7.* For each of the following English words, identify the affix(es) in the word. For each affix, say whether it is derivational or inflectional. For inflectional affixes, say what grammatical information the affix indicates.

purity
newest
misunderstand
Canadian
unlikely
weaken
nieces
expectantly

Exercise 4. *Intermediate; 5.5–5.7, 5.10.* For the bolded word in each of the following sentences of English, identify its category, and state the criterion (or criteria) you used to determine its category. For all the morphologically complex words, identify the root

and all the affixes, and determine each affix's selectional requirement (what it attaches to) and what change it makes to the category and/or meaning of its base. Bonus: try drawing trees to show the structure of any morphologically complex words.

1. The car goes very **fast**.
2. Amy likes hot **weather**.
3. Some **babies** never sleep.
4. I **dream** about the future.
5. I had a **dream** last night.
6. Our **discussion** was very interesting.
7. They started to run **quickly**.
8. I appreciate your **politeness**.
9. The store **misclassified** that book.
10. She founded a **nongovernmental** organization.

Exercise 5. *Advanced; 5.1–5.6.* Consider the English words *conceive*, *receive*, *perceive*, and *deceive*. Are these words morphologically simple or morphologically complex? Justify your answer with reference to concepts introduced in this chapter, mentioning additional facts of English morphology if relevant. Discuss evidence that argues for a different conclusion, if any.

Exercise 6. *Intermediate; 5.8.* Compound words in English are variable in their spelling: some are spelled with no space between the elements of the compound (*redhead*, *greenhouse*), some are spelled with a space (*ice cream*, *ski boots*), and some are spelled with a hyphen between the elements (*gluten-free*, *long-term*). Identify all the compounds in the following sentences[1]:

> *"Amélie Tourain leaned forward a little and switched on her desk light."*
>
> *"The third occasion on which she said something funny the headmistress had glanced at her over Doris Anderson's note-book, then at Mlle Devaux, and after that things went much easier with the grammar teacher."*
>
> *"Mlle Tourain was sitting back in her chair now, and had begun to tap the rubber end of her pencil against the brass ink-pot."*
>
> *"She had spoken with an undercurrent of passion running through her words, as she was speaking now."*

Exercise 7. *Basic; 5.8.* The examples below show compounds in Hebrew, a Semitic language. What category or categories of roots can participate in compounding, based on these examples? Do compounds in Hebrew appear to be left-headed or right-headed?[2]

(a)	beyt	xolim	(b)	batey	sefer
	house	patient		houses	book
	hospital			schools	
(c)	'orex	din	(d)	yom	huledet
	editor	law		day	birth
	lawyer			birthday	
(e)	gan	xayot	(f)	gan	yeladim
	garden	animals		garden	children
	zoo			kindergarten	

1. The sentences for Exercise 3 are taken from Swiss Sonata by Gwethalyn Graham, which is in the Public Domain in Canada. ↵

2. The Hebrew examples are adapted from Borer, H. (2011). "Afro-Asiatic, Semitic: Hebrew." In *The Oxford Handbook of Compounding*, eds. R. Lieber and P. Štekauer. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199695720.013.0027 ↵

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CHAPTER OVERVIEW

Chapter 6: Syntax

Learning Objectives

- When you've completed this chapter, you'll be able to:
- Use the evidence of constituency tests to identify the phrases within a sentence
- Categorize words into lexical and functional categories based on their distribution
- Identify relationships between grammatically related sentences (active and passive, statements and questions)
- Draw tree diagrams to represent the structural analysis of sentences in English

In Chapter 5 we looked at the internal structure of words (morphology). In this chapter we look at how words are organized into **phrases** and **sentences**, which in linguistics is called **syntax**. In linguistics, syntax is the study of how words are organized into phrases and sentences. Just as the morphemes in a word are organized into structures, the words in a sentence are also best viewed not just as a string of words, but instead as having a **hierarchical structure**. And just as words contain a head morpheme, we'll see that every phrase has an element that is its **syntactic head**.

6.1: Syntactic knowledge and grammaticality judgements
6.2: Word order
6.3: Structure within the sentence- Phrases, heads, and selection
6.4: Identifying phrases- Constituency tests
6.5: Functional categories
6.6: Clausal embedding
6.7: Main clause Yes-No questions
6.8: Main clause content questions
6.9: Embedded content questions
6.10: Arguments and thematic roles
6.11: Changing argument structure- Causatives and passives
6.12: Interim summary
6.13: From constituency to tree diagrams
6.14: Trees- Introducing X-bar theory
6.15: Trees- Sentences as TPs
6.16: Trees- Modifiers as adjuncts
6.17: Trees- Structural ambiguity
6.18: Trees- Embedded clauses
6.19: Trees- Movement
6.20: Trees- Movement beyond questions
6.21: Trees- Summary
6.22: Exercise your linguistics skills.

Alternative paths through this chapter

The first half of this chapter (6.1 to 6.12) introduces core concepts and argumentation in syntax, while tree diagrams and X-bar theory are covered in the second half (6.13 to 6.21). This structure has been chosen to emphasize core concepts over the details of tree structure.

Many introductory courses in linguistics instead interleave core concepts and their formalization in tree diagrams, however. For such courses—or for independent learners who prefer to follow such a structure—we recommend reading sections in the following order:

- Basics
  - 6.1 Syntactic knowledge and grammaticality judgements
  - 6.2 Word order
  - 6.3 Phrases, Heads, and Selection
  - 6.4 Identifying phrases: Constituency tests
  - 6.5 Functional categories
- Introducing trees
  - 6.13 From constituency to tree diagrams
  - 6.14 Trees: Introducing X-bar theory
  - 6.15 Trees: Sentences as TPs
  - 6.16 Trees: Modifiers as adjuncts
  - 6.17 Trees: Structural ambiguity
- Complex sentences
  - 6.6 Clausal embedding
  - 6.18 Trees: Embedded clauses
- Syntax of questions
  - 6.7 Main clause Yes-No questions
  - 6.8 Main clause content questions
  - 6.9 Embedded content questions.
  - 6.19 Trees: Movement
- Argument structure
  - 6.10 Arguments and thematic roles
  - 6.11 Changing argument structure: Causatives and passives
  - 6.20 Trees: Movement beyond questions
  - 6.21 Trees: Summary
- (This path through the chapter skips 6.12 Interim summary)

Each section ends with a “Navigation” section with links that can be used to follow this interleaved path.

Appendix 1 introduces trees using phrase structure rules instead of X-bar theory. Courses adopting that formalization should continue with Appendix 1 after 6.13 From constituency to tree diagrams.

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6.1: Syntactic knowledge and grammaticality judgements

What kind of knowledge do we have about the syntax of language? Let's start by considering the sentence in (1):

(1)		All grypnos are tichek.

You might not know what a *grypno* is, or what it means to be *tichek* (because these are made-up words!), but you can tell that this sentence is still the right kind of "shape" for English. In other words, (1) is consistent with the way English speakers put words together into sentences.

Compare this with the sentence in (2):

(2)		*Grypnos tichek all are.

Unlike (1), (2) isn't the right shape for a sentence in English. Even if you did know what a *grypno* was, or what it meant to be *tichek*, this still wouldn't be the way to put those words together into a sentence in English.

Something we can be pretty confident about is that you've never heard or read either of these sentences before encountering them in this chapter. In fact, most of the sentences you encounter in this textbook are likely to be ones you haven't heard or read in exactly that order before. So that means that your internal grammar of English must be able to generalize to new cases—this is the **generativity** of language, something introduced back in Chapter 1.2.

As someone who uses language—in the case of (1) and (2), as someone who speaks and reads English—you can identify sentences that do or do not fit the patterns required by your internal grammar. In syntax we describe sentences that do match those patterns as **grammatical** for a given language user, and sentences that do not match required patterns as **ungrammatical**.

Grammaticality judgements in syntax

In syntax when we say something is **ungrammatical** we don't mean that it's "bad grammar" in the sense that it doesn't follow the type of grammatical rules you might have learned in school. Instead, we call things ungrammatical when they are inconsistent with the grammatical system of language user.

The evaluation of a sentence by a language user is called a **grammaticality judgement**. Grammaticality judgements as a tool for investigating the linguistic system of an individual language user—there is no way to get a grammaticality judgement for "English" as a whole, for example, only grammaticality judgements from individual English speakers. Sometimes you will see a sentence described as grammatical or ungrammatical "in English" or another language; technically this is a shorthand for saying that users of the language generally agree about whether it is grammatical or not. In many cases different users of a language disagree about the status of a particular example, and this tells us something about **syntactic variation** in that language!

We are often most interested in examples that are **un**grammatical, because they tell us about the limits on building sentences in a language. The convention in linguistics is to mark ungrammatical examples with an **asterisk** (*) at the beginning of the sentence, sometimes called a **star** (slightly easier to say). Whenever you see that symbol in front of an example in this chapter, it indicates that the example is ungrammatical in the linguistic sense.

Sometimes we want to indicate that a sentences is weird because of its meaning, rather than its syntax. In these cases we use a hashtag symbol (#) instead of a star.

For example, consider an example like (3):

(3)		#The book pedalled the bicycle harmoniously.

This sentence is the right *shape* for English, it just doesn't make any sense. So we would say that it's grammatical but semantically odd, and that's what the hashtag symbol indicates.

Most of the sentences we will consider in this chapter are ones that many English speakers (but not all) share similar judgements about. If you disagree with any of the judgements reported here, you can take the opportunity to think about what that tells you about your own grammar, and whether the difference could be explained using the tools we develop here, or if it shows that we would need to revise our theory of syntax in other ways!

The goals of syntactic theory

Our goal in syntax is to develop a theory that does two things:

1. predicts which sentences are grammatical and which ones are ungrammatical, and
2. explains observed properties of grammatical sentences.

But we also want to build a theory that can be used to explain not just properties of English, but properties of *all* human languages. In much of this chapter we'll focus on the syntax of varieties of English, because that's a language that's common to everyone who reads this textbook, but we will often have opportunities to see how other languages show us the scope of variation for syntax in human languages.

What kind of theory do we need to make these kinds of predictions? If languages were **finite** we could simply list all the good sentences and be done. But any language user can generate sentences that no one has ever encountered before, and other people can understand those sentences, so what we "know" when we know the syntax of a language must be more than just a list of grammatical sentences. In the next section of this chapter, we'll see that what we know about syntax can't be just about the order of words, it has to be something about their grouping (**constituency**) as well.

Check your understanding

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, you should continue with 6.2 Word order.

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6.2: Word order

A starting point: basic word order

If you think about hearing or seeing a sentence, or if you think about reading a sentence that's been written down, a really obvious property is that words and morphemes come in a particular order. Indeed, the only difference between the grammatical and ungrammatical sentences we saw in 6.1, repeated below in (1), is that the words appear in different orders.

(1)	a.	All grypnos are tichek.
	b.	*Grypnos tichek all are.

Fixed vs. flexible word order

The relevance of word order for grammaticality is particularly strong for a language like English, which has relatively **fixed word order**. There isn't much flexibility in English to change the order of words in a sentence, without either changing the meaning or making the sentence ungrammatical. Many other languages also have relatively fixed word order, including French, Chatino, and Choktaw, but lots of other languages have much more flexible word order. In Latin, Anishinaabemowin, Kanien'kéha, and ASL, to name just a few, word order is relatively flexible, and determined by stylistic factors or by the topic or focus of the sentence.

What is the basic order of words in English sentences? Based on the grammatical sentences in (2) and the ungrammatical ones in (3), see if you can come up with any generalizations about where the **verb** appears in English.

(2)	a.	Amal ate chocolate.
	b.	Beavers build dams.
	c.	Cats chase mice.
	d.	Daffodils bloom.
	e.	Eagles fly.

(3)	a.	*Amal chocolate ate.
	b.	*Build beavers dams.
	c.	*Chase mice cats.
	d.	*Bloom daffodils.
	e.	*Fly eagles.

These sentences are all **statements**, not **questions** or **commands**: they state a fact about the world, something that could be *true* or *false*. Looking at (3b-e), and comparing them with the grammatical sentences in (2), we can make the generalization that the verb cannot be the *first* word in an English statement.

What about (3a)? In (3a) the verb isn't the first word, but the sentence is still ungrammatical. We might try to explain that by saying that the verb also can't be the *last* word in a statement—except that the verb does come last in (2d) and (2e), which are both grammatical. So a more accurate generalization would be to say that the verb in an English sentence has to come after at least one **noun**, and that it *can* be followed by a second noun, but doesn't have to be.

We could write this generalization as a kind of formula or template: the grammatical sentences in (2) have the order **N V (N)** (the parentheses around the second "N" mean that it is optional).

Another way to describe word order involves talking not just about categories like nouns and verbs, but grammatical functions like **subject** and **object**. Word order in English doesn't just require that *any* noun come before the verb, it must be the noun that corresponds to the subject. Similarly, if the verb is a **transitive** verb with an object, the object noun must come after the verb. This

is why *Chocolate ate Amal.* is a grammatical sentence of English (though with a somewhat implausible meaning), but cannot express the same meaning as (1a) (*Amal ate chocolate*).

If you aren't sure about terms like "subject", "object", and "transitive", read the rest of this section and then come back and re-read the last paragraph. If you feel you are comfortable with those terms, it's still a good idea to review the definitions given here, to make sure that you understand the terms in the same way they're used in this textbook.

Key grammatical terminology

This section reviews some key grammatical terminology that you might be familiar with from elsewhere (often from language classes). This vocabulary is important for describing the basic structure of phrases and sentences, and we'll use it frequently throughout this chapter.

Sentence

A string of words that expresses a complete **proposition**. For statements (as opposed to questions or commands), a proposition is something that can be *true* or *false*. A sentence is a **clause** that stands on its own as an utterance.

Clause

A clause is a combination of one subject and one predicate. Some clauses occur *inside* other clauses, though (see **complex sentence** below), and so not all clauses are independent sentences.

Predicate

A predicate is the state, event, or activity that the sentence attributes to its **subject**.

The word "predicate" is used in two ways. Sometimes it is used to refer to a single head or word (usually a verb or an adjective), but other times its used to describe everything in the sentence other than the subject (for example, a whole **verb phrase**). In this chapter we use it in the first sense, to refer to a word that combines with a subject and (sometimes) one or more objects.

Arguments

Arguments are phrases that correspond to the participants or actors involved in a sentence's predicate. They are typically **noun phrases**, but it's possible to have arguments of other types (usually prepositional phrases or whole clauses).

In the following sentences the arguments are in **bold** and the predicate is *italicized*.

(3)	a.	**Vanja** *loves* **chocolate**.
	b.	**The children** *gave* [**the kitten**] [**a toy**].
	c.	**Everyone** is *excited.*

CLASSIFYING PREDICATES

Predicates can be classified by their **transitivity**, which is the *number* of arguments they take. (This is also sometimes called the **valency** of a predicate.) The words for transitivity are based on the *number of objects* a predicate takes.

Intransitive

An intransitive predicate takes one argument (the subject); no object.

Transitive

A transitive predicate takes two arguments (subject and direct object); one object.

Ditransitive

A ditransitive predicate takes three arguments (subject, direct object, and indirect object); two objects.

CLASSIFYING ARGUMENTS

Arguments can be classified in at least two ways: their position in the sentence, and how they're related to the predicate (are they the actor, the thing acted upon, etc). For now we'll focus on the **position** of arguments, with diagnostics specific to English. Later

in this chapter, in 6.10 Arguments and thematic roles, we'll return to classifying arguments based on their role in the event.

Subject

Subjects almost always appear *before* the predicate in English, and control agreement on the verb. If the subject is a pronoun, it is in nominative case (*I*, *we*, *you*, *he*, *she*, *it*, *they*)

Direct object

Objects usually appear *after* the verb in English. If the direct object is a pronoun, it is in accusative case (*me*, *us*, *you*, *him*, *her*, *it*, *them*)

Indirect object:

With ditransitive verbs, the indirect object is often the recipient of the direct object. The indirect object is often (not always) marked by "to" (or another preposition); if it is a pronoun, it is in accusative case (but in languages that have dative case, often in dative case)

CLASSIFYING SENTENCES

Now that we've looked at grammatical terminology relating to predicates and arguments within sentences, let's talk about terminology for sentences and clauses as a whole. First, we can classify them according to their **function**—whether they are used to make a statement, ask a question, or give a command.

Declarative

Declarative clauses are statements, things that can be true or false.

Interrogatives

Interrogative clauses are questions. Questions come in two general types:

- Yes-No questions, like: *Did Romil watch a movie?*
  and
- Content questions, like: *What did Romil watch?*

Imperatives:

Imperative clauses express requests or commands. For example: *Open the door (please)!*

Alternatively, we can classify sentences according to their **structure**; that is, according to whether they contain one clause or more than one clause, and (if more than one clause) how the sub-clauses are related to one other.

Simple sentence

A sentence is **simple** if it contains only one clause. All the sentences we have seen so far have been simple sentences.

Compound sentence

A **compound** sentence has at least two clauses, linked by a conjunction (*and*, *or*, or *but*). For example: *[Danai laughed] and [Seo-yeon cried]*.

Complex sentence

A **complex** sentence is one that contains a subordinate embedded clause—a clause inside a clause. This is an example of recursion! For example: *Seo-yeon knows [that Danai laughed]* .

Variation across languages: order of Subject, Object, and Verb

Having reviewed terminology relating to predicates and their arguments, we're now in a better position to talk about variation across languages in terms of basic word order—the order found in simple declarative clauses, in the absence of any special emphasis or topic.

English is **Subject-Verb-Object** (SVO). This is one of the most common word orders in the world's languages, found in about 35.5% of languages (Dryer, 2013). Other languages with this basic word order include most of the Romance languages, ASL, both Mandarin and Cantonese, and Nahuatl. (This word order is usually referred to as "SVO" even though not all clauses have objects; in a sentence without an object, the order would just be SV.)

The most common basic word order is Subject-Object-Verb (41% of languages, according to Dryer 2013); for example, Japanese and Korean are both SOV languages, as is Haida.

Even though SVO and SOV are very common orders, all the other logically possible orders for subjects, objects, and verbs are also attested in the world's languages.

Basic Verb-Subject-Object order is found, for example, in Irish and the other Celtic languages, as well as in Anishinaabemowin. Orders where the object comes before the subject (VOS, OVS, OSV) are less common, but nonetheless found in a few languages.

As we noted before, even though most languages have a basic word order (the order found in neutral declarative sentences), in many languages this order is much more flexible than it is in English.

When word order is flexible, it's usually the case that order determined at least partly by **topic** and/or **focus**—the topic is the thing you're talking about, and the focus is something you want to emphasize. So while English has a very strict SVO word order, languages with word order that is flexible with respect to the subject and predicate might be said to have a strict **topic-comment** word order, where he first element in the sentence is the **topic** (the thing the sentence is about) and the rest is a **comment** on that topic. Language users will prefer or require particular word orders in particular conversational contexts.

In Chapter 9.3 Dr. Kanatawakhon-Maracle gives several examples of flexible word order of this type in Mohawk (also known as Kanien'kéha)—showing that translating from English isn't always straightforward, with many different translations being possible with shades of meaning that can be a bit hard to distinguish in English.

Check your understanding

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, this section comes after 6.1 Syntactic knowledge and grammaticality judgements, and the next section is 6.3 Phrases, Heads, and Selection.

References

Matthew S. Dryer. 2013. Order of Subject, Object and Verb. In: Dryer, Matthew S. & Haspelmath, Martin (eds.) The World Atlas of Language Structures Online. Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/81, Accessed on 2022-02-26.)

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6.3: Structure within the sentence- Phrases, heads, and selection

From words to phrases

Beyond the order of words, all human languages appear to group words together into **constituents**. The generalizations about which sentences people find grammatical and which ones they find ungrammatical don't refer to purely linear properties like "fourth word in a sentence", but instead to **phrases** in particular **structural positions**. In the rest of this section we'll explore what it means to be a phrase in more detail; in the next section we'll start talking about structural positions.

A **phrase** is a set of words that act together as a unit. Let's look at the example in (1) to see what this means:

(1)		All kittens are very cute.

What other groups of words can appear in the same position as the words **all kittens** in this sentence?

(2)	a.	**Puppies** are very cute.
	b.	**The ducklings that I saw earlier** are very cute.
	c.	**These videos of a baby panda sneezing** are very cute.

…and so on. It turns out that lots of different groups of words can go in this position—but not all of them! What all these examples have in common is that we've replaced [all kittens] with another group of words that includes at least one **plural noun**: *puppies* or *ducklings* or *videos*. If we swap in a singular noun, the sentences would be ungrammatical, as we see in (3).

(3)	a.	*__The puppy__ are very cute.
	b.	*__The duckling that I saw earlier__ are very cute.
	c.	***This video of a baby panda sneezing** are very cute.

…but if we change the plural verb *are* to the singular *is* they become good again (this is **subject agreement** inflection, last seen in 5.7 Inflectional morphology):

(4)	a.	**The puppy** is very cute.
	b.	**The duckling that I saw earlier** is very cute.
	c.	**This video of a baby panda sneezing** is very cute.

It turns out that the groups of words that we can easily substitute here are all ones that have a **noun** in them. But it's not enough to just have *some* noun in the group of words at the front of the sentence, as the examples in (5) show. (5a) is ungrammatical even though the string of words at the beginning includes the pronoun *I*—and this sentence is ungrammatical whether we try the form *is* or *are* or even *am*. In (5b) the sentence is ungrammatical even though we have the compound noun *baby panda*, again no matter what form of the verb we try.

(5)	a.	*__That I saw earlier__ {is / are / am} very cute.
	b.	*__Of a baby panda__ {is / are} very cute.

What distinguishes the grammatical sentences in (1), (2), and (4) from the ungrammatical sentences in (5) is that in (1), (2), and (4) the group of words at the beginning of these sentence are **noun phrases** (remember that the sentences in (3) were ungrammatical just because they had the wrong agreement inflection). Noun phrases are groups of words that not only contain a noun, but where the noun is the "most important" element in some sense.

By "most important" we mean that it's the noun that determines an important part of the meaning of the subject, but also that it's this noun that determines the category of the whole phrase, which determines where the phrase can go in relation to other phrases. The noun is the **head** of the phrase, the same kind of **headedness** we saw in 5.8 Compounding for compounds, but applied to words in a phrase instead of to morphemes in a word.

The head of a phrase also determines what else can go in the phrase; in particular it determines whether the phrase contains an **object**—though for heads that aren't verbs, we usually use the more general term **complement**. Recall from the discussion of grammatical terminology in Section 6.2 that we classify verbs by their **transitivity**—that is, by how many objects they take. Each verb has an opinion about whether and how many objects it allows. By contrast, there's no verb that cares whether it's modified by an adverb (and also no verb that cares whether it has a subject or not, because all clauses in English require subjects). The technical term for this is **selection**: heads **select** their complements, both whether a complement is required or allowed, and what the complement's category has to be.

Headedness is important to the grammar of **all** languages, not just English. The right kinds of generalizations in syntax are never about single words like nouns or verbs, but instead about phrases like noun phrases or verb phrases.

Importantly, phrases can contain other phrases *of the same type* inside of them. So for example, the noun phrase [*these videos of a baby panda*] contains a second noun phrase inside it, [*a baby panda*].

The ability of a structure to contain another structure of the same type inside itself is called **recursion**. This is another key property of natural language grammars—even though there is some debate among linguists about whether all human languages exhibit recursion, everyone agrees that many or most languages do, and that one of the things we need to explain about our human language capacity is that all humans can acquire a language with recursion. You can learn more about child language acquisition in Chapter 11.

Variation across languages: Word order within phrases

As we've already seen, languages vary in their word order, but this variation isn't random—it isn't the case that anything goes in word order.

This isn't just true for the order of major constituents in a sentence (subjects, objects and verbs), but also for the order of elements inside phrases; in particular, the order of heads and what they select (their object or complement).

In English it is always the case that heads *precede* their complements. This is true of verbs and their objects, prepositions and their noun phrase complements, and nouns and their prepositional phrase complements.

(6)	a.	I [$_{VP}$ ate$_{(V)}$ [$_{NP}$ an apple].
	b.	[$_{PP}$ to$_{(P)}$ [$_{NP}$ Toronto]
	c.	[$_{NP}$ picture$_{(N)}$ [$_{PP}$ of a robot]

In contrast to English, Japanese is an **SOV** language. And in Japanese, heads always *follow* their complements. In other words, heads in Japanese don't appear in the middle of their phrases like in English, but instead always at the *end* of their phrases.

(7)	a.	Watasi-wa	[$_{VP}$	[$_{NP}$	*ringo-o*	]	**tabe-ta**.	]
		I-TOPIC			apple-ACC		eat-PAST	
		"I ate (an) apple."						
	b.	[$_{PP}$	[$_{NP}$	*Tokyo*	]	**e**	]	
				Tokyo		to		
		"to Tokyo"						
	c.	[$_{NP}$	[$_{PP}$	*robotto*	*no*	]	**shasin**	]
				robot	of		picture	
		"picture of (a) robot"						

This is the *reverse* of the order we get in English.

Technically words like *e* ("to") in Japanese would be **postpositions** instead of **prepositions**, and sometimes the more general term **adpositions** is used for both languages like English and languages like Japanese. These terms are parallel to **suffix**, **prefix**, and **affix** in morphology.

The ability of **heads** to either precede or follow their complements is called **head directionality**. A language can be **head initial** like English, or **head-final** like Japanese. If you're analyzing an unfamiliar language, and need to figure out its word order, one of the first questions you should ask is whether it appears to be head initial or head final.

In later sections of this chapter we'll see other ways to derive differences in word order, involving differences in the **movement** (or *transformations*) available in a language's grammar.

Check your understanding

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.2 Word order and the next section is 6.4 Identifying phrases: Constituency tests.

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6.4: Identifying phrases- Constituency tests

By identifying certain parts of sentences as **phrases**, we are making a claim that language users represent them as units in their mental grammar. The technical term for units inside a sentence is **constituent**: a constituent is any group of words that acts together within a sentence.

Along with headedness, constituency is one of the central concepts in syntax. Both of these are highlighted when we represent the structure of language using **tree diagrams**, as we'll see beginning in Section 6.13, but they're fundamental to understanding the organization of sentences with or without trees.

When we analyze a new sentence, how do we identify the phrases inside of it? We want to find evidence that certain groups of words actually do act together as units. To find that evidence, we use grammaticality judgements, and a few simple tests.

The tests that identify constituents (often called **constituency tests**) that we'll review in this chapter come in four basic types:

- Replacement tests
- Movement tests
- It-clefts
- Answers to questions

Many textbooks also introduce a **coordination** test, but it is not always reliable, so we'll discuss it briefly at the end of this section but won't rely on it.

REPLACEMENT TEST

Here are two sentences to start with.

(1)		The students saw a movie after class.
(2)		The students saw a movie about dinosaurs.

Let's consider the string of words *a movie*. Based on discussion so far in this chapter, you might have the idea that this is a noun phrase—or at least that it *could* be a noun phrase. But whether or not you have that idea, we need evidence to decide one way or the other.

One piece of evidence that something is a noun phrase is that you can **replace** it with a pronoun, and get a sentence *with the same meaning* (in a context where the meaning of the pronoun is made clear). In (3) we take the pronoun *it* and replace the string of words we're interested in, then ask if the new sentence is grammatical and whether it has the same meaning.

(3)		The students saw a movie after class.	→	The students saw **it** after class.

Replacing *a movie* with *it* in (3) does give us a new grammatical sentence that can mean the same thing as (1), so we have evidence not only that *a movie* is a constituent in (1), but also that that constituent is a noun phrase.

What about *a movie* in (2)? Let's run the same test there:

(4)		The students saw a movie about dinosaurs.	→	*The students saw **it** about dinosaurs.

This time the result of replacing *a movie* with *it* is an ungrammatical sentence, so in (2) *a movie* is not a complete noun phrase. We might be surprised about this—we expect a noun like *movie* to be inside a noun phrase—but if we test other possible constituents we see that it's not that there's no noun phrase here, it's just that it's a bit bigger:

(5)		The students saw a movie about dinosaurs.	→	The students saw **it**.

Based on comparing the results of our replacement tests in (4) and (5), we can conclude that in (2) *a movie* is not a complete noun phrase, but *a movie about dinosaurs* is both a constituent and a noun phrase.

We can do the same pronoun replacement test with the string *the students* in (1). Because *students* is plural, the relevant pronoun is *they*:

(6)		The students saw a movie after class.	→	**They** saw a movie after class.

The result of this replacement is grammatical, so we conclude that *the students* is also a constituent, and also a noun phrase.

Replacement tests don't have to involve pronouns. Verb phrases can be replaced with *do* (or *do too*), but seeing this usually requires setting up two sentences with different subjects or with a contrast in time like *yesterday* vs. *today*. Since we have just seen that *the students* in (1) is a noun phrase subject (because it comes at the beginning of a simple declarative sentence, before the verb), let's set up a replacement test for verb phrase with a preceding sentence with a different subject:

(7)	a.	The teachers saw a movie after class, and…	→	The students **did too**.
	b.	The teachers saw a movie after class, and…	→	*The students **did too** before class.

What we see in (7) is that *did too* can replace *saw a movie after class*, but can't replace *saw a movie* alone. This tells us that *saw a movie after class* is a constituent, and it's a verb phrase (because *do (too)* replaces verb phrases).

What about the string *after class*? This string expresses a time, and we can replace it with the word *then*:

(8)		The students saw a movie after class.	→	The students saw a movie **then**.

This shows that *after class* is a constituent; in fact, it's a **prepositional phrase**. Not all prepositional phrases can be replaced by *then*, however—*about dinosaurs* is also a prepositional phrase, but can't be replaced by *then*.

(8)		The students saw a movie about dinosaurs.	→	*The students saw a movie **then**.

Here the result of doing replacement would be grammatical in other contexts, but it isn't another way to say that the students saw a movie about dinosaurs—this is why it's marked ungrammatical here, it's ungrammatical *on the intended meaning*. **You have to pay attention to both grammaticality and meaning when you do replacement tests.**

At this point, you're probably wondering how you know what you can use as a replacement. Here are some handy tips:

- Noun Phrases can be replaced with pronouns (*it*, *them*, *they*).
- Verb Phrases can be replaced with *do* or *do too* (or *did*, *does*, *doing*).
- Some Prepositional Phrases (but not all) can be replaced with *then* or *there*.
- Adjective Phrases can be replaced with something that you know to be an adjective, such as *happy* (though in this case the meaning will change)

Because replacement is category-specific, you can use the evidence of replacement tests both to identify constituents *and* to figure out the constituent's category: If you can replace it with a pronoun, then you've got a noun phrase and you can look for the noun that's the head. If you can replace it with *do (too)*, then you've got a verb phrase which will have a verb as its head.

MOVEMENT TEST

Replacement is not the only tool we have for checking if a set of words is a constituent. Some constituents can be moved to somewhere else in the sentence without changing the sentence's meaning or its grammaticality. Prepositional phrases are especially

good at being moved. Consider this sentence:

(9)		Nimra bought a scarf at that strange little shop.

Let's start by targeting the last string of words by moving it to the beginning. Move the string of words then ask yourself whether the resulting sentence is grammatical.

(10)		Nimra bought a scarf at that strange little shop.	→	**At that strange little shop** Nimra bought a scarf.

It is! In isolation the sentence might sound a little unnatural, but we can imagine a context where it would be fine, such as, "At the department store she bought socks, at the pharmacy she bought some toothpaste, and at that strange little shop, she bought a scarf."

On the other hand, if we target a smaller string of words, as in (11), we get a different result.

(11)		Nimra bought a scarf at that strange little shop.	→	***At that strange** Nimra bought a scarf little shop.

The result of moving the string *at that strange* to the beginning of the sentence is a total disaster. The fact that the resulting sentence is totally ungrammatical gives us evidence that the string of words *at that strange* is **not** a constituent in this sentence.

CLEFT TEST

A **cleft** construction is one where you take two parts of a sentence and divide them from each other. (A *cleft* is a split or gap.)

In English, a cleft is a sentence with the form: *It is/was _ that _*.

To use the cleft test, we take the string of words that we're investigating and put it after the words *It was* (or *it is*/*it's*), then put the remaining parts of the sentence after the word *that*. Let's try this for phrases that we've already shown to be constituents with our other tests.

(12)		The students saw a movie after class.
	→	It was **a movie** that *the students saw _ after class*.
	→	It was **after class** that *the students saw a movie _*.

(13)		The students saw a movie about dinosaurs.
	→	It was **a movie about dinosaurs** that *the students saw _*.

(14)		Nimra bought a scarf at that strange little shop.
	→	It was **at that strange little shop** that *Nimra bought a scarf _*.

To cleft a verb phrase in English you need put a present or past tense form of *do* in the position the verb phrase occupied in the original sentence, as shown in (15).

(15)		The students saw a movie after class.
	→	(?)It was **see a movie after class** that the students *did*.

Clefting a verb phrase doesn't always sound totally natural in English, but most people find it better than clefting non-constituents. At the end of this section, go back and compare (15) to the sentences in (16) and (17), and see if you agree that (15) is better.

By contrast, things that our tests showed were *not* constituents cannot be put into the first position of a cleft sentence:

(16)		*It was **a movie** that *the students saw _ about dinosaurs*.

(17)		*It was **at the strange** that *Nimra bought a scarf _ little shop.*

Now let's try the cleft test on a new sentence:

(18)		Rathna's brother baked these delicious cookies.
	→	It was **these delicious cookies** that *Rathna's brother baked _*.
	→	It was **Rathna's brother** that *_ baked these delicious cookies*.

The cleft test shows us that the string of words *these delicious cookies* is a constituent, and that the words *Rathna's brother* are a constituent. But look what happens if we apply the cleft test to another string of words:

(19)		Rathna's brother baked these delicious cookies.
	→	*It was **Rathna's brother baked** that *_ these delicious cookies*.

(20)		Rathna's brother baked these delicious cookies.
	→	*It was **these delicious** that *Rathna's brother baked _ cookies*.

(21)		Rathna's brother baked these delicious cookies.
	→	*It was **cookies** that *Rathna's brother baked these delicious _*.

All of these applications of the cleft test result in totally ungrammatical sentences, which gives us evidence that those underlined strings of words are not constituents in this sentence. Remember, though, just because a certain string of words isn't a constituent in one sentence, doesn't mean it's not a constituent in *any* sentence—the result of a constituency test only applies to the specific sentence you're testing.

AnswerS TO QUESTIONS

If a string of words is a constituent, it's usually grammatical for it to stand alone as the answer to a question based on the sentence.

(22)		Rathna's brother baked these delicious cookies.
	a.	What did Rathna's brother bake? **These delicious cookies.**
	a.	Who baked these delicious cookies? **Rathna's brother.**

Answers to questions can also help us identify a verb phrase, because they're a good context for *do*-replacement (as a **replacement test**):

(23)		Who baked these delicious cookies? Rathna's brother **did**.

In the answer, "Rathna's brother did", the word *did* replaces the verb phrase *baked these delicious cookies*.

Again, if a string of words is not a constituent, then it is unlikely to be grammatical as the answer to a question. In fact, it's difficult to even form the right kind of question:

(23)	a.	What did Rathna's brother bake cookies? *These delicious.
	b.	Who of Rathna's these delicious cookies? *Brother baked.

SUMMARY

Results of tests like these are how we investigate the structure of the mental grammar that underlies how people use the languages they know. We can't observe mental grammar directly, so observing how words behave is how we make inferences about how it must work. These four tests are tools that we have for observing how words behave in sentences. If we discover a string of words that passes these tests, then we know that the phrase is a constituent, and that tells us something about the organization of the sentence as a whole.

Not every constituent will pass every test, but if you've found that it passes two of the four tests, then you can be confident that the string is actually a constituent.

Check your understanding

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.3 Structure within the sentence: Phrases, heads, and selection and the next section is 6.5 Functional categories.

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6.5: Functional categories

From lexical categories to functional categories

In 5.5 Lexical categories we reviewed the **lexical categories** of nouns, verbs, adjectives, and adverbs. As we've started looking at phrases and sentences, however, you may have noticed that not all words in a sentence belong to one of these categories. Consider the sentence in (1).

(1)		The spaceship will arrive in orbit very soon.

Spaceship is a noun, and it is the head of the noun phrase [*the spaceship*] (we can tell because it could be replaced by a pronoun like *it*). But what category is *the*? Similarly, in this sentence *arrive* is a verb, *orbit* is a noun, and *soon* is an adverb, but what categories do *will*, *in*, and *very* belong to?

Words like *the*, *will*, *in*, and *very* belong to **functional** categories, which can be thought of as the grammatical glue that holds syntax together. While lexical categories mostly describe non-linguistic things, states, or events, functional categories often have purely grammatical meanings or uses.

Some of the most important functional categories that we'll use in this chapter are described in this section. In some later sections other functional categories will be introduced—as we develop a syntactic theory, a lot of the action comes in identifying new grammatical functions, and figuring out how they map onto structure.

Determiner

You may be familiar with the **definite article** *the* and **indefinite article** *a(n)*, as in *the book* or *a cat*.

(2)	a.	the book
	b.	a cat

In English, these occur in noun phrases before the head noun, as well as before any numbers or adjectives, as we see in the examples in (3):

(3)	a.	the three red books
	b.	a large angry cat

In fact, determiners are usually the very **first** thing in a noun phrase, and you can only have one of them (unlike adjectives, which you can pile up). If you try to have more than one, the result is ungrammatical, as we can see in (4)—for me it's not grammatical to say **a the book* or **the a cat*.

(4)	a.	*a the book
	b.	*the a cat

This distribution doesn't apply only to *the* and *a(n)*, though. There are a bunch of other elements that occur in exactly the same places, with exactly the same restrictions. These other things aren't articles in traditional grammar, so we use the label **determiners** for this larger functional category.

Some other determiners:

- Demonstratives (*this*, *that*, *these*, *those*)
- Some **quantifiers** (*every*, *some*, *each*, *most*, etc.)

Test for yourself that these occur in the same places in noun phrases as *the* and *a(n)* do—and that some other words expressing quantities (like *all* and *many*) and numbers do not.

Possessors in English expressed by possessive pronouns or by noun phrases marked with *‘s* also appear in the same position as determiners, and are also in complementary distribution with them, as shown in (5).

(5)	a.	**my** book
	b.	**[a friend from school]’s** cat
	c.	*the [a friend from school]’s cat
	d.	*[a friend from school]’s the book

Notice that the marker *‘s* attaches to the whole phrase, rather than to the head noun *friend*; this makes it a **clitic** rather than an affix, and makes it different from possessor marking typically found in languages with genitive case.

Possession in English can also be marked with a prepositional phrase, which would come after the noun and not be in complementary distribution with determiners: *the cat [of my friend from school]*.

Not all languages have definite and indefinite articles, but most languages have some kind of determiners. If you know a language other than English, try to figure out whether there’s a class a words that occur outside adjectives and numbers that might be determiners—these could come first, as in English, but might instead come after the head noun, especially if other things in the noun phrase also come after the noun.

Pronouns

Pronouns are a special functional category that can replace a whole noun phrase, as we saw in 6.4 Identifying phrases: Constituency tests. The set of pronouns in the variety of English most Canadians speak is limited to the following, where each row lists the nominative, accusative, and possessive forms of the pronoun (as introduced in 5.7 Inflectional morphology):

- First person singular: I / me / my
- First person plural: we / us / our
- Second person: you / you / your
- Third person singular inanimate: it / it / its
- Third person singular feminine: she / her / her
- Third person singular masculine: he / him / his
- Third person animate singular / general plural: they / them / their

Many English speakers have a dedicated second person plural like *y’all* or*yous*; for some English speakers, *you guys* may also have the distribution of a second person plural pronoun, though for other people this might be an ordinary noun phrase. Across different varieties of English, many people have different case forms for some of the pronouns listed above as well.

Try taking a moment to figure out what pronouns exist in your English grammar: do you use a distinct second person plural like *y’all*? Would you use a different form for any of the pronouns listed above?

Most languages have pronouns, but in some languages pronouns aren’t used as often as they are in English; when using those languages, people may usually leave noun phrases out entirely, rather than replace them with pronouns.

While pronouns are a functional category, in this textbook we will treat them as still belonging to the same category as nouns (abbreviated N).

Auxiliaries

Auxiliaries are like verbs in that they can be present or past tense, and can show agreement, but they always occur alongside a lexical main verb. For this reason they’re sometimes called “helping verbs”.

For example, in the **progressive** in English we see the auxiliary *be*, alongside a main verb that ends in the inflectional suffix *-ing*:

(6)		The bears **are** *dancing*.

In English declarative sentences, auxiliaries occur after the subject and before the main verb.

If an English sentence is negative, at least one auxiliary will occur to the left of negative *not* /*n't*:

(7)		The bears **aren't** dancing.

In a Yes-No questions in English, at least one auxiliary appears at the front of the sentence, before the subject:

(8)		**Are** the bears dancing.

The auxiliaries in English are:

- *have* (followed by a past participle, in the perfect)
- *be* (followed by a past participle in the passive, and a present participle in the progressive)
- *do* (used in questions and negation when there's no other auxiliary)

Importantly, these can all also be used as main lexical verbs! They're auxiliaries only when there's also another verb in the clause that's acting as the lexical verb. If *have* expresses possession, or *be* is followed by a noun or adjective instead of a verb, these are main verb uses.

In English there is also a class of **modal** auxiliaries. These only occur as auxiliaries in modern English, and are different from the other auxiliaries in that they don't agree with the subject. The modal auxiliaries are:

- will
- would
- can
- could
- may
- might
- shall (archaic for many people)
- should
- must

Sometimes lists of modals include *ought* (as in *You ought not do that.*)*need* (as in *You need not go*) and *dare* (as in *I dare not try*), but these aren't used as modals very frequently by most English speakers today.

You can test for yourself that these have the same distribution with respect to subjects, negation, and in questions as the auxiliaries *be*, *have*, and *do*.

Prepositions

Prepositions express locations or grammatical relations. They are almost always followed by noun phrases (though a few prepositions can occur by themselves)—in other words, they are almost always **transitive** and **select a noun phrase complement**. Prepositions can sometimes be modified by words like *very* or *way*. Those modifiers, the preposition, and the following noun phrase, all group together into a **prepositional phrase** constituent.

Some prepositions:

- on
- up
- beside
- through
- outside
- in
- above
- to
- of
- with

- for
- without

Outside is an example of a preposition that can occur without a following noun phrase, in a sentence like *They're playing* ***outside***.

Other functional categories

A few other functional categories that you will encounter in this chapter are **degree** words like *very* and *way*, which always modify adjectives or adverbs; **numbers**, which occur between determiners and adjectives, and which as a syntactic category also include words like *many* and *few*; and **conjunctions**, which include only *and*, *or*, and *but*, and connect two phrases of the same category.

Two other important functional categories will come up later in this chapter: **tense**, which will be the category that heads sentences, and **complementizers**, which will introduce embedded clauses. We will learn how to identify these functional categories in later sections; for now, it's useful to note that words like *because* and *although* pattern together with other words as part of the functional category of complementizers, even though in traditional grammar they're often identified as conjunctions (based mostly on their meaning, instead of their distribution).

Functional categories as "closed class"

Even though there are lots of different functional categories, they're different from lexical categories in that it's much harder to add new words to an existing functional category than it is to come up with new lexical items. So I can coin new nouns (like *grypno*) and new adjectives (like *tichek*) very easily, but it's more difficult to add, say, a brand-new determiner or auxiliary to a language.

Even though it's harder, though, it's definitely not impossible! Consider the functional category of pronouns. There are lots of new pronouns that people have proposed as nonbinary pronouns. These **neopronouns** are sometimes harder to get the hang of than new lexical nouns are (which is one of the signs that pronouns are more of a closed class than nouns are) but it's very possible to become a fluent user of a new pronoun with a bit of practice.

Prepositions: lexical or functional?

Prepositions are sometimes treated as a lexical category instead of as a functional category. For one thing, you might have noticed in 5.8 Compounding that prepositions can occur in compounds, which is something more typical of roots that belong to lexical categories. On the other hand, prepositions form a more closed class than nouns, verbs, adjectives, or adverbs, and they are often used to express purely grammatical information. In this textbook, we will continue to treat prepositions as functional elements—though the distinction between functional and lexical elements won't be relevant very often.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.4 Identifying phrases: Constituency tests and the next section is 6.13 From constituency to tree diagrams. **This is your first departure from the published order of sections.**

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6.6: Clausal embedding

Recursion: Sentences inside sentences

So far we've talked about the organization of words into constituents in a single clause. Consider the sentence in (1), which we saw before in 6.4 Identifying phrases: Constituency tests:

(1)		The students saw a movie about dinosaurs.

This sentence has 3 noun phrases: [*the students*], [*dinosaurs*], and [*a movie about dinosaurs*]. The noun phrase [*dinosaurs*] is inside the bigger constituent [*a movie about dinosaurs*], and they're linked together by a preposition *about*—in fact, [*about dinosaurs*] is a prepositional phrase. We also have a verb phrase [*saw a movie about dinosaurs*]—the verb and its object (or its objects, if it is ditransitive), will always be part of the same verb phrase constituent.

Now consider the sentences in (2) and (3):

(2)		Deniz said something.
(3)		Samnang might leave.

In (2), the object of the verb *said* is *something*; together these form a verb phrase. But now consider a sentence like (4):

(4)		Deniz said that [Samnang might leave].

In (4), the entire clause from (3) appears after the verb *said*, in the same position that *something* appeared in (2). Also, if we do constituency tests—for example replacement in (5)—we can see that [*said that Samnang might leave*] is a verb phrase that can be replaced by *do (too)*.

(5)		Keiko *said that Samnang might leave*, and Deniz **did too**.

What we see here is that the complement of a verb can be a whole clause; in this case we call the clause-inside-a-clause an **embedded clause**.

What about the word *that*? The role of *that* seems to be to introduce the embedded clause. Words that have this function of introducing an embedded clause belong to the category **complementizers** (called that because they turn clauses into the complements of verbs).

Like other categories, complementizers create complementizer phrases (CPs). Here the complementizer phrase is [*that Samnang might leave*]; again, you can identify this constituent with tests.

(6)		It was **that Samnang might leave** that *Deniz said* __.

Just as verbs select how many complements they take, they can also select the *category* of their complement. Some transitive verbs can combine only with noun phrase objects, some only with prepositional phrases, some only with complementizer phrases—and some with any or all of these.

For example, the verb *know* can combine with several different categories of complements:

(7)		They know…	
		…this fact.	(noun phrase)
		…about birds.	(prepositional phrase)
		…that birds can fly.	(complementizer phrase)

Other verbs can only take some of these as complements:

(8)		We ate…	
		…curry.	(noun phrase)
		*…about curry.	(*prepositional phrase)
		*…that curry is for dinner.	(*complementizer phrase)

(9)		The teacher said…	
		…something.	(noun phrase)
		*…about chocolate.	(*prepositional phrase)
		…that they like chocolate.	(complementizer phrase)

(10)		They talked…	
		…mythology.	(noun phrase)
		…about mythology.	(prepositional phrase)
		*…that mythology is interesting.	(*complementizer phrase)

(Some people might not find *They talked mythology.* totally grammatical; whether *talk* can take a noun phrase object is something that has changed over time in English.)

So far the examples of embedded clauses that we've seen are all embedded **statements**. Is that the only kind of embedded clause that exists in English, or in language in general? Are there any complementizers other than *that*?

Take a moment to see if you can think of some other verbs that embed whole clauses, and see if you can identify some element in those sentences that looks like another complementizer. You can do this for English, or for another language that you know.

Questions inside sentences: Embedded interrogative clauses

We just saw that the English verb *know* can combine with several different types of complements (complementizer phrases, noun phrases, and prepositional phrases). It also happens to be able to combine with more than one *type* of embedded clause. Consider the following examples:

(11)		I know…
		…(**that**) ghosts exist.
		…**whether** ghosts exist.
		…**if** ghosts exist.

What we see here is that the verb *know* can combine not only with clauses introduced by *that* (or nothing), but also ones introduced by *whether* or *if*. Another way to write this would be to use { curly braces } to surround the complementizers allowed after *know*, as in:

(12)		I know [$_{CP}$ {that, ∅, whether, if} ghosts exist].

Not all verbs are equally flexible! Some verbs, like *believe*, only allow *that* or ∅, not *whether* or *if*:

(13)	a.	I believe [$_{CP}$ {that, ∅} ghosts exist].
	b.	*I believe [$_{CP}$ {whether, if} ghosts exist].

Other verbs *only* allow *whether* or *if* as complementizers, like *wonder*:

(14)	a.	*I wonder [$_{CP}$ {that, ∅} ghosts exist].
	b.	I wonder [$_{CP}$ {whether, if} ghosts exist].

What this tells us is that the difference between *that* or ∅ on the one hand, and *whether* or *if* on the other hand, is something that verbs can be sensitive to when it comes to **selection**.

What, then, is the difference between these two sets of complementizers?

We can see the difference if we look at their use with **verbs of quotation**, comparing embedded clauses with direct quotation (indicated in English writing by using quotation marks).

Consider the verb *say* in (15):

(15)		They said **that** ghosts exist.	=	They said: "**Ghosts exist.**"

The embedded clause introduced by *that* can directly paraphrase a directly quoted **statement**.

Now compare the verb *ask* in (16):

(16)		They asked **if** ghosts exist.	=	They asked: "**Do ghosts exist?**"

In (16) we see that the embedded clause with *if* corresponds not to a quoted statement, but to a quoted **question**! This is the difference between *that* and ∅ versus *if* and *whether*:

- *that* and ∅: introduce **embedded statements**
  - they are [–Q] (non-question) complementizers
- *if* and *whether*: introduce **embedded questions**
  - they are [+Q] (question) complementizers

In English, all verbs that can select a CP headed by *whether* can also select a CP headed by *if*, though some speakers prefer one or the other, or prefer one to the other for certain verbs. If you're a fluent English speaker, ask yourself if you prefer one of these words to the other one.

The relationship between *that* and ∅ is slightly more complex. For the most part, any verb that can select a CP headed by *that* can also select a CP headed by ∅. But there are a few verbs that strongly prefer an overt *that*. In my own English, one example is the verb *report*:

(17)	a.	The newspaper reported that there was a demonstration yesterday.
	b.	*The newspaper reported ∅ there was a demonstration yesterday.

When a complementizer phrase occurs in a different position in a sentence *that* is also often obligatory. For example, when a clause is the subject of a sentence, many people find it ungrammatical to leave *that* out in English.

(18)	a.	[That there was a demonstration yesterday] surprised some people.
	b.	*[There was a demonstration yesterday] surprised some people.
	c.	It surprised some people [that there was a demonstration yesterday].
	d.	*It surprised some people [there was a demonstration yesterday].

The choice of complementizers is something that varies a lot across different varieties of English. If you or other people in your class don't share the judgements reported here, see if you can figure out generalizations that describe your own grammar better!

Embedded nonfinite clauses

Are complementizer phrases all just questions or statements?

There's at least one other distinction in types of clauses that verbs can take as complements. Consider, for example, the verb *want*:

(19)	a.	I want [ghosts to exist].
	b.	*I want [{that/∅} ghosts exist].
	c.	*I want [{whether/if} ghosts exist].

In my English, and maybe in yours, the verb *want* doesn't allow any of the complementizers we've seen so far. Instead, it requires that the clause it embeds have a **nonfinite verb**. Is a clause like [*ghosts to exist*] a complementizer phrase, or should we identify it as something else?

There is reason to think that at least some nonfinite clauses can occur in complementizer phrases: while many nonfinite embedded clauses don't have any overt complementizer, at least some do. Consider the examples in (20).

(20)	a.	I want [**for** ghosts to exist].
	b.	I prefer [**for** my coffee to have milk in it].
	c.	I'd like [**for** you to leave now].

Not everyone likes *for* in these examples, but at least some English speakers find it grammatical. Here *for* appears in the same kind of position we previously saw *that*, *if*, or *whether* in. We can analyze *for* as a **complementizer for nonfinite clauses**.

What makes *for* possible in (20), for many speakers, is the presence of a subject in the embedded clause. In many languages, including English, it's possible for nonfinite clauses to lack a subject; we won't look at such clauses more in this chapter, but in some varieties of English the complementizer *for* can occur without any subject, resulting in what are called *for to* infinitives, as in

I was happy for to leave. You can read more about this construction, and its distribution across varieties of English, at the Yale Grammatical Diversity Project: *for to* infinitives.

Some verbs can take *either* finite or nonfinite complements. Consider the verb *prefer*:

(21)	a.	I prefer [**that** cookies have chocolate chips].
	b.	I prefer [**for** cookies to have chocolate chips].

So just like the verb *know* can select either a question or a statement as its complement, the verb *prefer* can select either a finite or a non-finite clause.

"Nonfinite" and "infinitive" are two words for the same thing—notice that in both cases a negative prefix (*non-* or *in-*) attaches to the root *finite*. Nonfinite verbs in English appear with the infinitive marker *to*. This marker shows up in the same position occupied by auxiliaries—after the subject but before negation—and it's in complementary distribution with the **modal** auxiliaries.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.17 Trees: Structural ambiguity and the next section is 6.18 Trees: Embedded clauses.

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6.7: Main clause Yes-No questions

From embedded questions to main clause questions

So far we've seen **embedded questions**, introduced by *whether* or *if*, but what about actual questions—ones that we would write in English with a question mark? What generalizations can we make about this type of sentence?

Let's start with **Yes-No Questions**—questions whose answer in English can be "yes" or "no". Consider first the statements in (1).

(1)	a.	It will rain.
	b.	They have left.
	c.	Ghosts are haunting this house.

The statements in (1) become questions in (2):

(2)	a.	Will it rain?
	b.	Have they left yet?
	c.	Are ghosts haunting this house?

The questions in (2) could be answered by "*yes*" followed by the corresponding sentence in (1), or "no" followed by the negation of one of those sentences.

Comparing the statements and their corresponding questions helps us state a generalization about the structure of Yes-No questions in English:

Yes-No Question Formation in English

> Yes-No questions are formed by moving the first auxiliary in the main clause to the front of the sentence (i.e. before the subject).

This is also known as **Subject-Auxiliary Inversion** (or Subject-Aux Inversion).

It's important that we say "the first auxiliary **in the main clause**", instead of just looking for the first auxiliary in the sentence. If there's an auxiliary *inside* the subject, then it's not the one that moves. We can see this by thinking about how to form a Yes-No question based on the statement in (3)

(3)		[The information [that was shared]] will surprise them.

The subject of this sentence is [*the information that was shared*], which contains the auxiliary *was*. But trying to do Subject-Auxiliary Inversion with *was* as in (4a) is extremely ungrammatical; you have to move the auxiliary *will* from the main clause instead, as in (4b).

(4)	a.	* Was [the information [that _ shared]] will surprise them?
	b.	Will [the information [that was shared]] _ surprise them?

As far as linguists know, there is no human language with a grammatical process like "form questions by taking the first auxiliary you encounter, and putting it at the front of the sentence". That's interesting partly because it's a very computationally simple kind of rule. The fact that we don't find it in human languages supports the idea that **structure** and **constituency**, not just the linear order of words, is fundamental to their grammar.

Subject-Auxiliary Inversion can be described as a **transformation**. A transformation is a rule that changes the structure of a sentence in a predictable way, by reordering the constituents. It gives us a way of describing a set of grammatical sentences based on their consistent relationship to another set of sentences.

One of the big differences among current theories in syntax is whether they are **transformational** or not. By proposing that Subject-Auxiliary Inversion is a transformation, we are hypothesizing that someone's mental grammar applies it as a process while building the structure of sentences. The alternative view is that Subject-Auxiliary Inversion is a generalization about the relationship between statements and questions in English, but not a change or process that actively applies in anyone's mental grammar.

Knowing about this difference may help you relate this chapter to other courses in linguistics in the future, where you may encounter both transformational and non-transformational theories of syntax.

In current syntactic theory, transformations are usually formalized of in terms of **movement**. We will return to the idea of syntactic movement in the context of tree diagrams in 6.19 Trees: Movement.

Do-Support

There's one last piece we have to discuss with regard to Subject-Auxiliary Inversion in English, which is: **what do we do when there's no auxiliary?** Consider the sentence in (5):

(5)		Ghosts exist

There's no auxiliary in this sentence. But when we form a question, suddenly an auxiliary *do* appears!

(6)		Do ghosts exist?

Where does this *do* come from?

Generally in English, in contexts that require an auxiliary for a grammatical reason, if there's wasn't already an auxiliary in the sentence then the auxiliary *do* shows up to give you the auxiliary you needed. This is true not only in questions but also in negated sentences:

(7)	a.	Ghosts don't exist.
	b.	*Ghostsn't exist.
	c.	*Ghosts existn't.

If there's already an auxiliary, however, you don't get to add *do* for free in the same way:

(8)	a.	They have left.
	b.	They haven't left.
	c.	*They don't have left.
	d.	*Don't they have left?

The rule that adds *do* when a sentence requires an auxiliary in order to be grammatical is called **Do-Support**.

Echo Questions

There's another way to form Yes-No Questions in English, without doing any movement at all. This is by using **question intonation**: just pronouncing the sentence "as though it had a question mark."

So for example, alongside (9a), in some contexts I might just say (9b), without Subject-Auxiliary Inversion.

(9)	a.	Do ghosts exist?
	b.	Ghosts exist?

For many English speakers, questions like this are a bit more restricted than questions formed by Subject-Aux Inversion. Try to think of the contexts in which you might say "*Ghosts exist?*" instead of "*Do ghosts exist?*". While sometimes you could say either one, "*Ghosts exist?*" is slightly better in contexts where you're asking someone to repeat themselves, or maybe expressing surprise.

Embedded Questions, Main Clause Questions, and Punctuation

What are we doing in conversation when we use main clause questions versus when we use embedded questions?

If you're talking to someone and you produce a main clause question—like "*Do you like chocolate?*"—you are actually asking a question, usually hoping that the person you're talking to will answer it, to give you information you're looking for.

In English we indicate this with punctuation: questions have to end with a question mark (?), while other sentence types end with either a full stop (.) or an exclamation point (!).

But if you're talking to someone and you produce a sentence with an embedded question—like "*They asked if I like chocolate.*"—you're not actually asking the question yourself. Instead you're *reporting* on what someone else said, what they believe, or maybe what they know. These sentences **do not end with a question mark, because the sentence as a whole isn't a question.**

Now that we've looked at properties of both main clause questions **and** embedded questions, we can see what happens when combine them! Consider a sentence like the following:

(10)		They should know that ghosts exist.

We can turn the embedded clause into a question:

(11)		They should know whether ghosts exist.

Or we could make the whole sentence a question, but leave the embedded clause as a statement:

(12)		Should they know that ghosts exist?

Or we could do both at once!

(13)		Should they know whether ghosts exist?

In this last example, we have **two** [+Q] complementizer phrases. In the main clause this triggers Subject-Auxiliary Inversion (which is how main clause questions are marked in English), while in the embedded clause we get the question complementizer *whether* (which is how embedded Yes-No questions are marked in English).

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.18 Trees: Embedded clauses and the next section is 6.8 Main clause content questions.

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6.8: Main clause content questions

Until now we've only talked about Yes-No questions—questions that can be answered by saying "yes" or "no" in a language like English.

(1)		**Is it snowing?**	(Main clause Yes-No Question)

(2)		**They asked if it's snowing.**	(Embedded Yes-No Question)

Not all languages have words corresponding to "yes" and "no"! In many languages, the way you answer a Yes/No–question is by repeating the verb with or without negation. For example to answer *Is it raining?* you could say *Is.* or *Isn't.* This is the case in Mandarin, for example, as well as in Irish.

Yes-No questions like these just ask whether something is or is not the case. But we can ask more complex questions, asking for specific information about *part* of a sentence. For example:

(3)		**When** was it snowing?.	(asking about *time*)

(4)		**Where** is it snowing?	(asking about *location*)

These are **content questions**; in English they are often called **WH-questions** because they involve question words that start with the letters "wh" (*who*, *what*, *where*, *when*, *why*, *which*… and *how*, which doesn't start with "wh" but does contain both those letters). These words are traditionally labelled **interrogative pronouns**; in this chapter we will simply call them **content question words**. In linguistics the label "WH-questions" is often generalized to other languages, but in this textbook we will stick to "content questions" since the relevant words don't start with "WH" in other languages.

In many languages content question words do tend to start with some of the same sounds. For example, in French many (though not all) of these words begin with "qu-" (pronounced [kw]):

- *qui* (who)
- *quoi* (what)
- *quand* (when)
- *quelle* (which)

And in Anishinaabemowin many content question words start with [a] or [aa], though in some varieties the short vowel [a] is no longer pronounced in these words.

- *awenen* (who)
- *awegonen* (what)
- *aanapii* (when)
- *aaniin* (how, why, in what way)
- *aandi* (where)

Whether or not a language has a group of question words that start with the same sound, all languages have ways of asking content questions, just like all languages have ways of asking Yes-No questions.

Unlike Yes-No questions, the answer to a content question would be a word or phrase corresponding to the question word that was used. If someone asks:

(5)		Who were you talking to?

It wouldn't make any sense to answer with *yes* or *no*. Instead the answer would be a noun phrase like "*my friend*" or "*the person over there*" or "*U'ilani*", or with a full sentence ("*I was talking to my friend / the person over there / U'ilani.*")

Just like Yes-No questions, content questions in English involve a **change in word order** from what we find in corresponding statements.

Consider the following very short dialogue:

(6)	A:	That squirrel has hidden **something**.
	B:	**What** has the squirrel hidden?

By asking the question with *what*, Person B is asking for more information about the *something* Person A mentioned. But even though this question is about the object of the verb *hide*, the question word *what* appears at the very beginning of the clause.

We find the same thing with **all** content questions in English: no matter where the phrase we're asking about would show up in a statement, the question word has to go at the beginning of the sentence:

(7)		**Where** is it snowing?
	a.	**It's snowing in Ottawa.**
	b.	*It's snowing where?

(8)		**When** was it snowing?
	a.	It was snowing **yesterday**.
	b.	*It was snowing when?

(9)		**How** do squirrels hide nuts.
	a.	Squirrels hide nuts **by burying them**.
	b.	*Squirrels hide nuts how?

Echo Questions

When a content question word shows up in the same position in questions that a corresponding phrase would have appeared in a non-question, we say that the question word has stayed **in-situ** (="in place"). In many languages, this is the normal way to form content questions—there's no word order change of the type we see in English. In English, in-situ content questions aren't the default—that is, most people wouldn't use them when genuinely looking for information. This is why they're marked ungrammatical in the examples above.

However, in-situ questions can be used in some contexts in English to ask what are called **echo questions**. When you didn't quite hear what someone said, you can use an echo question to ask someone to repeat themself. In this case, you also use different intonation than in a regular content question: regular content questions have the same intonation as statements (falling towards the end), while echo questions require the same intonation as Yes-No questions (with a rise towards the end).

All the grammatical main clause content questions we've seen here also involve **Subject-Aux Inversion**, just like Yes-No questions do. We can see this because the is *before* the subject in all the grammatical content questions.

But Subject-Aux inversion isn't the only change in word order, we also need to state a generalization about the position of the question word itself. We will formalize the generalization in Section 6.19 in the context of **movement** within syntactic tree structures, but for now we can state the following generalization.

Question Word Fronting

> A content question word (e.g. *who*, *what*, *where*, *when*, *why*, *how*), or a phrase headed by a content question word, must appear at the beginning of the clause.

Variation across languages: Questions

Depending on what other languages you know, you may already have been thinking in previous sections about the fact that not all languages have Subject-Aux Inversion in questions, and now you might also notice that not all languages have Question Word Fronting. There are a variety of question-marking strategies in different languages, and in this section we review some of the most common ones.

Many languages use a fixed **question word** to mark Yes-No questions, sometimes called a **question particle**. For example, one of the more common ways to form a Yes-No question in French is to add *est-ce que* to the beginning of the sentence:

(10)		Nous	avons	trouvé	les	fantômes.
		we	have	found	the	ghosts.
		“We have found the ghosts.”				

(11)		Est-ce que	vous	avez	trouvé	les	fantômes.
		+Q	you.PL	have	found	the	ghosts.
		“Have y’all found the ghosts?”					

The particle *est-ce que* looks like multiple words, and historically it indeed derives from a phrase meaning something like “is it that”, but in contemporary French it acts like a single word, which we could hypothetically think of being spelled “*eska*”.

French has another way of forming questions that **does** involve Subject-Aux Inversion. Alongside the examples above, you can also say:

(12)		Avez-vous	trouvé	les	fantômes.
		have-you.PL	found	the	ghosts.
		“Have y’all found the ghosts?”			

This way of forming questions is somewhat old-fashioned for many current speakers of French, especially when speaking instead of writing. The more common strategy today is to use a question particle like *est-ce que*—or to just use question intonation.

We can treat *est-ce que* as a [+Q] complementizer that occurs in main clauses—exactly as though we marked questions in English by just adding *whether* or *if* to the beginning of the sentence.

Japanese also forms questions by adding a question particle, but because Japanese is head-final, the particle appears at the **end** of the sentence:

(13)		Gakusei-wa	yuurei-o	mitsuke-ta.
		Student-TOPIC	ghost-ACC	find-PAST
		“The student found the ghost.”		

(14)		Gakusei-wa	yuurei-o	mitsuke-ta	ka
		Student-TOPIC	ghost-ACC	find-PAST	**+Q**
		“Did the student find the ghost?”			

Similarly, one way to form Yes-No questions in Mandarin is to use the particle *ma* (Mandarin examples from Liing 2014).

(14)		wàimiàn	zài	xià	yǔ
		outside	PROG	fall	rain
		“It’s raining outside.”			

(15)		wàimiàn	zài	xià	yǔ	ma
		outside	PROG	fall	rain	**+Q**
		“Is it raining outside?”				

The analysis of Mandarin is a little bit more complicated, though. First of all, the particle appears at the **end** of the sentence in Mandarin, like in Japanese, even though Mandarin is otherwise head-initial, like English and French. Second, there are several other ways to ask Yes-No questions in Mandarin, which are equally (if not more) common than adding the particle *ma*.

Overall, it is very common for languages to form questions by adding a particle to the beginning or end of a sentence—but it is also very common to form questions by changing the position of a verb or auxiliary, like we see in English.

It’s tempting to think of question particles as being like the English auxiliary *do*, but remember that *do* only shows up in English when there’s no other auxiliary. The question particle in a language like French, Japanese, or Mandarin is more like the English complementizers *if* or *whether*, except found in main clauses instead of only in embedded clauses.

Just as not all languages have Subject-Aux Inversion in questions, not all languages exhibit Question Word Fronting. If a language doesn’t have Question Word Fronting, it usually leaves content question words in-situ.

Japanese, for example, is a language with in-situ content questions. Question words like *nani* (“what”) are pronounced in the same place as the corresponding non-question arguments are.

(16)		Usagi-wa	nani-o	tabe-ru	ka
		rabbit-TOPIC	what-ACC	eat-PRES	+Q
		“What do rabbits eat?”			

(17)		Usagi-wa	yasai-o	tabe-ru
		rabbit-TOPIC	vegetable-ACC	eat-PRES
		“Rabbits eat vegetables.”		

The key point to notice in these generalizations is that the word order in (17) and (18) is the same, even though (17) is a content question and (18) is the corresponding statement. Both have a different word order than the English translation, partly because Japanese is head-final (so the verb comes at the end) and partly because the word *nani-o* stays in-situ.

The **question particle** *ka* also appears in this WH-question, just like it does in Yes-No questions in Japanese, as we saw above.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.7 Main clause Yes-No questions and the next section is 6.9 Embedded content questions.

References

Liing, Woan-Jen. 2014. *How to ask questions in Mandarin Chinese.* Doctoral Dissertation, CUNY.

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6.9: Embedded content questions

In looking at simple and complex clauses in English, so far we have looked at:

- Statements
  - Main clauses
  - Embedded clauses (complementizer = *that*)
- Yes-No Questions
  - Main clauses (Subject-Auxiliary Inversion)
  - Embedded clauses (complementizer = *if* or *whether*)
- Content Questions
  - Main clauses (Subject-Auxiliary Inversion **and** Question Word Fronting)

All that remains to complete this picture is to look at the profile of Content Questions in embedded clauses.

It turns out that any verb that can embed a Yes-No question can also embed a content question. Let's see some examples:

(1)		*know*	
	a.	I know [$_{CP}$ if squirrels have hidden nuts].	(embedded Yes-No question)
	b.	I know [$_{CP}$ what squirrels have hidden].	(embedded content question)

(2)		*ask*	
	a.	They asked [$_{CP}$ if the movie ends at 8PM].	(embedded Yes-No question)
	b.	They asked [$_{CP}$ when the movie ends].	(embedded content question)

(3)		*wonder*	
	a.	We wondered [$_{CP}$ if someone had baked cookies].	(embedded Yes-No question)
	b.	We wondered [$_{CP}$ what someone had baked].	(embedded content question)

What's going on in the (b) examples? First of all, we do **not** see the complementizer *if* that is found in embedded Yes-No questions —and it's ungrammatical if we try to include it, no matter what position we try to put it in:

(4)	a.	*I know [$_{CP}$ what if squirrels have hidden].
	b.	*They asked [$_{CP}$ if when the movie ends].
	c.	*We wondered [$_{CP}$ what whether someone had baked].

From the ungrammaticality of all the sentences in (4), we can conclude that it's impossible to include a complementizer in embedded content questions in English.

What about Subject-Auxiliary Inversion? There's no inversion in *I know what squirrels have hidden.*—the auxiliary *have* stays after the subject *squirrels*—and if we try to add Subject-Auxiliary Inversion this sentence would become ungrammatical:

(5)		*I know [$_{CP}$ what have squirrels hidden].

So it looks like embedded content questions—at least for most English speakers in Canada—are **like** main clause content questions in putting the content question word at the front of the clause, but **unlike** main clause content questions in that they don't do Subject-Auxiliary Inversion.

There are some varieties of English where sentences like (5), with Subject-Auxiliary Inversion in embedded clauses, are grammatical! This has been described for some varieties spoken in Belfast, Ireland, for example, as described by Henry (1995). Do you find examples like (5) grammatical, or have you ever heard someone use them in English?

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.8 Main clause content questions and the next section is 6.19 Trees: Movement.

References

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6.10: Arguments and thematic roles

Arguments as participants in events

In Section 6.2 we classified predicates in terms of their **transitivity**—that is, the number of arguments they combine with. Intransitive verbs take only a subject, while transitive verbs take both a subject and an object, and ditransitive verbs take a subject, an object, and an indirect object.

Importantly, "subject" and "object" are **structural** terms, not semantic ones. In English, a subject appears at the beginning of a declarative clause, has nominative case (if it's a pronoun), and controls agreement on the tensed verb. An object in English occurs after the verb, and has accusative case (if it's a pronoun).

We might ask, though, whether all subjects are interpreted similarly, or if all objects are.

Looking towards semantics (the study of meaning), verbs can be thought of as describing **events** or **states**. The difference between events and situations, in semantics, is that events are often thought of as dynamic (things are actively happening), whereas states are static (things that are simply true, without anything happening, like *being tall*). From here on we'll use **eventuality** as a general term for both events and states.

An eventuality involves some number of **participants**. The participants in an event can play various **roles** in the event, which in linguistics are called **thematic roles**.

Do subjects always play the same **role** in an eventuality? If we look at the following examples, it looks like they don't:

(1)	a.	The children yelled.	(children did something on purpose)
	b.	The wind blew the tree down.	(wind did something, but not on purpose)
	c.	The tree burned.	(something happened to the tree)

Indeed, we sometimes see this even with a single verb, as with *sink* in (2).

(2)	a.	The pirate sank the ship.	(pirate did something on purpose)
	b.	The ship sank.	(something happened to the ship)

In the sentences in (2), we see that the verb *sink* can be either transitive or intransitive. In the first case [*the pirate*] is the subject and in the second [*the ship*] is the subject, but they play different roles in the eventuality. Indeed, in (2a) [*the ship*] is the *object*, but plays the same role in the eventuality as it does when it's the subject in (2b).

But for other verbs, we don't see this kind of "trading places":

(3)	a.	The author wrote the book.
	b.	The author wrote.

In (3) the subject stays the same in the transitive and intransitive uses of the verb *write*, and [*the author*] continues to play the same kind of role in the eventuality.

To talk about the different roles associated with subjects and objects, we can define a number of thematic roles that are relevant in natural language. There are potentially many such roles, but in this chapter we'll focus on just a few.

Agent:
Agents are animate actors who do things on purpose.

- [The pirate] sank the ship. (subject = agent)

Causer:
Causers are often inanimate (not alive); they cause things to happen but without acting on purpose.

- [The bilge pump malfunction] sank the ship. (subject = causer)

Not all animate subjects are agents: some animate subjects instead perceive something or experience a mental state.

Experiencer:
An experiencer is an animate participant that experiences a mental state. This includes perceiving something, as with the subjects of verbs like *see*, *hear*, etc.

- [Pirates] frighten **me**. (**me** = experiencer, [pirates] = causer)
- **I** fear [pirates]. / **I** like [pirates]. (**I** = experiencer, [pirates] = causer)
- [**The pirates**] saw an approaching storm. ([**the pirates**] = experiencer)

Theme:
The theme is the participant to which something happens, and may be changed by the event.

- The pirate sank [the ship]. (object = theme, affected/changed by the event)
- The author read [a book]. (object = theme, not affected by the event)

Some work on thematic roles distinguishes **themes** (undergo the event, but are not affected or changed) from **patients** (undergo the event, and are affected or changed as a result). The objects of verbs of consumption (like *eat*) or creation (like *build*) are prototypical patients: they either disappear or come into existence as a result of the verb's action. The distinction between themes and patients is not relevant in this chapter, however, and so we won't worry about it.

Instrument:
An instrument is the thing an agent uses to accomplish an action, often (but not necessarily) introduced in English by the preposition *with*.

- The pirate sank the ship [with a cannon]. (PP = instrument)

Location:
A location is the place where an eventuality occurs, often (but not necessarily) introduced by a locative preposition.

- The pirate sank the ship [at sea]. (PP = location)

Goal:
The goal is the location or person that receives the theme. In most ditransitives, the indirect object is the goal of the eventuality.

- The pirates sent [the ship] **a message**.
- The pirates sent **a message** to [the ship]. ([the ship] = goal; **a message** = theme)

Different verbs don't just select how *many* arguments they combine with, but also select what thematic roles their arguments take. But verbs aren't totally free to map thematic roles onto argument positions; for example, while we've seen that an experiencer can be either the subject or object of a verb, if a verb combines with both an agent and a theme, the agent is always the subject. Also, whenever a verb takes only a single argument, that argument will necessarily be the subject (at least in English, and in many other languages).

Looking at verbs with only one argument, we find both **agent-intransitives** and **theme-intransitives**.

(4)		**Agent intransitives:**
	a.	The pirate laughed.
	b.	Everyone jumped.
	c.	The author wrote.

(5)		**Theme intransitives:**
	a.	The tree fell.
	b.	The ship sank.
	c.	The ice melted.
	d.	A train arrived.

Events with no participants

Does every verb have to have at least one argument? In languages like English, every (non-imperative) sentence has to have a pronounced subject. But consider sentences like the following:

(6)	a.	It is raining.
	b.	It is snowing.

We might think that weather verbs like *rain*, *snow*, etc. take something like a theme subject—the *it* subject refers to something like "the weather".

Pronouns like *it* can usually be replaced with full NPs, however, and yet it's quite odd to replace the *it* subject of weather verbs with [the sky] or [the weather]:

(7)	a.	#The sky is raining.
	b.	#The weather is snowing.

Thinking in terms of thematic roles gives us a handle on what's going on with this type of predicate: these are verbs that describe eventualities that don't have *any* participants. So when it's raining or snowing, then (at least in English) we don't describe that as being something that anything is *doing*, it's just something that happens.

Where does the *it* come from, then? One influential suggestion is that this *it* just shows up to give the sentence a subject, when there's no other subject available. (This is kind of like Do-Support, but for nouns.)

So a verb like *rain* or *snow* has one syntactic argument (a subject), but does not have any semantic arguments to which it gives thematic roles.

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.19 Trees: Movement and the next section is 6.11 Changing argument structure: Causatives and passives.

Check your understanding

Coming soon!

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6.11: Changing argument structure- Causatives and passives

So far we've only looked at thematic roles that verb roots come specified with. But all languages have ways to **adjust** the thematic roles expressed in a clause, either syntactically or morphologically.

Adding arguments: Causatives

For example, many languages have a **causative** construction. Causatives add an extra causer or agent (which becomes a new subject):

(1)	a.	They read a book.	(transitive: subject = agent, object = theme)
	b.	**I made** them read a book.	(causative: Adds a second causer/agent)

English has a syntactic causative construction. Other languages have morphological causatives, that don't involve a causative verb like *make*, but instead have verbal morphology that does the same work of adding an additional causer argument. Japanese is a language with a morphological causative, illustrated in (2). Causative morphology was previously discussed briefly in Chapter 5.7.

(2)	a.	Neko-wa	tabe-ta		
		cat-TOPIC	eat-PAST		
		"The cat ate."			(intransitive: Agent)
	b.	Watasi-wa	neko-ni	tabe-sase-ta	
		I-TOPIC	cat-DAT	eat-CAUS-PAST	
		"I made the cat eat."			(causative: adds a second Causer/Agent)

Other argument *adding* constructions include applicatives (adding a participant that the event is done *for*, usually as an indirect object. For example: *I baked a cake. -> I baked **my friend** a cake.*).

Removing arguments: Passives

Conversely, there are constructions that **remove** an argument from the ones the verb usually projects. Perhaps the most famous of these is the **passive**.

English, like many of the world's languages, has a passive construction, which removes the original subject of a verb, resulting in the original object becoming the passive subject. A non-passive sentence is known as an **active** sentence. For example:

(3)	a.	They **wrote** a book.	(original sentence: active)
	b.	A book **was written** (by them).	(passive)

A grammatical passive can be identified by the following three properties:

1. Original subject of the basic (active) transitive verb is demoted: it ceases to be the subject, and is **optionally** expressed in a propositional phrase (in English = *by* phrase) or in a noun phrase marked with specific case morphology.
2. Theme object of the basic (active) transitive verb becomes the **subject** of the passive clause.
3. Characteristic morphology or syntax (in English = *be* + Past Participle *-en/-ed*)

All three of these properties are needed for a clause to be a true grammatical passive. Active and passive are often referred to as grammatical **voices** (as in *active voice* or *passive voice*). Some languages have other grammatical voices, for example middle voice

in Greek, but we will not discuss other voice constructions in this chapter.

The first property of passives relates them to corresponding active sentences. This is a key property of passives: for any passive clause, there is always an active counterpart. (This is similar to questions, which we described in terms of their grammatical relationship to statements.)

Consider the following active sentence:

(4)		The pirates sank the ship.

This is transitive, so it has a passive counterpart:

(5)		The ship was sunk (by the pirates).

The sentence in (5) has all three defining properties of passives:

1. The verb is replaced by *be* + past participle *sunk*
2. The original subject is demoted and appears in an optional *by-phrase*
3. The subject is [the ship], which was the theme object of the active verb.

Compare this with the theme-intransitive we saw earlier

(6)		The ship sank (*by the pirates).

In contrast to (5), (6) does not have all three defining properties of a grammatical passive:

1. The subject is [the ship], which was the theme object of the active verb, but
2. The original subject **cannot** be expressed in a *by-phrase*
3. There is **no** auxiliary *be*, and no past participle.

While the subject in both these cases is [the ship], the theme intransitive doesn't have the other properties of a passive clause.

Passives in Popular Discourse

In prescriptive grammar and in popular discussions, the passive has a bad reputation, and advice or "rules" for writing often says that you should avoid the passive entirely. Sometimes this is justified by saying that the passive "hides" the agent of an event.

In fact, though, the passive allows you to express the agent in a *by*-phrase in a way that other intransitives do not:

(7)	a.	The ship was sunk by the pirates.	(Passive, but expresses the agent)
	b.	The ship sank.	(Active! But no way to express who did the sinking)
	c.	The bomb exploded.	(Active! But doesn't say who set the bomb)

So the reason given for avoiding the passive doesn't hold up.

In both writing advice and in online discussions, you often see headlines criticized for using "passive voice" when they use verbs like "dies"/"died" or "something went wrong", without identifying the cause of death or who did something wrong. This points out a problem with the *content* of various types of public language (headlines, public statements by politicians), but they frame the criticism in terms of *grammatical structure*.

This is an example of how *language ideologies*—our attitudes and beliefs about language—can be expressed in popular discourse. Here people express a legitimate criticism of public writing—not clearly expressing the agent or person responsible for an action—

but presented as though it is a grammatical issue (in a way that doesn't match the original grammatical meaning of the term "passive"). While there's nothing wrong with changing the meaning of the word "passive"—the meanings of words change all the time!—it's useful to be aware of its specific meaning as applied to grammatical structure.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.10 Arguments and thematic roles and the next section is 6.20 Trees: Movement beyond questions, which discusses the structure of passives in terms of trees and movement.

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6.12: Interim summary

In this chapter, we have so far covered some of the core concepts in syntactic theory, and seen how we can use them to reason about grammatical structures and relationships between classes of sentences.

These core concepts include the observation that natural languages are better described in terms of **structural relations** rather than just the linear order of words, that the properties of a phrase are determined by its **head**, and that we can use grammaticality judgements to investigate fine details about a language's syntax. We've also seen how we can usefully describe the properties of certain classes of clauses (questions and passives) by showing how they are systematically related to other clauses (statements and actives), and how these concepts can give us a handle on syntactic differences across languages. As just one example, the **head direction** parameter accounts for differences in word order between English and Japanese in all types of clauses.

Even though we have mostly focused on one language, we have still only scratched the surface of the language's syntactic grammar. However, we now have tools we could apply either to other phenomena in English, or to the grammar of entirely unrelated languages.

In the remaining sections of this chapter we introduce a particular formal notation used to represent the syntactic structure of natural language: tree diagrams. In particular, we will introduce a derivational implementation of **X-bar theory**, where the grammatical sentences of a language are described in terms of constraints on a set of well-formed tree structures, and movement transformations that can be applied to those tree structures.

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6.13: From constituency to tree diagrams

In this section we begin to introduce the formal notation of **tree diagrams**. We use tree diagrams to make specific and testable claims (hypotheses) about the structure of phrases and sentences.

Thinking back to Section 6.1, one way of thinking about the goal of syntactic theory is that it's aiming to account for what languages users know about which sentences are grammatical, and which sentences are ungrammatical.

What constituents do we find inside sentences? Well, we know that a sentence consists of (at least) a subject and a predicate, and that subjects are (usually) noun phrases, and predicates are often verb phrases. We might express this as a rule, known as a phrase structure rule.

Phrase structure rules were central to the theory of syntax developed in Chomsky 1957, which kickstarted the modern field of generative syntax.

(1)		S → NP VP

This rule says that wherever you have an S, it is possible for that S to be made up of an NP followed by a VP.

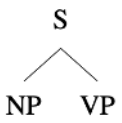


Figure 6.1 Schematic tree for S containing an NP subject and VP predicate

Another way to represent the same idea is with a **tree diagram**, as in Figure 6.1. Tree diagrams can express the same information as phrase structure rules, but can more efficiently express the output of multiple such rules; current syntactic theories are typically expressed in terms of constraints on possible trees, rather than in terms of constraints on phrase structure rules.

What kind of structure might we expect to find inside the NP subject? Here are some NPs—you might think of a sentence in which some or all of them can occur (remember that you can tell if a string in a sentence is a single NP by using a replacement test to try substituting a pronoun).

(2)	a.	robots	(N)
	b.	some robots	(D N)
	c.	six robots	(Num N)
	d.	the six robots	(D Num N)
	e.	the six small robots	(D Num Adj N)
	e.	robots from Boston	(N PP)
	f.	the robots from Boston	(D N PP)
	g.	the six small robots from Boston	(D Num Adj N PP)

We could abstract across all of these, and write a general phrase structure rule for
NPs, putting parentheses around all optional elements. A subscript "n" indicates that that element can be repeated any number of times.

(3)		NP → (Det) (Num) $(Adj)_n$ N $(PP)_n$

This can be read as:

> *An NP can consist of a determiner (optional), followed by a numeral (optional), followed by any number of adjectives (all optional), followed by a noun (required), followed by any number of prepositional phrases (all optional).*

We could represent the structure of some of the specific NPs in (2) as in Figure 6.2.

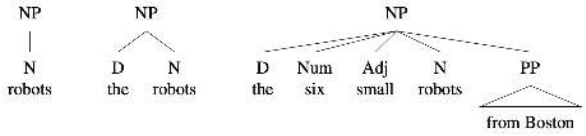


Figure 6.2 Tree diagrams for [*robots*], [*the robots*], and [*the six small robots from Boston*]

The phrase structure rule for NPs referred to prepositional phrases (PP). These phrases have fewer possible shapes than NPs:

(4)	a.	from Boston	(P NP)
	b.	outside	(P)
	c.	just outside	(Deg P)
	d.	way beyond my knowledge	(Deg P NP)

We can abstract this in a single phrase structure rule:

(5)		PP → (Deg) P $(NP)_n$ N $(PP)_n$

We could then expand the "NP" symbol using our phrase structure rule for NPs above. That NP might contain another PP inside it —here we've encountered **recursion** again. Figure 6.3 shows tree structures for some of the PPs in (4).

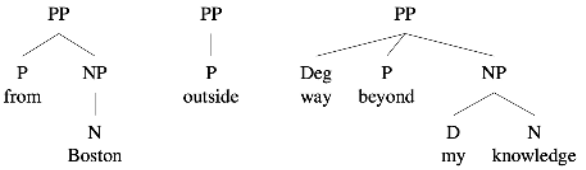


Figure 6.3 Tree diagrams for [*from Boston*], [*outside*], and [*way beyond my knowledge*]

Now let's look at some verb phrases (VPs). In the following examples, the VPs are all in [square brackets].

(6)	a.	The crew [repaired the ship].
	b.	The captain [gave the crew orders].
	c.	The spaceship [arrived].
	d.	The crew [travelled across the galaxy].

How do we know these are VPs? Well, they come after the *subject* of the sentence (an NP in all these examples), so that means they are predicates. In one case the predicate is a single word *arrived*—this word is a verb, so the only thing it could be is a verb phrase. All the other sequences in square brackets could be swapped into the same position as *arrived*, so they must be phrases of the same type. For example:

(7)		The spaceship [gave the crew orders].

This sentence might be pragmatically odd unless you assume the spaceship is an artificial intelligence, but it is grammatical. Another test would be the **replacement test** for VPs, which involves replacement with *do* (you can review the replacement test in

6.4 Identifying phrases: Constituency tests).

Based on these tests, we know that a verb by itself (like *arrived*) can be a VP, and that the object is inside the VP with the preceding verb. We have intransitive VPs with just a verb, transitive VPs with one NP, and ditransitive VPs with two NPs.

Many ditransitive verbs in English can also appear with an NP and a PP, though some ditransitive verbs, like *put*, only allow the NP PP version). The alternation between a ditranstive [NP NP] as in (7) and [NP PP] as in (8) is called the **dative alternation**.

(8)		The spaceship [gave orders to the crew].

The VPs we've seen in this section can be derived with the following phrase structure rules:

(9)	a.	VP → $V_{intrans}$
	b.	VP → V_{trans} NP
	b.	VP → $V_{ditrans}$ NP NP
	b.	VP → $V_{ditrans}$ NP PP

If we looked at a wider range of VPs we'd also find that adverb phrases can go at the *beginning* or *end* of VPs, though not typically in the middle. So we'd end up with the following general phrase structure rule for VP:

(10)		VP → (AdvP) V (NP) (NP/PP) $(AdvP)_n$

By putting together the structures we've proposed for NPs, PPs, and VPs, we're now in a position to show some trees for full sentences. Figure 6.4 shows a tree for the sentence [*The crew from Mars repaired the spaceship*].

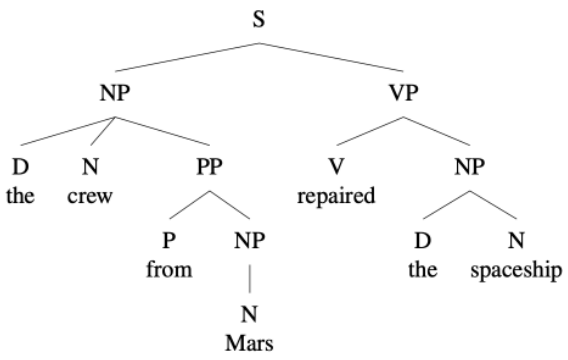


Figure 6.4 Tree diagram for *The crew from Mars repaired the spaceship*.

There are also some cases where a verb can be followed by an adjective phrase (*We are happy.*; *They seem nice.*). There isn't an easy way to collapse this with our previous phrase structure rule; to account for this we could add a second phrase structure rule for VPs (VP → V AdjP).

We can also formulate phrase structure rules for various modifier phrases: AdvP, AdjP, and NumP.

Adverb phrases consist of an adverb (11a), preceded by an optional degree phrase (11b). You can also sometimes get a PP after an adverb (11c).

(11)	a.	quickly
	b.	very quickly
	c.	quite quickly for a sloth

This is summarized by the phrase structure rule in (12):

(12)		AdvP → (DegP) Adv $(PP)_n$

Adjective phrases are similar:

(13)		The robot is $[_{AdjP}$ very proud of itself].

(14)		AdjP → (DegP) Adj $(PP)_n$

Number phrases are also modified by degree phrases!

(15)	a.	exactly six
	b.	approximately 30
	c.	very many

(16)		NumP → (DegP) Num_n

The "objects" of adjectives are almost always expressed by PPs—that is, if there's something in an AdjP that comes after the adjective, it usually can't be an NP (or a VP), but instead has to be a PP.

Adjectives with NP complements

In English there are a very tiny number of exceptions to the generalization that complements of adjectives are PPs, though the exact number is different for different speakers. The one exception that all English speakers have is the adjective *worth*. So we can say:

(17)		This object is [worth a lot of money.]

Here the adjective is followed by the NP [*a lot of money*]. The NP has to be something that expresses a value.

Some English speakers, including most Canadian English speakers and some in upstate New York and Pennsylvania, have another exception with the deverbal adjectives *finished* and *done*:

(18)	a.	I am [finished my coffee].
	b.	The children are [done their homework].

If you aren't from one of those places, you might need to use the verbal perfect (*have finished my coffee*), or use the preposition *with* (*are finished with their homework*).

Some people allow a few more adjectives in this construction, but they're all deverbal (that is: derived from verbs). For example, people might allow NP complements with the adjectives *started* and *completed*.

Let's return to phrase structure rules for whole sentences. We've already seen that sentences can consist of an NP followed by a VP:

(19)		[The robot] [repaired the spaceship].

They can also have an **auxiliary** (modal or non-modal), and can have adverbs at the beginning or end.

(20)	a.	[The robot] will [repair the spaceship].
	b.	Maybe [the robot] will [repair the spaceship] tomorrow.

You can also put **negation** in a sentence—though negation always requires an auxiliary in English (if there isn't already an auxiliary, we apply Do-support):

(21)	a.	[The robot] didn't [repair the spaceship].
	b.	[The robot] hasn't [repaired the spaceship].

From these we can get a full phrase structure rule with several optional elements, but an obligatory NP subject and an obligatory VP predicate:

(22)		S → (AdvP) NP (Aux) (Neg) VP (AdvP)

Phrase structure rules are useful for describing the sequences that can occur in phrases of different types, but neither these rules nor the trees we've seen in this section do more than list the elements that can occur in phrases of different types. In the remaining sections of this chapter, we'll explore a theory that limits possible tree structures to a few basic configurations, with the goal of explaining not only how languages can vary, but also explaining limits on the variation seen across human languages.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.5 Functional categories and the next section is 6.14 Trees: Introducing X-bar theory.

If your instructor has assigned Appendix 1 instead of the second half of this chapter, you should move on to Appendix 1 now.

References

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

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6.14: Trees- Introducing X-bar theory

Constituency tests and phrase structure rules provide a useful starting point for thinking about the structure of possible sentences, but they don't really start explaining *why* certain structures are grammatical, or predicting what possible and impossible grammars might look like. In this section we introduce **X-bar theory**, which aims to make stronger predictions by restricting the shape of possible trees. It's called that because it introduces an extra layer of structure inside phrases called the "bar level".

To see why we might want to constrain what trees are possible, let's begin by thinking about a type of structure that's really easy to describe using a phrase structure rule:

- **Weird phrase structure rule:** NP –> V (Adj) PP

This rule is weird because it's a noun phrase that's missing the noun: we already saw in Section 6.3 is that what makes something a noun phrase is precisely that it has a noun inside it. The restriction that all natural languages phrases have heads of the same category is the first limit we'll put on possible structures in X-bar theory:

- Every phrase (XP) has a head of the same category (X)

And this goes the other way as well: all **heads** (words) **project** (or "occur inside") a phrase of their category:

- Every head (X) projects a phrase of the same category (XP)

What this means is that even when a noun or verb—or any other category—doesn't obviously have any other words in the same phrase as it, it's still inside an NP or a VP. In other words, while the two sentences in (1) are in one sense very different (one has two words, the other has 11), in another sense they have the same structure: both sentences consist of an NP followed by a VP.

(1)	a.	Cats sleep.
	b.	The many very fast spaceships carried a lot of valuable cargo.

By default, in X-bar theory we assume that the same constraints apply to all categories and phrases, and that they apply in all languages. In the absence of evidence to the contrary, we assume that determiners occur inside determiner phrases (DPs), degree words occur inside degree phrases (DegPs), and so on.

The assumption that all phrases involve the same structure, and that this is true in all languages, is a **hypothesis**. If we encounter evidence that is inconsistent with this hypothesis, we would revise the theory to account for new data. Active research in syntax consists of investigating grammatical patterns in languages, and showing how they do (or do not) require specific revisions to current syntactic theories.

The key feature of X-bar theory (and the source of its name) arises from the observation that phrases aren't just a flat structure.

Our phrase structure rule for NPs, for example, could build NPs that contain a determiner (or DP), a noun, and a PP, but there was no sub-grouping. The tree diagram in Figure 6.5 shows this. (the triangle over *robots* indicates that we have abbreviated structure inside this constituent.)

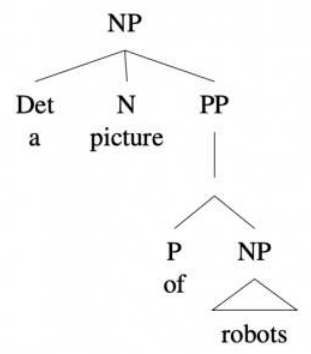


Figure 6.5 Tree diagram for [*a picture of robots*]

What we find if we look at phrases of all types, in many languages, is that head is always in a closer relationship with one other element inside the phrase, than with anything else. Specifically, heads are in a closer relationship with their **complement—** remember that in English the complement follows the head of the phrase, while it can come before the head in other languages. We saw in Section 6.3, for example, that verbs determine whether and how many objects they combine with. Above we saw that adjectives generally combine with PP complements, but that a few adjectives idiosyncratically allow NP complements.

This means that there are units—**constituents**—inside phrases. So not only do all heads have phrases, and all phrases have heads, but there is what we might call a "mid sized sub-phrase" in every phrase (or an "intermediate phrase"). This mid-sized phrase is called **X-bar** (written **X'**), which is where the theory gets its name.

So we expand X-bar theory to the following generalizations, expressed in phrase structure rules:

- XP → (YP) X'
- X' → X (ZP)

XP, YP, and ZP are all variables over any category of phrase. These rules can be read as saying:

> *Every phrase (XP) must have a bar-level of the same category (X') within it, optionally preceded by another phrase (YP). Every bar-level (X') must have a head of the same category within it, optionally followed by another phrase (ZP).*

The positions occupied by YP and ZP are **argument positions**, and they have special names. The names for structural relations in trees are adapted from family relationships: parent, child, etc.

The sibling of the head is the copml**e**ment (with an "e"), not the compl**i**ment (with an "i")! This is *complement* as in set theory, not as in saying nice things to someone.

Complement:

Sibling of the head X (child of X') is its **complement**

Heads **select** their complement (including *if* they take a complement)

Specifier:

The child of XP, sister of X' is the **specifier** of the phrase

If we put these labels in the tree in place os "YP" and "ZP" above, we get a **general X-bar template for English** (specific to English because it includes the linear order found in English).

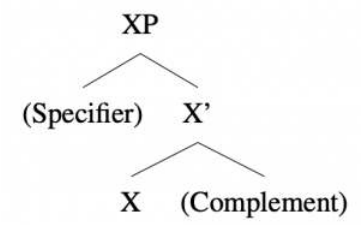


Figure 6.6 Generalized X-bar template (for English, head initial)

What is the evidence for bar levels? In the remainder of this section we review the evidence for sub-constituents inside NPs and VPs.

Evidence for N'

The evidence for N' ("N-bar") involves showing that a noun is in a closer relationship with a PP that follows it than it is with a previous determiner.

We can show this with **constituency tests** that target this sub-NP unit. These tests are a bit trickier to apply than the constituency tests covered in Section 6.4, but they follow the same general principle.

Here we will only go through one of these tests: *one*-replacement. Just as a pronoun can replace a whole NP, the word "one" can (for at least some speakers of English) replace a noun and a following prepositional phrase, leaving behind anything before the noun. Like other kinds of replacement, especially replacement with *do* for VPs, *one*-replacement requires that there's an earlier NP that "fills in" what's being replaced.

(2)		[$_{NP}$ Yesterday's **launch of a spaceship**] was exciting, but [today's **one**] was not. (where [*one*]=[*launch of a spaceship*])

By contrast, you can't replace a determiner and an N with *one*, leaving the PP behind:

(3)		*[$_{NP}$ **The launch** of a spaceship] is exciting, but [**one** of a mining drone] is not. (where [*one*]=[*the launch*])

Recall from Section 6.5 that determiners and possessors are in complementary distribution, which we account for by putting them in the same structural position: NP only has one specifier, so it can only hold one determiner or possessor.

This gives us the following overall structure of an NP, showing a **closer relationship** between the N and a following PP than between either of those and the preceding determiner or possessor.

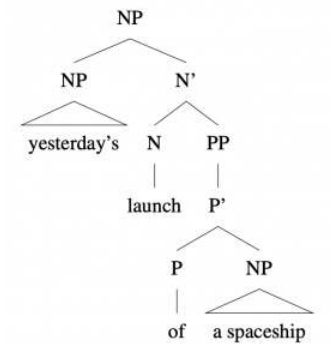


Figure 6.7 Tree diagram for [*yesterday's launch of a spaceship*]

Evidence for V'

We can do similar tests to find a constituent inside VP, consisting of the verb and its object. For example, we can **elide** a verb and its object, leaving a previous AdvP behind, but we cannot elide AdvP + V, leaving the NP object behind.

(4)	a.	They will [$_{VP}$ quickly build a spaceship], and we will [$_{VP}$ slowly _]
	b.	*They will [$_{VP}$ quickly build a spaceship], and we will [$_{VP}$ _ an orbital station]
		(ungrammatical if what's missing is [quickly build])

For many speakers the contrast is clearer with *do so* replacement: *do so* can replace a verb and its object, but can't replace an adverb and verb if this strands the object.

(5)	a.	They will [$_{VP}$ quickly <u>build a spaceship</u>], and we will [$_{VP}$ slowly **do so**]
	b.	*They will [$_{VP}$ <u>quickly build</u> a spaceship], and we will [$_{VP}$ **do so** an orbital station]
		(ungrammatical if what's missing is [quickly build])

As with noun phrases, we can represent the fact that the verb and its object form a constituent, to the exclusion of any adverbs, by putting them both under the V' node.

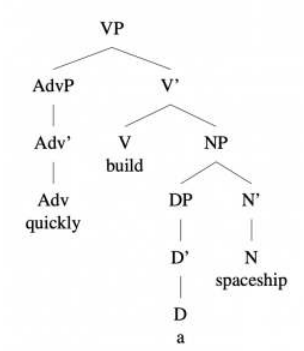


Figure 6.8 Tree diagram for [quickly build a spaceship]

"Empty" bar levels

As with the hypothesis that all heads project phrases, even when there are no other words in the phrase, X-bar theory assumes that all phrases contain at least one bar level, even when it is not needed to host a complement.

So for the sentence in (6), we would have the tree in Figure 6.9, where every phrase has a bar level even though none of the phrases we've drawn includes a complement:

(6)		The spaceships landed.

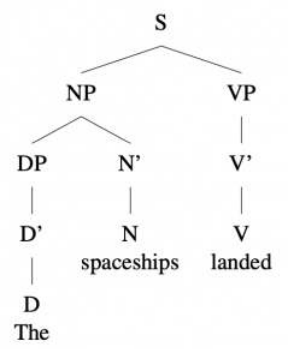


Figure 6.9 Tree diagram for *The spaceships landed.*

This tree also illustrates something that's still missing from our implementation of X-bar theory: we've said that every phrase has to have a head, but our sentences are currently headless. In the next section we turn to the proposal that all sentences are projected from a *tense* head.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through the chapter that interleaves core concepts with tree structures, the previous section was 6.13 From constituency to tree diagrams and the next section is 6.15 Trees: Sentences as TPs.

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6.15: Trees- Sentences as TPs

So far we've applied X-bar theory to a range of phrase types. But what about sentences? Up to this point we've simply been labelling them as "S", as in Figure 6.10.

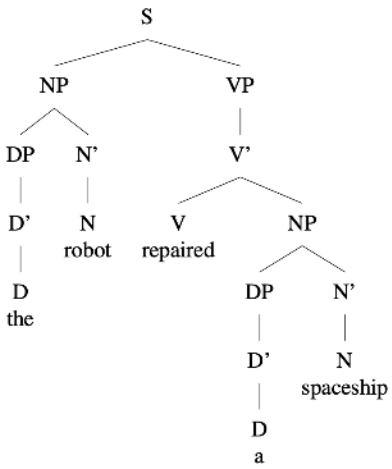


Figure 6.10 Tree diagram for *The robot repaired a spaceship.* (to be revised)

But if a "phrase" is a string of words that form a constituent, then sentences are also phrases—and X-bar theory requires that all phrases have heads, a hypothesis we don't want to abandon unless we have evidence that it's incorrect.

What could the head of the sentence be?

Recall that we had a phrase structure rule for sentences like the following:

- S –> NP (Aux) VP

This rule allows sentences to include an auxiliary between the subject NP and the predicate VP, as in Figure 6.11:

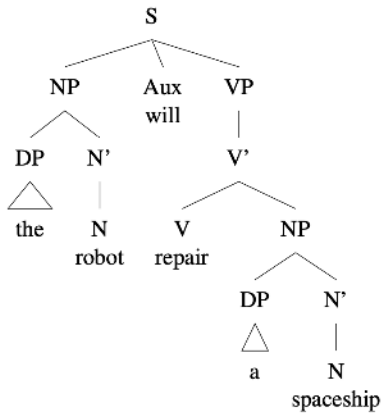


Figure 6.11 Tree diagram for *The robot will repair a spaceship.* (to be revised)

This tree has two problems from the perspective of X-bar theory: now not only does the sentence (S) not have a head, but the auxiliary is a head without a phrase! We could simply put the Aux into an AuxP, as we did with determiners, degree adverbs, and so on. But there's another option open to us: we can solve both the lack of a phrase for Aux and the lack of a head for S in one stroke, by analyzing the auxiliary itself as the head of the phrase:

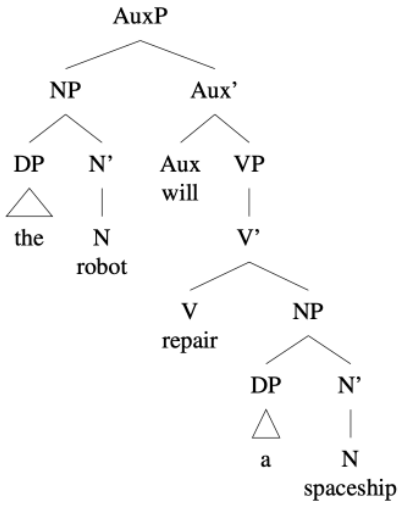


Figure 6.12 Tree diagram for *The robot will repair a spaceship.*, with the sentence as category AuxP (to be revised)

What if there weren't an auxiliary, though? Are all sentences AuxPs? **No.** In fact, if we think about what auxiliaries in English express, they are always inflected for **tense**. Even in the absence of an auxiliary, we see tense on the main verb, and in nonfinite clauses the nonfinite marker *to* takes the place of an auxiliary.

Based on this, the proposal in X-bar theory is that sentences aren't auxiliary phrases, but they are **tense phrases** (TPs). Tense represents **finiteness**—we say that sentences when they stand independently are always **finite**, which is a term meaning that they have tense.

This is an example of a case where the greater technical detail of X-bar theory motivates us to look at sentences and reconsider whether they are projections of some category, just like all other phrases are. In fact, TP is a very nice phrase from the perspective of X-bar theory, because it always has both a **specifier** (the subject) and a **complement** (the predicate).

What things are of category T?

- The modal auxiliaries (*will*, *would*, *can*, *could*, *may*, *might*, *shall*, *should*, *must*)
- The non-modal auxiliaries (*be*, *have*, *do*)
- The nonfinite marker *to*
- Abstract tense features ([+PAST] for past tense, [–PAST] for present tense)

So the final version of the tree for *The robot will repair the spaceship.* is as in Figure 6.13, and the final version of the tree for *The robot repaired the spaceship.* (without an auxiliary) is as in Figure 6.14.

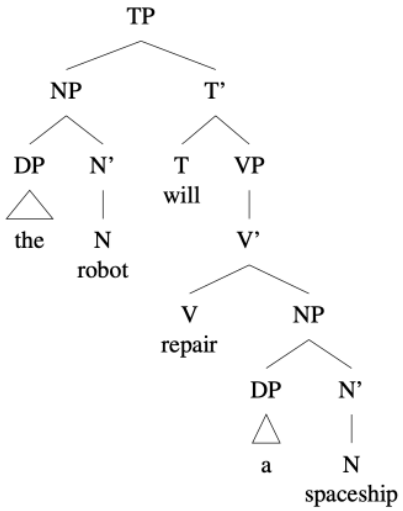


Figure 6.13 Tree diagram for *The robot will repair a spaceship.*, with the sentence as category TP (final version)

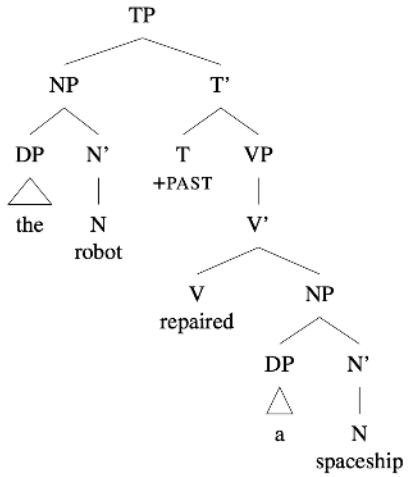


Figure 6.14 Tree diagram for *The robot repaired a spaceship.*, with the sentence as category TP (final version)

What about languages that don't have tense?

There are different options! We could say that languages that don't require tense—like Mandarin or Cantonese, for example—don't have sentences that are TPs, but instead have some other category. (Can you think of any plasible options?)

The other option is to assume that even though we don't pronounce tense in all languages, it's nonetheless the case that something abstract makes a sentence a sentence—something that corresponds to "finiteness". So even if it doesn't have the same *meaning* as English tense, there's something that does the same grammatical work of anchoring a clause, and gluing the subject and predicate together.

This second option is fairly widely assumed, in the type of syntactic theory that we're learning in this class (descendants of X-bar theory). People sometimes use the label "Inflection Phrase" (InflP or IP), but it's also common to simply use the label "TP" even if you're assuming that the semantic content of this functional phrase might vary.

X-bar theory and language variation: Head direction

We saw in Section 6.3 that languages can vary systematically in their basic word order, and characterized some differences in terms of the relative order of **heads** and their **complements**.

This analysis is very easy to encode in X-bar theory, by a simple switch in the **X-bar template** of languages of the two types.

Recall the basic shape of phrases of several categories in English, illustrated in the trees in Figure 6.15.

(1)	a.	I [$_{VP}$ ate$_{V}$ [$_{NP}$ an apple].
	b.	[$_{PP}$ to$_{P}$ [$_{NP}$ Toronto]
	c.	[$_{NP}$ picture$_{N}$ [$_{PP}$ of a robot]

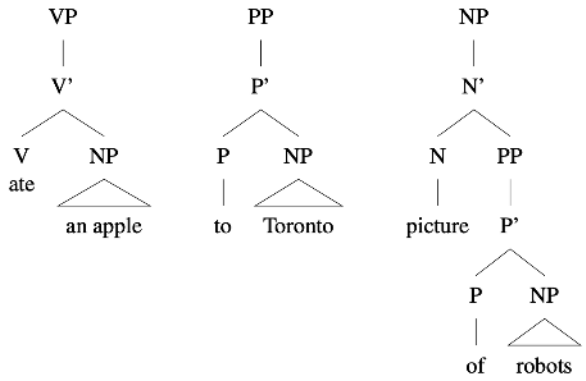


Figure 6.15 Tree diagrams showing head initial word order in English

In contrast to English, Japanese is a strictly **SOV** language. And in Japanese, **heads** always *follow* their complements, the *reverse* of the order we get in English.

What X-bar theory allows us to say is that phrases in Japanese have the same **structure** as phrases in English, but a different **order**.

Specifically, in Japanese complements are still the siblings of their heads, but they *precede* the head instead of following it, as illustrated for the examples in (2) in Figure 6.16. These Japanese examples appeared previously in 6.3 Structure within the sentence: Phrases, heads, and selection.

(2)	a.	Watasi-wa	[$_{VP}$	[$_{NP}$	*ringo-o*	]	**tabe-ta**.	]
		I-TOPIC			apple-ACC		eat-PAST	
		“I ate (an) apple.”						
	b.	[$_{PP}$	[$_{NP}$	*Tokyo*	]	**e**	]	
				Tokyo		to		
		“to Tokyo”						
	c.	[$_{NP}$	[$_{PP}$	*robotto*	*no*	]	**shasin**	]
				robot	of		picture	
		“picture of (a) robot”						

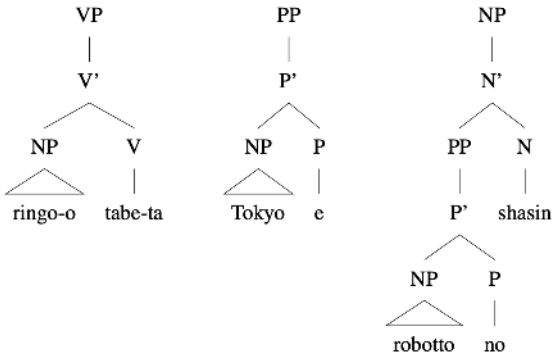


Figure 6.16 Tree diagrams illustrating head final word order in JapaneseIf we draw a tree for Japanese, we would extend this template to TP, as well as all the other phrases we've looked at, as shown in Figure 6.17.

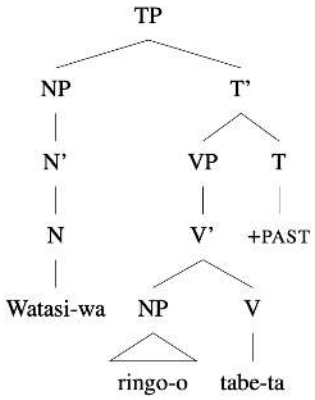


Figure 6.17 Tree diagram showing a head-final TP structure in Japanese

When you're drawing a tree for another language, it's important that the words come in the right order if you read the words off the bottom of the tree! If you're analyzing an unfamiliar language, and need to figure out its word order, one of the first questions you should ask is whether it appears to be head initial or head final.

In contrast to complements contrast, **specifiers** don't show the same variation. They always come before their complements, across all known languages.

When analyzing a new language, the starting assumption is that all **structural** relations are the same, but that linear order and the distribution of silent functional heads may be different. Beginning in Section 6.19, we will also see the possibility that languages may exhibit different types of **movement**.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through the chapter that interleaves core concepts with tree structures, the previous section was 6.14 Trees: Introducing X-Bar theory, and the next section is 6.16 Trees: Modifiers as adjuncts.

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6.16: Trees- Modifiers as adjuncts

When we introduced X-Bar theory, we gained the ability to represent the asymmetric relationship between heads and their complements on the one hand, and heads and their specifiers on the other hand.

At the same time, with X-Bar structure as we've had it so far, we lost a bit of empirical coverage that we'd been able to include in phrase structure rules: we lost a place to put **modifiers**:

- AdjPs and NumPs in NPs
- AdvPs in VPs and TPs
- modifier PP in all other phrases

With **adjuncts** we expand X-Bar structure to accommodate modifiers.

The basic idea of adjuncts is that while there can only be one **head** in a phrase, and there can only be one **phrase** (because it's the final projection of a head), a bar level is a "mid-sized phrase" or "partial phrase", and in principle there can be many partial phrases within a larger phrase.

Let's see how this works in practice. Consider the noun phrase (NP) in (1).

(1)		[$_{NP}$ the early arrival of spring]

This NP contains a modifying adjective phrase [$_{AdjP}$ *early*]. Without that AdjP, the structure would be as shown in Figure 6.18.

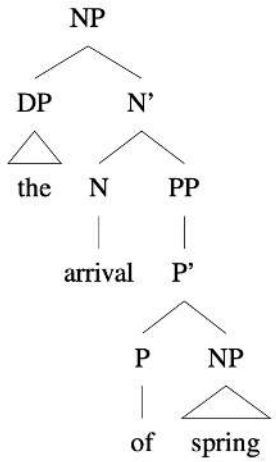


Figure 6.18 Tree diagram for [the arrival of spring], showing that both Specifier and Complement positions are occupied.

In this NP both the specifier and complement positions are filled, so there's no more space for the adjective phrase [$_{AdjP}$ *early*].

By adding additional bar levels, we can create structural "space" for modifiers. These positions are neither specifiers nor complements, instead they are **adjuncts**.

Adjunct

A constituent that is both the child *and* sibling of X' is an **adjunct**.

Unlike specifiers and complements, adjuncts are flexible in their position: they can appear on either the left side or the right size of a phrase structure.

Figure 6.19 illustrates how an additional N' creates space for [$_{AdjP}$ *early*] to appear as an adjunct.

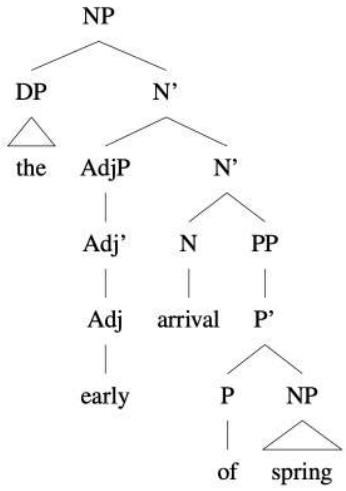


Figure 6.19 Tree diagram showing [$_{AdjP}$ early] as an Adjunct to N', with the extra N' level creating "space" for the modifier.

The same expansion of X-Bar structure gives us space within an NP to represent **two** PPs after the head noun, as in [$_{NP}$ *a letter* [$_{PP}$ *from home*] [$_{PP}$ *in the mailbox*]]. If we run our *one*-replacement test, we can show that *letter* can be replaced by *one*, leaving either both PPs behind, or leaving just the second one behind. If *one* replaces an N-bar constituent, this means that there must be an N-bar that contains *letter* but not either of the PPs.

(2)	a.	I saw a letter from home in the mailbox, and **one** from the bank on the table.
	b.	I found that letter from home in the mailbox, and this **one** on the table.

The tree showing both PPs as adjuncts within NP appears in Figure 6.20.

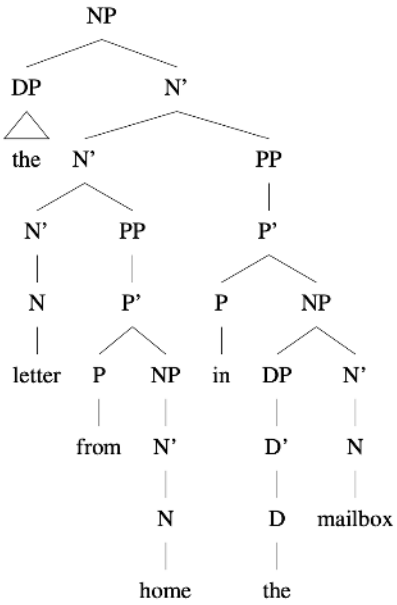


Figure 6.20 Tree diagram for [the letter [PP from home] [PP in the mailbox], showing both PPs as Adjuncts.

Adverbs within verb phrases are also adjuncts. We've already seen that adverbs can go either at the beginning or end of verb phrase, as in (3a-b); we can also get more than one adverb in a verb phrase, as in (3c).

(3)	a.	They [$_{VP}$ [$_{AdvP}$ quickly] left the room]
	b.	They [$_{VP}$ left the room [$_{AdvP}$ quickly]].
	c.	We [$_{VP}$ [$_{AdvP}$ deliberately] left the room [$_{AdvP}$ slowly]].

Adverbs appearing in adjunct positions to the left and right of VP are shown in Figure 6.21.

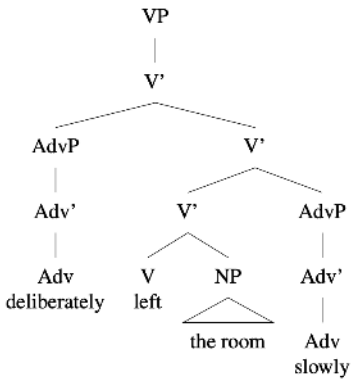


Figure 6.21 Tree diagram for [VP [AdvP deliberately] left the room [AdvP slowly]], showing both adverbs as Adjuncts to V'.

All adverbs occur in adjunct positions, as do all adjective phrase inside NP. (Predicate adjectives, as in *The book is long.* are complements of a verb.)

PPs sometimes occur as complements, and sometimes as adjuncts—we've seen examples of both in this section. constituency tests like replacement with **one** (for N') and **do so** (for V') are very useful for figuring out if a particular PP is a complement or an adjunct.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.15 Trees: Sentences as TPs and the next section is 6.17 Trees: Structural ambiguity.

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6.17: Trees- Structural ambiguity

In Section 5.9 we saw cases of structural ambiguity in morphology, cases where the same string of morphemes can have more than one structure, with each structure corresponding to a different interpretation.

The same thing is found in syntax. Consider the following example:

(1)		I saw someone with a telescope.

This has two possible interpretations:

1. I was using a telescope, and I saw someone. (PP modifies VP)
2. I saw someone, and that person had a telescope. (PP modifies NP)

In the first interpretation, the prepositional phrase [$_{PP}$ with a telescope] modifies the verb phrase headed by *saw*. In the second interpretation, the same prepositional phrase modifies the noun phrase *someone*. These two structures are illustrated below:

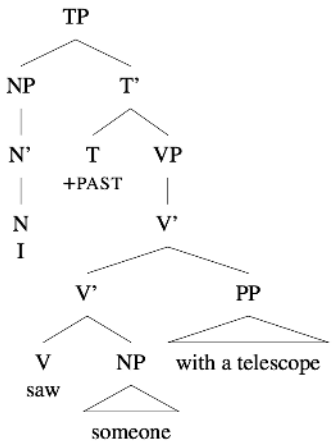


Figure 6.22: Tree diagram showing [$_{PP}$ with a telescope] as an Adjunct of the verb, meaning "I used a telescope to see someone".

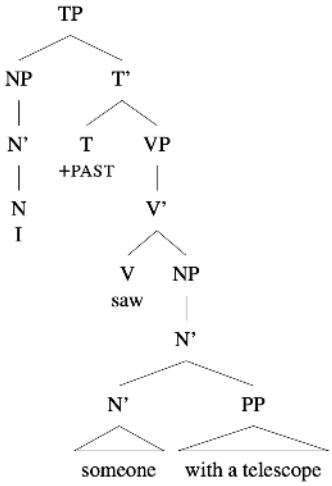


Figure 6.23: Tree diagram showing [$_{PP}$ with a telescope] as an Adjunct of the NP object, meaning "I saw a person and that person had a telescope"

The same will be true for other cases of structural ambiguity—each meaning will correspond to a different potential tree structure.

Many cases of structural ambiguity in syntax involve modifiers in adjunct positions on one or both interpretations. Some of the practical implications of ambiguity are discussed in 8.3 Semantics and pragmatics in the legal domain.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.16 Trees: Modifiers as adjuncts and the next section is 6.6 Clausal embedding.

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6.18: Trees- Embedded clauses

In Section 6.6 we observed that **complementizers** allow clauses to be embedded—that is, to be complements of a verb.

Following our principles of X-bar structure, this means that the complementizer (C) must project a **CP**. Because verbs can **select** whether they take an embedded clause, this CP should be the complement of the verb, and should take TP as its own complement.

Recall the sentences we looked at in Section 6.6:

(1)		Deniz said something.
(2)		Samnang might leave.

Based on the principle of X-bar theory we have seen in previous sections, these would correspond to the tree structures in Figure 6.24.

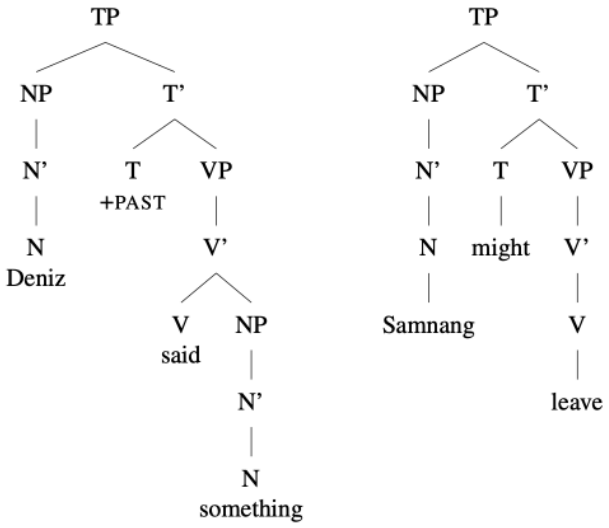


Figure 6.24 Tree diagrams for two TP clauses, [*Deniz said something.*] and [*Samnang might leave.*]

Now we can ask: how do these two clauses fit together when (2) is embedded below the verb *said* of (1), as in the complex sentence in (3)?

(3)		Deniz said **that** [Samnang might leave].

In addition to what we said in previous sections about the fact that some verbs **select** CPs as their complements, here's no space to put the C head, or the CP it's part of, within either the embedded TP to the main clause VP. Instead, we put the TP *inside* the CP, as in the tree in Figure 6.25.

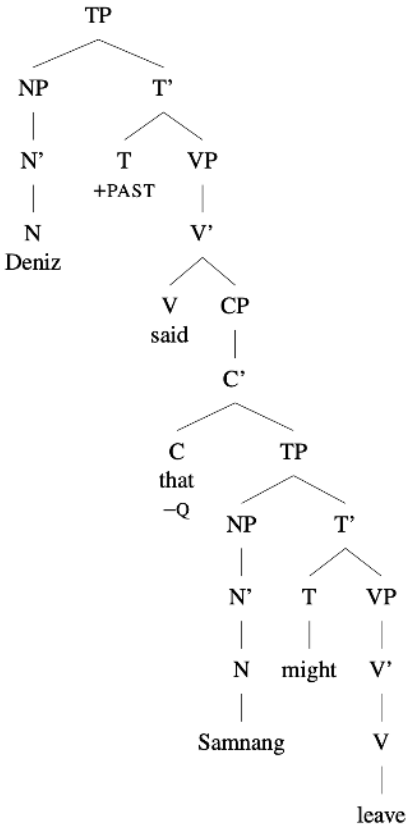


Figure 6.25 Tree diagram for an embedded clause structure. The embedded clause is a CP that is the sibling of the main clause V

What if the complementizer [$_C$ that] is missing, as in (4)?

(4)		Deniz said **that** [Samnang might leave].

In this case we'd wouldn't say that there's no CP, but that in English the C head can be **null**. (In Section 6.19 we'll see other cases where we assume there is an empty C head, because its specifier position is filled.) The tree for (4) would be just like the tree in Figure 6.25, but with no word in the C head.

In Section 6.6 we saw that embedded Yes-No questions are structurally similar to embedded declaratives, but with the complementizer *if* or *whether*. Since they have similar structures, their trees are also fundamentally the same, with *if* or *whether* occurring in a C head. Thus the tree for a sentence like (5) is as in Figure 6.26.

(5)		Eryl wonders **if** [ghosts exist].

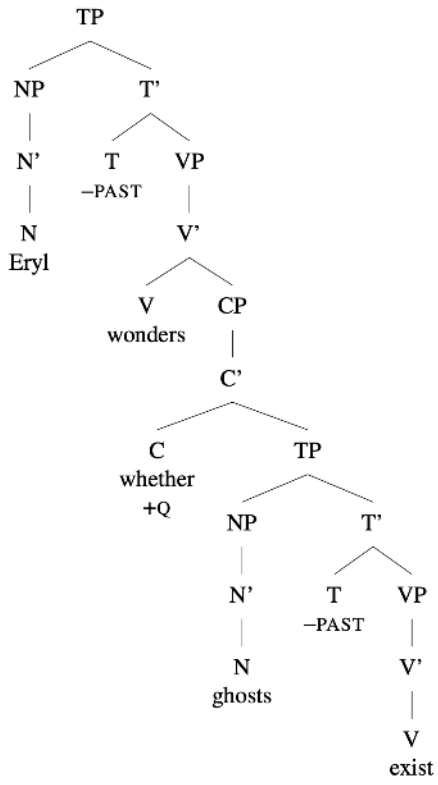


Figure 6.26 Tree diagram showing an embedded Yes-No question. The CP headed by a +Q C is the sibling of the main clause V

In 6.6 Clausal embedding we introduced the feature [–Q] for declarative complementizers and [+Q] for interrogative complementizers. Reframing this in terms of C heads, both *that* and ∅ are declarative C heads with a [–Q] feature, while both *if* and *whether* are interrogative C heads with a [+Q] feature. Verbs select whether they compose with [–Q] CPs, [+Q] CPs, both, or neither.

Finally, in section 6.6 we also introduced embedded *nonfinite* clauses. The complementizer in these clauses is either ∅ or *for*, which we could call [–FIN] complementizers. They also differ in that the head of T is the nonfinite marker *to*.

(6)		I want **for** [ghosts to exist].

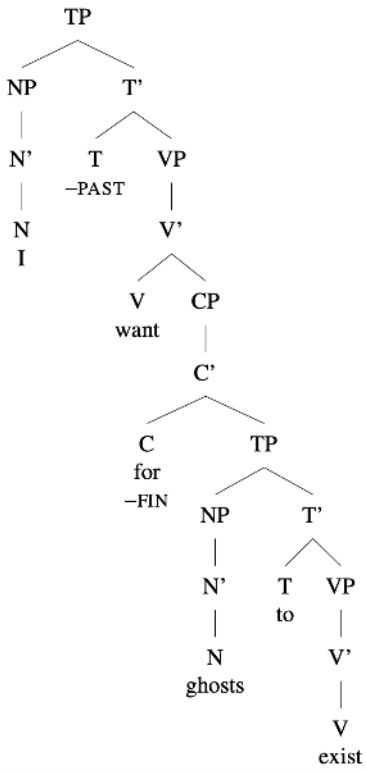


Figure 6.27 Tree diagram for an embedded nonfinite clause. The CP headed by -FIN C is the sibling of the main clause V; the embedded TP is headed by *to*

We've now finished formalizing the basic structure of clauses in X-bar theory. Our next step will be to look at how we can formalize transformations in tree structures, introducing the concept of syntactic movement.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.6 Clausal embedding, and the next section is 6.7 Main clause Yes-No questions.

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6.19: Trees- Movement

X-bar theory: Subject-Aux Inversion as Head Movement

The first transformation we saw, in Section 6.7, was Subject-Auxiliary Inversion, which reverses the order of the subject and the auxiliary.

Thinking not in terms of the linear order of the subject and the auxiliary, but instead in terms of our X-Bar structure, could we state this transformation more precisely?

The tree for [*They have left.*], an ordinary declarative clause, will be as in Figure 6.28.

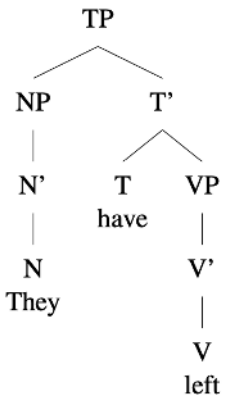


Figure 6.28 Tree diagram for the declarative sentence [*They have left.*]

The structural relations in this tree encode the grammatical relations between the subject, the clause as a whole, and the predicate. Those relations should not be fundamentally different in a question. We just want to add a difference in the order of constituents, in order to mark that this is a question.

The simplest way to change the order of the subject and the auxiliary is to **move** one of them. We could either move the auxiliary up and to the left, or move the subject down and to the right.

If we think about *embedded* questions, which we developed an X-bar theory analysis for in Section 6.18, these had a +Q complementizer above the TP, *if* or *whether*. This complementizer is in the same position that the auxiliary appears in in main clause questions: right before the subject. This gives us a way to understand Subject-Auxiliary Inversion as movement of the auxiliary from T up and to the left, to land in C. This is illustrated in Figure 6.29.

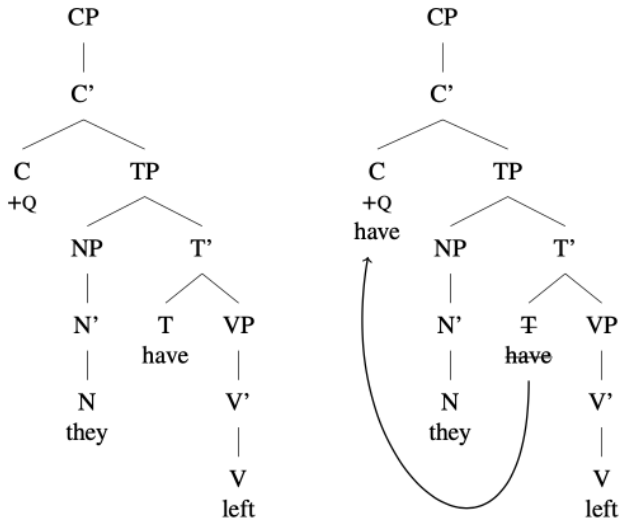


Figure 6.29 Tree diagrams for the question [*Have they left?*] before and after T-to-C Head Movement

The movement in Figure 6.29 is an example of **Head Movement**, which changes a tree by moving a head to the next head above it.

Head Movement:

Movement of a head (X) into the next higher head position.

We can now restate the generalization about how Yes-No Questions are formed in English main clauses. To name an instance of head movement, you can identify the start and end points. So the movement we see in English main clause questions is called **T-to-C movement.**

Yes-No Question Formation in English:

Yes-No Questions are formed by **moving the auxiliary in T to C.**

This is a **derivational** way of representing the relationship between a fronted auxiliary and the position it occupies in statements: we start with one tree structure, and make a change to it in order to arrive at the final structure. There are other ways to represent this dependency, some of which are pursued in non-derivational approaches to syntax.

Notation for Head Movement

In the history of generative linguistics, there have been several different notations used for movement. In this textbook we draw a line through the moving head in its base position (

~~like this~~), and draw an arrow to the position it moves to.

There are other ways of indicating movement, which you might encounter online or in other resources. These include *trace notation*, where the original position of the moved element has a "trace" (written *t*) left in it. This can be thought of as a variable, or as the empty space left
behind by the thing that moved. Trace notation won't be used in this textbook, but we mention it so that you won't be confused if you see it elsewhere.

X-bar theory: Question word fronting as Phrasal Movement

As we saw in Section 6.8, content questions in English also involve a change in word order from corresponding statements. However, we'll see in this section that we can't describe that change just in terms of head movement. Instead, we're going to introduce a second (and final) type of movement: **Phrasal Movement**.

Recall some examples of content questions in English:

(1)	a.	**What** has the squirrel hidden?
	b.	**Where** is it snowing?
	c.	**When** was it snowing?
	d.	**How** do squirrels hide nuts?

All these questions involve **Subject-Aux Inversion**, which we analyzed earlier as **T-to-C movement** when looking at main clause Yes-No questions. We can tell this has applied because the auxiliary is **before** the subject in all the content questions in (1).

But we can't use T-to-C movement to analyze how the content question word gets to the front of the sentence for two reasons:

1. The auxiliary is already in C. We can't put two words in one head, so we need to put the WH word somewhere else—and somewhere higher up.
2. The thing that moves to the front of the sentence in a WH-question isn't just a head, it's a whole phrase.

How can we tell that what moves is a whole phrase? We can tell by looking at a wider range of content questions.

(2)	a.	**What kind of nuts** has the squirrel hidden?
	b.	**Which city** is it snowing in?
	c.	**Which nuts** did the squirrels hide?

Here instead of the single word *what* or *where*, we have larger NPs moving to the front of the question—though these larger NPs still *contain* content question words. Here *what* and *which* are determiners, occurring in the same position that *this* or *the* or *a* would occur.

So we know that the content question phrase isn't pronounced in the C head in content questions. Where **is** it pronounced, then?

To answer this question, let's consider again word order for the statement *The squirrel has hidden nuts*. The auxiliary *has* is in T, and the object *nuts* is the complement of the verb *hidden*. We can represent this in a labelled bracket structure:

(3)		$[_{TP}$ $[_{NP}$ the squirrel] $[_{T'}$ $[_{T}$ has] $[_{VP}$ hidden nuts]]]

In the content question, what changes is that we have *what* as the object of *hidden*, instead of *nuts*. We also have a +Q C head above TP, because that's where the auxiliary in T moves. We can schematize the structure before we do any movement as in Figure 6.30. (The tree before any movement occurs is called Deep Structure in some theories of syntax, though we won't focus on that terminology here.)

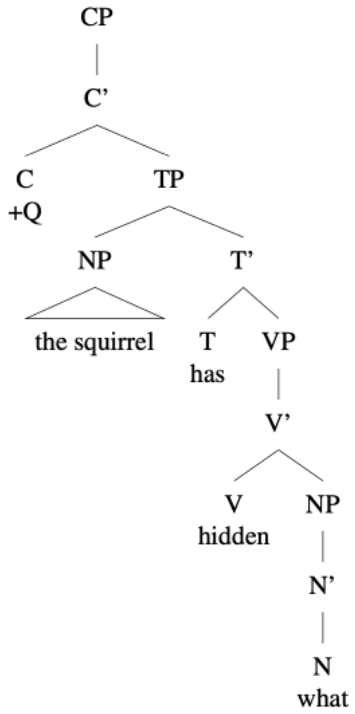


Figure 6.30 Tree diagram for the question [*What has the squirrel hidden?*] prior to any movement

Now we need to transform this clause so that the question phrase appears in initial position, at the beginning of the sentence. This isn't head movement, it's **Phrasal Movement**, also referred to as **XP Movement**. A phrase can't go in a head position, but it can move to the empty Specifier position in CP.

Phrasal Movement:

Movement of a phrase (XP) into a higher specifier position.

This type of Phrasal Movement is known as WH-movement; Phrasal Movement is usually named for the type of phrase that moves.

WH-movement:

Move a WH-phrase from its original position into Spec,CP.

Figure 6.31 shows what the tree structure will look like after both T-to-C Movement and WH-movement have applied.

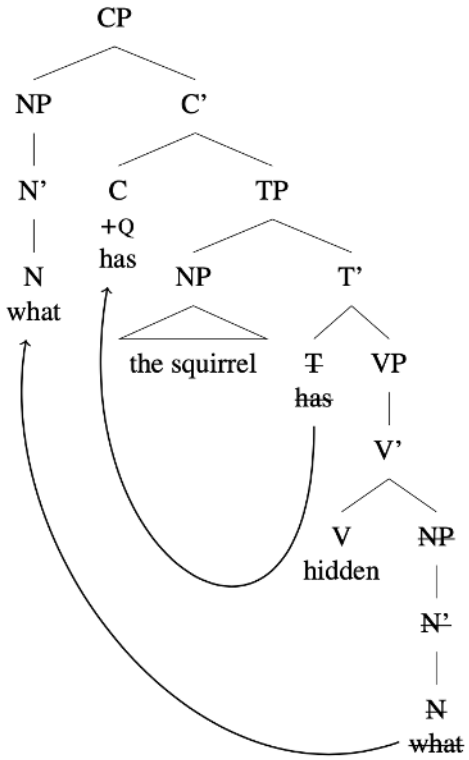


Figure 6.31 Tree diagram for the question [*What has the squirrel hidden?*] after both T-to-C and WH-movement

What does it look like when we have a **complex NP** moving to Spec,CP? Basically the same, as shown in Figure 6.32. This tree also shows the auxiliary *did* in C, inserted as a result of Do-Support:

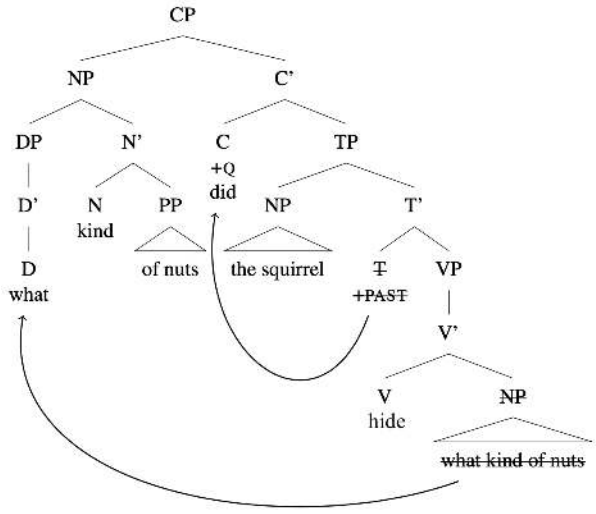


Figure 6.31 Tree diagram for the question [*What kind of nuts did the squirrel hide?*] after both T-to-C and WH-movement

Embedded content questions, which we saw in Section 6.9, have very similar tree structures. They are **like** main clause content questions in putting the WH-phrase at the front of the CP, but **unlike** main clause content phrases in that they don't do Subject-Auxiliary Inversion (T-to-C movement).

What would this look like in a tree? Consider this embedded content question:

(4)		I know [$_{CP}$ what squirrels hide].

The tree for this sentence would be as in Figure 6.32.

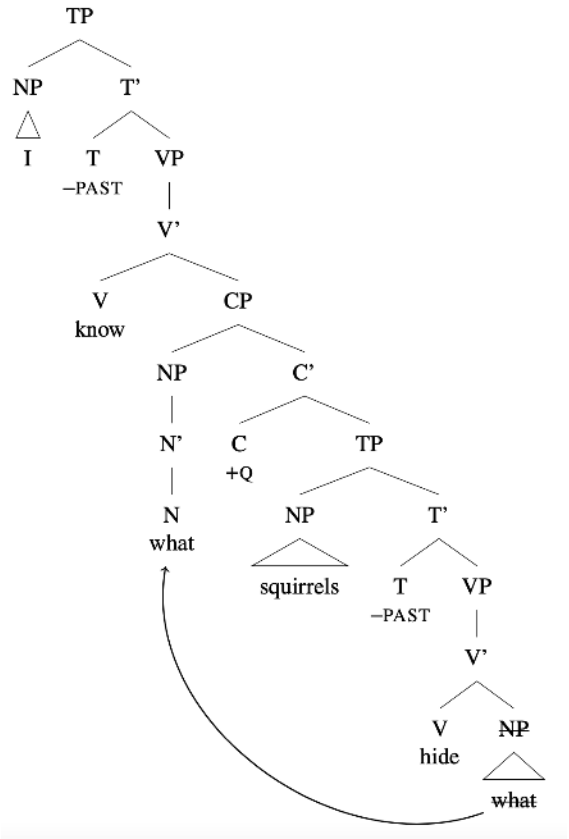


Figure 6.31 Tree diagram for embedded content question *I know what squirrels hide.*

Notice that the embedded C is empty! In many varieties of English, when you get a phrase in embedded Spec,CP, it's impossible to also have an overt complementizer. So sentences like (5) are always ungrammatical in my English, even though *if* is a +Q complementizer.

(5)		*I know [$_{CP}$ what if squirrels hide].

This isn't true in all languages! In many languages WH-movement is totally compatible with an overt complementizer. Tlingit is a Na-Dené language spoken by members of the Tlingit Nation, whose territory includes parts of Southeast Alaska in the United States, and parts of the Yukon territory and Northern British Columbia in Canada. In Tlingit content questions, the content question word must appear in the left edge of the sentence, but must also be followed by a question particle *sá*, as shown in (6). The Tlingit

examples here are drawn from Cable (2007). “Ergative” is a case that appears on transitive subjects; the symbol <g̲> represents a voiced uvular stop, an acute accent on a vowel indicates high tone, and the symbol <x’> represents a glottalized velar fricative.

(6)	a.	Daa	sá	kéet	axá?	
		what	+Q	killerwhale	he.eats.it	
		“What do killerwhales eat?”				
	b.	Aadóoch	sá	kg̲watóow	yá	x’úx’?
		who.ERGATIVE	+Q	he.will.read.it	this	book
		“Who will read this book?”				

Other phrases can appear before the content question word, but only when they are the topic of the sentence. One way to understand the word order in (6) is that the content question word has moved to the specifier of CP, while the head of CP is also filled by a +Q complementizer *sá*. So the restriction we see in English isn’t a universal one, it’s just one type of syntactic pattern.

Movement gives us another tool for understanding the variation in word order that we see across different languages. In this section we’ve focused on how we can use movement to analyze the word order difference between statements and questions in English. This can be applied to any other type of construction or to any other language: if there is a difference in word order in a language that can’t be explained by X-bar structure, one possibility is that the difference results from either a head or a phrase moving in some contexts but not others.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.9 Embedded content questions, and the next section is 6.10 Arguments and thematic roles.

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6.20: Trees- Movement beyond questions

Head Movement outside questions: V-to-T movement of auxiliaries

Based on the discussion so far, you might think of movement as something that we only find in questions. But that isn't the case! It happens that questions are one of the places that we clearly see movement in English, but both Head Movement and Phrasal Movement can be found in other contexts as well.

In this section we'll see evidence that auxiliaries like *be* and *have* start out lower than T and move to it via Head Movement, then evidence that the same is true for all verbs in a language like French.

ENGLISH AUXILIARIES

The following sentences all have one auxiliary in them:

(1)	a.	The leaves **will** fall.
	b.	The leaves **have** fallen.
	c.	The leaves **are** falling.

We saw in Section 6.5 that auxiliaries all have the same **distribution** in English sentences, a distribution that is different from main verbs: they appear before negation and participate in Subject-Auxiliary Inversion (T-to-C movement). They also appear before adverbs like *always*, as in (2):

(2)	a.	The leaves **will *always*** fall.
	b.	The leaves **have *always*** fallen.
	c.	The leaves **are *always*** falling.

We explained this similarity in distribution—and the way the auxiliaries are all different from main verbs—by analyzing all the auxiliaries as belonging to a single syntactic category: **T**.

But it turns out that the picture is a bit more complex. There's a difference between modals (and nonfinite *to*) on the one hand, and all the other auxiliaries on the other.

First, for many speakers of English, modals (and *to*) cannot **stack**—you always get exactly one of them.

(3)	a.	*The leaves **will might** fall.	(cf. *will maybe fall*)
	b.	*The leaves **must can** fall.	(cf. *must be able to fall*)

By contrast, *have* and *be* **can stack**, with a modal or with each other. And the order is always the same: the modal **must** be the highest auxiliary, the one that shows the distribution that we associated with the head T.

(4)	a.	The leaves **will have** fallen.	(Future + Perfect)
	b.	The leaves **will be** falling.	(Future + Progressive)
	c.	The leaves **will have been** falling.	(Future + Perfect + Progressive)
	d.	The leaves **have been** falling.	(Perfect + Progressive)

Some varieties of English, including Southern American English, and also some varieties of Scots do allow more than one modal in a clause—for speakers of these varieties, the equivalent of (3a) or (3b) might be grammatical (though there are restrictions on which modals can stack, and these restrictions are different in different varieties). When analyzing the syntax of these varieties, we might need a different hypothesis about where modal auxiliaries start out, and whether any of them also move to T in declarative

clauses. Even in varieties where modals can co-occur with one another, though, it's still the case that all modals come before *have* and *be* auxiliaries.

If we check all these sentences for the distributional properties that we've associated with being in T—being before negation + adverbs like *always*, undergoing Subject-Auxiliary Inversion—it turns out that only the **first** auxiliary passes those tests. All the subsequent auxiliaries suddenly have the same distribution of main verbs. Let's see this for the Future + Perfect:

- *will* is in T:
  - Before negation: The leaves **will not** have fallen.
  - Before *always*: The leaves **will always** have fallen.
  - Subject-Aux inversion: **Will** the leaves have fallen?
- *have* is **not** in T:
  - Not before negation: *The leaves will haven't fallen.
  - Not before *always* (maybe not totally ungrammatical, but not totally acceptable): *The leaves will have always fallen.
  - Can't invert, alone or with *will*: *Have the leaves will fallen? *Will have the leaves fallen?

So where is the second auxiliary—or in the Future + Perfect + Passive, where is the **third** auxiliary?

Proposal (for English)
Only tense features, the modals, and nonfinite *to* start out in T—that is, only these morphemes truly belong to the functional category T. All other auxiliaries move to T, but they only do so if that T isn't already filled by a modal or *to*.

So when there's a modal in T, the lower auxiliary will appear in an extra VP layer—sometimes called a VP "shell". (We could instead label this phrase AuxP, or even PerfectP or ProgressiveP—if you read more about syntax you might encounter those labels, but for simplicity we'll call it VP here.) This is illustrated in Figure 6.34.

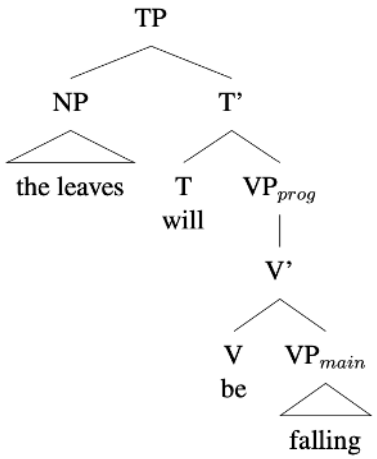


Figure 6.34 Tree diagram for [*The leaves will be falling.*], showing a progressive VP shell

But if there's nothing in T—or rather, if all that's in T is a tense feature—the auxiliary verb will **move** from V to T, as illustrated in Figure 6.35.

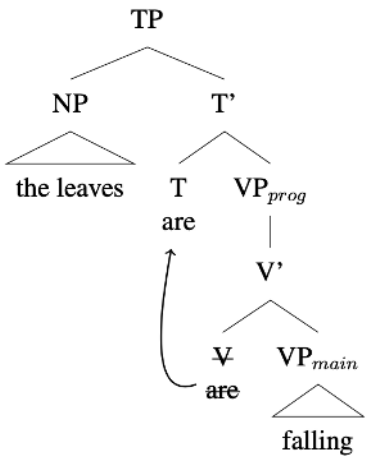


Figure 6.35 Tree diagram for [*The leaves are falling.*], showing a progressive VP shell and movement of auxiliary *are* to T

Very few verbs move in most contemporary varieties of Modern English. Only *be* (as an auxiliary and as a main verb copula), and *have* (only as an auxiliary) show evidence of moving to T.

The same isn't true in other languages, necessarily. For example in French (and in earlier stages of English), we have reason to think that **all** verbs move to T.

V-to-T OF ALL VERBS IN FRENCH

In contemporary English it's only *auxiliaries* that ever appear in T—main verbs always show a different distributions. But in French—and in earlier stages of English—when there's **no** auxiliary the main verb also appears in the T position.

French auxiliaries, like English auxiliaries, show up before negation, before auxiliaries like *toujours* ("always"), and can undergo Subject-Aux inversion (though only with pronominal subjects, and even then it isn't very natural in casual speech for most speakers).

(5)	Les feuilles ont tombé.
	the leaves have fallen
	"The leaves fell/have fallen."

(6)	Les feuilles (n')ont pas tombé.
	the leaves (NEG)have NEG fallen
	"The leaves have fallen."

(7)	Les feuilles ont toujours tombé.
	the leaves have always fallen
	"The leaves always fell / have always fallen."

(8)	Ont-ils tombé?
	Have-they fallen
	"Have they fallen?."

Negation in French is traditionally described as involving a *ne* before the tensed verb, and a *pas* after the verb—kind of like a circumfix. But in spoken French in both Quebec and France, the *ne* is almost never pronounced, and so it's marked as optional in all examples in this section.

What's different about French is that **main verbs** show exactly the same distribution—whereas English verbs are after negation and adverbs, and can't do Subject-Aux inversion (instead they require the support auxiliary *do*):

(9)		Les feuilles (ne) tombaient pas.
		the leaves (NEG)fell NEG
		"The leaves didn't fall/weren't falling."

(10)		Les feuilles tombaient toujours.
		the leaves fell always
		"The leaves always fell / were always falling."

(11)		Tombaient-ils?
		Fell-they
		"Did they fall? / Were they falling?."

English verbs do **not** have the same distribution as auxiliaries—though they did in Early Modern English, ca. 1600s).

(12)		*The leaves fell not.

(13)		*The leaves fell always.

(14)		*Fell the leaves?

We can analyze this difference in **word order** between English and French by saying that while in English only *be* and auxiliary *have* move to T, in French **all verbs undergo V-to-T movement**. This is illustrated for (10) in Figure 6.36.

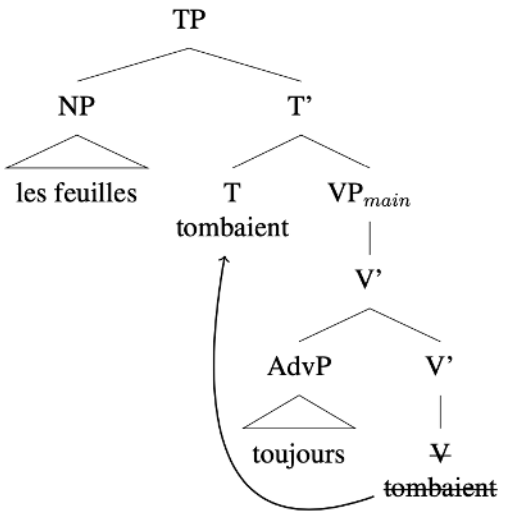


Figure 6.36 Tree diagram for [*Les feuilles tombaient toujours.*], showing a movement of the main V to T

We've now introduced two types of **movement** in our theory:

- Head movement: movement of a head to the next head position up in the tree.
- Phrasal movement: movement of a phrase to a higher specifier position.

Though we find them both in English questions (as T-to-C and WH-movement, respectively), what we see in English auxiliaries and with all French verbs is that these movement types can be found in other
contexts as well—and that languages can differ in what types of movement they exhibit.

Head movement and phrasal movement in passives

So far we've talked about how to *identify* passives—but what is their syntax like? Remember the pair of active and passive sentences we saw in Section 6.11:

(15)	a.	The pirates sank the ship.	(active)
	b.	The ship was sunk (by the pirates).	(passive)

In a theory of syntax that employs movement, the natural way to think about the passive is to say that its syntax (e.g. the presence of the passive *be*) prevents the subject from being introduced in the first place, leaving an empty position (indicated by an underscore).

(16)		[$_{TP}$ _ was sunk [the ship]]

Then because English is a language that always requires a subject, in Spec,TP, something needs to be done to fill that empty position. This is done by **moving** the object NP into the subject position:

~~the ship~~]

(16)		[$_{TP}$ [the ship] was sunk

This is a new case of **phrasal movement**: movement of an NP into subject position.

NP movement:

Move an NP into Spec,TP, to fill an otherwise-empty subject position.

We start with the theme argument *the ship* as the complement of the verb, and the passive auxiliary *be* in a VP shell. To get the correct output, we apply two instances of movement:

1. The passive auxiliary moves to T: **V-to-T movement**
2. The object NP [the ship] moves to the subject-position in Spec,TP: **NP-movement**

The result of these two steps of movement is illustrated in Figure 6.37.

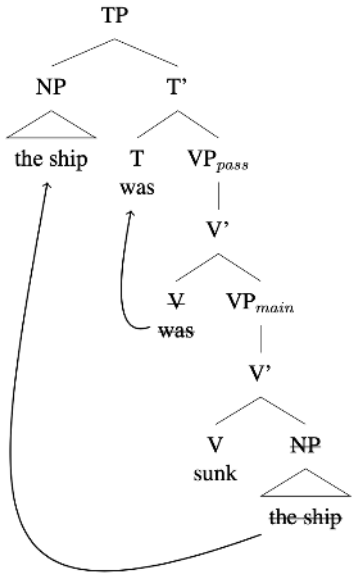


Figure 6.35 Tree diagram for [*The ship was sunk.*], showing a passive VP shell, movement of auxiliary *was* to T, and NP movement of the passive subject

This section has illustrated our final tool in accounting for word-order differences across languages: not just the parameters of head-initial vs. head-final ordering, but also what types of movement arise in what contexts.

Check your understanding

Coming soon!

Navigation

If you are following the alternative path through this chapter that interleaves core concepts with tree structures, the previous section was 6.11 Changing argument structure: Causatives and passives, and the next section is 6.21 Trees: Summary.

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6.21: Trees- Summary

We've now expanded our theory of syntax a little bit further. It now consists of X-Bar Theory as well as two types of Movement.

X-Bar Theory accounts for the overall shape of trees in individual languages—it describes possible and impossible tree shapes for a given language.

Movement is a theory about how you can change (or **transform**) an existing syntactic tree once you have built it. Adding movement to our tree allows us to expand the explanatory power of our syntactic theory in two ways:

1. We have a new tool for talking about differences across languages in terms of word order: while X-Bar Theory offers the variation of head-initial vs. head-final word order, Movement allows us to say that languages transform their basic word order in different ways (or in different contexts).
2. We can talk about relationships between different sentence types—between statements and questions, or between the basic order of a sentence and one where some phrase has been topicalized or fronted.

By introducing movement into our theory, we have a way of talking about the fact that elements are sometimes **displaced**: they are pronounced in a different position than they "belong", in some sense.

With the tools we've developed in this chapter, we could investigate relationships between many more types of sentences, both in English and in any other language. In Chapter 7 we'll also see that syntax is relevant for the computation of certain types of linguistic meaning (though not all types).

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6.22: Exercise your linguistics skills.

Exercise 1. *Intermediate; 6.2.* An important skill for anyone studying linguistics is to come up with potential sentences, and test whether they're grammatical—and it's important to remember that grammaticality judgements don't describe what is "supposed" to be correct, but what fluent users of the language actually do. For this exercise, come up sentences that match the following descriptions, in a language you are fluent in. This exercise is likely to be easiest to do for the language(s) you first acquired as a child, or for the language(s) you use most often day-to-day at home or work.

- 2 fully acceptable sentences (neither ungrammatical nor semantically odd)
- 2 ungrammatical sentences (*)
- 2 grammatical but semantically odd sentences (#)

Exercise 2. *Basic; 6.2.* For each of the following sentences, do the following: (i) determine whether the sentence is simple, compound, or complex; (ii) determine whether the sentence is declarative, interrogative, or imperative; (iii) identify the main predicate, and state whether it is intransitive, transitive, or ditransitive; (iv) identify the subject and (if applicable) the direct and indirect objects.

a. The children read the book.
b. I loaned her some money.
c. The weather is cold.
d. Emily may win the race.
e. I have finished my homework.
f. My very best friend arrived recently.
g. You can easily recognize the town hall.
h. We always talked in the kitchen.
i. The weather report said that it would be colder.
j. Everyone has already left but someone forgot their phone.

Exercise 3. *Basic; 6.3.* For each of the following sentences, determine the category of the bolded phrase(s):

a. Peter sat in **the kitchen**.
b. Everyone **likes chocolate**.
c. Alice bought a **very rare** book.
d. **The people we talked to** all admired **our ideas**.
e. They **almost always** eat **on the porch**.

Exercise 4. *Intermediate; 6.3.* Consider the following sentences of a constructed language, Language X. Based on these examples, what is the basic order of subject, object, and verb in Language X? Is this language head-initial or head-final? (Data adapted from the random constructed language generator Vulgar.)

a. Tsa akisesho ku ipapu. (English translation: "I went to the school.")
b. Qo itsemoj chetsupu. (English translation: "They read the book.")
c. Qo wadij fukapu. (English translation: "They caught the cat.")
d. Wadi hinpu. (English translation: "The cat slept.")
e. Tsa qup ij pasu shapu. (English translation: "I sent them a letter.")
f. Qo pasuj chetsupu. (English translation: "They read the letter.")

Exercise 5. Intermediate; 6.4. For each bolded string of words in the following sentences, apply two constituency tests to determine whether the words form a syntactic constituent.

a. A **large golden** fish is **swimming in the pond**.
b. **Tomorrow we might** take a drive to visit **some friends**.
c. **Some friends** of hers have been **in the audience** every evening.
d. **What I said** was that the correct answer **will surprise** you.

Exercise 6. *Basic; 6.5 (and 5.5).* In the following paragraph, identify all the nouns, verbs, and adjectives. This text is drawn from Swiss Sonata by Gwethalyn Graham, which is in the Public Domain in Canada.

> "The main door of the school is on the side away from the town. The drive leading to it is long, cutting straight across between the tennis courts after it leaves the big wooden gates, then curving round the extreme edge of the gardens until, after a long, straight stretch up the slope, it ends in the courtyard by the front door. It takes about five minutes' fast walking to get from the gates to the grateful seclusion of the court during which you become thoroughly self-conscious as you notice the eyes watching you from the windows. Once you reach the corner of the house you are safe."

Exercise 7. *Basic; 6.5.* In the following sentences, give the category of all the words from closed-class categories. This text is drawn from Swiss Sonata by Gwethalyn Graham, which is in the Public Domain in Canada.

> "All the rooms on the ground floor open off the T-shaped front hall. When you come in from the courtyard the doors of Mlle Tourain's study are directly opposite you; on your right are the kitchens and laundry-rooms and between them and the study, occupying the whole corner, is the dining-room. On your left, behind the big dark staircase which curves up to the first floor, is the girls' living-room, and in front of it on the south-east corner, the main classroom."

Exercise 8. *Basic; 6.5.* In the following sentences, identify all the modal auxiliaries, non-modal auxiliaries, and the main verb uses of *have* and *be*. This text is drawn from Swiss Sonata by Gwethalyn Graham, which is in the Public Domain in Canada.

> "Some day they are going to get it mended but at present they are too busy, for Mlle Tourain is correcting proofs for the second volume of her work on the history of Swiss independence, which will appear next autumn, and she, Mary Ellerton, has no time for anything, since she dismissed the housekeeper and has her job as well as that of assistant principal."

Exercise 9. *Basic; 6.6.* For each of the following sentences, do the following: (i) identify every verb and every subject; (ii) identify the embedded clause and the main clause; (iii) determine whether the embedded clause is a statement, a question, or an infinitive; (iv) identify the complementizer.

a. Some meteorologists believed that the storm would hit the coast.
b. Every person in town worried that the mayor was embezzling funds.
c. We wondered if it would rain tomorrow.
d. My friend asked if I like comics.
e. I want everyone to leave.

Exercise 10. *Basic; 6.7.* Below are a series of Yes-No Questions in English. Undo Subject-Aux Inversion to generate the corresponding statements.

a. Was there someone at the door?
b. Would your friend like to come with you?
c. Can you believe what they were saying?
d. Have you heard the story everyone has been talking about?
e. Were they waiting for a long time?
f. Does it matter?
g. Do birds that swim also fly?
h. Have the people who read the notes asked any questions?
i. Did you ever wonder about it?

Exercise 11. *Basic; 6.8.* Below are a series of statements in English with one or more phrases underlined. Apply relevant transformations to generate corresponding content questions, one question for each underlined phrase. For example, for "They are reading a book." the corresponding content questions would be "Who is reading a book?" and "What are they reading?"

a. Someone is playing the bagpipes outside.
b. The library will ask to see proof of **your address**. (form questions for "proof of your address" and "your address")
c. Several people have been talking about the recent scandal.
d. Frogs use their tongues to catch flies.
e. They always go to the beach in the summer.

Exercise 12. *Basic; 6.10.* The following sentences are taken from The Venturesome Voyages of Captain Voss, by John Claus Voss, which is in the Public Domain in Canada. For each sentence, identify the thematic role of each NP.

> Because I had found, from the day I first met Dempster on Cocos Island till he died, that he was a straightforward and reliable man, I have decided to place confidence in you. I now ask, can you and will you procure for me a vessel and fit her out properly, sail with me to Cocos Island and assist me to put the treasure on board and take it to Victoria?
>
> The wind freshened considerably and hauled round to the west, at the same time throwing up a lively choppy sea, which made the little vessel jump about worse than a bucking horse.
>
> All three ships under full sail passed Cape Flattery towards evening, shaping their courses toward the south-west with a fresh easterly breeze.

Exercise 13. *Intermediate; 6.11.* The following paragraph is taken from Swiss Sonata by Gwethalyn Graham, which is in the Public Domain in Canada. The main verb, together with any auxiliaries, has been underlined in several clauses. For each such clause, say whether it is passive or active.

> Her eyes reached Miss Ellerton, the games mistress, who, after a few impatient glances in Mlle Tourain's direction, had got up from her chair and wandered over to the french windows where she was standing now, holding the curtain back with one hand and looking over the lovely grey town where dusk already lurked here and there. Some of the light which yet remained in the outer world was caught in her hair and outlined her small features so that the others, sitting patiently in their chairs, were aged by their contrasting dullness. Amélie Tourain leaned forward a little and switched on her desk light, then remained motionless looking at the girl by the window. An unaccountable conviction that Miss Ellerton was in some way connected with the turmoil in her mind had complete possession of her.

Exercise 14. *Basic; 6.13–6.15.* Draw trees for sentences (a) through (e) in Exercise 2.

Exercise 15. *Intermediate; 6.13–6.15.* Below are three sentences from Japanese. You can ignore morphological alternations in the form of the Japanese word for 'three' (*sanninno* in B and *sandaino* in c). For the purposes of this question you can assume numerals like 'three' are determiners (d) in Japanese, even though we would usually treat them as numerals (Num). Data for this question drawn from Crabtree & Powers 1991: 209; Sugisaki 2011:2.

Describe in words how the order of words in NP, VP, and PP are **different** from the ones for similar categories in English. Based on the templates for specific phrase categories, provide a general X-bar schema that can generate all three Japanese sentences provided here. Draw tree structure diagrams for sentences (b) and (c).

a. Taroo-ga ringo-o tabeta.
   Taroo-NOM apple-ACC ate
   'Taro ate an apple.'
b. Sanninno gakusei-ga kita.
   three student-NOM came
   'Three students came.'
c. Gakusei-ga sandaino kuruma-de kita.
   student-NOM three car-in came
   'Students came in three cars.'

Exercise 16. *Basic; 6.16.* Draw trees for sentences (f) through (h) in Exercise 2.

Exercise 17. *Intermediate; 6.17.* Groucho Marx has famously joked, "One morning I shot an elephant in my pyjamas. How he got in my pyjamas I don't know." Draw the two tree diagrams that correspond to the two separate meanings of the sentence, "*I shot an elephant in my pyjamas*."

Exercise 18. *Basic; 6.18.* Draw trees for the sentences in Exercise 9, which all involve embedded clauses.

Exercise 19. *Basic; 6.19.* Draw trees for the following sentences, which all involve main clause questions in English. Show any instances of movement with arrows, crossing out the relevant head or phrase in its original position.

a. Were they waiting a long time?
b. Does it matter?

c. Who can bring snacks?
d. What book were you reading?
e. Where is that train going?
f. When was this building built?

Exercise 20. *Basic; 6.20*. Each of the following sentences is passive. For each one, come up with a corresponding active sentence (in most cases this will require inventing an agent). Draw trees for these sentences, showing any instances of movement with arrows, crossing out the relevant head or phrase in its original position.

a. She was being followed.
b. Their secrets were revealed by a newspaper story.
c. This cheese has been aged for 3 years.
d. That scarf was knit on very small needles.
e. Was the mystery solved?

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CHAPTER OVERVIEW

Chapter 7: Semantics

Learning Objectives

When you've completed this chapter, you'll be able to:

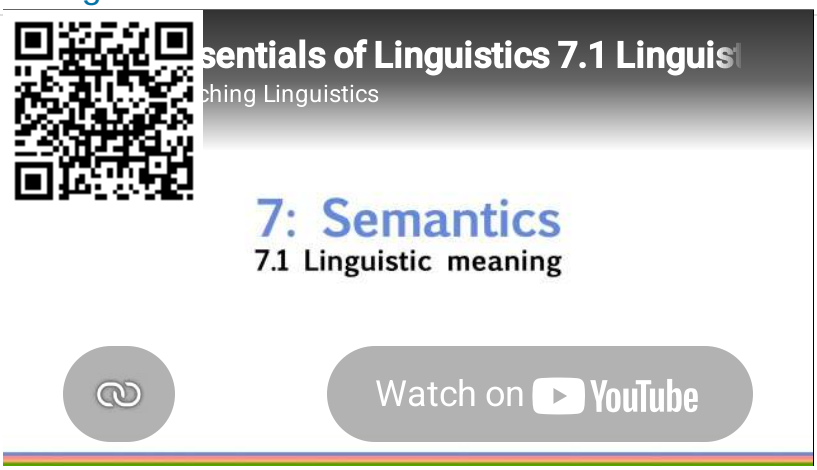
- Acknowledge the plurality of linguistic theories concerning the status of the lexicon, explain the differences between each theory, and evaluate the pros and cons of each theory;
- Explain why the dictionary is not the ultimate authority of linguistic meaning;
- Analyse linguistic meaning critically based on descriptive observations;
- Gain a general understanding of what kinds of concepts lexical meaning encodes in language;
- Explain the difference between sense and denotation;
- Use diagnostics to identify entailments, implicatures, and presuppositions;
- Evaluate the usefulness of each kind of meaning in linguistic analysis;
- Appreciate the complexity and diversity of linguistic meaning.

This chapter is about linguistic meaning, particularly **semantics**: how the meaning of words combine to form the meaning of sentences. We will start by examining lexical meaning: what goes into the meaning of a word and other smaller linguistic expressions stored in your mental lexicon. We will examine various theories of lexical meaning and evaluate the pros and cons of each one. The latter half of the chapter focuses on case studies of linguistic meaning across categories and across languages, and along the way, we will think about what it means for the meaning of one word to combine with the meaning of another word. We will examine various data across categories and across languages in order to appreciate the complexity of human semantic competence.

7.1: Linguistic meaning
7.2: Compositionality- Why not just syntax?
7.3: What does this sentence "mean"? Entailments vs. implicatures
7.4: The mental lexicon
7.5: The nature of lexical meaning
7.6: Events and thematic roles
7.7: Countability
7.8: Individual- vs. stage-level predicates
7.9: Degrees
7.10: Why not the dictionary?
7.11: Denotation
7.12: Introduction to set theory
7.13: Negative polarity items
7.14: Summary
7.15: Exercise your linguistics skills

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7.1: Linguistic meaning



We use the word “meaning” in various ways in our everyday lives. Consider (1)-(4).

(1) In Japanese culture, what does it **mean** when a tea stalk floats vertically in your green tea?

(2)

takai	mishin-o	katte-mo	tsukaikata-ga	wakaranakereba	**imi**-ga	nai
expensive	sewing.machine-ACC	buy-even.if	how.to.use-NOM	understand.NEG.if	**meaning**-NOM	NEG.exist

‘There is no point in buying an expensive sewing machine if you don’t know how to use it’ (Japanese)

(3) I said coffee is just as tasty as tea, but I didn’t **mean** it.

(4) *Ode’imin* and *strawberry* **mean** the same thing.

(Examples inspired by Bach 1989)



Figure **7.1.1**. A tea stalk floating vertically in a cup of green tea.

In this chapter (Chapter 7) and the next chapter (Chapter 8), we will explore **linguistic meaning**: the sorts of things we have to know as language users when we produce and comprehend meaning. This excludes notions of “meaning” like in (1). (1) is not an

example of *linguistic* meaning because the floating tea stalk (the object depicted in Figure **7.1.1**) is not a linguistic expression. Sometimes we use the word *mean* or *meaning* to talk about our interpretation of the world. In this case, the vertical tea stalk "means" — or is symbolic of — good luck! Although interesting, this is not the kind of "meaning" we will focus on in this textbook.

(2) also describes a kind of "meaning" that isn't linguistic. Literally, the Japanese sentence in (2) means 'There is no **meaning** in buying an expensive sewing machine if you don't know how to use it'. This use of *imi*, or *meaning*, is about the purpose of some action. Here, we are saying that there is a relation between an action and some sort of ideal end result that the act is supposed to lead to. This, again, is not the kind of "meaning" we are interested in in this textbook.

The notion of **meaning** in (3) is certainly about language, in the sense that we are evaluating what someone said. "Meaning" here seems to be something about sincerity: (3) is roughly paraphrasable as 'I said coffee is just as tasty as tea, but I wasn't being sincere when I said this'. This is not the kind of "meaning" we will be concerned with in this particular chapter, but Chapter 8 (Pragmatics) will discuss some points that will be relevant to this notion of "meaning".



Figure **7.1.2**. A strawberry.

"Meaning" as used in (4) best exemplifies what we mean by *meaning* (= linguistic meaning) in this chapter: the words *ode'imin* and *strawberry* **mean** the same thing. *ode'imin* is an Ojibwe (Anishinaabemowin) word, and *strawberry* is an English word. But what does it mean for them to "mean the same thing"? What we want to figure out in this chapter is something like this: what is the knowledge about the word *ode'imin* that an Ojibwe speaker stores in their head, such that when they utter the word, they know it points to that juicy red fruit with small seeds on the surface (Figure 2)? Similarly, what is the knowledge about the word *strawberry* that English speakers have in their head, such that they know that this word in English points to this same fruit? Both the word *ode'imin* and the word *strawberry* carry some sort of content, and this information allows for Ojibwe and English language users to say "Yes, that is an *ode'imin/strawberry*" or "No, that is not an *ode'imin/strawberry*" for any given object. In this way, the two words "mean the same thing".

Did you know? *Ode'imin* in Ojibwe literally means '**heart berry**' (in reference to its heart-like shape; see Figure 7.2)! The origin of the English version *strawberry* is not clear according to the Oxford English Dictionary. One explanation is that the name is perhaps in reference to the "straw"-like particles on the fruit's surface.

Note that when we say "the meaning of *ode'imin*", we are talking about the meaning of the **linguistic expression** *ode'imin*, not the actual fruit in real life. In this chapter, we are asking what meaning is attached to the stream of sounds *ode'imin* (IPA: [odeimin]) in Ojibwe, not to the actual fruit like in Figure 7.2. Similarly, we are asking what meaning is attached to the stream of sounds *strawberry* (IPA: [stɹɔbɛɹi]), again, not to the actual fruit. For signed languages, we want to know what meaning is attached to a certain sign: like what is shown in Figure 7.3, which is the sign for 'strawberry' in American Sign Language. **Linguistic expressions** are the words, phrases, and sentences we produce as language users. Following writing conventions in linguistics, linguistic expressions that are mentioned in paragraphs will be italicized in this textbook. So when we write "*strawberry*" (in italics), we are referring to the linguistic expression (the word) that points to the object in Figure 7.2. When we write "strawberry" (no italics), we are actually talking about the object in Figure 7.2, the actual fruit. So "***the strawberry*** has 4 syllables" makes sense, but "**the strawberry** has 4 syllables" doesn't (because a fruit doesn't have syllables).

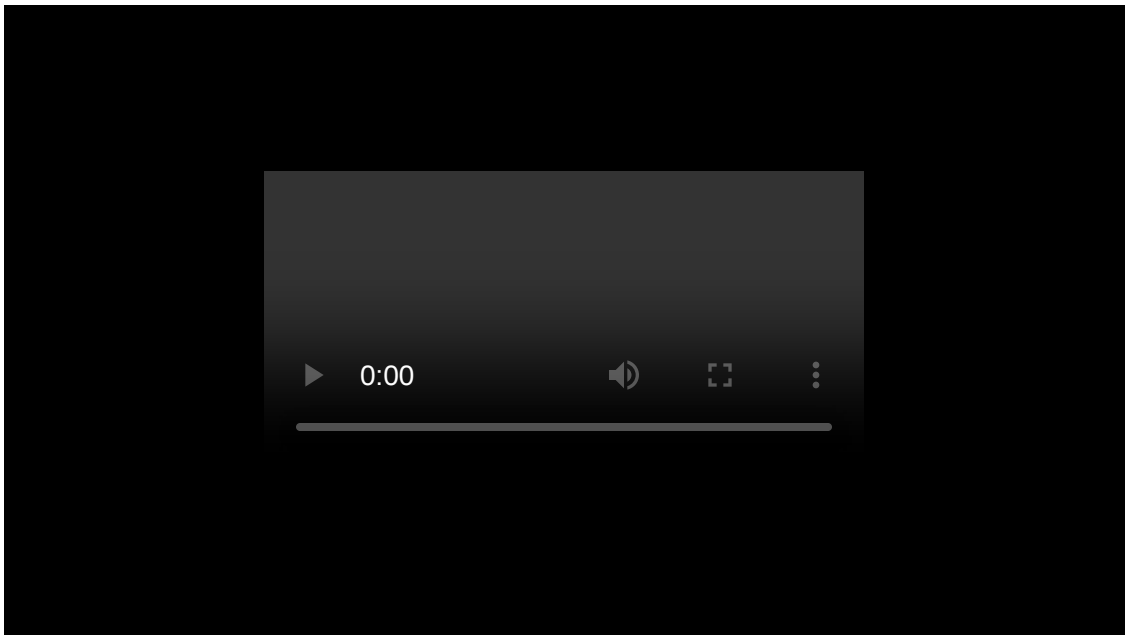


Figure 7.3. Three variations of the word 'strawberry' in American Sign Language.

The English word **semantics** comes from the Ancient Greek word that means 'significant' (*sēmantikós*). This comes from a word that means 'to show, signify' (*sēmaínein*).

Semantics is the study of linguistic meaning: how the meaning of words combine to form the meaning of sentences. In this chapter, we will analyse linguistic meaning from various perspectives. One of the big conclusions of this chapter (Chapter 7) and the next chapter (Chapter 8, Pragmatics) is that there are many different kinds of linguistic meaning. Each way of thinking about meaning gives us important insight into how we produce and understand meaning as language users. We will start this chapter by looking at what people probably usually think of when they hear "meaning": the **sense** of words that we store in our heads. The sense of *strawberry* would be whatever "meaning" of that word English users store in their head. After our discussion of sense, we will look at meaning in terms of the **denotation** of linguistic expressions: what linguistic expressions point to in the real world. As we've seen already, one way of thinking about how *ode'imin* and *strawberry* "mean the same thing" is to say that these words both point to (or **denote**) the same fruit in the actual world. As we will see, thinking about meaning in terms of the linguistic expression's denotation also helps us explain semantic patterns in language.

The idea that there are two ways of thinking about meaning — sense and denotation — was originally proposed by German philosopher, logician, and mathematician **Gottlob Frege** in 1892.

Check your understanding

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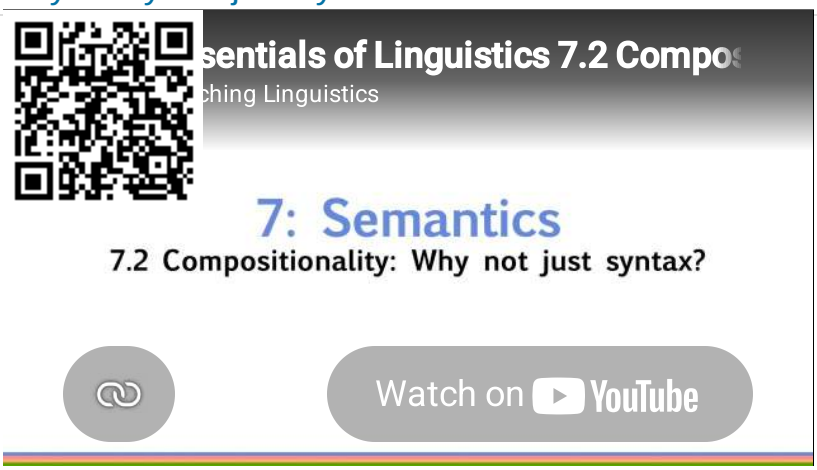
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7.2: Compositionality- Why not just syntax?



Consider the following sentence.

(1)		The raccoon clothing store was doing a photo contest so I submitted a picture of a Toronto raccoon wearing a bright pink bandana with lime green polka dots on it.

This is likely a sentence you have never heard before in your life, but you are still able to comprehend it and understand what it means. The reason for this is because you have the meaning of each morpheme that appears in this sentence stored in your head, and by combining those meanings, you are able to get the meaning of the overall sentence. This is the principle of **compositionality**: the meaning of a complex linguistic unit results from the individual meanings of its subparts, and how these subparts were combined. This means that the meaning of a sentence is determined by the meaning of the words that it contains, and how these words were put together. It also means that the meaning of a multi-morphemic word is determined by the meaning of the morphemes it contains, and how they were put together. So for example, the meaning of the word *unhelpfulness* is the combination of the meaning of *un-*, *help*, *-ful*, and *-ness*, put together as [[un- [help -ful]] -ness].

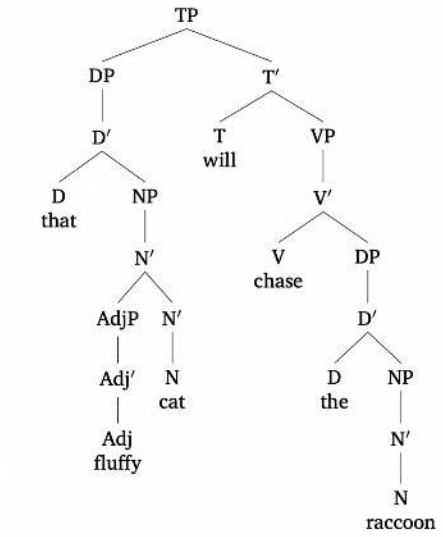


Figure **7.2.1**. Syntactic structure for *That fluffy cat will chase the raccoon.*

Compositionality is not just a matter of *what* linguistic pieces you put together: it also matters *how* you put the pieces together, too. This is relevant to the notion of **constituency**, or unithood, from Chapter 6 (Syntax). For example, per compositionality, the meaning of the sentence *That fluffy cat will chase the raccoon* is the combination of the meaning of the words *that*, *fluffy*, *cat*, *will*,

chase, *the*, and *raccoon*. What Chapter 6 taught us is that you don't just string these words together like a necklace to form a sentence: the composition of a sentence happens in a more systematic way, with smaller substructures within. For example, *that fluffy cat* and *the raccoon* are syntactic units, or **constituents** in this sentence. *That fluffy cat will* is not a constituent in this sentence, but *chase the raccoon* is. Following this syntax (see Figure 7.3), we can analyse that word meanings combine in the same structured way, too. The meaning of *the* and *raccoon* will combine first, then the meaning of *the raccoon* will combine with the meaning of *chase*, and so on. Keep this in mind as you read this chapter. If you need a refresher on syntax, you may want to reread Chapter 6 (Syntax) before proceeding with the rest of this chapter. This chapter will assume that you have completed Chapter 6 (Syntax) already.

We just said that compositionality is about how linguistic pieces are put together. Since we talked about this notion in detail in Chapter 6 (Syntax), you may be wondering how this chapter on semantics is different. To a large extent, syntax and semantics go hand-in-hand. If two words go together as a syntactic unit, it's fair to hypothesise that they form a semantic unit, too, and vice versa. For example, in our sentence *That fluffy cat will chase the raccoon*, *fluffy* and *cat* form a syntactic unit: it's a noun phrase. *Fluffy cat* is also a semantic unit: the meaning of *fluffy* gives us more information about what kind of *cat* we are talking about. So then, why do we need to talk about semantic composition when we've already talked about syntactic composition? Put another way, we know that an adjective and a noun form a unit (NP), a determiner and a noun phrase form a unit (DP), a verb and a determiner phrase can form a unit (VP), and so on — so what more is there to say about compositionality? If we know the syntax, doesn't the semantics naturally follow?

The answer is "no, not necessarily." We see places in language where the syntactic categorisation of a linguistic expression does not predict everything about the semantics of it. Consider the determiner phrases (DPs) *a scientist* in (2) and (3), for example.

(2)	Vera greeted **a scientist**.
(3)	Vera became **a scientist**.

Syntactically, *a scientist* is a DP in both (2) and (3). However, just because they have the same syntactic form does not mean that their semantics is the same: *a scientist* in (2) does not mean the same thing as *a scientist* in (3). The meaning of *a scientist* in (2) is **referential**: it refers to some existing scientist. If this scientist is named Gladys, (2) is equivalent in meaning to *Vera greeted Gladys*. *A scientist* in (3) is not referential; this time, it is not pointing to some existing scientist. *A scientist* in (3) is **predicative**: it expresses a property about the subject, which in this case is *Vera*. Adjectives are often predicative and can be seen in a construction like (3), too: e.g., *Vera became cheerful*. In English, sentences with a referential DP can be **passivized** as in (4), but sentences with a predicative DP cannot be passivised, as (5) shows (Williams 1980, 1983).

(4)	**A scientist** was greeted by Vera.
(5)	* **A scientist** was become by Vera.

The point of these examples is that we might expect (5) to be grammatical based on the syntax of *a scientist*: it's still a DP, after all. However, the reality is that (5) is ungrammatical. Clearly, this ungrammaticality is not due to the syntax of *a scientist*: we know that some DPs can be the subject of a passive construction, as seen in (4). Rather, it is the *meaning* of the DP that is causing the ungrammaticality in (5): DPs that are predicative in their meaning cannot be passivised. This is one example of how the meaning of a linguistic expression really matters in language, not just the syntax.

There are also places in language where the reverse is true: we might expect something to be grammatical based on the semantics of the expression, but it winds up being ungrammatical due to the syntax. Consider the prepositions *before* and *during* in (6) and (7), respectively.

(6)	Alan sneezed **before** { the meeting with his student / the race / the party / the event }.
(7)	Alan sneezed **during** { the meeting with his student / the race / the party / the event }.

Based on this data, the prepositions *before* and *during* seem to be semantically compatible with expressions that point to an event of some sort. For *before*, the syntactic type of this event does not seem to matter. For example, it can also take a full clause (TP/CP)

as an object:

(8)	Alan sneezed **before** { he met with his student / he raced / he partied / he attended the event }.

During, however, is syntactically pickier. It does not allow for a clausal complement:

(9)	* Alan sneezed **during** { he met with his student / he raced / he partied / he attended the event }.

The DP *the meeting with his student* and the sentence *he met with his student* semantically both point to the event of Alan meeting with his student, but syntactically they are different types of units. (9) is an instance in language where just the semantics is not sufficient for explaining the descriptive patterns; the syntax clearly matters too.

To summarise, syntax certainly is important when thinking about how sentences are composed, but it's also important for us to examine the semantics separately, too.

Check your understanding

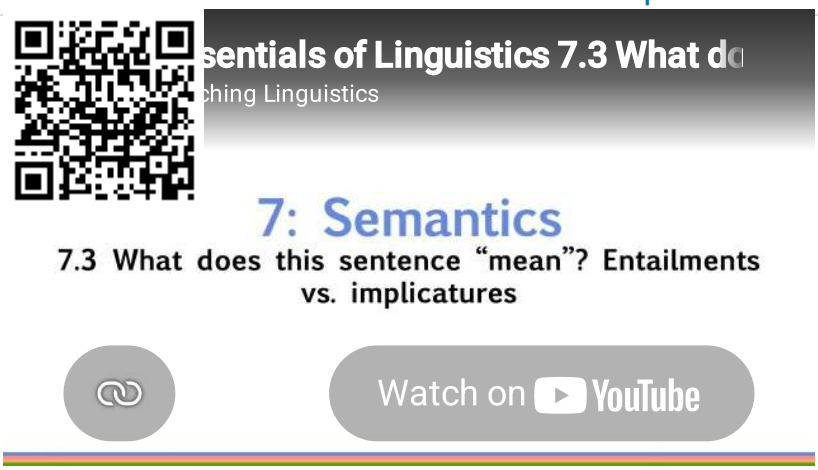
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7.3: What does this sentence "mean"? Entailments vs. implicatures



Entailments

In this chapter, we are interested in how word meanings combine to arrive at sentence meaning. To analyze the meaning of a word in a language, it's not useful to just look at that word in isolation. For example, if you wanted to know what the meaning of the verb *sigh* was, looking at just the word *sigh* is not insightful. What we want to consider is the interaction of this word with other words in that language: we need to look at how that word is (or isn't) used in sentences in that language. Because sentences inform us about the meaning of words, we will first think about what we can and cannot conclude from the meaning of sentences.

Consider the sentences in (1) and (2).

(1)	The customer sighed.
(2)	The customer emitted a breath.

If the sentence in (1) is true, then the sentence in (2) is necessarily true, too. We say that the sentence in (1) **entails** the sentence in (2), or that (2) is an **entailment** of (1). Using variables *p* and *q* as placeholders for sentences, we can define entailment in the following way: *p* entails *q* if and only if *p* being true makes *q* necessarily true, too.

Semantics and math: variables

In mathematics, a **variable** is a symbol that is used as a placeholder for a value that may change. For example, the mathematical formula for calculating the area of a circle is πr^2, where r is a variable that represents the radius of the circle. The value of r will be different depending on which circle you are analyzing. If the circle has a radius of 3cm, we can plug in 3cm for r, which yields approximately $28.26cm^2$. If we put 10m in for r, we get approximately $314m^2$. In semantics, we often use variables as place holders too, as we have done in the definition of entailments.

You can see if something is necessarily true from a sentence by negating the piece of meaning in question with "it is not the case that…" as in (3) and conjoining it with the original sentence with "but…" as in (4). For example, if we want to show that (2) is an entailment of (1), we want to see what happens when we negate (2) and conjoin it with (1).

(3)		**It is not the case that** the customer emitted a breath.
(4)	⊥	The customer sighed, but it is not the case that the customer emitted a breath.

The ⊥ symbol indicates a **contradiction**. A contradiction is a sentence that is never true. When you negate an entailment of a sentence, you get a contradiction. So we say that the sentence in (4) is a contradiction. We can also say that the sentence in (3) **contradicts** the sentence in (1). (4) is a contradiction because if you sigh, it is necessarily the case that you emit a breath; it would

be impossible to sigh without doing so. This contradiction informs us what it means for someone to *sigh:* what's required of this event.

Implicatures

Consider other things we might conclude from the sentence in (1), reproduced below as (5). (6) is something we might conclude from hearing (5).

(5)		The customer sighed.
(6)		The customer is angry.

Is (6) an entailment of (5), though? Let's try the contradiction test.

(7)		**It is not the case that** the customer is angry.
(8)		The customer sighed, **but** it is not the case that the customer is angry.

(8) is *not* a contradiction, which means that (6) is NOT an entailment of (5). (6) is called an **implicature** of (5). Once again using the variables *p* and *q* as place holders for sentences, *p* implies *q* if, based on the context, *p* has the suggestion that *q* is true, but *q* is NOT necessarily true. In other words, an implicature is a possible, but not a guaranteed, conclusion from a sentence. You can show that something is *not* necessarily true by **cancelling** it (negating it without a contradiction) as we did in (8). Implicatures are cancellable because they don't always have to be true. For example, it's possible in this case that the customer sighed for other reasons: relief, for example.

Implicatures will be covered in more detail in Chapter 8, but for right now, it is important for us to be aware of what we mean when we say a sentence "means" something: is it an entailment or an implicature?

Presuppositions

Now consider the following sentence.

(9)	The restaurant stopped charging extra for guacamole.

The sentence in (9) expresses that the restaurant no longer charges extra for guacamole. That's likely a good thing for customers who are hoping to cut down on lunch costs. However, guacamole enthusiasts may still feel mild annoyance towards what is expressed in this sentence because the sentence also "means" (10).

(10)	The restaurant used to charge extra for guacamole.

(10) is an entailment of (9), as shown below:

(11)	⊥ The restaurant stopped charging extra for guacamole, **but it is not the case that** they used to charge extra for guacamole.

(10) is a special kind of entailment, called a **presupposition**. A presupposition is an entailment that a sentence takes for granted. (9) presupposes (10), meaning that (9) assumes that (10) is true already. To illustrate this, imagine this discourse:

(12)	Hanna: The restaurant stopped charging extra for guacamole.
	Ken: That's not true!

In (12), the only thing that Ken is able to contest is whether or not the restaurant *stopped* charging extra for guac or not. Even when Ken says "that's not true", it is still assumed by Ken and Hanna in this conversation that the restaurant has charged extra for

guacamole in the past. This is what we mean when we say that the content of the presupposition is taken for granted.

Because a presupposition is what must be true *before* a sentence is uttered, it cannot be the target of negation or questioning in the main sentence. Consider (13) and (14).

(13)	It is not the case that the restaurant stopped charging extra for guacamole.	**(negation test)**
	(Still entails: 'The restaurant used to charge extra for guacamole')	
(14)	Did the restaurant stop charging extra for guacamole?	**(question test)**
	(Still entails: 'The restaurant used to charge extra for guacamole')	

(13) and (14) still presuppose (10): 'The restaurant used to charge extra for guacamole'. Whether a piece of meaning "survives" negation and questions is a good diagnostic to see if it is a presupposition or not. Contrast (13)/(14) with a regular (non-presupposition) entailment in (15). What happens to the entailment that the customer emitted a breath in (16) and (17)?

(15)	The customer sighed.	
	(Entails: 'The customer emitted a breath')	
(16)	It is not the case that the customer sighed.	**(negation test)**
	(Does not entail: 'The customer emitted a breath')	
(17)	Did the customer sigh?	**(question test)**
	(Does not entail: 'The customer emitted a breath')	

The entailment that was there with (15) is no longer there in (16) and (17). If it is not the case that the customer sighed, we cannot necessarily conclude that they emitted a breath. If we are *asking* if the customer sighed, we also cannot necessarily conclude that they emitted a breath.

In summary, there are two main kinds of sentential meaning relations we discussed in this section: **entailments** and **implicatures.** Entailments can further be split into "regular" entailments and presuppositions.

Check your understanding

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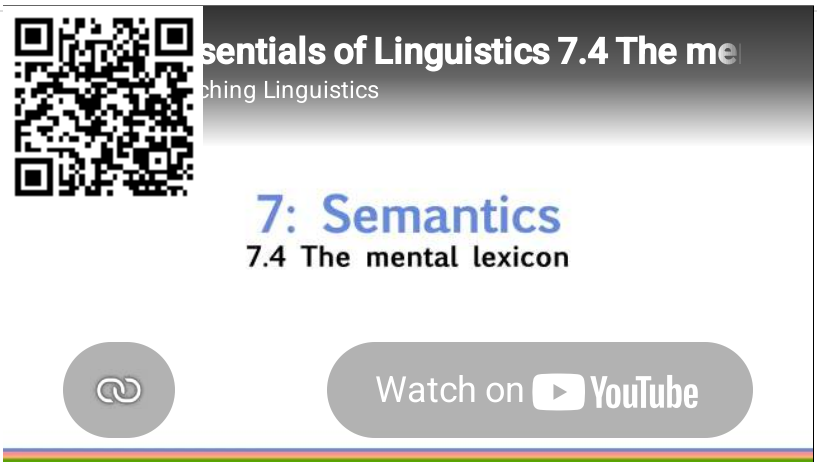
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7.4: The mental lexicon



In the previous chapters, we looked at some of the **regularities** that occur in language: predictable patterns that are rule-based. For example in English, the plural -s /z/ turns into [ɨz] after sibilant (= high pitched, hissy) consonants. That's a **regular** pattern, because if you encounter a count noun that ends in a sibilant consonant, we can predict that the plural marker would be realised as [ɨz]. You can tie regularity to predictability: if something is predictable, it's a regular rule. Imagine that a new beverage called *Loquesh* [lowkwɛʃ] was invented in Canada. Even though you have likely never heard this word before in your life, you can still predict that if we pluralised it using regular English plural morphology, it would be pronounced [lowkwɛʃɨz] and not *[lowkwɛʃz] or *[lowkwɛʃs]. The regular rules in your mind as a language user is a part of the language user's grammar (or **mental grammar**; see Chapter 1).

Some things in language, however, are not predictable like this. Some things are **irregular**. For example, consider the morpheme *goose*. The fact that the stream of sounds [ɡuws] (*goose*) refers to the large waterbird with a long neck is not a predictable pattern in English. As discussed in Chapter 1, this connection between the pronunciation and the meaning is **arbitrary**. It's not that the sound [ɡ] means 'long neck', [uw] means 'water', [s] means 'beak', etc.: we just happen to use this combination of sounds to refer to this animal in English. If the sound-meaning connection *were* meaningful, we would expect that a similar sequence of sounds would be used in all languages to refer to a goose. But this of course does not happen. In Ojibwe it's *nika* [nika], and in French it's *oie* [wa], for example. Sign-meaning correspondences of morphemes are irregularities in language, because you simply must memorise the fact that in your language community, certain sequences of sounds/signs mean certain things. These irregularities — the things that *cannot* be predicted by rules — are stored in your **lexicon**, which is a part of your mental grammar or linguistic competence.

Morphology recap!

A **free morpheme** is a morpheme that can stand on its own as a word. A **bound morpheme** is a morpheme that cannot stand on its own as a word.

The lexicon (also sometimes called the **mental lexicon** in this context) is a language user's mental storage of that linguistic information that cannot be captured by rules. So this means that the lexicon stores linguistic units whose meaning cannot be predicted from its subparts. Meaning that cannot be predicted from its subparts is called **non-compositional** meaning. For example, **free morphemes** like *goose*, *luck*, and *go* in English have non-compositional meaning; you can't break down its meaning into smaller parts. Therefore, they get stored in the lexicon. **Affixes** also have non-compositional meaning, so morphemes like *-s*, *-ly*, *un-*, *-er*, and so on also get stored in the lexicon.

Idioms are stored in the lexicon too. *Over the moon* is an example of an idiom: it is a meaningful sequence of words, but the meaning is not compositional.When someone says that they are *over the moon*, they likely are not literally over the moon; in spoken North American English, this means that this person is extremely happy. Because this idiomatic meaning of *over the moon* does not break down into the meaning of *over*, the meaning *the*, and the meaning of *moon*, the meaning of this idiom is non-compositional. It's important to remember that different language communities have different idiomatic phrases. In North American English, *piece of cake* is an idiom that means 'easy'. But if you say in Japanese *ke:ki hito-kire* 'cake one-slice' (literally 'piece of

cake') with the intention of saying that something is easy, you are not going to be successful. A Japanese speaker may use the idiom *asameshi-mae* 'breakfast-before' (literally 'before breakfast) to express that something is easy, though! In American Sign Language, TRAIN GONE SORRY (as shown below) is an idiom that roughly means 'you missed what was said, and I'm not going to repeat it.' In French, the phrase *les carottes sont cuites* (literally 'the carrots are cooked') means 'it's too late, there's nothing more you can do'. In each language community, there are different idioms.

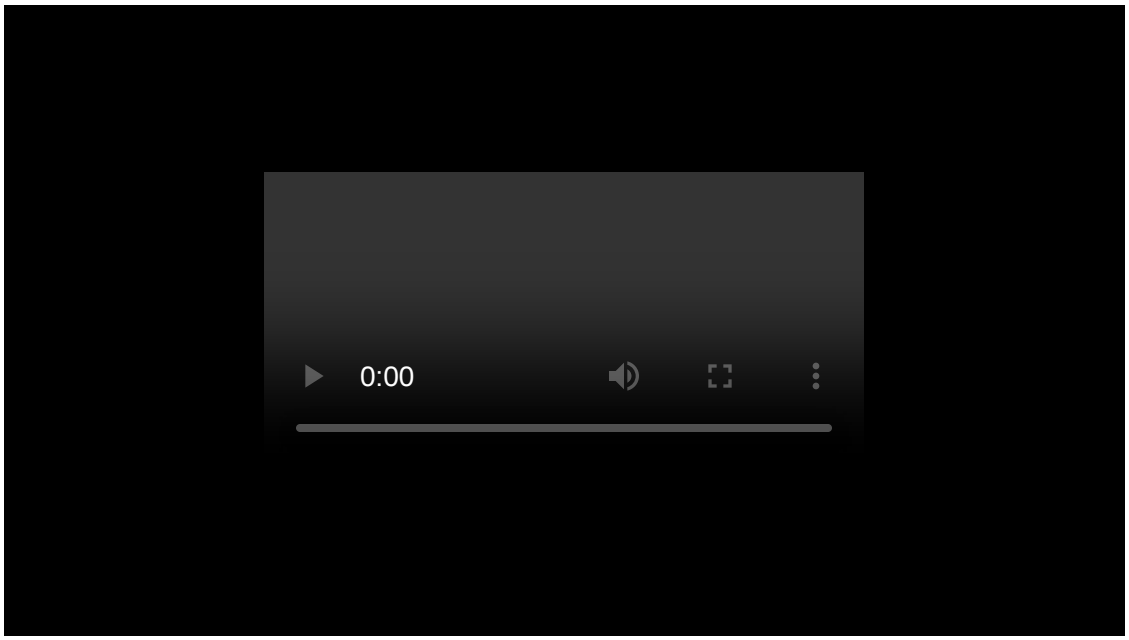


Figure 7.4.1. TRAIN GONE SORRY (American Sign Language)

Under the same reasoning as idioms, it can be said that non-compositional **compounds** like *hotdog* (it's non-compositional because a *hotdog* is not a dog that is hot) are stored in the lexicon, too. Compositional compounds like *dog leash* are probably not stored in the lexicon: *dog* would have its own entry and *leash* have its own separate entry.

Other things *not* stored in the lexicon are words like *skater*, *unluckily, reclassify*, and other multimorphemic words. These words have **compositional** meaning because their meaning is predictable from their subparts: *skate* and *-er* for *skater; un-, luck, -y,* and *-ly for unluckily*, and *re-, class,* and -ify for *reclassify.* The idea is that you don't have to "memorize" what *unluckily* means. You memorise the meaning of *un-*, the meaning of *luck*, the meaning of *-y*, and the meaning of *-ly* separately — and then morphosyntactic rules in the grammar put them together as *unluckily*. Similarly, phrases and sentences with compositional meaning are not stored in the lexicon, either. For example, a phrase like *over the candle* (as in *I placed a jar over the candle*) is not stored in the lexicon, provided that it is not an idiom in that language community.

We will use the term **listeme** to refer to anything that has a lexical entry in the lexicon. This is an umbrella term that includes morphemes, idioms, and some compounds. They are called *listemes* because they are *listed* in the lexicon. Each listeme in the lexicon has a **lexical entry**, which contains the linguistic expression's phonological, syntactic, and semantic information. So for the lexical entry of *goose*, it lists its pronunciation (/guws/), its syntactic category (noun), and of course, its meaning, or the **sense** of that listeme.

Note that the mental lexicon is not like a literal dictionary, so some things you find in a dictionary entry are not necessarily found in a lexical entry. For example, if a language has a writing system, some users of that language may know how words are spelled. However, **spelling** is not something you *have* to know in order to be a language user. Have you ever spoken to a 5-year old? Children are language users, too! It's entirely possible for children to use words accurately in conversations without knowing how to spell the words. This is why we will not discuss spelling as a part of lexical knowledge in this chapter. The **etymology** of the listeme is not something you necessarily know when you "know" the listeme, either. If you are a word history enthusiast, you might know that *goose* comes from Old English *gōs*, but certainly a 5-year old would not know this (many adults don't, either!).

Unlike phonology, syntax, and semantics, etymology is not something you naturally pick up when you are first learning a word. For this reason, we will also exclude etymology from our discussion of lexical knowledge in this chapter.

Some linguists say that **irregular inflected forms** of words are stored in the lexicon, too. For example, the past tense of *go* is not **goed*, but rather *went*. The plural form of *goose* is *geese*, not **gooses*. Since expressions like *went* and *geese* are irregular patterns that must be memorised, it can be hypothesised that they have their own lexical entry in the lexicon, too.

To summarize, the lexicon is the storage of irregularities in a language. Each lexical entry in the lexicon comes with a listeme's phonological, syntactic, and semantic information. This leaves us with the big question of this chapter: what goes into the semantics of a lexical entry? What even is word sense? We will begin to address this in the next section.

How to be a linguist: Whose lexicon?

It's important to remember that even within one language community, one language user's lexicon may not be exactly the same as another language user's lexicon. For example, my brother and I are both Japanese speakers, but there may be some words he knows that I don't know, and vice versa. But when I compare my Japanese lexicon to my brother's lexicon, there is enough overlap that we are able to communicate with each other. As a Japanese-American individual who grew up speaking both Japanese and American English, I occasionally find that the meaning of some words in my American English lexicon are different in specific ways from the meaning that other American English speakers have. I've gotten funny looks from people for calling green traffic lights in Canada *blue*. *Ao* in Japanese is typically translated as 'blue', and for the most part it points to the same shade that the English word *blue* points to. But *ao* is also used to describe "green" things sometimes, including green traffic lights, green apples, and vegetables. Because of this, I have the impulse to call traffic lights *blue* in English. It is entirely possible that my lexical representation of the word *blue* in English is not the same as that of many Americans. It is also equally possible that not all Japanese-English bilinguals have the same representation as I do! Does this mean that I have the "wrong" meaning of *blue* stored in my head? I don't think so. It just happens to be the case that *blue* means a certain thing in my **idiolect**. In this chapter, we use commonly attested linguistic data to make inferences about lexical meaning at a general level. So in this textbook you won't find me discussing how *blue* in English can also mean 'green'. But I'd like to explicitly acknowledge here that semantic variation exists, in the same way that phonological, syntactic, and morphological variation exist. So for example, in this chapter I might say "*she is very alive* is descriptively well-formed in Canadian English", but it is entirely possible that some people will find it ill-formed in their dialect or their idiolect. Where semantic variation is especially common, notes will be made — but in general, know that it's OK if your judgment varies, and that your idiolect is valid. When you encounter semantic variation, we hope that you will practice your linguist skills and ask questions like "in what descriptive ways is my idiolect/dialect different from the one described here?", "to what extent can meaning vary across languages?", and "what might this tell us about how meaning can change over time?". The purpose of this chapter is to highlight interesting semantic patterns within and across languages, rather than to describe the lexicon of any particular person, or to describe the meaning of any particular word.

Check your understanding

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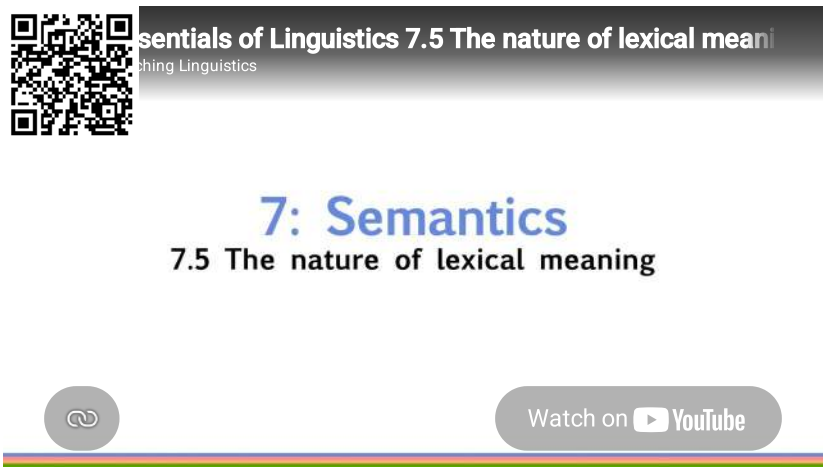
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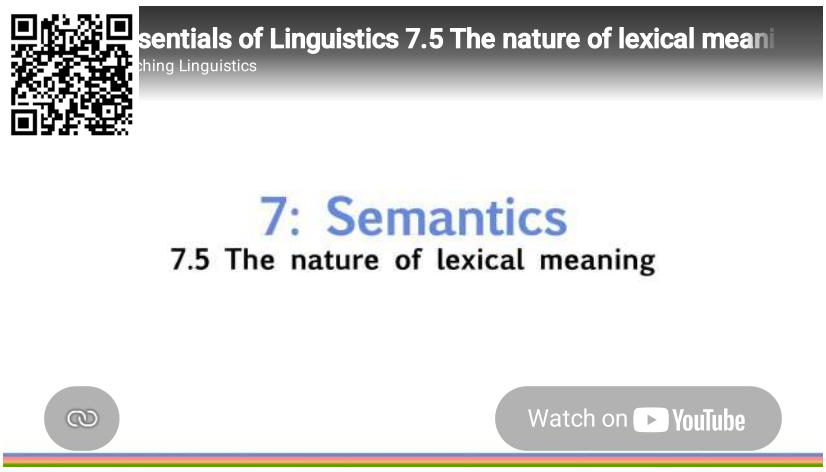
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7.5: The nature of lexical meaning

Video Part 1:



Video Part 2:



Lexical knowledge vs. world knowledge

We are now ready to address the big question of this chapter: what is lexical meaning, anyway? The nature of lexical meaning is still under considerable debate. We will outline a few theories of lexical meaning here.

To appreciate what a difficult question "what is word meaning?" is, let's take a look at an example first: the English word *chair* (the one that refers to a piece of furniture). There are lots of things that you know about chairs, based on your life experience. In other words, you have a lot of **world knowledge** (sometimes also called **encyclopedic knowledge**) about chairs. World knowledge is a part of your general **cognition**, which is the collection of mental processes used for gaining new knowledge. Your concept of **chair** that you have in your mind is a subset of this world knowledge. Concepts are building blocks of thought, so your concept of *chair* is your abstract understanding of what a chair is. The linguistic expression *chair* has some sort of connection with some group of concepts; this connection is what lexical meaning, or sense, is.

Now, the question is what the relationship between the lexical entry for *chair* and your concept of chairs is. One basic question we must ask is whether lexical meaning and concepts are separate things, or whether lexical meanings *are* concepts. If we say that they are separate things, the architecture of the mind might look like something like Figure **7.5.1**. The star in the image indicates what "sense" is under this theory.

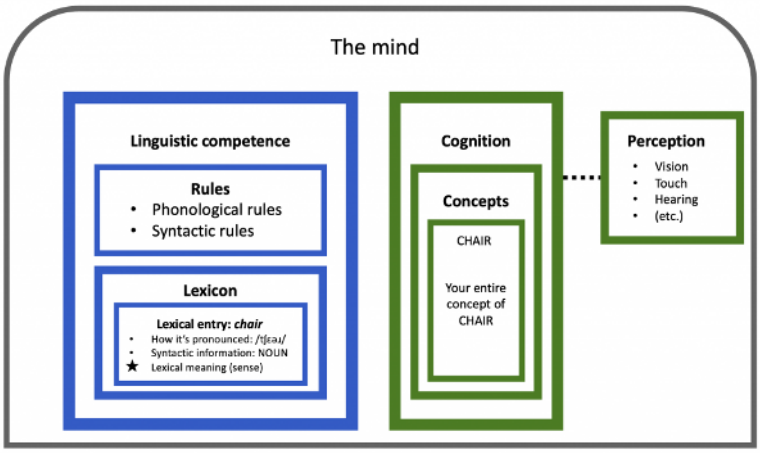


Figure **7.5.1**. The lexical meaning is completely separate from concepts.

Under this approach, the lexical entry for *chair* would come with its phonological information (how it's pronounced or signed), its syntactic information (syntactic category), and its semantic information: the lexical meaning, or sense. One way to think about it is that *chair* would come with a "definition" of sorts. Earlier works in lexical semantics tended to have this kind of "meanings as definitions" kind of approach, including Jerrold J. Katz and colleagues' work from the 1960s and 1970s (Katz and Fodor 1962, Katz and Postal 1964, Katz 1972). This approach assumes that this definition is purely linguistic in nature. This definition would be consistent with your concept of chairs: what you know about chairs informs the definition of it. But strictly speaking, the meaning itself is not a concept. If we assume a separation of lexical knowledge and world knowledge like this, we might think that maybe things like "it's a countable object", "it's for sitting on", "it has a back", "it has a seat", and so on would be included a part of the lexical knowledge. Non-lexical world knowledge of chairs might include things like "you can stand on it", "it's often made out of wood," "it can be bought", "people usually buy matching chairs for their kitchen table", "IKEA sells chairs," "there's a game where you play music and walk around chairs, and you have to sit in one when the music stops", "I love chairs", and so on. By traditional standards, non-lexical knowledge is usually thought to include things like subjective feelings evoked, and properties that are described with non-universal qualifications like "usually" and "often". However, what's considered lexical knowledge vs. not is a hard distinction to draw, and there is not a consensus about what counts as linguistic knowledge vs. world knowledge. Things like "people usually buy matching chairs for their kitchen table" certainly feels like it's not a part of the "definition" of *chair*, but what about something like "it usually has four legs"?

Some linguists would argue that only the **necessary and sufficient** conditions for *chair* would be a part of its lexical meaning — only enough information to distinguish it from other classes of objects. To use the terminology from 7.3, the lexical meaning would only include things that the statement *x is a chair* would **entail**. So if x is a chair, then the necessary and sufficient conditions of *chair* might be describable as the following "check list":

- the purpose of x is to seat one person;
- x has a seat;
- x has a back.

To illustrate another example, the necessary and sufficient conditions of *doe* might be:

- x is a deer (a kind of animal);
- x is an adult;
- x is female.

These are called "necessary and sufficient conditions" because these conditions are necessary for distinguishing the *doe* category from other categories, and these conditions are also sufficient for the distinction (i.e., no more conditions need to be added). So for *doe*, it's **necessary** that we specify "x is a deer": without it, we would incorrectly include other adult female animals in the *doe* category, such as cows. "x is female" is also necessary; without it, we would incorrectly include other adult deer, like bucks. Collectively, these four conditions are **sufficient**: we don't need additional conditions like "x lives in a forest"; some does live in mountains. The listed conditions are *sufficient* because that's the minimum number of conditions needed for distinguishing does from non-does.

The limitation of this "checklist" approach to lexical meaning is that the boundary between categories of things is not as sharp as the theory makes it out to be. *Chair* and *doe* might be relatively intuitive categories (well, personally, I have uncertainties about a chair requiring a back; try an online image search for "backless chair" in quotation marks, and see what you think!). But what about other things? What makes something a jacket vs. a coat? What does it mean for something to spin vs. rotate? How much moisture is required for you to call something moist? Is a hotdog a sandwich? Try searching the phrase "the cube rule" on the internet to see some people's comically unsuccessful attempts at coming up with necessary and sufficient conditions for certain food categories.

Experiments show that people often do not have sharp judgments about categories of things. Consider the images in Figure **7.5.2** below, which are inspired by the stimuli from Labov (1973)'s study.



Figure **7.5.2**. Cup or bowl?

Your task is this: categorise each of the objects labeled 1 through 5 as a cup or a bowl. Most people agree that 1 is a cup, while 5 is a bowl. People are usually much less confident about the objects in 2 to 4, especially 3, and there tends to be disagreement about them. If we hypothesise that in our mental lexicon, there are clear necessary and sufficient conditions listed for cup, we should be able to categorise 1 through 5 as a cup or not, no problem. The fact that we cannot suggests that there's more to meaning than listing minimal requirements for it. Interestingly, participants in an experiment like this find information like "what goes into this thing" helpful in the categorisation process. For example, if the object in 3 had mac and cheese in it, people would likely say that it's a bowl. If it had tea in it, people are more willing to say that it's a cup. It seems that category boundaries are fuzzy, and a lot more world knowledge goes into the lexical meaning of words than just "necessary and sufficient" conditions.

Are lexical meanings concepts?

The first theory of lexical meaning that we examined (in Figure **7.5.3**) assumed that lexical meaning is a distinct thing from concepts. A competing theory of lexical meaning is that lexical meanings *are* concepts. In other words, in this approach, the listeme *chair* in the lexicon does not have a "definition" in the lexical entry — the concept that is associated with *chair* is the "meaning". Figure 7.6 illustrates one way in which this kind of approach can work. Once again, the star in the diagram indicates what the "sense" of the word is under this approach. Try comparing it with Figure **7.5.3** from earlier.

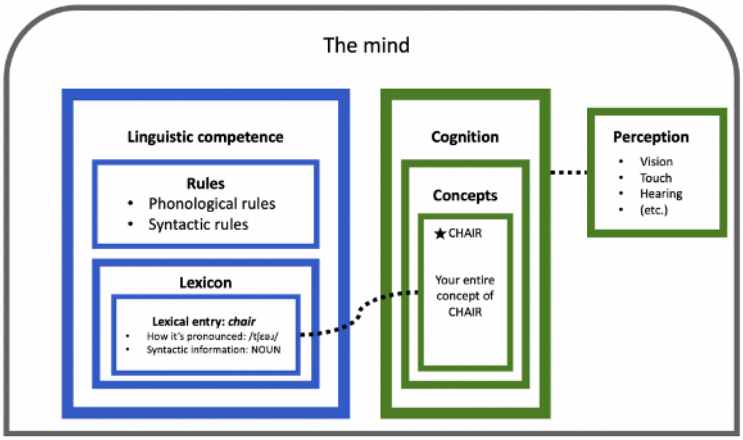


Figure **7.5.3**. The lexical meaning of chair is the entire concept of chair.

This version of the "concepts as meaning" theory is what we might call the *maximalist* approach: literally, the "meaning" of *chair* is every single thing you know about chairs, including things like "IKEA sells chairs" and "there's a game where you play music and walk around chairs, and you have to sit in one when the music stops". Ray Jackendoff (1976)'s Conceptual Semantics (CS) is one such theory. In Conceptual Semantics, only the phonology and the syntax of the listeme resides natively in the lexicon. The lexical entry doesn't contain a separate semantics of the listeme — the meaning is the conceptual representation in your cognition that the listeme is tied to. One reason for theorising that our language faculty has access to our general cognitive faculty is the fact that language is something that we use to respond to things we perceive. We describe things we see, touch, hear and so on.

A more *intermediate* approach might lie somewhere in between the "meaning as definition" approach and the "meaning as concepts" approach. In this kind of approach, listemes do have a semantic representation in the lexical entry in the lexicon (as in Figure ***PageIndex3***), but the lexical meaning has access to the cognitive conceptual module in limited ways. Here is something all semanticists can agree on: there are linguistic phenomena that are sensitive to certain concepts.



Figure **7.5.4**. A prototypical cup.

For example, *I started a meal* in English can mean 'I started eating a meal' or 'I started preparing a meal', while *I started a book* means 'I started reading a book' or 'I started writing a book.' The first meaning for each word refers to the **intended purpose** of that object, and the second meaning points to **how that object came into being**. We can see from data like this words activate concepts like "purpose of the object" and "how the object came into being". One way to analyse this in terms of the architecture of the mind is that the lexical meaning of *meal*, *book*, *chair*, *cup*, etc. (and all nouns, in fact) on the linguistic competence side has a template that says "specify the intended purpose of this object" and "specify how this object comes into being". Then, it retrieves the needed information from your concepts on the cognition side. This is roughly the approach that James Pustejovsky's Generative Lexicon Theory (1995) takes, among others.



Figure **7.5.5**. A prototypical chair.

Regardless of whether you think lexical meanings are concepts or not, one thing that neither approach has explained so far is **prototype** effects. We already saw in the "cup or bowl?" experiment that some things are "clearly" cups or "clearly" bowls, and some things are in the grey area. Even if you couldn't tell me what *exactly* makes



Figure **7.5.6**. A non-prototypical chair.

a cup a cup, you probably have intuitions about what a typical cup looks like: for many Canadians, a **prototypical** cup is probably like the one in Figure 7.8. A prototypical member of a category is very central to that category; a prototypical cup is a very cuppy cup. If I asked you to imagine a chair, what do you immediately think of? Many of you probably imagined something like Figure 7.9 (a prototypical chair), rather than something like Figure **7.5.6** (a non-prototypical chair).

If I asked you to name 5 bird species, what would you write down? Typically, things like *robin* and *sparrow* are at the top of the list for many people, but birds like *penguin* are not named as frequently. These kinds of experiments, made famous by Eleanor Rosch, suggest that our minds organise concepts by prototypicality (Rosch 1973, 1975, among others).

If we assume the "meanings are concepts" approach to lexical meaning, then we might modify the architecture of the mind to look like this:

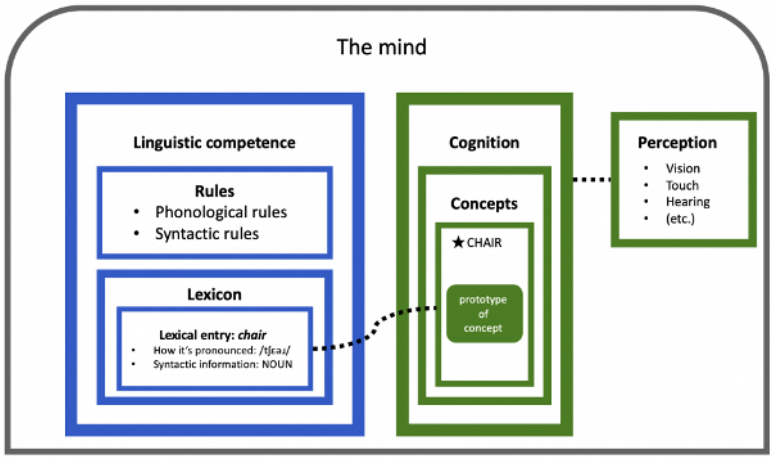


Figure **7.5.7**. The lexical meaning of chair is the entire concept of chair, but the concept has a structure, organised by prototypicality.

Under the kind of theory illustrated in Figure **7.5.7**, we would still assume that the lexical meaning of *chair* is the concept associated with *chair*, but this concept would have more structure to it. Previously, the concept of *chair* was an unorganized collection of what you know about chairs. So, "musical chairs is a game that involves chairs" and "sometimes chairs have one leg" would have had equal importance as something like "the purpose of a chair is to seat one person". Under a prototype theory of concepts, the concept of *chair* would be organized by prototypicality, with the prototype of the concept being at the "core". This means that at the "center" of what you know about chairs would be, for example, the fact that a chair is for seating one person, and that it typically has four legs. What's at the "center" of the concept would have more prominence in the organization of the concept. In other words, what's at the center would be considered more important for what it means for something to be a chair. Less central information, like how musical chairs is a game that involves chairs, and how sometimes chairs have one leg, would be farther away from this conceptual core. This accounts for why we tend to think of the most prototypical example of a category when asked to name a member of that category.

Language, power, and our relationship with words

Regardless of what theory of lexical meaning we adopt, there is no denying that our individual lived experiences shape our relationship with words. This of course means that our experience in the world affects our understanding of word meaning (e.g., a fashion enthusiast's understanding of the meaning of *purse* may be very different from a non-fashion-enthusiast's!), but there are other effects, too. For example, in one study of 51 veterans, researchers found that veterans with PTSD (Post-Traumatic Stress Disorder) and veterans without PTSD process combat-related words differently (Khanna et al. 2017). Particularly, in a **Stroop test** where participants have to say the name of the color that a word is written in (instead of reading the word itself), veterans with PTSD (31 of the 51 participants) responded significantly slower to combat-related words than they did to more neutral words and "threatening" words that are unrelated to combat. Veterans without PTSD (20 of the 51 participants) did not show a significant difference in their response time to different categories of words. The researchers also examined the veterans' brain activity during this kind of task, and found that veterans with PTSD have reduced activity in the part of the brain that regulates emotional regulation. As discussed in Chapter 1, words are powerful, sometimes triggering strong emotional and physiological responses. Words that are non-traumatic to you may have a completely different effect on other people. This is something we might want to be considerate of in thinking about how words are used. The "literal" meaning of the word is not the only thing invoked when a word is uttered, and some words come with a lot of baggage, sometimes personal, sometimes more widespread as cross-generational trauma (especially for marginalized communities). So if someone says "hey, that word is painful for me to hear/see," let's try not to dismiss their claim based on just the literal meaning of the word, and based on just your personal perception that the word is unproblematic.

Whatever your theory of lexical meaning you side with, what we do know is that certain pieces of information affect how a word behaves grammatically. For example, *I drank the chair* sounds distinctly odd compared to *I drank the tea* — this data suggests that concepts concerning the state of matter of physical objects matter for language. In the sections that follow, we will investigate what other sorts of information language tends to care about across languages. This will help us answer questions about lexical meaning at a more global level: what categories of meanings are there in language?

Check your understanding

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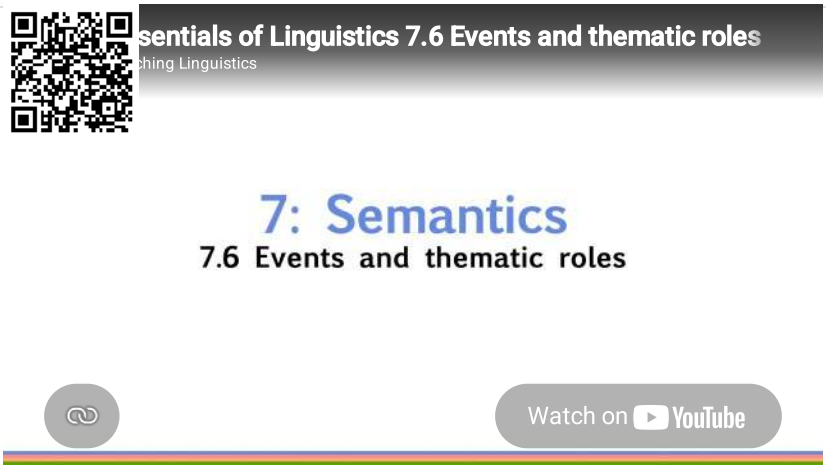
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7.6: Events and thematic roles



So far in this chapter, we have discussed how there are different types of meaning, and how there are different theories about how lexical meaning works in our minds. In this section, we begin to explore various linguistic phenomena that highlight our semantic competence as language users. The way to think about meaning like a linguist is to look for semantic **patterns**. Here are some questions we will answer in analysing linguistic meaning:

1. Why is this combination of words well-formed, and why is that combination of words ill-formed? What does this tell me about the lexical semantics of this word? What other words behave this way? (e.g., *I drank the water* sounds OK, but *I drank the ice* does not; this tells us that *drink* requires its object argument to be liquid)
2. What semantic categories are there in language? What semantic classes of verbs are there? What semantic classes of nouns are there? What semantic classes of adjectives are there?
3. What types of information is linguistic meaning generally sensitive to?
4. In what ways do different languages vary in their semantic parameters?

To make Question 2 easier to keep track of, the upcoming sections are organised by syntactic categories. This section (7.6) will focus on verbs, 7.7 will focus on nouns, and 7.8 and 7.9 will focus on adjectives.

How to be a linguist: Meaning and unacceptability

We have seen already that the asterisk symbol * indicates that a linguistic expression is descriptively ill-formed (ungrammatical). For example, the following sentence is ungrammatical in English:

(1) *Karen made scarf the.

The ungrammaticality of (1) is clearly due to the order of the DP *the scarf*: since English is a head-initial language, the determiner must precede the noun phrase. This syntactic rule is violated in (1), therefore it is descriptively unacceptable.

When the descriptive badness has to do with the meaning (rather than the syntax like in (1)), linguists sometimes use the hashtag/pound symbol #, like in (2).

(2) (Context: Mako danced a tango (a kind of dance).)

#Mako recited a tango.

(Intended meaning: 'Mako performed a tango')

(3) (Context: Tamara put her hands together quietly to meditate.)

#Tamara clapped.

(Intended meaning: 'Tamara put her hands together')

(2) and (3) are both syntactically well-formed, but they are **infelicitous** in the given context (i.e., the sentence is syntactically OK, but it isn't something you would utter in that particular context). The # indicates this particular kind of linguistic anomaly. Note, however, that some linguists use * more generally for all types of descriptive violations, whether it be syntactic, semantic, pragmatic, or phonological ones. You may also encounter the question mark symbol ? when the acceptability judgment is not crisp (i.e., "not crashingly bad, but not perfectly good either").

Sentences like (2) and (3) are useful if you are trying to figure out what a word means. To figure out what a word means, you start by forming a hypothesis based on observations. Let's say that you observe in spoken English that you can say things like *Tamara clapped* if Tamara is applauding. From this, we hypothesize that *clap* means 'putting one's hands together.' Here is the thought process: *IF* this hypothesis is right, *THEN* in any context where your hands simply come together, like the one in (3), you should be able to use the verb *clap*. So we test this hypothesis: in a context like *clap*, can you say *Tamara clapped*? I think many English speakers would say no: this is infelicitous in this context (hence the pound sign). This little experiment suggests that our hypothesis was wrong, and that *clap* means something more than just putting your hands together. What do you think is an additional required condition for something to count as *clapping*? (See "Check your understanding" at the end of this section for a sample answer.)

Coming up with a hypothesis and testing it with data — now that's thinking like a linguist! Try formulating a hypothesis about what a word means, then see if there are any counterexamples to disprove your claim. Adjust your hypothesis to account for the counterexamples. The repetition of this procedure will lead to better insight about the lexical semantics of that word!

Syntax throwback: Arguments and thematic roles

In the Syntax chapter (Chapter 6), we learned that some verbs are **intransitive**, some are **transitive**, and some are **ditransitive**. This concerns how many **arguments** the verb takes. (4), (5), and (6) show an example of an intransitive verb, a transitive verb, and a ditransitive verb, respectively. The **predicate** is bolded, and the arguments are underlined.

(4)		Dan **blinked**.
(5)		Ida **imitated** Raj.
(6)		Cristina **gave** Alan a lab report.

Syntax review!

Predicate: the state, event, or activity that the sentence attributes to its subject. Can be used in two ways: (i) to refer to everything in the sentence minus the subject, or (ii) to refer to just the head verb, adjective, or noun in the "predicate" described in (i).

Argument: the participants in the event or state described by the predicate.

We tend to think of verbs when we think about predicates, but recall from 7.2 that nouns and adjectives can be used predicatively, too. In English, nouns and adjectives that are used predicatively follow the copula *be*.

(7)		The artist is **happy**.
(8)		Abhi is a **student**

Many predicates refer to some sort of **event**. Events are **dynamic**: something is happening. The sentences in (9)-(11) describe events.

(9)		Kat built a table.
(10)		Nana ran.
(11)		Ivan put the paper in the envelope.

Some predicates do not point to anything "happening": what's going on is much more **stative** (non-dynamic). (12)-(14) describe states.

(12)		Leila knew the student.
(13)		The poster hung on the wall.
(14)		The interviewer had purple hair.

You can tell events apart from states because an event can be an answer to the question "What happened?" while states generally cannot. This is exemplified in (15)-(16).

(15)		A: What happened? B: { Kat built a table. / Nana ran. / Ivan put the paper in the envelope. }
(16)		A: What happened? B: { #Leila knew the student / #The poster hung on the wall. / #The interviewer had purple hair. }

The umbrella term that includes both events and states is **eventuality**. Verbs seem to encode what kind of eventualities are involved in its meaning.

Recall also that participants in eventualities take on various roles, depending on what the predicate is. So this means that the lexical information of verbs don't just specify the number of arguments that it takes; it also specifies what role these arguments have. These roles are called **thematic roles**. Here is a list of thematic roles that were introduced in the Syntax chapter.

- **Agent:** Agents are animate actors who do things on purpose.
- **Causer:** Usually inanimate (not alive), cause things to happen but without acting on purpose.
- **Theme:** The participant affected by the event, may be changed by the event.
- **Instrument:** The thing an agent uses to accomplish an action. (Often, but not necessarily, in a with PP)
- **Location:** The place where the event takes place.
- **Experiencer:** An animate participant that experiences a mental state, including perceptions (see, hear, etc.)
- **Goal:** The location or place that receives the theme.

Language myth!

You might have been taught that "the subject is the doer of the action, and the object is the undergoer of the action" before taking linguistics classes. This is not true! Recall from the Syntax chapter that **subject** and **object** are structural notions: subject is the TP specifier position, and the object of the verb is the verb's complement. Remember that in **passive** constructions like *The document was written by Hong-Yan*, the subject is *the document*, and it's not the "doer" at all!

Eventualities, entailments, and conjunction

What do thematic roles tell us about the meaning of verbs? Consider the following sentence.

(17)	The chef lifted the egg with the spatula.

There are several things that this sentence **entails**:

1. There was a **lifting event**;
2. **The building** was the **theme** of this event;
3. **The spatula** was the **instrument** of this event;
4. **The chef** was the **agent** of this event.

This entailment pattern is similar to entailments of sentences that are coordinated with the conjunction *and:*

(18)		The big cat stole a treat **and** the small cat meowed

(18) entails:

1. The big cat stole a treat;
2. The small cat meowed.

Based on this similarity, we can also analyse the lexical semantics of *lift* to also involve "and" (conjunction). Putting all of the observations together, we can propose that the lexical semantics of *lift* specifies what participants it needs in the event, and that this is expressed conjunctively. Using **variables** (recall Section 7.3), we can express the meaning of *lift* like this (this kind of semantic representation that makes reference to events can be called **event semantics**):

(19)		There is an event *e*		&
			e is a LIFTING event	&
			x is the THEME of e	&
			y is the INSTRUMENT of e	&
			z is the AGENT of e.	

Semantics and logic

"&" is a logical symbol that expresses conjunction: it means 'and'. You may be familiar with this symbol, since it is often used outside of mathematics, logic, and linguistics in our everyday lives. You may also encounter the symbols ∧ or • for logical conjunction; they mean the same thing as &.

Remember that variables are place holders. The idea is that each argument in the sentence in (13) fills in, or **saturates**, these argument positions represented by the variables. Let's assume that the argument positions get saturated in the order we see them in (15): so x gets filled in first, then y, and then z. As a reminder, the syntactic structure of this sentence looks like the structure in Figure **7.6.1**. Let's see what happens when the meaning of *lift* combines with the meaning of the arguments in this sentence. Let's assume that **the egg** means whatever specific egg we are referring to in the discourse, that **the spatula** is also a specific spatula, and that **the chef** is also a specific chef that has been mentioned in the discourse already.

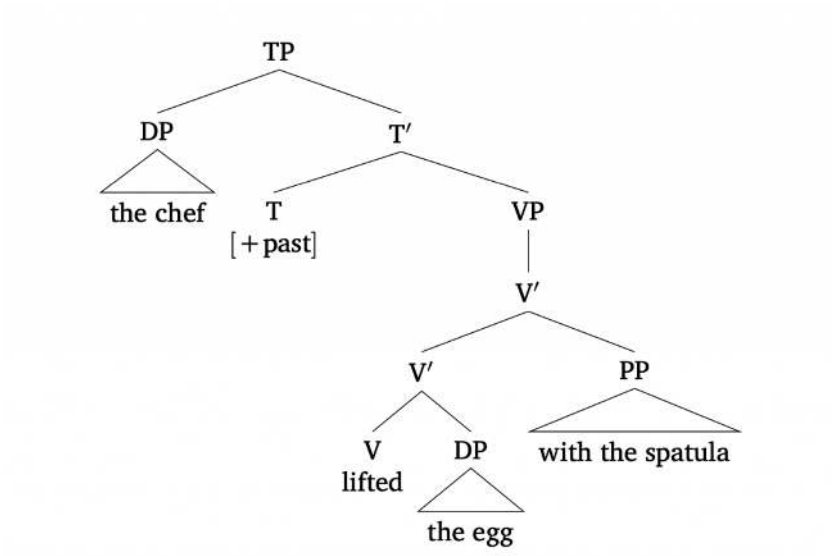


Figure **7.6.1**. The structure for the sentence *The chef lifted the egg with the spatula*.

As a first step, the verb combines with its object. When the verb merges with its object *the egg*, the meaning of *the egg* would go into the x. That produces the verb phrase *lifted the egg*, which would have a meaning like this:

(20)		There is an event *e*		&
			e is a LIFTING event	&
			the egg is the THEME of e	&
			y is the INSTRUMENT of e	&
			z is the AGENT of e.	

This verb phrase then merges with the prepositional phrase *with the spatula*, and the meaning of *the spatula* will go into y:

(21)		There is an event *e*		&
			e is a LIFTING event	&
			the egg is the THEME of e	&
			the spatula is the INSTRUMENT of e	&
			z is the AGENT of e.	

Finally, the verb phrase *lift the egg with the spatula* merges with the subject DP *the chef* (we will ignore tense for simplicity). The meaning of *the chef* goes into z:

(22)		There is an event *e*		&
			e is a LIFTING event	&
			the egg is the THEME of e	&
			the spatula is the INSTRUMENT of e	&
			the chef is the AGENT of e.	

This gives us the full meaning of *The chef lifted the egg with the spatula*, and it gives us the entailment pattern we saw in (17), due to the conjunction that is a part of the lexical meaning of *lift*.

To summarise, one way to analyse what is happening with the thematic roles of arguments in sentences is to posit that the thematic roles are specified in the basic meaning of verbs.

Check your understanding

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7.7: Countability

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A fundamental aspect of nominal meaning is whether the entity is countable or not. Descriptively, nouns that are countable can be pluralized, can appear with numerals, and take the determiner *many*. All of the nouns (bolded) in (1)-(3) are called **count nouns** in English because they have these properties.

(1)		I bought these **shirt**s today.
(2)		Beth needs three **chair**s in this room.
(3)		There are so many **cup**s on the shelf.

There is another class of nouns which cannot be pluralized in English, like *dirt*. Nouns like *dirt* are called **mass nouns**. They often point to substances or entities that are otherwise considered to be a homogenous group. For example, *rice* is also a mass noun in English. In principle individual grains of rice can be counted, but linguistically *rice* behaves like a mass noun. Mass nouns resist pluralization, cannot take numerals, and takes the determiner *much* rather than *many*. This is shown in (4)-(6).

(4)	a.	*	That is a lot of **dirt**s.
	b.		That is a lot of **dirt.**
(5)		*	Beth needs three **mud**s for this garden.
(6)	a.	*	There are so many **rice**s in the rice cooker.
	b.		There is so much **rice** in the rice cooker.

Conceptually, count nouns are countable in the sense that, for example, if I have one cup on the table and then put another cup on the table, this results in two distinct, separate cup entities where the boundary of each one is perceptible. We say that count nouns are **bounded** for this reason. Mass nouns like *dirt* is different because if I have a pile of dirt on the table and add more dirt to it, you still have just one pile of dirt, just larger. So mass nouns are **unbounded**.

You may have noticed that in (4)-(6), pluralised mass nouns sound acceptable in certain contexts. For example, saying *a lot of dirts*, *three muds*, or *many rices* gives rise to the **kind** interpretation: a lot of kinds of dirt, three kinds of mud, and many kinds of rice. Like this, mass nouns can often be used in a “count” way.

Besides counting the kinds of the mass noun, another way to make mass nouns countable is to put them into containers. For example, nouns like *water* and *pudding* are homogenous substances and therefore are fundamentally a mass noun, but when

pluralised they have a fairly natural interpretation in which you are counting the number of containers that contain the substance. This is shown in (7)-(8).

(7)	a.		There is so much **water** in the sink.	(mass)
	b.		Can we have two **water**s?	(count, 'two glasses of water')
(8)	a.		There is a lot of **pudding** in this bowl.	(mass)
	b.		There are four **pudding**s in the fridge.	(count, 'two cups (containers) of pudding')

The reverse is possible as well: in some contexts, fundamentally count nouns can be used in "mass" ways. *Pumpkin* for example is at the basic level a count noun, but if for example a truck carrying a bunch of pumpkins crashed on the highway and the pumpkins got smashed and got everywhere on the road, you can use it in a "mass" way. This is shown in (9)-(10).

(9)			There are many **pumpkin**s on the truck.	(count)
(10)			The pumpkin truck crashed on the highway and there was so much **pumpkin** everywhere.	(mass)

What we learn from these observations is that nouns lexically encode whether it is a count noun or a mass noun in its lexical entry. However, there also seems to be a rule in English where a mass noun can be converted into a count noun, and vice versa.

Whether a noun is linguistically count or mass varies from language to language. Consider (11) and (12). For example in Halkomelem (Hul'qumi'num), an indigenous language spoken by various First Nations peoples of the British Columbia Coast, *fog* can be readily pluralized, giving rise to the meaning 'lots of fog'. In French, singular *cheveu* is interpreted as 'a strand of hair,' while *cheveux*, which is morphosyntactically marked plural, is interpreted as 'a mass of hair,' as in the hair on your head.

(11)		Halkomelem			
		tsel	kw'éts-lexw	te/ye	**shweláthetel**
		1sg.s	see-trans.3o	det/det.pl	**fogs**
		'I've seen a lot of fog' (Wiltschko 2008)			

(12)	a.	French			
		Il y a	**un cheveu**	dans	ma soupe
		there.is	**a hair**	in	my soup
		'There is a strand of hair in my soup'			

	b.	Je	veux	me brosser	les **cheveux**
		I	want	myself to.brush	the.pl **hairs**
		'I want to brush my hair'			

It is also worthwhile to note that some languages like Japanese do not have productive morphosyntactic plural marking. For example, (13) can be interpreted as ‘bring cups’ or ‘bring a cup’ depending on context.

(13)		Japanese	
		koppu	mottekite
		cup	bring
		‘Bring cups / a cup’	

Some linguists have analysed languages like Japanese as having only mass nouns (Chierchia 1998). This does not mean that you cannot count things ever in Japanese. Japanese has a rich system of **noun classifiers**. Similar to the way in English hair is counted as ‘one *strand* of hair,’ ‘two *strands* of hair,’ etc., Japanese has morphemes that attach to numerals to turn mass nouns into bounded bits. Which morpheme is used depends on the semantic classification of the noun being counted. Consider the data in (14).

(14)		Japanese		
	a.	kami	3-**mai**	kudasai
		paper	3-**CL**	give
		‘Please give me 3 pieces of paper’ (Classifier: thin sheets)		
	b.	enpitsu	2-**hon**	kudasai
		pencil	2-**CL**	give
		‘Please give me 2 pencils’ (Classifier: long cylindrical objects)		
	c.	kuruma	1-**dai**	kudasai
		car	1-**CL**	give
		‘Please give me 1 car’ (Classifier: object with mechanical parts)		
	d.	neko	12-**hiki**	kudasai
		cat	12-**CL**	give
		‘Please give me 12 cats’ (Classifier: smallish quadripedal animals)		
	e.	tori	4-**wa**	kudasai
		paper	4-**CL**	give
		‘Please give me 4 birds’ (Classifier: animals with wings)		
	f.	tomato	5-**tsu** / 5-**ko**	kudasai
		tomato	5-**CL** / 5-**CL**	give
		‘Please give me 5 tomatoes’ (Classifier: general)		

The bolded morpheme (glossed as “CL” for “Classifier”) is the classifier in each sentence. The idea is that literally saying something like ‘2 pencils’ (**2 enpitsu* or **enpitsu 2*) is ungrammatical in Japanese. You must use a classifier when counting things. Nouns in Japanese are categorised into grammatical groups that are roughly semantically-based. For example, “thin, flat objects” forms a category, whose typical member include objects like paper, posters, and pizza. Nouns in this class use the classifier *-mai* as in (14a). The classifier *-hon* in (14b) is typically used for *long*, thin, often cylindrical objects like pencils, pens, and drinking straws. *-dai* in (14c) is used for typically mechanical objects with perceptible parts (e.g., cars, trucks, and computers), *-hiki* in (14d) for smaller quadripedal mammals (e.g., dogs, cats, hamsters), and *-wa* in (14e) for animals with wings (e.g., chicken, sparrow,

eagle). *-tsu* and *-ko* are the "elsewhere" classifiers that can be used for a more heterogenous group of inanimate nouns that don't fall into a specific class (e.g., tomatoes, pebbles, cushions, etc.). Some members of a noun class can be surprising: for example, *usagi* 'rabbit' takes the classifier typically used for animals with wings (*-wa*), likely because their ears are perceived to be like wings. *ke:ki* 'cake', if whole, takes the classifier *-dai* for "mechanical objects with perceptible parts" and if by the slice, the classifier *-kire* for "slices" or *–pi:su* for "pieces".

How to be a linguist: Context matters!

We see from the discussion of the mass/count distinction that the **context** matters when you are making (or asking for) **acceptability judgments** about sentences. We saw in the previous "How to be a linguist" that what's felicitous or infelicitous is often very informative of the semantics of a word. Here's another tip. When making (or asking for) acceptability judgments, be very careful about what's actually well-formed vs. ill-formed. For example, what do you think about (15)?

(15) I swam in vanilla extract.

You might have the intuition that there is *something* unusual about this sentence — but should we conclude from this that this is a semantically bad sentence? Hold on! Not quite. (15) might sound odd out of the blue because based on your world knowledge, you know that vanilla extract is usually used in small amounts — not a large enough quantity to swim in. However, with a proper context like in (16), this is a perfectly natural thing to say:

(16) (Context: I work at a vanilla extract factory, and while I was examining the quality of the product, I fell in a 4000-gallon tank of vanilla extract.)

I swam in vanilla extract.

The moral of the story is that make sure you think about the context carefully when examining data. Is the sentence bad in all contexts, or just certain ones? In fact, the difference that the context makes may be quite informative in terms of what a linguistic expression means. Consider (17) and (18): same sentence, same emoji, but different context.

(17) (Context: Your friend's dog did a cute and funny trick at a dog show)

Your dog was so cute 😂

(18) (Context: At the funeral service for your friend's cute dog that passed away)

#Your dog was so cute

Your dog was so cute without the emoji would be fine in both (17) and (18); the addition of the emoji is what matters. For many readers, the emoji is infelicitous in (18). This tells us something about the meaning of this particular emoji: it doesn't mean SAD-crying! The context in (17), where the emoji *is* felicitous, suggests that it means LAUGHING-crying: it perhaps means that something is funny. Try this same-sentence-different-context approach yourself with the upside-down smiley emoji, 🙃. What does it mean? When do you use it? Back up your intuition with an example sentence. Construct a sentence with this emoji, and come up with two different contexts: one in which the emoji is felicitous, and another one in which the emoji is infelicitous. If this emoji is not a part of your lexicon, do the same exercise but ask someone else who uses the emoji for the **acceptability judgement**: "Is this sentence natural in this context? How about this context?". Can you infer from their response what sentiment the upside-down smiley indicates? (See "Check your understanding" at the end of this section for a sample answer.)

This kind of approach to meaning may be useful whenever you encounter a new word (either in your first language or additional language(s)!). Instead of just asking "What does this word mean?", consider asking linguist questions like "In what kinds of contexts do you use this word in? Where can you *not* use it?"! This will get you a more nuanced picture of the meaning of that word!

Check your understanding

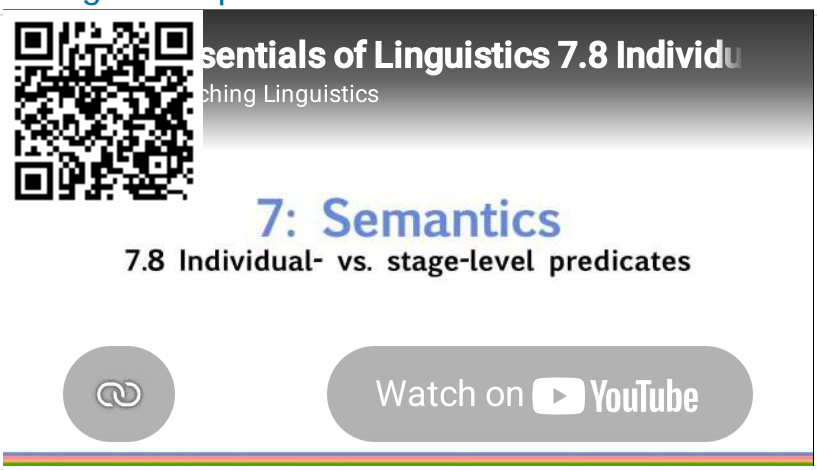
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7.8: Individual- vs. stage-level predicates



One interesting aspect of the meaning of adjectives is that it seems to matter whether the state that the adjective points to has a temporal limit or not. That is, is the adjective describing something that can be "on" or "off" with an individual, or does it point to something that is relatively more persistent? Consider (1).

(1)	a.	?	When Ash is { tall / Canadian / talented }, I get worried.
	b.		When Ash is { excited / bored / sick }, I get worried.

The reason that (1a) sounds slightly odd is because predicates like *tall*, *Canadian*, and *talented* are adjectives that generally hold of individuals persistently. The *when* clause makes the eventuality sound temporary, which is why it sounds odd. These kinds of adjectives are classified as **individual-level** predicates, because they are true of individuals as a whole. Individual-level predicates give rise to the inference that the predicate will continue to be true of the individual unless otherwise specified (Condoravdi 1992). For example, when you say *Ash is tall*, hearers infer that Ash is going to *continue* to be tall, unless otherwise specified.

The adjectives in (1b) are classified as **stage-level** predicates. Unlike individual-level predicates, stage-level predicates are only true of individuals during a certain period, or at certain *stages* (hence the name). It is felicitous to use *when* phrases with stage-level predicates as in (7b), because it's possible for someone to be excited, bored, sick, etc. for just a specified interval of time. With stage-level predicates, there is no inference that the eventuality will continue to hold indefinitely. For example, when someone says *Ash is bored*, you don't by default assume that Ash will continue to be bored forever.

In English the copula used for adjectives is the verb *be* regardless of the kind of adjective it is, as in *Ash* ***is*** *tall* and *Ash* ***is*** *bored*. In some languages like Spanish, the form of the copula depends on whether the adjective is an individual-level or stage-level predicate (Luján, 1981; Fernández Leborans, 1999). The two copulas are *ser* and *estar*. In (2), *ser* is inflected as *es* and *estar* as *está.* (2a)

shows some examples of Spanish adjectives that can only be used with the copula *ser*. In (2b) are some Spanish adjectives that can only be used with the copula *estar*. (2c) shows examples of Spanish adjectives that be used with either *ser* or *estar*.

(2)	a.		Juan	{es / *está}	{ leal / inmoral / inteligente / odioso }.
			Juan	{is (ser) / is (estar)}	{ loyal / immoral / intelligent / hateful }.
			‘Juan is { loyal / immoral / intelligent / hateful }.’		
	b.		Eva	{*es / está}	{ contenta / enferma / perpleja / sola }.
			Eva	{is (ser) / is (estar)}	{ content / ill / perplexed / alone }.
			‘Eva is { content / ill / perplexed / alone }.’		
	c.		Tu hermano	{es / está}	{ alegre / inquieto / nervioso }.
			your brother	{is (ser) / is (estar)}	{ happy / restless / nervous }.
			‘Your brother is { happy / restless / nervous }.’		

The adjectives in (2a), compatible with *ser*, are individual-level predicates. The adjectives in (2b), compatible with *estar*, are stage-level predicates. The adjectives in (2c) are sometimes called **ambivalent** predicates that can take on individual-level or stage-level interpretations depending on context (at least in Spanish).

Conceptually, we can think of stage-level predicates as being **bounded**: there’s a beginning point and an ending point to them. Individual-level predicates are **unbounded**: they’re not contained within a certain interval of time. You may remember that boundedness was a conceptual notion that was also used to characterise count vs. mass nouns in the previous section. What we see is an interesting pattern of what concept lexical meaning is sensitive to cross-categorically: whether something has bounds and limits.

Check your understanding

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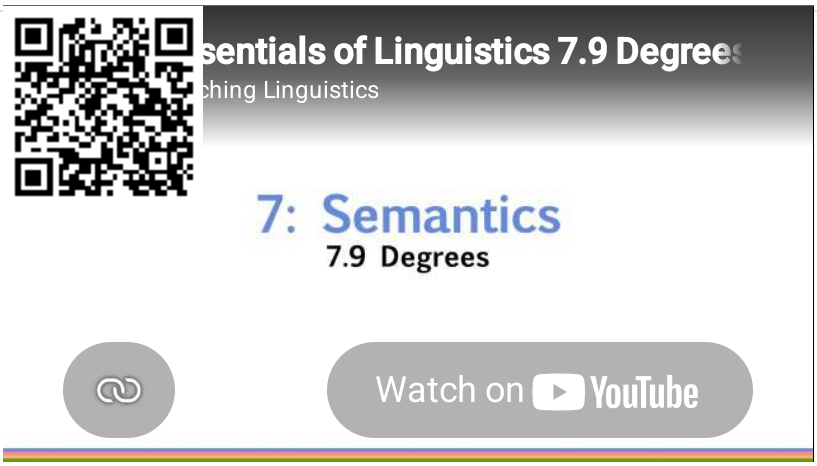
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7.9: Degrees



When you describe someone as being *tall*, a response to that might be "How tall?" There are various ways to answer this question in English, including *very tall* and *6ft tall*. You can also compare two people's heights by saying one person is *taller* than the other. In this way, many adjectives allow for the specification of the magnitude, or ***degree*** of the property held by an individual. (1)-(3) show examples of degree-related constructions like this.

(1)		That's a very **scary** story.
(2)		It's **warm**er today than yesterday.
(3)		That person is 6ft **tall**.

Adjectives like *scary, warm,* and *tall* are called **gradable** adjectives. Gradable adjectives allow for modification with the word *very* like in (1), and can appear in comparative constructions (2). If there is a unit of measurement for the adjective, the adjective can also often be modified with a measure phrase like *6ft* for *tall* in (3).

One way to analyse gradability is to posit that the lexical semantics of these adjectives have degrees as an argument. In other words, *tall* doesn't just mean '*x* is tall' (where *x* is the variable for the subject) — it means something like '*x* is tall to a degree *d*'. Furthermore, it must be specified that this degree *d* lies along a **scale**. Think of a **scale** as an abstract measuring stick. *Tallness* is measured along a length scale, and *warm* is measured along a temperature scale. When you say *6ft tall*, you are specifying that the degree of tallness on the scale is 6ft. When you say *very tall*, you are saying that this degree is considered high in that context. When you use a comparative like *A is taller than B*, you are saying that A and B both lie on the same scale (height in this case), and that B's degree on this scale is higher than A's degree on this scale.

For something like length and temperature, the idea of scales may seem intuitive because English happens to have units of measurement for these things (e.g., cm, ft, °C, °F), but it is worth emphasising here that *all* gradable adjectives have an associated scale, regardless of whether the unit of measurement is lexicalised in that language or not. For example, English certainly does not have a unit of measurement for *scary*, but because we still have the intuition and descriptive observation that there are varying magnitudes of *scariness*, we can analyse *scary* as having a scale in its lexical semantics, too. It may help to think of it this way: you can always make up a scale for gradable adjectives, even if it doesn't have a conventional unit. For example, you can ask questions like "On scale of 1 to 10, how scary was the movie?".

In Italian Sign Language / Lingua dei Segni Italiana (LIS, 'Lingua Italiana dei Segni'), the degrees on a scale are "visible" with certain adjectives (Aristodemo and Geraci 2018). (4) shows the word-by-word sequence of 'Pietro is tall' in LIS (Illustration is based on Aristodemo and Geraci 2018).

(4)			
	PIETRO$_{\alpha}$	IX$_{\alpha}$	TALL$_{s}$-deg$_{d}$

The sign in the second image (which looks like pointing) represents a pronoun. In the gloss underneath the image, pointing pronouns are glossed as "IX". Pronouns have **deictic** meaning: it refers to a specific person, thing, time, or space, and what it refers to depends on the context. The subscript α in IX$_{\alpha}$ indicates that this is a pronoun that points towards **locus** α A locus (plural loci) is a position in signing space typically tied to nominal element. In (4), the relevant locus is introduced by PIETRO: the pointing pronoun is referring to the locus introduced by PIETRO in the first image. To show this, PIETRO$_{\alpha}$ also has the subscript α in the gloss.

Let's take a look at the sign for TALL in the third image. This sign introduces two loci: *s* for the minimum degree for what counts as tall (we can call this degree the **standard** for *tall*), and *d* for the degree of tallness that Pietro has.

In LIS, you can use a pointing pronoun to refer to degree loci introduced by some gradable adjectives. So for example, (5) is a possible sentence in LIS.

(5)		PIETRO TALL$_{s}$-deg$_{d}$ IX$_{d}$ 1 METER 70
		'Pietro is tall; his height is 1.70 meters.'

In (5), notice that the pointing pronoun (IX) is referring to Pietro's degree of height. This is what we mean by "the degrees are visible" in this LIS sentence: the degree argument of *tall* is an overt "object" that a pronoun can refer to. In other words, the *d* in the semantics of *tall* (*x is tall to a degree d*) is actually expressed overtly in LIS. In spoken English, this degree argument that is a part of the lexical semantics of the adjective is not expressed overtly. So unlike in SIL, in spoken English a sentence with a pronoun that refers to the degree argument is not possible.

(6)	*	Pietro is tall. It is 1.70 meters.
		Intended meaning: 'Pietro is is tall and his height is 1.70 meters.'

Adjectives that do *not* inherently have degrees and scales in their meaning exist across languages as well. Consider (7) and (8).

(7)	?	This vase is very **ceramic**.
(8)	?	This table is more **wooden** than that one.

Adjectives that resist degree modification like *ceramic* and *wooden* are called **non-gradable** adjectives. Non-gradable adjectives generally cannot be modified by *very*, and do not appear in comparative constructions. This is because when something is *ceramic*, it's not a matter of *how* ceramic something is: *x* is *ceramic*, well, if *x* is made out of clay and hardened by heat. Similarly, something is *wooden* if it's made out of wood. These kinds of adjectives simply classify things into categories: you're either wooden or not wooden, and you're either ceramic or not ceramic.

Note however that we as language users are very good at coming up with scales, even if an adjective is originally non-gradable. For example, an adjective like *alive* is in principle non-gradable: you're either dead or alive, and we typically don't measure "how alive" someone or something is. However, if someone said *That mosquito is very alive even though I smacked it*, for many people it's actually not completely unacceptable. In this case, the scale for aliveness may be measuring something like how much vigor the mosquito is exhibiting externally. The important take-away here is that we can **coerce** (force) non-gradable adjectives to have a gradable interpretation in some contexts by assigning it a scale.

Some languages do not have degree arguments at all. In Washo (spoken by the indigenous Washoe people near the California-Nevada border in the U.S.) and in Motu (spoken by the Motuans, an indigenous ethnic group of Papua New Guinea), there are no morphemes that correspond to the comparative *-er* or *more* in English. (9) and (10) are how comparisons would be expressed in these languages, respectively.

(9)		Washo (Bochnak 2015)				
		t'é:liwhu	delkáykayiʔ	k'éʔi	daʔmóʔmoʔ	delkáykayiʔé:s
		man	tall	is	woman	tall.not
		'The man is taller than the woman' (Literally: 'The man is tall, the woman is not tall')				
(10)		Motu (Beck et al. 2009)				
		Mary na	lata	to	Frank na	kwadogi
		Mary TOP	tall	but	Frank TOP	short
		'Mary is taller than Frank' (Literally: 'Mary is tall but Frank is short')				

(9) and (10) show that it's logically still possible to express comparison without a degree morpheme like *-er*. The method of comparison in Washo and Motu is called **implicit comparison** (Kennedy 2007, Sapir 1944). When you make an implicit comparison of entities x and y with respect to the property *tall*, you manipulate the context so that *tall* is true of one of the entities, but not both. So in (10), a certain standard of what counts as *tall* has been established in the context such that Mary is put in the *tall* category, but Frank is not. If Mary is in the *tall* category but *Frank* is not, it necessarily means that Mary's height exceeds Frank, which is why can still get a comparative reading.

Languages like English with degree morphemes like *-er* employ **explicit comparison** (Kennedy 2007, Sapir 1944). When you explicitly compare *x* and *y* with respect to the property *tall*, what you are saying is that the degree to which *x* is tall (e.g., 160cm) is higher than the degree to which *y* is tall (e.g., 150cm). You are explicitly comparing two degrees, or two measurements. It's actually possible in English to make both explicit and implicit comparisons. For example, (11) is an explicit comparison of degrees, while (12) is an implicit comparison.

(11)		Marcin is taller than Anne-Michelle.
(12)		Compared to Anne-Michelle, Marcin is tall.

In summary, adjectives specify in their lexical entry whether it has a degree argument or not. The lexical specifications can vary from language to language.

Check your understanding

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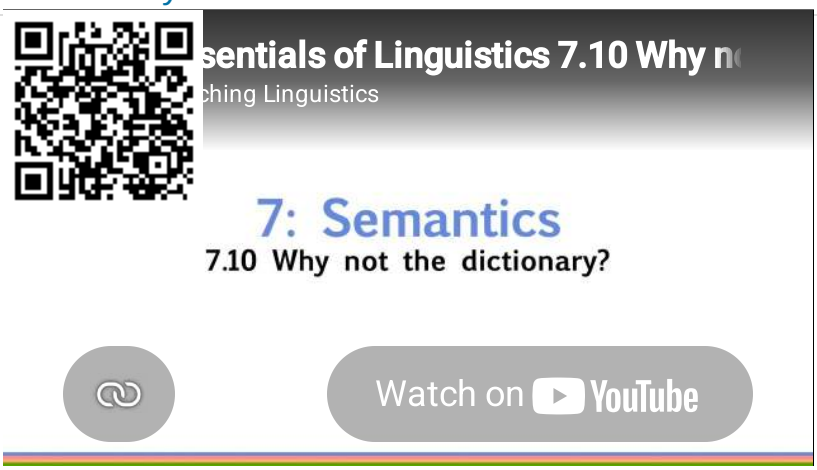
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7.10: Why not the dictionary?



Lexical meaning is complex. In this chapter, we are only scratching the surface of what goes into lexical meaning. If lexical meaning is so complicated, then you might be wondering, "Why not just look in a dictionary, then?" There are several things that are problematic with relying on dictionaries to figure out what you know when you know the meaning of a listeme.

Generally, there is a common myth that dictionaries are the ultimate authority of language. In arguments, perhaps you have heard people say things like "The dictionary defines X as…" or "That's not a word because it's not in the dictionary." Let's think about why this type of argumentation is flawed.

Much of the discussion in this part draws from the discussion of dictionaries in Rochelle Lieber's textbook, *Introducing Morphology* (2016). Chapter 2 of *Introducing Morphology* is an accessible resource if you would like to learn more about words, dictionaries, and the mental lexicon.

Dords and mountweazels

People who write dictionaries are called **lexicographers**. Lexicographers, of course, are human! A human being cannot possibly know every single thing about every single word in a language, and human beings are prone to errors, too. In the early 1930s, a consultant to the lexicographers of the Merriam-Webster dictionary made the note "D or d" next to the entry for *density* (Gove 1954). What they meant was that you can use either an uppercase *D* or a lowercase *d* can be used as the abbreviation for *density* in physics. However, the lexicographer who saw this mistakenly included *Dord* in the dictionary as a word that meant 'density'. Furthermore, this error was not corrected in print until 1947! While modern dictionaries (especially online ones) likely correct any errors very quickly and catch most of them before they get printed, this is still a good reminder that humans make mistakes.

There are other "fake" words that make it into the dictionary for different reasons. Sometimes, lexicographers include made-up words in their dictionary to prevent other publishers from plagiarizing their dictionary. This kind of fictious entry in a dictionary or other reference work is called a **mountweazel** (Lieber 2016). The term comes from when the 1975 New Columbia Encyclopedia included a fake entry on *Lillian Virginia Mountweazel*, an imaginary photographer.

Dords and mountweazels show us quite literally that just because something is in a dictionary doesn't mean that it's a word that is actually used in a language.

Not all words are in the dictionary

Another issue with putting dictionaries on the pedestal as the ultimate authority of language is that not all words are in the dictionary. Recall derivational morphemes from Chapter 5 (Morphology), particularly, highly productive suffixes like *-ist.* For example, this affix is often attaches to musical instrument nouns to mean 'person who plays this instrument': guitarist, violinist, oboist, flutist/flautist, percussionist, harpist, and so on. However, *tubist* (or *tubaist*) — a person who plays the tuba — does not have an entry in the Oxford English Dictionary. This doesn't mean that *tubist* isn't a word: among the many attested uses of this word

includes the National Academy Orchestra of Canada's website, which described Brandon Figueroa as their "principal tubist" in 2021. Other morphemes like -ness are also capable or producing a lot of nouns out of adjectives, but not all -ness words make it into dictionaries. For example, *unenthusiastic* is in the Oxford English Dictionary, but not *unenthusiasticness*. *Purpleness* is, but not *beigeness* (Lieber 2016). It is not efficient to include all derived forms of all words in a dictionary, so lexicographers must make a decision about which ones to include. The non-inclusion of some words in the dictionary is often a matter of efficiency, and not a judgment of some non-validity of those words. Additionally, there are many different kinds of dictionaries: monolingual dictionaries, bilingual dictionaries, signed language dictionaries, online dictionaries, pocket dictionaries — just to name a few. Necessarily, different dictionaries will have different entries; each dictionary has its own purpose. It is important to remember that what makes something a "real word" is *not* its presence in a dictionary. What does make it "real" is that language users in the relevant language community actually use it with a meaning attached to it. So is *cheugy*, which is not in the Oxford English Dictionary, a "real word"? Sure it is. People use it!

Language users create meaning, not dictionaries

Even if a word *is* included in a dictionary, the definition provided by the lexicographer(s) is *not* perfect, and it is *not* the complete picture of the meaning of the word. Consider the following uses of the word *museum* in English.

(1)		I visited a **museum** in Toronto today.
(2)		The **museum** said they were closing indefinitely.

The use of *museum* in (1) is straight-forward: roughly, it means 'place where art, etc. is exhibited'. *Museum* in (2) does not literally mean that, since it is not the place or the building that said something. (2) roughly means 'person who works at the museum said they were closing indefinitely'. If you look up *museum* in the Oxford English Dictionary (or any dictionary), this meaning — 'person who works at a museum' — is not listed. But does this mean that the word *museum* cannot be used under this interpretation in English? Not at all: it *is* a descriptively valid use of the word because there are people who *do* use it this way.

We have to remember again that human beings are writing dictionaries. It is quite unrealistic to expect a lexicographer, or even a group of lexicographers, to include every single meaning of every single word in a dictionary. It is unrealistic because one word can have many different meanings, varying in use depending on context. We cannot expect lexicographers to observe, track, and record all possible uses of a word — especially when new uses of existing words emerge all the time. What we need to remember is the purpose of dictionaries. Dictionaries are meant to be a *reference*: something that gives you the general picture of a word, with enough information to give you an idea as to how it might be used. One way of thinking about this is that a dictionary is a *partial* record of how language users use their language. Language users in a language community create new words and attach meaning to them, and lexicographers record some of their use in dictionaries. They can't include every single meaning of every single word, so they give *enough* information so that people can get an idea of how the word is used.

Language and power: Dictionaries

Dictionaries are actually cultural artefacts that were originally made for specific purposes. In the 18th century, scholars were interested in creating an "English academy", which had as its purpose "ascertaining, purifying, refining, and fixing the English language" (Long 1909). Lexicographer Samuel Johnson created the *Dictionary of the English Language* to embody this kind of prescriptive (and classist) attempt.

It is important to remember that lexicographers themselves never meant and will never mean for dictionaries to be a *complete* record of language use. This is what James Murray, one of the people to work on the first edition of the Oxford English Dictionary (1933), said:

"The Vocabulary of a widely-diffused and highly-cultivated living language is not a fixed quantity circumscribed by definite limits." (quotation retrieved via Lieber 2016)

By "living language," he means that language is always changing and evolving. Because language is always changing, there literally is no finite number of "real words" in a language. He is acknowledging here that a dictionary will never be a complete record of the vocabulary of a language. And that is OK, because dictionaries don't create meaning; people do.

How to be a linguist: Minimal pairs and testing hypotheses

OK, so dictionaries might be a good *starting point* if you're trying to figure out what a word means, but it's certainly not the whole picture! So how *do* we figure out what a word means? Well, if *people* create meaning, then we have to observe what people do with language! We've been doing this already in this chapter when discussing lexical meaning: we look at what you descriptively can and cannot do with a word (recall the previous "How to be a linguist" boxes from Section 7.6 and Section 7.7). If you are interested in the meaning of a word, one tactic that may be useful is coming up with a **minimal pair** of sentences. Recall from Sections 3.8 and 4.3 that a minimal pair is a pair of things that are the same except for one parameter. (3) and (4) are sentential minimal pairs in Japanese, differing by exactly one word:

(3) (Context: Beth broke a tree branch into two pieces.)

eda-o	otta
branch-ACC	broke
'She broke a branch'	

(4) (Context: Beth dropped a ceramic plate and broke it.)

#sara-o	otta
plate-ACC	broke
'She broke a plate'	

You might find in a Japanese-English dictionary or translator that *otta* means 'broke', but there's more to it than that! (3) and (4) show that the Japanese verb translated in English as 'broke' is sensitive to the kind of object it takes. You might hypothesize from this that *otta* is a specific way of breaking something. Of course, this minimal pair alone doesn't quite tell you what *otta* means, exactly (especially if you have zero knowledge about Japanese!): You have to come up with more sentences to test your hypothesis. Let me give you a hint if you don't speak Japanese: think about how Beth is breaking the object in each context. What shape are the objects? What do they look like once broken? Come up with a hypothesis about what kind of action *otta* is. What additional data might you ask a Japanese speaker about to test your hypothesis? Perhaps another sentence that is the same as (3)/(4) except the object! Do you predict that your sentence will be acceptable or unacceptable, based on your hypothesis? (See "Check your understanding" at the end of this section for a sample answer.)

Check your understanding

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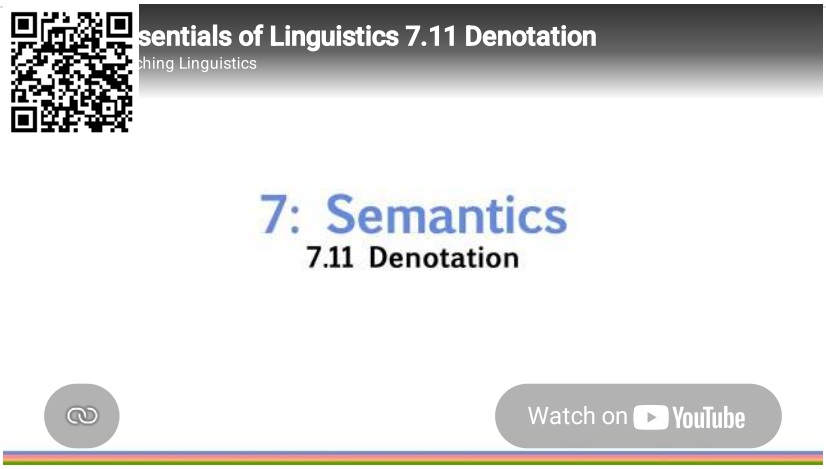
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7.11: Denotation



Sense vs. denotation

So far in this chapter, we have spent a lot of time on lexical meaning: the meaning of words and other linguistic expressions you store in your mental lexicon. In doing so, we have been analysing meaning in term of the **sense** of the linguistic expressions. The sense of a word is what that word expresses; you store the sense of listemes in your mental lexicon.

Figuring out the sense of any given word is a difficult task. Let's take a look at a summary of what we have been able to figure out about word senses so far.

1. It's probably not just a list of necessary and sufficient conditions;
2. It's probably tied to concepts in some way;
3. Verbs (and other predicates) specify how many arguments it takes, and what role these arguments play;
4. Nouns specify whether it's count (bounded) or mass (unbounded);
5. Adjectives specify whether it's stage-level (bounded) or individual-level (unbounded);
6. Some adjectives have a degree argument, some do not.

What we've done is identify some major patterns in word senses, but this of course doesn't fully answer the question "what do words mean?". If we ask right now what the sense of the adjective *sour* was, our best approximation would be '*x* is **sour** to degree *d* '. You may still be wondering, "but what does it mean for something to be *sour*, exactly, though?". Similarly, we know that the lexical semantics of *pencil* says that it's a count noun, but what makes a pencil a pencil?

Some linguists have proposed that word meaning encodes things like what parts it has (e.g., a *pencil* is something consists of graphite or a similar substance), what its purpose is (e.g., a *pencil* is something that is used for writing), and how it came into being (e.g., *pencils* are man-made, not found in nature) (Pustejovsky 1995). Much of this is still on-going research in linguistics.

Although words like *pencil* have a somewhat articulable meaning, there are other words like *sour* whose sense is actually quite hard to characterise, except that it's, well… that sour taste. What about the word *care*? What does it actually mean for someone to *care* about something? What's the different between a *jacket* and a *coat*? Are hotdogs *sandwiches*? If we focused on the sense of a specific word, we could write a whole book on it! Sense is fun to think about, but if we focus too much on a single word, we can lose sight of the bigger picture. Generally, lexical semanticists are not interested in "pinning down" the exact meaning of any particular word. Instead, they ask more general questions like: "What lexical meaning patterns do we see across different words?", "What semantic classes of nouns, verbs, and adjectives are there?", "What is the nature of lexical meaning in the lexicon?", "How is lexical meaning represented in our minds?", "How are lexical entries organised in our lexicon?", and "How does lexical meaning relate to cognition?".

There is another angle of analysing linguistic meaning: **denotation**. If you were really pressed by someone to say what the meaning of *sour* was, you might eventually grab a lemon and say, "Look, *this* is sour, OK! It's whatever this is!". This is a way to talk about the meaning of the word *sour* via denotation. The **denotation** of a linguistic expression is what that linguistic expression points to in the actual world.*Sour* points to all sour things in the world, including lemons, limes, grapefruit, vinegar, pickles, etc. The denotation of *pencil* would be the set of all things that are pencils in the actual world.

More about denotation

We just said that **denotation** is what the linguistic expression points to in the actual world, but it's actually slightly more complicated than that. When we say that the denotation of a word is what it points to in the *actual world*, we run into problems when we want to analyse the meaning of words like *unicorn*, or names like *Mario* (the character from the Nintendo games). If denotations were what these words points to the *actual world*, then that would be nothing (what mathematicians call **the empty set**) — because unicorns and Mario do not actually exist in the real world. That means if we take word meaning to be denotations, then *unicorn* and *Mario* would be meaningless. But we don't want to say that! Surely, they are meaningful still. So more accurately, **denotation** is what the linguistic expression points to is our ***cognitive representation* of the actual world.** So words point to the abstract representation of the world that we have in our cognitive faculty, and not the actual things out there, so to speak. Fictional things can certainly have a representation in our cognition, so if we think of denotation this way, even words like *unicorn* and *Mario* have "things" they point to in our cognitive faculty. For simplicity, we will say "in the actual world" when discussing denotations in this textbook, but keep in mind that technically, it's the *cognitive representation* of the actual world in our minds.

Denotation and sense are related, which is why it is useful to talk about both. Sense is what you store in your head as the semantic information of that word. And whatever this internal information is, *that*'s the knowledge that allows you to point to things out there in the real world and say, yes, that's sour, no, that's not sour, etc. So the two modes of meaning are connected in that the sense of a word is what you use to figure out the denotation of that word. So even without knowing the exact sense of a word, we can still get a lot of insight about how meaning works in language.

To understand the difference between sense and denotation, consider the following map. Let's say that this map represents an actual town in Ontario.

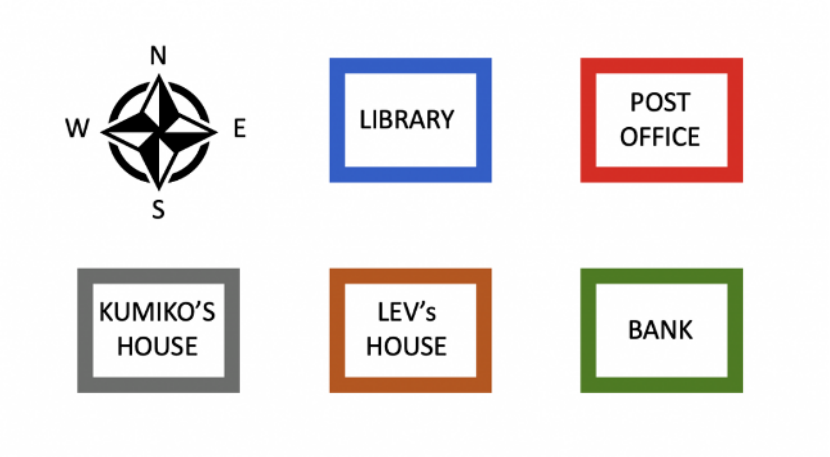


Figure **7.11.1**. Map to show the location of Post Office.

Let's say that you are explaining to someone where the post office is in this town. There are several ways to describe its location, including (1) and (2).

(1)		The building to the north of the bank
(2)		The building to the east of the library

The phrases in (1) and (2) have **different senses**: the phrases don't contain identical words (e.g., *north* vs. *east*, *bank* vs. *library*), so the internal semantic content of each phrase would be different. However, (1) and (2) have the **same denotation**: the post office in this town. Although described differently, both phrases point to the same thing.

Consider also an expression like (3).

(3)		My house

Imagine that Kumiko said (3). If that were the case, the expression in (3) would point to Kumiko's house in this town (represented by the bottom left box on the map). If Lev said it though, this same expression would point to Lev's house (represented by the bottom middle box on the map). This means that *my house* has a different denotation depending on who says it. It has the same sense no matter who says it though: something along the lines of 'the place of living that is associated with the speaker'.

The denotation of words

Denotation gives us a fairly efficient way to talk about the meaning of words. For *sour*, you are essentially saying, "*sour* is whatever property that all of these sour things have in common." You are pointing to that group of sour things. So, we can characterise the denotation of one-place predicates (predicates that only take one argument: some nouns, adjectives, and intransitive verbs) as **sets** of things. A **set** is a collection of things. In (4), ⟦x⟧ (*x* enclosed in double brackets) should be read as 'the denotation of the linguistic expression *x* '.

(4)	a.	⟦sour⟧ = the set of all sour things in the actual world
	b.	⟦pencil⟧ = the set of all pencils in the actual world
	c.	⟦snore⟧ = the set of all things that snore in the actual world

You might find it unintuitive that verbs denote a set of individuals too. But think about it this way: if someone asked "Who snores?", you can answer "they do" and point to the people that have this snoring property.

We will treat the denotation of proper names (like *Nathan Sanders*, the name of a linguist, who happens to be one of the co-authors of this textbook) to be the particular individual that that the name is pointing to in that context. In other words, the denotation of *Nathan Sanders* is the individual Nathan Sanders in the actual world. Sometimes the denotation of a name is abbreviated as the initial letter of the name (and bolded), like in (5b).

(5)	a.	⟦Nathan Sanders⟧ = the individual Nathan Sanders in the actual world
	b.	⟦Nathan Sanders⟧ = **n**

Constants and variables

The symbol that stands for the denotation of Nathan Sanders (in this case the bolded lowercase **n**) is called a **constant**. A constant is different from a variable. Recall that a variable is a placeholder for other values; it's called a variable because what it stands for can vary. A constant has a fixed value: what it stands for cannot be altered. So in (5), the constant **n** always stands for the individual Nathan Sanders. Any letter or symbol can be used as constants or variables, although traditionally, letters towards the beginning of the alphabet in English are typically used for constants (e.g., **a**, **b**, **c**) and letters towards the end of the alphabet tend to be used for variables (e.g., x, y, z). In this textbook, constants will be bolded, but variables won't be.

When a linguistic expression **denotes** (points to) a unique individual, this can also be called the expression's **reference**. For example, a name like *Nathan Sanders* points to a unique individual, so the individual Nathan Sanders is this name's reference. We can also say that the name *Nathan Sanders* **refers** to that individual.

It should be re-emphasized here that words like *sour*, *pencil*, *snore*, and *Justin Trudeau* denote actual things in the actual world. When we say "⟦sour⟧ = the set of all sour things in the actual world," we are not saying that the denotation of the word *sour* is the phrase (the linguistic expression) *the set of all sour things in the actual world*. We are quite literally saying that the word *sour* points to actual *sour* things that exist out there in the real world (or at least, our cognitive representation of them; see note above). The following representation may be helpful for imagining what denotation really is:



Figure **7.11.2**. The (partial) denotation of sour. (lemon, lime, grapefruit, sour candy, vinegar, umeboshi (Japanese pickled plums) — and all other sour things in our world!)



Figure **7.11.3**. The denotation of Nathan Sanders.

Because we don't always have the time to find stock images to represent the denotation of a linguistic expression, in this textbook, we will use the convention in (4) and (5).

Thinking of meaning in terms of the linguistic expression's denotation is useful in various ways. For example, how can we characterise the compositional meaning of the sentence *Nathan Sanders snores*? The denotation of *snore(s)* is the set of all things that snore in the actual world, and the denotation of *Nathan Sanders* is the individual Nathan Sanders in the actual world. What *Nathan Sanders snores* means, then, is that this individual Nathan Sanders is among this set of things that snore in the actual world.

The denotation of sentences

We know what some words denote now; how about sentences? What do they denote? One property of a sentence is that it has a **truth value**. There are two truth values in language: the abstract truth value true (sometimes written as T or 1), or the abstract truth value false (sometimes written as F or 0). To say that a sentence has a truth value means that a sentence is always either true or false. Words and non-sentential phrases don't have truth values. You can see if a linguistic expression has a truth value or not by embedding it in the construction "It is true/false that…", like in (6).

(6)	a.		It is true/false that **Nathan Sanders snores**.
	b.	*	It is true/false that **Nathan Sanders**.
	c.	*	It is true/false that **snores**.
	d.	*	It is true/false that **lives in Canada**.
	e	*	It is true/false that **in Canada**.

(6) shows that only sentences have truth values. Taking this observation, we can actually think of the denotation of sentences as its truth value: either the value T or the value F. In other words, sentences "point to" these abstract truth values. (7a) shows the denotation of a sentence that is true, and (7b) shows the denotation of a sentence that is false.

(7)	a.		⟦Nathan Sanders is bald⟧ = T
	b.		⟦Nathan Sanders is not bald⟧ = F

It is crucial to observe here that you need world knowledge in order for you to determine the denotation of a sentence. Oftentimes, we know enough about the world that we know whether a sentence is true or false (like the above examples). However, the more realistic view is that we don't know everything about every single thing in the world. Take the sentence *My neighbour's cat's liver weighs 326 grams* for example: what's the denotation of this sentence? It it true or false? The sentence surely has a truth value, but we don't have the relevant world knowledge to actually determine the truth value. This is why we often express the denotation of a sentence as its **truth condition** (the circumstances that yield a certain truth value). The truth condition of *My neighbour's cat's liver weighs 326 grams* is shown in (8).

(8)			⟦My neighbour's cat's liver weighs 326 grams⟧ =	T if my neighbour's cat's liver weighs 326 grams in the actual world, F otherwise

It might help to think of it this way: if we really wanted to, we could figure out if the sentence in (8) is true or false. Whether we can or want to is another matter. What's more relevant is that we know what circumstances would make the sentence true or false.

If and only if

The denotation in (8) can also be written as "T **if and only if** my neighbour's cat's liver weighs 326 grams in the actual world". *If and only if* means 'provided that': T provided that my neighbour's cat's liver weighs 326 grams in the actual world. This means that if my neighbour's cat's liver weighs 326 grams, then the truth value is T, and that if the truth value is T, then my neighbour's cat's liver weighs 326 grams. So, "if and only if" (sometimes also abbreviated as "**iff**") means that the implication goes both ways. This is the same thing as what (8) says.

The formula for the denotation of a sentence should be seen as: truth condition + world knowledge = truth value. If we reframe (8) in terms of truth conditions, we get something like this:

(9)	a.		⟦Nathan Sanders is bald⟧ = T if Nathan Sanders is bald, F otherwise
	b.		⟦Nathan Sanders is not bald⟧ = T if Nathan Sanders is not bald, F otherwise

In this case, we can combine our world knowledge with each truth condition to get T in (9a) and F in (9b), which is what was shown in (7). If you do have the relevant world knowledge to determine the truth value of a sentence, you should write out the actual truth value, like in (7). If you don't have the relevant world knowledge, you can write the denotation of the sentence as a truth condition.

In summary, intransitive verbs, adjectives, and nouns denote sets, proper names denote an individual, and declarative sentences denote truth values. In the rest of this chapter, we will look at various semantic phenomena that denotative meaning is equipped to explain.

Check your understanding

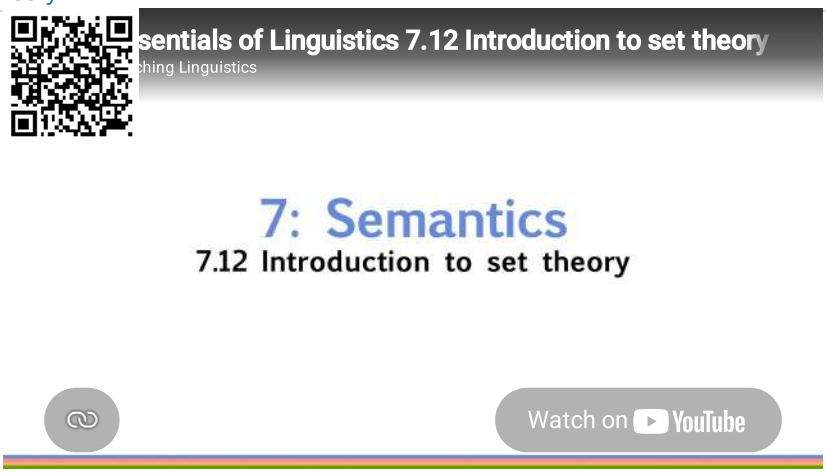
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7.12: Introduction to set theory



We just introduced **denotation** as a way of thinking about linguistic meaning. Let's consider the word *cat*. The sense of this word would be whatever meaning of *cat* that you store in your mental lexicon, but the denotation of it would be the set of all cats in the actual world. Terminologically, "things" that are in a set are called **members** (or **elements**) of that set. Recall from the previous section that double brackets mean 'the denotation of (the linguistic expression)'. So, ⟦cat⟧ in (1)should be read as 'the denotation of the linguistic expression *cat*'.

(1)		⟦cat⟧ = the set of all cats in the actual world

Recall also that names denote the individual that the name refers to. So the name *Panks*, the nickname for my cat, denotes the individual (the cat) named *Panks* in the actual world (the cat in the foreground in Figure **7.12.1**).

(2)		⟦ Panks ⟧ = the individual Panks in the actual world



Figure **7.12.1**. A cat named Pancakes/Panks (foreground) and a cat named Waffles/Waffy (background) in Toronto.

Sentences denote the **truth value** of the sentence, which can also be expressed as a **truth condition**. When we think about the meaning of intransitive predicates like *cat* as sets of things, this gives us an intuitive way to characterise the truth condition of a sentence like *Panks is a cat*. This sentence is true if the individual Panks is among the set of cats in the actual world.

(3)		⟦ Panks is a cat ⟧ = T if the individual Panks is a member of the set of all cats in the actual world, F otherwise

Since Panks indeed is a cat, the sentence in (3) would denote the truth value T. On the other hand, let's say that *Karti* is a name of a dog (see Figure **7.12.2**) (4) would be the denotation of the sentence *Karti is a cat*. It would denote F this time, because Karti is not among the set of cats in our world.

(4)		⟦ Karti is a cat ⟧ = T if the individual Karti is a member of the set of all cats in the actual world, F otherwise



Figure **7.12.2**. A dog named Karti in Portland.

The concept of set membership is illustrated in Figure **7.12.3**. Let's say we live in a world where the listed animals are the only animals that exist. The top circle represents the set of cats in this world. The bottom circle represents the set of dogs in this world. The sentence *Panks is a cat* expresses Pank's set membership relationship in this world: Panks can be found as a member in the top circle. The reason that *Karti is a cat* is false is because Karti cannot be found in this circle (he can, however, be found in the set of dogs).

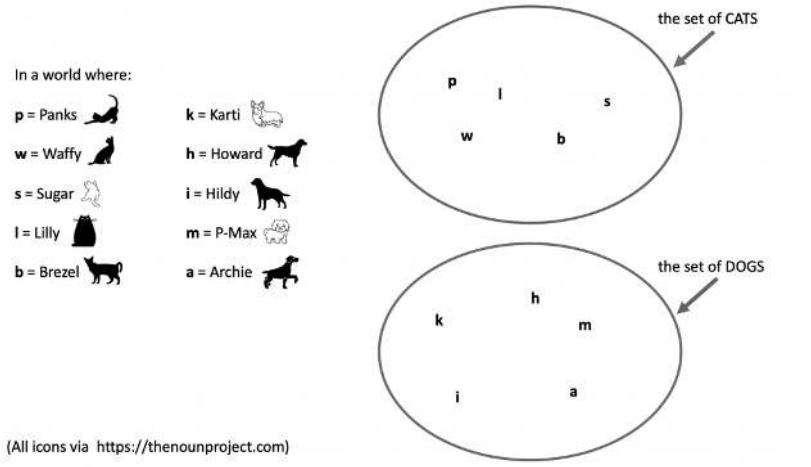


Figure **7.12.3**. The set of cats and dogs.

There can be smaller sets within a set. In other words, if we look at the set of cats in Figure **7.12.4**, there could be a subgroup of cats that have a certain property in common. For example, let's say Panks, Waffy, and Lilly are Siberian Forest Cats (Siberian Cats), and that Sugar and Brezel are not. We can say that the set containing just Panks, Waffy, and Lilly is a **subset** of the set of cats.

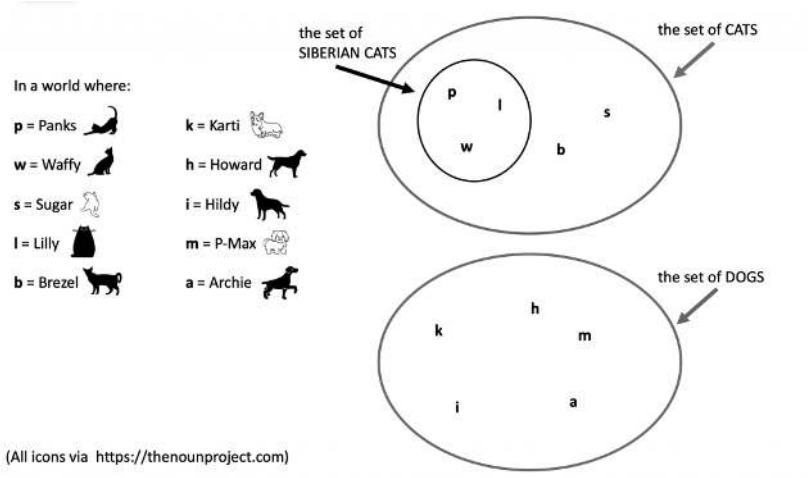


Figure **7.12.4**. The set of Siberian Cats is a subset of the set of cats.

A more formal definition of the subset relation goes like this; let's use the variables A and B to represent sets (capital letters are usually used for variables and constants that stand for a set).

(5)	A is a subset of B if all members of A are also members of B.

As you can see, Panks, Waffy, and Lilly are members of the set of Siberian Cats. Panks, Waffy, and Lilly are also members of the set of cats. Therefore, the set of Siberian Cats is a subset of the set of cats. In logic, the subset symbol is $\subseteq$. $A \subseteq B$ can be read as 'A is a subset of B'. So in our example, if we call the set of cats C and the set of Siberian Cats S, the subset relationship can be stated as $S \subseteq C$.

In the definition given in (5), we can also say that B is a **superset** of A. In our example, the set of cats is a superset of the set of Siberian Cats. The superset symbol is simply the subset symbol flipped. So $C \supseteq S$ reads as 'C is a superset of S'.

According to the definition in (5), it also means that if A and B contained exactly the same members, A would still be a subset of B and vice versa. If we want to specifically discuss how some members of B are *not* in A (like how not all cats are Siberian Cats in Figure 7.19), the term **proper subset** is used. (6) is the formal definition of *proper subset*.

(6)	A is a proper subset of B if all members of A are also members of B, and there is at least one member of B which is not a member of A.

So in Figure 7.19, S is a subset of C, but S is also a proper subset of C. The symbol for proper subset is $\subset$: so we can write $S \subset C$. We can also say that B is a **proper superset** of A in the definition described in (6). The superset symbol is $\supset$, so we can write $C \supset S$ for our example in Figure **7.12.4**.

The symbols that were are using here borrow from a branch of mathematics that studies sets, called **set theory**. Table 1 below summarises some common set theory notations.

Table 7.12.1. Set theory notation.

Notation	Meaning
A	The set A. Capital letters are used to refer to sets.
{ **a, b, c** }	The set containing members **a**, **b**, and **c**.
b ∈ A	**b** is a member of A.
d ∉ A	**d** is not a member of A.
A⊆B	A is a subset of B.
B⊇A	B is a superset of A.
A⊂B	A is a proper subset of B.
B⊃A	B is a proper superset of A.
A = B	A is identical to B (that is, A and B have exactly the same members)
|A|	The cardinality of A. That is, the number of members in A.
|A| = 3	The cardinality of A is equal to 3. That is, there are three members in A.
A∩B	The intersection of A and B. This set contains objects that are both a member of A and a member of B.
A∪B	The union of A and B. This set contains objects that are either a member of A or a member of B.

Set theory is useful for understanding how the meaning of some **quantificational** words work in language. Quantificational means having to do with quantity, or how much of something. In English, there are quantificational determiners like *every*, *some*, *most*, *many*, *few*, *two*, *five*, and so on. In order to understand the meaning of a sentence like *Two cats are grey* let's think about **set intersection**. Let's say there is a set of cats (call it C). Let's say there's another set, a set of grey things (call it G). When you take the **intersection** (or overlap) of C and G, that's the set of cats that are grey (see Figure **7.12.5**). This can be written as C∩G in set theory notation.

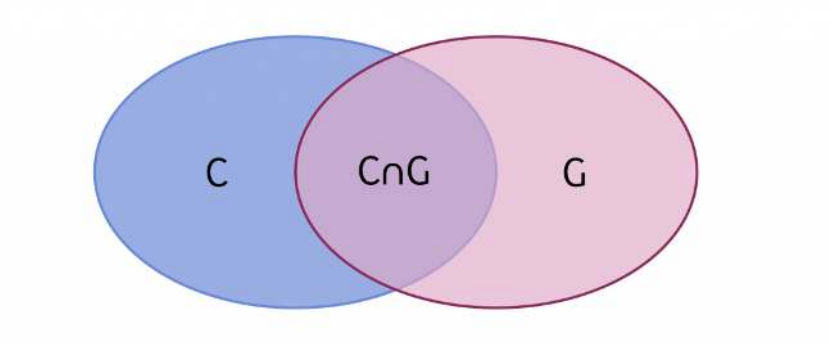


Figure **7.12.5**. Set intersection.

The quantificational determiner *two* essentially asks the question of, "How many things are in this intersection, C∩G?". The determiner *two* says "two things". Now think about *every*: What does *Every cat is grey* mean in terms of sets? It means that all things in the cat set, C, are also in the grey set, G. Formal set theory notation is not super important in this textbook — all you need to retain for the next section is what a superset and a subset is, conceptually. For the advanced learner, try the exercises at the end of this section to see if you can write *Panks is a cat*, *Two cats are grey*, and *Every cat is grey* in set theory notation!

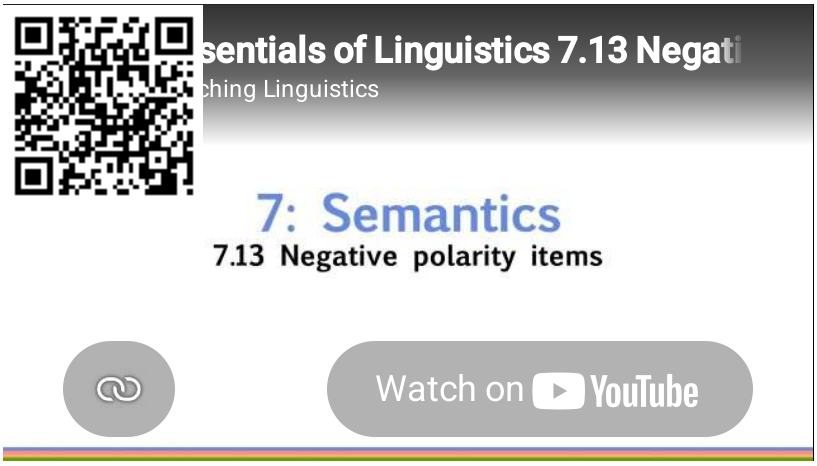
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7.13: Negative polarity items



When we think of the meaning of linguistic expressions in terms of their denotation, there are some interesting linguistic patterns that we can explain. Consider the following sentences.

(1)	a.		They did not pet **anything yet**.
	b.		We did not like the candy **at all**.
	c.		She didn't see ghosts **anywhere**.
	d.		Nobody **ever** dressed up as a dinosaur.
	e.		I doubt that you saw **anyone**.
	f.		If you bought **any** pumpkins, then put them on the counter.

The underlined expressions in (1) are called **negative polarity items** (NPIs). NPIs are expressions that only appear in certain "negative" grammatical contexts. We call the context in which NPIs can appear its **licensing context**. The most straight-forward case, NPIs are licensed (= appears) in sentences with the negation *not* or *no*, as in (1a)-(1d). Note however, that it is not sufficient for the sentence to just *contain* negation. Syntactically, the negation must be in a structurally higher position than the NPI in the tree. So although (2a) is well-formed, when the NPI is fronted, it is ungrammatical, as shown in (2b).

(2)	a.		I did not pet any cats.
	b.	*	Any cats, I did not pet.

(3) shows what happens when the NPI-licensing environments disappear. The sentences are ungrammatical.

(3)	a.	*	They petted **anything yet**.
	b.	*	We liked the candy **at all**.
	c.	*	She saw ghosts **anywhere**.
	d.	*	Somebody **ever** dressed up as a dinosaur.
	e.	*	I know that you saw **anyone**.
			(Intended interpretation: 'I know that you saw someone')
	f.	*	You bought **any** pumpkins.

Of interest to us is the fact that you do not literally have to have the negation *not* for NPIs to be licensed. In (1e), the licensing context is embedding under the verb *doubt*. In (1f), the licensing context is the **antecedent of the conditional**: the "if" clause.

You might have the intuition that *doubt* is still "inherently negative" in some way. But what about (1f) with the "if" clause? What makes that "negative"? As it turns out, there is a more precise way to characterise NPI-licensing context than "negative". The contexts in (1a)-(1f) all have something in common when we take set relationships into consideration.

NPIs are licensed in **downward-entailing** contexts. Let's start with the NPI-licensing context "They did not ____" to illustrate downward entailment.

(4)	Context: *They did not* ____			
	a.		They did not pet **cats**.	(**proper superset**)
	b.		They did not pet **Siberian Forest Cats**.	(**proper subset**)

To see if a context is downward-entailing, there are three steps. Step 1: Insert a phrase into the context, and make sure the phrase contains something that denotes a set. In (4a), *cats* denotes a set of cats. Step 2: Construct another sentence with the same context — but swap out the set from the original sentence with a proper subset of that set. So in (4b), I have chosen Siberian Forest Cats, because the set of Siberian Forest Cats is a proper subset of cats.

Step 3: Check the entailment relationship between the two sentences you constructed. Does the sentence with the proper **superset** (=(4a)) entail the sentence with the proper **subset** (=(4b)), or does the sentence with the proper **subset** (=(4b)) entail the sentence with the proper **superset** (=(4a)). In (4), If they did not pet cats, then it necessarily means that they did not pet Siberian Forest Cats. The other way around does not hold: Just because they did not pet Siberian Forest Cats does not mean that they did not pet cats (perhaps they petted a Siamese Cat). So in this case, the sentence with the proper **superset** (=(4a)) entails the sentence with the proper **subset** (=(4b)). A context that gives rise to this kind of entailment relationship is called a **downward-entailing** context. And *this* seems to be what's relevant to NPI licensing.

Let's try this with a context without negation, which we know is *not* an NPI-licensing environment. We will try the three steps in (5) again.

(5)	Context: *They* ____			
	a.		They petted **cats**.	(**proper superset**)
	b.		They petted **Siberian Forest Cats**.	(**proper subset**)

OK, now, which one entails which? In this case, (5a) does *not* entail (5b). Just because they petted cats does not necessarily mean they petted Siberian Forest Cats. However, (5b) *does* entail (5a): If they petted Siberian Forest Cats, then it necessarily means that they petted cats. A context that gives rise to this opposite kind of entailment relationship is called an **upward-entailing** context. NPIs are *not* licensed in upward-entailing contexts.

Let's try this with the antecedent of the conditional, which we said was an NPI-licensing environment.

(6)	Context: If ____, then [declarative sentence].			
	a.		If you buy **pumpkins**, then you get free candy.	(**proper superset**)
	b.		If you buy **orange pumpkins**, then you get free candy.	(**proper subset**)

Which one entails which? If the rule is that you get free candy for buying pumpkins, then it is necessarily true that you get free candy if you buy orange pumpkins, too. But if the rule was that you get free candy for buying orange pumpkins in particular, do you necessarily get free candy if you buy pumpkins? The answer is no: it's possible you bought green or yellow pumpkins! Since (6a) entails (6b) but not the other way around, this is a downward-entailing environment.

So as we can see, thinking about the meaning denotations and sets is actually quite useful!

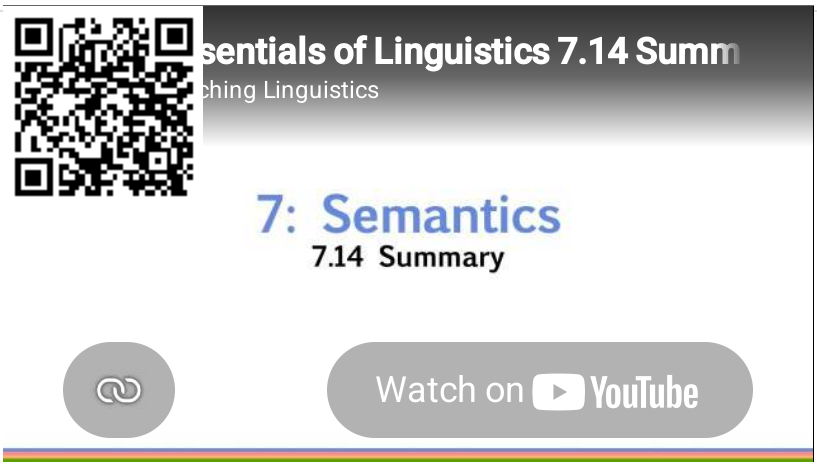
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7.14: Summary



In this chapter, we explored different kinds of linguistic meaning: entailments vs. implicature, sense vs. denotation, lexical vs. sentential meaning, compositional vs. non-compositional meaning. The take away is that "what does this mean?" is a complicated question: there are many layers to linguistic meaning, each providing important insight into how we produce and understand meaning as language users.

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7.15: Exercise your linguistics skills

Exercise 1. *Basic; 7.5.* Consider the category *vehicle*. List ten words that denote members of the *vehicle* category. Which ones are more prototypical, and which ones are less prototypical members of the category? Discuss what properties make something a more prototypical vehicle or a less prototypical vehicle.

Exercise 2. *Intermediate; 7.10.* Imagine that someone said to you during a debate that *drip* to mean 'style' isn't a "real word" because that kind of use isn't found in the Oxford English Dictionary. How might you respond to them?

Exercise 3. *Advanced; 7.4-7.9, 7.11*. Discuss the pros and cons of each way of thinking about linguistic meaning.

1. Sense vs. denotation
2. "Lexical meaning as definitions in the lexicon" vs. "lexical meaning as concepts"

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CHAPTER OVERVIEW

Chapter 8: Pragmatics

Learning Objectives

When you've completed this chapter, you'll be able to:

- Appreciate the diversity of linguistic meaning;
- Understand that "meaning" is much more than just the literal meaning of words and sentences;
- Understand why meaning is important in our daily lives;
- Use conversational principles to calculate how implicatures can be produced in discourse;
- Appreciate neurodiversity in pragmatics and understand that different people calculate implicatures in different ways in conversations;
- Respond to common misconceptions about the Cooperative Principle in an informed way;
- Use diagnostics to classify a piece of meaning as an implicature or an entailment;
- Appreciate the diversity of conversational principles across languages and cultures;
- Explain the difference between locutionary, illocutionary, and perlocutionary meaning;
- Analyse the illocutionary meaning of basic speech/sign acts (assertions and questions) by making reference to formal notions of the context like the Common Ground and the Question Under Discussion;
- Evaluate the limitations of the theories that are introduced in the chapter and think critically about what other types of meanings there may be in language;
- Use the scientific method to think about meaning like a linguist.

In this chapter, we look at sentential meaning from the perspective of how it is influenced by and how it influences the context. The study of how context affects meaning is called **pragmatics**. In the previous chapter, we learned that sentences can create certain implicatures based on the discourse context. In the first half of this chapter, we will look at the conversational logic of how implicatures arise. We will look at the foundational work of philosopher Paul Grice — the Cooperative Principle — and evaluate it as a theory. We will look at the basic principles of conversational logic, and examine what differences various languages and cultures exhibit in terms of conversational rules. In the latter half of the chapter, we will look at illocutionary meaning: what "happens" to the context when you make utterances. We will focus on the formal analysis of what it means for us to make an assertion versus ask a question in discourse. In doing so, we will sharpen our understanding of what a "context" is by introducing formal notions such as the Common Ground and the Question Under Discussion. These tools will be helpful for analysing illocutionary meaning and what we mean by what "happens" to the context when we make utterances.

8.1: At-issue vs. non-at-issue meaning
8.2: Cross-community differences in discourse
8.3: Semantics and pragmatics in the legal domain
8.4: Conversational implicatures
8.5: The Cooperative Principle
8.6: How inferences arise, and neurodiversity in inference making
8.7: Violating vs. flouting a maxim
8.8: More about the Cooperative Principle
8.9: Illocutionary meaning
8.10: Thinking about illocutionary meaning compositionally
8.11: What is a context?
8.12: Assertion
8.13: Question
8.14: Analysing meaning dynamically

8.15: Summary (and further questions to consider)
8.16: Exercise your linguistics skills

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8.1: At-issue vs. non-at-issue meaning

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Let's revisit the issue of what we mean by *meaning* from Chapter 7 (Semantics). In Chapter 7, we learned how (3) concerns linguistic meaning, while (1) and (2) do not.

(1)		In Japanese culture, what does it **mean** when a tea stalk floats vertically in your green tea?
(2)		taka i / mis hin-o / katt e-mo / tsuk aika ta-ga / wak aran aker eba / **imi-** ga / nai exp ensi ve / sewi ng. mac hing - ACC / buy- eve n.if / how .to.u se- NOM / und erst and. NEG.if / **mea nin g-** NOM / NE G.ex ist 'There is no point in buying an expensive sewing machine if you don't know how to use it' (Japanese)
(3)		*Ode'imin* and *strawberry* **mean** the same thing.

We learned that the notion of *meaning* in (3) can be thought of in one of two ways: the sense of the word, or the denotation of the word. So when we say that *ode'imin* in Ojibwe and *strawberry* in English "mean the same thing", that can be interpreted as (i) '*ode'imin* and *strawberry* have the same sense; Ojibwe speakers and English speakers have the same lexical semantics for the term in their heads' or (ii) '*ode'imin* and *strawberry* have the same denotation; these words both point to the same fruit in the actual world'. We found that thinking about meaning in terms of their sense was very useful for thinking about the lexical meaning of words, and thinking about meaning in terms of their denotation was helpful for analysing how a lot of quantificational meaning works, like when we say ***Three*** *strawberries are red* or ***Every*** *strawberry is red*.

Recall the other use of *meaning* that we introduced in Chapter 7:

(4)		I said coffee is just as tasty as tea, but I didn't **mean** it.

We mentioned briefly in Chapter 7 how *meaning* in this sentence is used to express something about the speaker's sincerity. This use of *meaning* is not about the sense of the words or the sentence, considering *Coffee is just as tasty as tea* still has sense, even if the speaker wasn't sincere about it. So this is not the same kind of "meaning" as the one mentioned in (3) — but it's still related to language. This type of meaning concerns what you are doing in a conversation when you produce an utterance. This person is referring to some sort of commitment that they made during the discourse when they said "coffee is just as tasty as tea", and now they wish to retract it. In this chapter, we will discuss what exactly is happening when you have a conversation with someone.

Here is another sort of *meaning* we will explore in this chapter. Consider (5).

(5)		What do you **mean**, Mounissa bought 10lbs of strawberries?

Here, it's not very likely that the speaker is asking about the literal meaning of this sentence when they say, "What do you mean?" — the compositional sense of the sentence is pretty clear: an individual named Mounissa exchanged some amount of money for strawberries, and these strawberries weighed 10lbs total. Instead, a natural understanding of what is meant by *meaning* here is about the **implicature** the sentence carries. Recall from Chapter 7 that an **implicature** is a non-entailment that is suggested by a sentence, based on the context. So in (5), if you know that Mounissa loves jam, *Mounissa bought 10lbs of strawberries* might imply that Mounissa is making strawberry jam — lots of it. Importantly, an implicature is not an entailment, so the implicature of any particular sentence can change depending on the context. So in another world, maybe Mounissa isn't making strawberry jam; maybe she's making a bunch of strawberry lemonade at a farmer's market. In this chapter, we will continue to explore what implicatures are, and how they arise in a conversation.

In this textbook, we will call the "literal", "surface" meaning of a sentence the **at-issue** meaning of the sentence. The main, literal meaning of the sentence is the at-issue meaning, because that's the main "issue" being discussed. "Issue" here just means 'topic of discussion', and not something negative like 'problem'. In Chapter 7, we largely discussed at-issue meaning.

The meaning that is not a part of the "surface" meaning of the sentence can be called the **non-at-issue** meaning of the sentence. So implicatures are a type of non-at-issue meaning. In declarative sentences, a good diagnostic for the at-issueness of a piece of meaning is to negate the sentence using "it is not the case that…". Let's see what happens to the various meanings produced by the sentence in (6) when you negate it in (7).

(6)		(Context: Mounissa is at the market, looking for ingredients to make jam with.)
		Mounissa will buy the discounted strawberries.
		a. **At-issue meaning:** 'Mounissa will buy the discounted strawberries.'
		b. **Non-at-issue meaning (possible implicature):** 'Mounissa likes strawberries.'
		c. **Non-at-issue meaning (presupposition):** 'There are discounted strawberries.'

(7)		It is not the case that Mounissa will buy the discounted strawberries.
		a. **No longer means:** 'Mounissa will buy the discounted strawberries'
		b. **Still can mean:** 'Mounissa likes strawberries.'
		c. **Still can (and must) mean:** 'There are discounted strawberries.'

Sentential negation ("it is not the case that…") targets the at-issue meaning. The negated sentence in (7) can no longer mean 'Mounissa will buy the discounted strawberries'. In fact, it means the exact opposite: the event in which Mounissa buys the discounted strawberries will *not* take place. The at-issue meaning that was present in (6) necessarily gets canceled in (7).

The negation does not necessarily cancel the implicature, however: It's possible for Mounissa to not buy discounted strawberries *and* simultaneously like strawberries still. Non-at-issue meaning cannot be the target of sentential negation. It's certainly possible that Mounissa does *not* like strawberries in (7), but what matters is that the implicature we got from the positive sentence in (6) *can* still be true in (7).

Given the above diagnostic, we can conclude that **presuppositions** are non-at-issue, too. Recall from Chapter 7 that presuppositions are what's assumed to be true already when a sentence is uttered. In (6), the definite determiner *the* triggers the presupposition that discounted strawberries exist. Sentential negation cannot negate presuppositions. In fact, (7), which is the negated version of (6), still *necessarily* assumes that there are discounted strawberries. That is, even if you negate the original sentence, the presupposition of that sentence "survives". When you negate a sentence, its implicature possibly disappears, but never its presupposition.

In linguistics, you might also encounter the term **truth-conditional meaning** and **non-truth-conditional meaning** outside of this textbook, to refer to at-issue meaning and non-at-issue meaning, respectively. We find that it's a little less confusing to call e.g., presuppositions
"non-at-issue meaning" rather than "non-truth-conditional meaning", because presuppositions are still related to the truth of the sentence (because a presupposition is what has to be *true* before the sentence is uttered).

In this chapter, we will explore what kinds of non-at-issue meanings there are in language, what their differences are, and how they come about in conversations.

Check your understanding

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8.2: Cross-community differences in discourse

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Figure 8.1. A comic about a Japanese child learning about sarcasm in American English.

Imagine a time where you were in a conversation with someone with a cultural background different from yours. Have there been times where miscommunication happened? As someone who immigrated to the United States from Japan at the age of 6, I certainly had experiences where American conversational rules felt really different from Japanese conversational rules. One of things I remember learning "how to do" in English is sarcasm (see Figure 8.1). Something I noticed was that Americans (in my 9-year old perspective) said blatantly false things, often to be funny, sassy, or mean. I distinctly recall one summer — I must've been 9 or 10 — where we visited a friend in Japan, and in a conversation with this friend, I used this new discourse tactic that I was so proud to have acquired. *waa, kore cho: okaidoku-da-ne* 'Wow, that is such a good deal!' I said in Japanese, pointing at super expensive jewellery in a magazine. I will never forget the confused look on my Japanese friend's face. Studies support my anecdotal experience: Ziv (1988) found that American students are more sarcastic than Japanese students (see also Adachi 1996).

There are different conversational rules for different language communities. What counts as a 'friendly' interaction? What counts as 'polite'? Linguists who have done anthropological work have found imperatives (commands like "cut down that branch!") can vary in terms of their perceived politeness from culture to culture: they may be more commonly perceived as rude in Australia than in China, for example (Wierzbicka 2003). In Canadian English, *Why don't you close the window?* could be a perfectly polite request, but according to Wierzbicka, the literal equivalent of this in Polish — *Dlaczego nie zamkniesz okna* — would imply stubbornness on the part of the addressee (e.g., 'why haven't you closed the window yet like you should?! it's the right thing to do!'). In ordinary conversational contexts, being honest is usually assumed to be one of the most important principles of conversation (Grice 1975), but what counts as "being honest" may vary from community to community. In some communities, any falsehood — including fiction — is considered a "lie" (Danziger 2010).

When we study pragmatics, we need to be aware that there are cultures and conversational norms beyond your own. Encountering unfamiliar discourse rules in a language that you may not have encountered before may give rise to feelings of surprise, and that's OK — but we hope that you will use your linguist mind to prevent this surprise from turning into negative judgments about other cultures and languages. Remember, all forms of language are valid!

Check your understanding

This is a reflection question with no right answer. Have you ever had an experience like the one described in the comic in Figure 8.1, where you had to learn new conversational rules in another language? Informally describe what the unfamiliar rule was, and compare it to conversational rules in your first language.

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8.3: Semantics and pragmatics in the legal domain

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Before we talk more about non-at-issue meaning, let's consider why it's important for us to study linguistic meaning, and how what we are learning about meaning in this textbook might have an impact on our lives.

One immediate way in which linguistic meaning has an impact on our lives is how meaning affects the law. This can range from how a legal contract is to be interpreted to how statements are to be interpreted in court. We discussed in Chapter 7 that words are not static in their meaning: depending on the context, they can take on



Figure 8.2. A digital drawing of a cat.

various interpretations. Oftentimes, we as humans are good at using context cues to figure out the intended meaning. For example, if we are looking at the digital drawing in Figure 8.2 and utter "That cat is so cute!", most adult English users likely do not get confused about the fact that *cat* does not refer to an actual cat in this context. *Cat* in this context means something like 'drawing of a cat'. And even if an utterance is truly ambiguous, the momentary confusion is likely not harmful in everyday conversations. In a legal context however, how something is to be interpreted can be life-changing, so an informed understanding of types of linguistic meaning and possible sources of ambiguity is critical.

One interesting legal case from 1960 (Frigaliment Importing Co. v. B. N. S. Int'l Sales Corp.) concerned a dispute over the meaning of the word *chicken* in a contract. The contract stated an agreement that the defendant would send the plaintiff some chicken. The plaintiff thought that *chicken* in the contract meant '(young) stewing chicken', but the defendant thought it meant 'chicken' more generally. So when the defendant sent the plaintiff (mature) frying chicken, the plaintiff claimed this was a breach of the agreement in the contract. One of the issues in this case was that in the poultry trade language community, *chicken* indeed is used to refer to young chicken. What had to be decided in court was whether it was also possible for it to have the general 'chicken' interpretation in this particular context: was the term *chicken* ambiguous? The court ruled in favour of the defendant: it was reasonable for *chicken* to be interpreted in the general sense because it had been used that way at least once during the negotiation (among other factors).

In another case in 2017 (State of La. v. Demesme), the supposed ambiguity was with the word *dog*. Plaintiff Warren Demesme was being questioned for a suspected crime by the police, and during the questioning Demesme asked for legal counsel, saying "Why don't you just give me a lawyer dawg". This was not taken to be a request for a lawyer, and Demesme was therefore not given a lawyer at the time. Demesme sued. In the view of the prosecution, "Why don't you just give me a lawyer dog (dawg)" was non-sensical or at least ambiguous. The claim was that *dog* could be interpreted as 'canine'. According to the Louisiana Supreme Court, it was possible for the interrogator to think that Demesme was requesting a canine lawyer. However what Demesme meant, of course, was *dawg*, a second-person form of address like *dude*. Ultimately, the court ruled in favour of the state of Louisiana and decided that what Demesme said did not count as a request for legal counsel. What we learned in Chapter 7 tells us yes, *dog* is in principle ambiguous. However, you may have the intuition that the ruling in this case feels unreasonable. This chapter will help us explain why this feels that way. It should also be flagged that Demesme is Black and spoke in a dialect of English called African American English during his conversation. This case also relates to the discussion from Chapter 2 (Language and Power) and how someone's preconceived ideas about groups of people can affect how utterances are perceived and interpreted, often unfairly.

This chapter will also discuss implicatures and how they arise in discourse. Another legal case, Bronston v. United States (1973), gives us insight into why it is important for us to study how implicatures are created. This case from 1973 involved Samuel

Bronston, who was a movie producer who filed for federal bankruptcy protection. During this process, he was being asked in court about his financial history. Here is how the conversation between the examiner and Bronston went.

Examiner:	Do you have any bank accounts in Swiss banks, Mr. Bronston?
Bronston:	No, sir.
Examiner:	Have you ever?
Bronston:	**The company had an account there for about six months, in Zürich.**
Examiner:	Have you any nominees who have bank accounts in Swiss banks?
Br	No, sir.

Bronston:	
Examiner:	Have you ever?
Bronston:	No, sir.

The relevant part of this conversation is the bolded statement made by Bronston. He was asked whether he ever had a (personal) Swiss bank account. His answer to this was “The company had an account there”. If you are not familiar with this case, you probably inferred what the court inferred from this statement: that Bronston’s *company* had a Swiss bank account, but *Bronston* himself never personally did. The conversational logic is that if it was true that Bronston himself had a Swiss account, he would’ve said so. But he didn’t, so what he said — that the company had a Swiss account — must have been the most truthful and most informative thing he could say.

There’s a plot twist to this story: Bronston actually did have a personal Swiss bank account. When this fact was revealed later, there was a debate as to whether Bronston had committed **perjury**: lying under oath in court. The catch here is that the literal words Bronston uttered in the conversation in (1) contain no lies: it’s actually also true that his company had a Swiss bank account. It is also the case that the sentence *The company had an account there for about six months, in Zürich* does not *entail* that Bronston himself didn’t have a Swiss account. This is merely an implicature. What he did was refrain from giving other relevant, truthful information, which misled the court to believe that the answer to “Have you (personally) ever had a Swiss bank account” was “No.”

What do you think? If someone misleads the addressee to believe something false because of an implicature they created, does that count as lying? In ordinary cases, such as in regular everyday conversation, it’s certainly true that this still feels like deception. In this legal case, the United States Supreme Court decided that this did NOT count as perjury. The decision was based on the fact that Bronston genuinely believed his response to be true. It was not actually clear if he intended to mislead the examiner. The Supreme Court held that it was the *examiner*‘s responsibility to recognise that Bronston was avoiding answering the question that was posed, and to get the relevant answer by asking follow-up questions.

There are other cases, however, in which people have been held accountable for implicatures they created. For example, in Dahan v. Haim (2017), which was a small claims dispute in Israel, a landlord put up an ad for an apartment online. The prospective tenant showed interest in the apartment. (2) is what this potential tenant texted to the landlord (the text was originally in Hebrew).

(2) Good Morning 😊 interested in the house 💃👯✌☄🐌🔪 just need to discuss the details…When's a good time for you?

Based on this message, the landlord inferred that this person (and their partner) was going to rent the apartment, and removed the ad online. After some conversation about when the contract could be signed, the potential tenants disappeared and fell out of touch. Because of this, the landlord sued them claiming **reliance**: a type of contract law that says you can file suit for damages if someone doesn't follow through with a deal that you both have agreed on.

The Judge decided that the emojis (among other factors) conveyed optimism. Although this wasn't a binding contract, the Judge decided that it was reasonable for the plaintiff (the landlord) to conclude that the couple intended to rent the apartment. The message in (2) doesn't literally say that they will be renting the apartment. It doesn't entail that; it just strongly implies so. In this case, the defendant was held accountable for this implicature.

As we can see from these legal cases, it very much matters in real life what sorts of implicatures a speaker creates. This is a good reason for us to study not just **semantics** but also **pragmatics** — how meaning is used in context — and the mechanism of how non-at-issue meaning like implicatures arise in discourse. In this chapter, we will explore what different kinds of non-at-issue meanings there are in language.

Check your understanding

This is a discussion question with no right answer. Can you think of situations you have personally been in where someone made a misleading implicature? Why did you infer what you inferred? What contextual cues led you to infer it? Did you feel deceived when this happened? Or maybe you were the one who accidentally created an implicature you did not intended; in that case, why do you think the other person inferred what they inferred? Did the other person accuse you of lying, and if so, did you feel that it was fair or unfair?

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8.4: Conversational implicatures

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Let's start with a review of entailments vs. implicatures. Recall from Chapter 7 (Semantics) that implicatures are cancellable. They are not entailments, so they are not necessarily true from a certain sentence being true. (1) shows that you cannot cancel an entailment, while (2) shows that an implicature can be.

(1)	a.		This is a book about the history of China.
			(**Entailment**: 'This is a book.')
	b.	⊥	This is a book about the history of China, but it is not the case that this is a book.

(2)	a.		This is a book about the history of China.
			(**Possible implicature**: 'This book is long.')
	b.		This is a book about the history of China, but it is not the case that this book is long. (e.g., It's actually a short concise summary.)

Since an implicature is a non-entailment, an implicature of a sentence can change depending on the context. For example, in (3), Danny's utterance *This is a book about the history of China* carries the implicature 'I think you will like this book', but with the

context in (4), this implicature is harder to get (in fact, the more natural implicature is the opposite: ‘I do not think you will like this book’).

(3)			(Context: Danny knows that Josh is a history enthusiast.)
	Josh:		Do you think I will like this book?
	Danny:		This is a book about the history of China.
			(Implicature: ‘I think you will like this book.’)

(4)			(Context: Danny knows that world history has never been Josh’s forte.)
	Josh:		Do you think I will like this book?
	Danny:		This is a book about the history of China.
			(Implicature: ‘I do not think you will like this book.’)

Importantly, the entailment ‘This is a book’ is *always* there for the sentence*This is a book about the history of China*, no matter what the context is. It entails this in (3), and it still entails this in (4), too. And in fact, no matter what the context is, it will always entail that. This is a crucial difference between implicatures and entailments: implicatures are context-dependent, entailments are not.

Sometimes, implicatures are called **conversational implicatures** because the implicatures arise out of conversational rules, to be discussed in the next section.

Check your understanding

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8.5: The Cooperative Principle

Part 1 video (the Cooperative Principle):

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The Cooperative Principle

In this section, we will discuss the conversational logic behind why certain implicatures arise in discourse. Let's start with the following example in (1).

(1)	Aya:		Did Raj feed the cat and clean the litterbox?
	Bo:		He fed the cat.
	Aya:		(Infers: 'He didn't clean the litterbox.')

Terminologically, the ***speaker/signer*** creates an **implicature** or they **imply** that content. The ***addressee*** makes an **inference** or they **infer** that content.

We use ***speaker/signer*** and ***addressee*** in this chapter to discuss the dichotomy of "producer of utterance" vs. "person at whom the utterance was directed". Where we are referring to the producer of an utterance in a *spoken* language in particular, we will use ***speaker***. Where we are referring to the producer of an utterance in a *signed* language in particular, we will use ***signer***. When we are referring to 'producer of utterance' in a more general way not specific to modality, we will use ***speaker/signer***. Outside of this textbook, you may encounter just "*speaker*" being used to mean 'producer of utterance (not specific to modality)'. Some signed language users do not have a problem with this use of "*speaker*", but many signed language users think a more modality-inclusive term should be used. Some other alternatives for this include: *utterer/addressee*, *addressor/addressee*, *author/addressee*, *sender/perceiver*, *producer/perceiver*, *sender/receiver*, *sender/recipient*, and *communicator/audience*.

The basic idea of why we get this implicature in this context is that *if* Raj had fed the cat *and* cleaned the litterbox, Bo would've said so. He didn't in this case, so Aya can infer that only *Raj fed the cat* is true, and that *Raj cleaned the litterbox* is false. Here is how this implicature would be calculated by Aya:

1. I asked Bo if Raj fed the cat and cleaned the litterbox.
2. I assume that Bo would only tell me things that are true.
3. I assume that Bo would give me the maximally informative answer to my question.
4. Bo could've answered "Raj fed the cat and cleaned the litterbox", "Raj fed the cat", "Raj cleaned the litterbox," or "Raj didn't feed the cat or clean the litterbox".
5. If the actual facts were that Raj fed the cat AND cleaned the litterbox, then the following answers would be logically true statements: "Raj fed the cat and cleaned the litterbox," "Raj fed the cat," and "Raj cleaned the litterbox".
6. However, if Raj actually fed the cat AND cleaned the litterbox, "Raj fed the cat and cleaned the litterbox" would be the more informative thing to say than "Raj fed the cat" or "Raj cleaned the litterbox".
7. In actuality, Bo only said "Raj fed the cat." This must be because if he said "Raj fed the cat and cleaned the litterbox," it would be a false statement.
8. Therefore, it must be the case that only *Raj fed the cat* is true, and that *Raj cleaned the litterbox* is false.

This way of analysing how implicatures arise in discourse is called the **Cooperative Principle**, proposed by philosopher Paul Grice. He proposed that one way of explaining how we get implicatures in a conversation is to think that there are implicit conversational principles that discourse participants follow. According to the Cooperative Principle, the major underlying assumption that we make in a conversation is that all discourse participants are acting in a way to accomplish conversational goals. For example, let's say that the topic of discussion was "How much money should we spend on our cat's birthday party?". *If* everyone in the conversation agrees that the goal is to figure out a reasonable cost for the party, then all discourse participants

assume that everyone in the conversation is acting in a reasonable way and uttering things in order to accomplish this goal. This is what is meant by "cooperation" in the Cooperative Principle. Specifically, Grice described four **maxims** (or general rules of conduct) that might be the basis of many conversations: the Maxim of Quality, Maxim of Quantity, Maxim of Relation, and Maxim of Manner. The idea is that if these are the conversational rules that people follow (and if people assume that other people follow these rules too), then there is an explanation of why certain implicatures arise in discourse.

You will notice that the maxims are stated as imperatives (e.g., "do this!", "don't do that!"). These are *not* meant to be prescriptive "do's" and "don't's". They should be taken as a way to describe someone's pragmatic knowledge in a language. It's similar to how phonological rules can be stated like "turn voiceless consonants into voiced consonants!" or "don't voice the consonant if you already have a voiced obstruent in the morpheme!". Grice at one point describes the Cooperative Principle as something that is "REASONABLE for us to follow" and something that "we SHOULD NOT abandon" (Grice 1975, p.48; emphasis his). Sometimes this is misinterpreted to mean that the Cooperative Principle is a set of prescriptive rules, something along the lines of "if you don't follow these rules, you are not a good language user". However, that is not what he meant. A better interpretation of the Cooperative Principle goes something like this: *I*F discourse participants have a common immediate goal in the conversation, THEN it is in their best interest to follow something like the Cooperative Principle (Grice 1975, p.49). Grice pondered that this type of assumption may be an extension of cooperative transactions in general, not limited to language: if you and I agreed to get a car fixed together, it would be in our best interest to act in a cooperative way to accomplish this goal (Grice 1975, p.48).

Of course, what counts as "cooperative" in a conversation might be different depending on what kind of conversation it is (Grice 1975, p.48): what if you are fighting? Or writing a letter? Or making a witness statement in court? For the sake of exemplifying how the Cooperative Principle works, our examples in this chapter will be "ordinary" conversations (e.g., casual conversations between friends, family, or roommates). But after you are done reading or listening to this chapter, you are encouraged to think further about how the Cooperative Principle might work differently in other types of discourse!

Speaking of variation, we have seen already that conversational rules can vary from community to community, meaning that what counts as "cooperative" might vary depending on who the interlocutors are (not just the discourse genre). We will study the Cooperative Principle as applied to various linguistic communities, and you are also encouraged to think about how conversational rules might differ in your own culture(s)! The linguist way of thinking about the Cooperative Principle is that it is subject to variation within and across language communities.

Keeping all of this in mind, let's take a look at the four maxims that Grice described.

Part 2 video (Maxim of Quality):

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/essentialsoflinguistics2/?p=869#oembed-2

The Maxim of Quality

Grice observed that discourse participants seem to follow a conversational rule about being honest. He stated this rule as the **Maxim of Quality**: in a conversation, you say what you believe to be true, and only say what you have sufficient evidence for. For your convenience, our previous example is reproduced below as (2).

(2)	Aya:		Did Raj feed the cat and clean the litterbox?
	Bo:		He fed the cat.
	Aya:		(Infers: 'He didn't clean the litterbox.')

This maxim says that the fundamental assumption that you make in discourse is that no one is lying in the conversation. Aya gets the the inference from Bo's statement in (2) partially because she assumes he would only say true things. Their logic is that Bo must have not said *Raj cleaned the litterbox* because it would be false to say so.

If the Maxim of Quality is violated, someone would be overtly lying in the discourse. Imagine for example that the conversation in (2) took place, except that Raj never fed the cat (or clean the litterbox for that matter). Bo is being blatantly uncooperative in this

conversation in this case. When a maxim is **violated** in a conversation, it gives rise to the intuition that something has gone wrong in the discourse. In this case, the objective in the conversation was to figure out if Raj fed the cat and if Raj cleaned the litterbox, but now Aya incorrectly thinks Raj did feed the cat. This does not help with the objective of the conversation, hence, something has gone wrong. Note that if Bo is a good liar, Aya might not realise that something has gone awry in the discourse during the conversation. But if it was revealed later that Raj didn't feed the cat, Aya would certainly feel that the conversation she previously had with Bo was not a cooperative one: a maxim was violated.

In English and many languages, failure to *try* is what is considered a maxim violation. That is, if you were not *trying* to follow Quality at all, knew the statement was false but uttered it anyway, that is what is considered a violation. Let's assume for a moment again that Raj actually didn't feed the cat. If Bo *truly* thought that Raj fed the cat, saying "He fed the cat" would technically not be a violation under the Cooperative Principle. English users likely wouldn't wouldn't accuse Bo of "lying" because Bo truly had the belief that he was telling the truth (Carson 2006). Bo said something false but didn't lie.

What is considered a maxim violation can vary from language to language. In Mopan / Mopan Maya (an indigenous language of the Mayan family in Eastern Central America, spoken by Mopan people), falsehoods are characterised as *tus* 'lying' regardless of whether the speaker was aware of the falsehood at the time of utterance or not (Danziger 2010). So in Mopan, if Raj didn't feed the cat but Bo said he did with the sincere belief that he did so, Bo's utterance would still be considered a *tus*. It should be noted that *tus* has a negative connotation, much like the word *lie* in English: in Mopan, there is moral disapproval of falsehoods (Danziger 2010). This parameter for the Maxim of Quality in Mopan has interesting implications for how fiction is treated in the language/culture. Consider the following anecdote from a linguist who studied this phenomenon (Danziger 2010):

"One or two prosperous Mopan families have since the 1980s owned electrical generators and VCRs. But it has always been difficult in remote Mopan communities to find tapes to play on them. When I left the village after my first long stay (and before I had begun researching issues of truth and lies in Mopan), I was asked to bring back videotapes for entertainment when I returned. I did so. The first commercial tape which I supplied was Walt Disney's The Jungle Book. It was received with enthusiasm, as I had hoped it would be—it is colorful and amusing and because of the rainforest setting proved very interpretable even to older and monolingual Mopan people. But it does show some troubling scenes. In this film, a baby is abandoned in the forest and taken by wild beasts— and they don't eat him. Later, the boy develops the disturbing habit of playing happily with jungle cats and other wild animals. Perhaps most alarming of all, in one choreographed scene Mowgli not only touches but actually dances with Kaa the snake. In Southern Belize constrictors are unknown, but the region is home to snakes which harbor some of the world's fastest-acting and deadliest poisons. At last one day a good friend asked me doubtfully if all of this were really true. When I answered that of course it was not, I was surprised at her shocked reaction. She seemed to think that if this story was not true, it could only be considered tus ''lies''. I discovered that this conclusion holds true for all areas in which narrative output must be assessed or evaluated in Mopan. While narratives in various media offer fascinating plots and themes, no classificatory distinction is made in Mopan between stories involving supernatural creatures and those involving actual accounts of events in the speaker's own life. If stories are discovered not to be true, they are not excused as fictions, they are condemned as tus." (Danziger 2010, p.213)

In summary, the Maxim of Quality is paraphrasable as "don't lie" and "make sure you have enough evidence for what you're saying", which is a maxim common to a lot of languages — but what counts as a lie (= a violation of the maxim) may vary from community to community. Later, in Section 8.6 , we will see that what counts as "enough evidence" can vary from person to person as well.

Part 3 video (Maxim of Quantity):

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The Maxim of Quantity

Grice also observed that discourse participants seem to follow a conversational rule about how much information they should give when trying to meet conversational goals. He stated this as the **Maxim of Quantity**: in a conversation, don't be more informative than is needed by the purpose of the conversation, and don't be less informative than is needed by the purpose of the conversation,

either. You need to be as informative as is required. **Informativity** is generally measured based on entailment relations. This definition of informativity is given below. Take *p* and *q* to be variables for sentences.

(3)			If *p entails q* (and *p* and *q* are not the same sentence), then *p* is more informative than *q*.

By this definition, *Panks is a Siberian Forest Cat* (=*p*) is more informative than *Panks is a cat* (=*q*), because *p* entails *q* and they are not the same sentence. Let's go back to our original example, reproduced below as (4).

(4)	Aya:		Did Raj feed the cat and clean the litterbox?
	Bo:		He fed the cat.
	Aya:		(Infers: 'He didn't clean the litterbox.')

The relevant entailment relation is between *Raj fed the cat* and *Raj fed the cat and cleaned the litterbox*. The latter sentence entails the former; so, *Raj fed the cat and cleaned the litterbox* is more informative than *Raj fed the cat.*

To understand how this maxim works, imagine in (4) that Bo knew that Raj actually fed the cat AND cleaned the litterbox, and still said what he said ("He fed the cat."). This would be a violation of the Maxim of Quantity, because the statement *He fed the cat* is underinformative: the more informative thing to say in this situation would be *Raj fed the cat and cleaned the litterbox*. If Aya found out after the conversation in (4) that Raj actually cleaned the litterbox too, Aya would likely feel that Bo was being uncooperative in the conversation they had ("Why didn't you tell me he cleaned the litterbox too, if you knew?!"). Bo didn't make a false statement, but the true statement that he did make wasn't the most informative one. This also is the case in Bronston v. United States (1973) from Section 8.3: Bronston was not being maximally informative in the courtroom, which is why he was accused of being deceptive.

The flip side of this is being OVERinformative. For this, imagine this version of the previous discourse:

(5)	Aya:		Did Raj feed the cat and clean the litterbox?
	Bo:	??	Yes, he fed the cat, he cleaned the litterbox, he brushed the cat, he trimmed the cat's claws, he told the cat what a good boy he was, he pet the cat, he napped with the cat…

Assume that Raj actually did all of the things that Bo said he did. This means that Quality is not being violated. What IS being violated is Quantity. This time, he gave more information than what was requested by Aya's question. A simple "Yes (he fed the cat and cleaned the litterbox)" would've sufficed to meet the objective of the conversation.

Note that depending on what other linguistic and extra-linguistic factors there are, withholding information is not necessarily seen as "uncooperative". Consider the translation of the following conversation in Malagasy, an Austronesian language spoken in Madagascar (Keenan (1976) does not provide the original utterances in Malagasy, just the English translations):

(6)	A:		Where is your mother?
	B:		She is either in the house or at the market.

If you are an English user, because of the disjunction *or*, you may have drawn the inference that speaker B does not have the specific information pertaining to their mother's whereabouts: if speaker B knew exactly where she was, they would've said so. In Malagasy, that type of inference is unlikely. For Malagasy users, information that isn't already publicly known to everyone is highly valued, meaning that having exclusive knowledge about something is highly regarded (Keenan 1976). Because this cultural value, speaker A is more likely to infer something like 'B is superior to me at this moment' in this kind of conversation (Prince 1982). Even if speaker B knew that speaker A actually knew the whereabouts of their mother, the conversation in (6) would *still* not be considered uncooperative because speaker A would have the understanding that speaker B is saying what they are saying to accrue social currency.

Part 4 video (Maxim of Relation):

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/essentialsoflinguistics2/?p=869#oembed-4

The Maxim of Relation

Another one of Grice's observation was that discourse participants seem to expect each other to stay on topic during a conversation. He described this as the **Maxim of Relation**: make your contributions to the conversation relevant to what is being discussed. Consider the following conversation in (7).

(7)	Aya:		I used to take piano lessons when I was little. What sorts of extracurricular activities did you do as a kid?
	Bo:		Nice. When I was little, I used to go to weekly swimming classes.

This is a perfectly normal and cooperative conversation, because Aya brought up the topic of what things they did in their childhood. Bo responds with something that is related to this topic: what he did as a child, which in this case is *take swimming classes*. The Maxim of Relation is being followed.

Contrast this with Bo's reply in (8), which for some people is a slightly more surprising turn in the conversation.

(8)	Aya:		I used to take piano lessons when I was little. What sorts of extracurricular activities did you do as a kid?
	Bo:	??	When I was little, my favourite food was chicken nuggets.

Assuming that Bo is not lying, Bo has said something truthful, thus Bo is following the Maxim of Quality. We don't get the sense that he is oversharing or undersharing, and he has at least said something about his childhood, which is to some extent informative — so Quantity doesn't seem like the main maxim being violated either. The main reason that (7) might feel odd to some adult English users is because Bo is off topic. The topic under discussion is "what extracurricular activities did you do as a child", so to stay on topic you would minimally name events, not stative properties like what your favourite food was. This in this context would be a violation of the Maxim of Relation.

If you find yourself thinking things like 'Well, maybe Bo means that he took cooking classes, or that he didn't do any extracurriculars at all?', that is a valid inference you are trying to draw. Section 8.5 will clarify why you feel the impulse to make sense of Bo's utterance.

Part 5 video (Maxim of Manner, and other possible maxims):

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/essentialsoflinguistics2/?p=869#oembed-5

The Maxim of Manner

Grice's fourth and final observation was that discourse participants seem to have an expectation about *how* they say things in a conversation too, not just *what* they say. He described this as the **Maxim of Manner**: be as clear, brief, and as orderly as possible when you make your contributions in a conversation. Consider the following conversation (Note: the hand-washing instructions are adapted from this CDC guideline).

(9)	Aya:		How do I properly wash my hands?
	Bo:	??	Dry your hands using a clean towel or air dry them. Scrub your hands for at least 20 seconds. Lather the backs of your hands, between your fingers, and under your nails. Rinse your hands well under clean, running water. Lather your hands by rubbing them together with the soap. Wet your hands with clean, running water. Turn off the tap, and apply soap.

Bo's instructions are truthful, in that each step he listed indeed are things you do when you wash your hands. His contribution is also appropriately informative, and relevant to the question that was asked by Aya. However, Bo said the instructions in a funny way: he didn't list the steps in order. So the oddness of Bo's utterance mainly comes from a violation of the Maxim of Manner. For Bo to conform to the Maxim of Manner, we would of course have to change the order in which he presented each step:

(10)	Aya:		How do I properly wash my hands?
	Bo:		Wet your hands with clean, running water. Turn off the tap, and apply soap. Lather your hands by rubbing them together with the soap. Lather the backs of your hands, between your fingers, and under your nails. Scrub your hands for at least 20 seconds. Rinse your hands well under clean, running water. Dry your hands using a clean towel or air dry them.

The Maxim of Manner essentially says that the way that you present the information should not get in the way of transmitting the information. So under the scope of this maxim are things like the order in which you present information, whether your statement is ambiguous, which words you choose, how quickly you speak or sign, and how loud you speak (for spoken languages). The Maxim of Manner sees quite a bit of cultural variation. For example, what is considered to be an appropriate "manner" of speaking may depend on things like cultural expectations about expressions of emotion (Wierzbicka 2009), and different values attached to veiled speech (Ameka & Terkourafi 2019). For example, in some African cultures it is not necessarily considered "uncooperative" to make one's utterance obscure, long-winded, and vague (Ameka & Terkourafi 2019).

Other possible maxims

Note that the above four maxims are not meant to be an exhaustive list of maxims. Grice himself speculated that there are probably more than just these four maxims in language (Grice 1975, p.47).

One of the maxims that Grice mentioned, but did not elaborate on, is the **Maxim of Politeness**. Some researchers think this maxim is needed (Kallia 2007, Pfister 2009), while others think it is not necessarily a maxim (Brown & Levinson 1987) — but there is a general consensus that politeness is something that has relevance in discourse. Some languages, like Japanese, Korean, and Thai, have specific affixes you must use for expressing politeness! Pfister (2009) has proposed the following as the Maxim of Politeness: Do not impose on the addressee (avoid unnecessary imposition), and show approval of the desires and actions of the addressee. To not "impose" means to not force the other person to do what they don't necessarily want to do (e.g., not asking them to take you to the airport on their day off). To "show approval of the desires and actions" means to show that what the other person wants is desirable (e.g., complimenting their haircut).

Check your understanding

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8.6: How inferences arise, and neurodiversity in inference making

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One of the underlying assumptions in the Cooperative Principle is that in all conversations, people have good faith in their conversation partners: everyone assumes that everyone is being rational and cooperative, except in special circumstances. This assumption is the foundation of how implicatures are created in discourse. Let's revisit the discourse from earlier.

(1)	Aya:		Did Raj feed the cat and clean the litterbox?
	Bo:		He fed the cat.
	Aya:		(Infers: 'He didn't clean the litterbox.')

The inference that Aya would naturally make from Bo's response is that Raj did NOT clean the litterbox. Aya arrives at this inference because she assumes Bo is following all four maxims in the conversation. Particularly, Aya's faith in the Maxim of Quantity leads to the conclusion that this must've been the most informative thing Bo could've said.

Here are more examples with the other three maxims.

(2)	Aya:		I wonder how the game today went.
	Bo:		The Blue Jays won.
	Aya:		(Infers: 'Bo saw the results of the game.')

According to the Cooperative Principle, the default assumption that Aya would make after Bo's utterance in (2) is that Bo has some way of knowing *The Blue Jays won* is true, whether it be direct evidence (e.g., he was at the game) or indirect evidence (e.g., he saw it on the news), and that the evidence is reliable. This is based on the Maxim of Quality, which states that discourse participants should not utter things that they don't have sufficient evidence for. Depending on the context, you may get various implicatures about how they know what they have said to be true. For example, if Aya knows that Bo was in class during the game, she might infer that Bo saw the results of the game online.

In (3), the Maxim of Relation plays a significant role in the creation of the implicature.

(3)	Aya:		Did you vacuum?
	Bo:		The cat is sleeping.
	Aya:		(Infers: 'No, Bo did not vacuum.')

Here, Bo's utterance at first glance may seem unrelated to the question that A posed. To reiterate how the Cooperative Principle works, the idea is that Aya does *not* automatically assume that Bo is being uncooperative when something like this happens. The default assumption that Aya would make is that Bo *is* being cooperative and following all four maxims. Based on this, Aya would make the calculation that Bo's utterance is somehow related to the question she posed. For example, the relation she might infer may be that vacuuming creates a lot of noise, the noise would wake the cat up, and he didn't want to do that. Hence, 'No, Bo didn't vacuum' results as the inference. Remember the chicken nuggets example in Section 8.5 (Aya: What extracurriculars did you do? / Bo: ??My favorite food was chicken nuggets.)? There, if you found yourself trying to make a connection between Bo's utterance and Aya's question, the Gricean explanation is that this is because you want to believe that Bo is following the Maxim of Relation. This kind of faith is what the Cooperative Principle is all about.

Here is a question for you (the reader/listener/viewer): in an example like (3), did you actually draw the same inference as Aya? Were any of you uncertain about whether that kind of inference could be drawn from the given utterances? If you did not draw the same inference as Aya or if you were not super confident about making the inference Aya made, that's totally OK! We mentioned already that conversational rules can vary from language to language and from culture to culture — in addition to that, there is also quite a bit of individual variation when it comes to drawing inferences in a conversation. The inference in (3), for example, depends on things like how much and what kind of experience you have with vacuums and cats. Another factor in pragmatic variation involves **autism**. For example, studies have shown that **autistic** adults and **non-autistic** adults sometimes have different strategies for drawing inferences in a conversation.

What is autism?

Autism is a neurocognitive condition that affects how you experience the world around you. This means that autism can affect how you think, how you learn stuff, how you communicate, and how you adjust to a new environment. Like everyone, each autistic person has their own strengths and weaknesses. Some autistic people have difficulties with social communication. Autism is a **spectrum condition** (sometimes called Autism Spectrum Disorder), meaning that there isn't "one way to be autistic". There is a range of conditions associated with autism, and the severity of difficulties that an autistic person might have can vary. To learn more, go to an online search engine and try searching "Autistic Self Advocacy Network" and "National Autistic Society": you will be able to read about the lived experiences of actual autistic people.

In one study, researchers analysed how 66 autistic adults and 118 non-autistic adults interpreted conversations like the following (Wilson & Bishop 2020):

(4)	Character 1:		Could you hear what the police said?
	Character 2:		There were lots of trains going past.

Participants in this study were asked whether they thought Character 2 heard what the police said or not. Participants were given three answer options: "Yes", "No," and "Don't know". Non-autistic adults typically answered "No" in this kind of context. In (4) in particular, this is an inference from Character 2's utterance: lots of trains imply lots of noise, which implies "No, couldn't hear what they said". Autistic adults were about 2.5 times more likely than non-autistic adults to answer "Yes" in a context like this. Autistic adults were also about 6 times more likely than non-autistic adults to answer "Don't know" in a context like this. Importantly, autistic adults and non-autistic adults performed about the same in other linguistic tasks (e.g., vocabulary tests, syntactic acceptability judgment tasks, and comprehension of literal meanings in a conversation). This suggests that non-autistic adults and autistic adults' pragmatic abilities in inferencing in particular were different.

In a follow-up study, the researchers repeated the same inferencing task with just the autistic participants. This time, they eliminated the "Don't know" option to see what the autistic participants would do when forced to choose "Yes" or "No" in a context like (4). Results showed that if an autistic participant chose "Don't Know" in the first task in a context like (4), they had about a 91% probability of choosing "No" in this second task. This suggests that when constrained to do so, autistic participants generally gave the same response as non-autistic participants in this study. Applied to everyday situations, this might mean that autistic adults *can* get the implicatures intended by non-autistic adults' — but their tendency to do so is different.

Another interesting insight from this study is the comments that the autistic participants gave after the experiment: several autistic participants expressed frustration that there wasn't enough information to answer the implicature questions. We might wonder if autistic adults and non-autistic adults have a difference in their Maxim of Quality ("Only say what you believe to be true, and only say what you have adequate evidence for"): could it be that what counts as "adequate evidence" is stricter for autistic individuals? Some autistic participants also made comments like this:

"I can make a really good guess at what people mean but the anxiety surrounding all the possible meanings is so exhausting that like if they say something I'm 99% sure it means this but that 1% of but what about all the other things it could possibly mean… It's just really, really exhausting and second guessing yourself all the time of 'was that thing the right thing?' … And people aren't brilliant at giving feedback, so you don't know if you've said the right thing … I think it's much more the anxiety of not being sure if you're understanding someone correctly than just outright getting it wrong … because there were so many times as a kid when I misunderstood and got it wrong and then if you get it wrong people react to you badly or they ostracize you … I think it's an anxiety that's built up over a lifetime of not quite getting it right enough of the time." (Wilson & Bishop 2020, quoting one of their participants)

Based on this kind of comment, autistic adults' tendency to select "Don't know" in the first task might also be driven by their history of being criticised for not getting non-autistic adults' intended implicatures.

Neuro- means 'relating to the nerves or nervous system (including the brain)'. **Neurodiversity** refers to the different ways in which people's brains function, and the different ways in which people behave as a result of these neurocognitive differences. **Neurotypical** is a term that is sometimes used to describe people who have neurological development and functioning that is "typical" by some cultures' socio-political standards. **Neurodivergent** is sometimes used as a descriptor for people who diverge from this standardized profile, including (but not limited to) autistic individuals and individuals with attention deficit hyperactivity disorder (ADHD).

What do we learn from all of this? What inferences can be made from an utterance depends on the context, and "context" includes who is participating in the discourse, too. The quote above points to yet another power dynamic in language (recall Chapter 2): conversational expectations are often very **neurotypical**-centric, which is unfair to **neurodivergent** individuals. Some people may not get the implied meaning immediately, and even when they think they understand the implicature, they might not feel confident about it. Following the Autistic Self-Advocacy Network's advice, we urge you to be patient if miscommunication arises in everyday situations. If you are organizing an event, you may want to avoid relying on implicatures to communicate important information to participants, because some people might not get it. Everyone has a different mind, so let's support these differences rather than suppress them.

Check your understanding

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8.7: Violating vs. flouting a maxim

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In the previous sections, we saw that when a maxim is violated in a conversation, it causes the conversation to be anomalous in some way. We saw that when it is revealed that a maxim has been violated, discourse participants have the intuition that the person who violated the maxim was being uncooperative, and that something has gone wrong in the discourse itself. For example, Bo is violating Quality in the following discourse in (1).

(1)			(Context: Aya and Bo met online. Aya lives in Vancouver. Bo lives in Ottawa.)
	Aya:		Where did you say you live again?
	Bo:		I live in Ottawa.
	Aya:		So how is Ottawa? Do you like it?
	Bo:		I live in Toronto.
	Aya:		(Wait, what? You told me you lived in Ottawa just a few seconds ago!)

In (1), it seems that the conversation has broken down in some way because of the violation: facts must be straightened out before the discourse continues. The discourse must be repaired. Let's compare this to the conversation in (2).

(2)			(Context: Aya and Bo are discussing what they did over the weekend. They both know there is no city named Toronto in Saskatchewan.)
	Aya:		I visited Toronto over the weekend.
	Bo:		Oh, Toronto, Ontario?
	Aya:		**No, Toronto, Saskatchewan.**
			(Implicature: 'Yes, of course it's Toronto, Ontario')

As mentioned in Section 8.6, communication by implicature may not be a part of some people's native discourse strategies. So for some people, it is possible that the conversation in (2) is as confusing as (1). In that case, the discourse may have to be clarified by uttering the implicature part out loud (e.g., "Oh, I was being sarcastic; of course it's Toronto, Ontario!").

For other people, (2) might not feel as odd as (1). One way of interpreting the conversation in (2) is that Aya is acting like she is violating the Maxim of Quality in a way that is very noticeable to the addressee, and she is doing so deliberately in order to create a certain implicature. This is called **flouting** a maxim: appearing as if you are violating a maxim in a very obvious way, in order to create an implicature. In (3), Aya is saying something that is obviously false (and something that she thinks Bo would find to be obviously false too) in order to create an implicature. Aya is flouting the Maxim of Quality. Intonation (for spoken language) and

facial expressions (for both spoken and signed language) that accompany the sentence can often help indicate that the speaker/signer is flouting a maxim.

Check your understanding

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8.8: More about the Cooperative Principle

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Paul Grice was a philosopher of language. He developed the Cooperative Principle in the 1960s partially in response to philosophers at the time who claimed that natural, ordinary language is too ambiguous and too illogical to rigorously analyse. He developed a system that allowed for researchers to analyse everyday human discourse logically. He called this system **conversational logic**, and the Cooperative Principle is a basic part of it. His work has been foundational in the subfield of pragmatics.

One misconception about the Cooperative Principle is that a conversation in which discourse participants follow Quantity, Quality, Relation, and Manner perfectly are somehow "ideal" conversations. This is not necessarily true! Strict adherence to the maxims might produce a conversation that is logical and maybe even efficient, but whether that is "ideal" or even natural or comprehendible, is a different matter. In fact, many linguists (including Grice himself) have observed that in natural conversations, there are other factors that go into the interpretations of utterances, including linguistic and non-linguistic contexts of utterances (Grice 1975, p.50). This may include things like the genre of discourse, mutual trust between the interlocutors, psychological distance between the interlocutors, and much more (Lakoff 2009). Depending on the context, some maxims may get prioritised while others may be deprioritised.

As a language philosopher, Grice's objective in developing the Cooperative Principle was not to give extensive empirical observations about human discourse. Rather, his goal was to give a more general sketch of how conversational logic *might* work. There are places in his writing where things are intentionally vague, as many of his thoughts were meant to be introspections rather than a fully developed system. His musings were based largely on English, and unsurprisingly, he was never really clear about whether his maxims were meant to apply to non-English conversations. In this textbook we have taken the interpretation that there is cross-linguistic and cross-cultural variability in the Cooperative Principle. However, we also do not deny the fact that Gricean theories of pragmatics have contributed to the perception that (educated, white) English is somehow the "norm" and somehow culturally "neutral" (Ameka & Terkourafi 2019). We echo Ameka & Terkourafi (2019)'s call for more inclusive research practices in pragmatics.

As with any theory, it is important to ***not*** look at Grice's original work (which is roughly the version that was presented in this chapter) as something that is flawless. In fact, many newer theories of pragmatics reduce Grice's maxims to just one or two principles (e.g., "Relevance" and "Informativeness")! If you'd like to learn more, Kearns (2011) has a short summary of post-Gricean approaches to pragmatics in her Chapter 1. For the more comprehensive learner, Huang (2007) is a more advanced but accessible overview of the history of pragmatics, from past to present.

Check your understanding

This is a reflection question with no right answer. In what kind of conversations might Grice's maxims (as described in the chapter) operate vastly differently? What about that type of discourse makes it different from an everyday conversation?

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8.9: Illocutionary meaning

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Illocutionary meaning

In Chapter 7, Section 7.11, we talked about the meaning of sentences in terms of their truth condition. This tells us what the sentence entails: it tells us what the sentence means on its own, regardless of context. So far in this chapter, we have also seen that when we combine the literal truth-conditional meaning of the sentence with the discourse context, other layers of linguistic meaning emerge, like implicatures. Implicatures rely on the fact that sentences don't occur in isolation in natural language use: they're a part of a larger discourse context.

In this section, we will explore **illocutionary meaning**: sentential meaning in terms of what the speaker/signer means *in* making an utterance. The idea is that after we compositionally build up the literal meaning of a sentence, we *do* something with this sentence in a conversation. In other words, what's the point of saying something in a conversation? Let's take a look at what exactly you do with a sentence in discourse.

What is illocutionary meaning?

Illocutionary meaning again is the meaning of a sentence in terms of what the speaker/signer means in making an utterance. To understand what this means, let's take a look at the conversation in (1).

(1) (Context: Aya and Bo are roommates, and are trying to decide what to make for dinner.)

Aya: Should we have spaghetti for dinner?

Bo: We have tomato sauce and ground beef in the fridge.

Aya: Yeah. Can we make pasta bolognese with those ingredients?

Bo: Yeah, I think so.

Aya: OK, cool. We'll do spaghetti then.

Let's focus on Bo's utterance, *We have tomato sauce and ground beef in the fridge*. The sense of this sentence is the lexical meaning of all the words it contains combined. But Bo is not saying this sentence in this conversation for the sake of expressing the sense of the sentence. He is saying this because he believes this sentence to be true, and he would like for the addressee, Aya, to agree with it. This layer of meaning is what we are referring to as **illocutionary meaning**, and what we mean by "what we mean in making an utterance." In this case, Bo has made an **assertion**. In contrast, if you look at Aya's first utterance in (1), she has posed a **question**: *Should we have spaghetti for dinner?*. Assertion vs. question is a way of classifying sentences based on their illocutionary meaning. There's more that you can do in a conversation than just assert things and ask questions. For example, you might exclaim things in an **exclamative** (e.g., *What a beautiful raccoon!*) or you might give orders with an **imperative** (e.g., Look at the raccoon!). In this textbook, we will focus on just assertions and questions. In the rest of this chapter, we will ask the following question: what does it mean for someone to make an assertion vs. pose a question in discourse?

Re: Language is performative

In Chapter 2, we introduced the idea that language is **performative**, meaning that things happen and the world changes when you say or sign things. When someone says *I name this ship the S.S. Anne*, they christen the ship. Writing *I bequeath my card collection to my child* in a will gives rise to certain contractual rights about the future ownership of the card collection. As philosopher John Langshaw Austin wrote, "to *say* something is to *do* something" (emphasis his) (Austin 1975). Austin originally used the term "performatives" to refer to certain types of sentences, like ship christening, bequeathing in wills, and marriage vows. Under the original definition, performatives are utterances that are made for the purpose of doing something and giving rise to a conventional consequence (e.g., transfer of rights, legal union, etc.). The term usually refers to something that uses **performative verbs** like "I hereby **name**", "I hereby **bequeath**", "I now **pronounce** you", etc.

Anything that you linguistically express that serves the purpose of "doing something" is called a **speech/sign act.** Note that some linguists use the term **speech act** to refer to acts in all modalities of language. So when you say a performative like "I now pronounce you married," that's a speech act. You don't always have to use performative verbs to do a speech/sign act, though. For example, if you simply ask the question *"Did you break my bike?"* in spoken English (instead of expressing it as a performative like "I hereby ask if you broke my bike"), it's still a speech act: it's an act of inviting the addressee to supply information. So performatives are just a special kind of speech/sign act.

By making a **speech/sign act**, there are different actions that you make simultaneously: you make a **locutionary act**, an **illocutionary act**, and a **perlocutionary act**. Let's take the sentence *You're manspreading*, uttered by a woman to a man on a bus.

The **locutionary act** of a speech/sign act is an expression of the **locutionary meaning** of the sentence, which is the literal meaning of the sentence. The locutionary meaning of *You're manspreading* is something like 'the addressee, presupposed to be male, is sitting with their legs wide apart.'

The **illocutionary act** of a speech/sign act is an expression of the **illocutionary meaning** of the sentence, which is what you "do" in making an utterance. Typically, in making an assertion, what the speaker "does" is commit herself to the truth of the utterance (the performative version would be something like 'I hereby publicly declare that I believe that you are manspreading'). In this particular case, she's also likely "doing" something else too: making a request (for him to move his legs). Those are both illocutionary acts. Other than asserting and requesting, illocutionary acts can include: asking, resigning, promising, congratulating, and more.

Finally, the **perlocutionary act** (or **perlocutionary effect**) of a speech/sign act is an expression of the **perlocutionary meaning** of the sentence, which is the actual effect of the utterance on the addressee. In this case, the perlocutionary effect of *You're manspreading* might be that the addressee moves his legs to make more room for the speaker.

In the rest of this chapter, we will focus on the **illocutionary meaning** of sentences, particularly that of assertions and questions. Note that there isn't a one-to-one correspondence between the form of a sentence and its illocutionary meaning. In one context, *You got first place!* might be an act of congratulating (e.g., adults are playing a video game), but in another context, it might be an act of scolding (e.g., an adult immaturely beat a bunch of children in a video game). In fact, even if you utter a performative like *I hereby promise that I will buy you the game*, it doesn't really have the illocutionary meaning of a promise unless the utterer sincerely means it. Some types of illocutionary meaning are closely connected to certain word order, intonation, or performative verbs, though: for example, T-to-C movement in spoken English typically indicates that a question is being asked.

Check your understanding

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8.10: Thinking about illocutionary meaning compositionally

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What we learned in Chapter 7 is that the meaning of a sentence is compositional. Let's take the sentence *Panks is a cat.* If we think denotationally, this means that we combine the meaning of *cat* (the set of all cats) with the meaning of *Panks* (the individual Panks), which results in the meaning of the sentence (TRUE if and only if Panks is in the set of all cats). This kind of analysis might suffice if you are interested in the meaning of the sentence in isolation — that is, uttered on its own. A more realistic view of how language works, however, is that sentences don't get produced in isolation; they are a part of a larger conversation. In fact, you typically don't get to decide on your own if a sentence is true or not. This is why you have conversations: to consult others to see what is true about the world we are in, and what is false. We want to analyse sentential meaning as something more collaborative and discourse-based like this in this chapter. As introduced in the previous section, this largely concerns the **illocutionary meaning** of a sentence.

Before we discuss the details of various types of illocutionary meaning, let's make sure that we understand some terminology that might potentially be confusing. Consider the pair of sentences in (1)-(2).

(1) Panks is a cat (**assertion**)

(2) Is Panks a cat? (**question**)

You likely have the intuition that (1) and (2) are two "versions" of the same thing: (1) is the **declarative** version of Panks being a cat, and (2) is the **interrogative** version of it. We can say that (1) and (2) are based on the same **proposition**: that an individual called Panks is among the set of cats (or, **p**∈C in set theory terms). A proposition is something that *can* be assigned a truth value. When a proposition is given a truth value (or truth condition), it is called a **statement**.

To understand this better, let's think about the meaning of (2), *Is Panks a cat?*. This is not a statement, because questions do not have truth values (You can't say **It is true that is Panks a cat*). However, the meaning of the question still involves the proposition that was introduced earlier: **p**∈C. In the meaning of a question, you are not saying that the proposition has a certain truth value. Instead, you are *asking* about the truth value of the proposition: is **p**∈C true, or is **p**∈C false?

In order to understand how illocutionary meaning works, we will assume in this chapter that a TP is simply a proposition, like **p**∈C (we might also just write a proposition in bold, like **Panks is a cat**). This means that it doesn't actually have a truth value yet.

A proposition on its own has no illocutionary meaning; we have to add illocutionary meaning to it. To do this compositionally, we can posit a silent **illocutionary force** morpheme that carries illocutionary meaning. For example in English, we can assume that there is a silent **ASSERT** morpheme that resides in C (the head of the CP). The idea would be that this ASSERT morpheme adds illocutionary meaning to the proposition represented by its sister TP. This structure is shown in Figure 8.3 below.

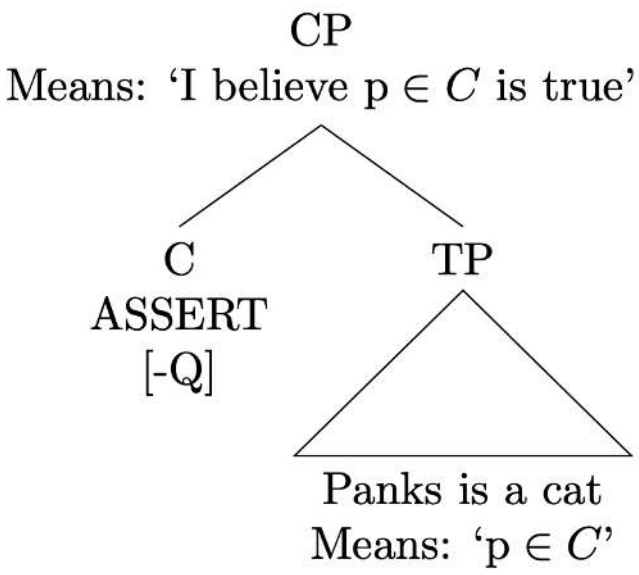


Figure 8.3. A tree with an ASSERT morpheme in C (irrelevant nodes have been omitted).

The role of the ASSERT morpheme would be to take a proposition and "do" something with it in the discourse context. For example, if you assert *Panks is a cat*, this means that ASSERT takes **p**∈C and says something along the lines of 'I (the speaker/signer) believe that **p**∈C is true; do you (the addressee) believe this, too?'. The underlined part is what we call the illocutionary meaning of a sentence (or illocutionary **force**): what is being "done" with the proposition in the discourse.

Illocutionary force

Sometimes, the term **illocutionary force** is used to refer to the utterer's *intended* illocutionary meaning of a sentence. Sometimes this specification is necessary, because illocutionary acts are successful only if the addressee understands the illocutionary meaning properly. For example, for "You're manspreading" to be a successful illocutionary act of requesting, then the addressee needs to understand it as so. If the addressee fails to see it as an act of requesting, then it's not clear that this utterance actually has the "illocutionary meaning" of a request. We can say that it does have the illocutionary *force* of a request though, since that's what the speaker's *intended* illocutionary meaning was. The distinction between "illocutionary meaning" and "illocutionary force" is not super important in this textbook.

Let's look at questions now. A question would work in a similar way, just with a different illocutionary force morpheme. Let's call this silent question force morpheme **INTERR**. Figure 8.4 is the structure we will assume for a question.

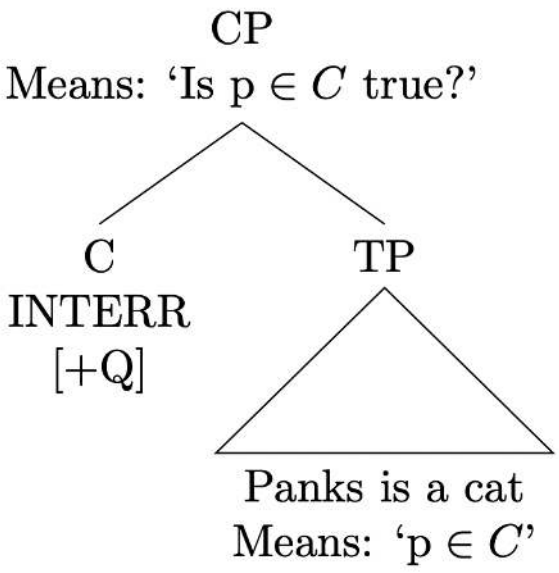


Figure 8.4. A tree with an INTERR morpheme in C (irrelevant nodes have been omitted).

As you can see, the question actually has the same TP as the assertion tree we saw before, and thus the same proposition it starts out with: **p**∈C. This time, the illocutionary morpheme INTERR (for interrogative) would combine with this proposition and give it interrogative illocutionary force. INTERR **p**∈C roughly means 'Either **p**∈C is true or **p**∈C is false; which one do you think it is?'. The underlined part is the illocutionary meaning contributed by INTERR.

Some languages like Korean actually have overt (= unsilent) morphemes for ASSERT and INTERR. Consider (3) and (4).

(3)		Korean (Brandner, 2004)				
		ku-ka	seoul-e	ka	-ass	**-ta**
		he-NOM	Seoul-to	go	-PAST	**-INTERR**
		'He went to Seoul'				

(4)		Korean (Brandner, 2004)				
		ku-ka	seoul-e	ka	-ass	**-nunya**?
		he-NOM	Seoul-to	go	-PAST	**-INTERR**
		'Did he go to Seoul?'				

In (3), *-ta* is the morpheme that marks the sentence as an assertion; a non-silent ASSERT. In (4), *-nunya* is the morpheme that marks it as a question; a non-silent INTERR. These illocutionary force morphemes appear in C in Korean as well. Linearly, it shows up at the end of the sentence because Korean is a **head-final language** — just like Japanese (recall Chapter 6, Section 6.3).

With this kind of compositionality of illocutionary meaning in mind, we will begin to address the question of what exactly these ASSERT and INTERR morphemes mean.

Check your understanding

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8.11: What is a context?

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In the previous section, we gave an informal description of what force operators like ASSERT and INTERR contribute to an utterance. To get a more concrete picture of what illocutionary force operators do with a proposition, it will help to think about why we have conversations in the first place. The "big" question that we are always trying to answer in a conversation is **'what is the state of affairs in our world?'**. In a conversation, you are in a **collaborative game** with the other discourse participants, trying to figure out which propositions are true, and which ones are false.

We can think of this game as each "player" (discourse participants) updating the **context** each time they make an utterance. What is a context? You may already have a loose understanding of what a **context** is, and in fact, we've already mentioned the notion when we introduced implicatures earlier in this chapter. Informally, the context of an utterance is the state of affairs in the discourse when the utterance is made: what the topic is, who is a part of the conversation, what things have been said already, etc. More formally, we can characterise the context as a **collection of sets** that keep track of information in the discourse. This idea is illustrated in Figure 8.5 below.

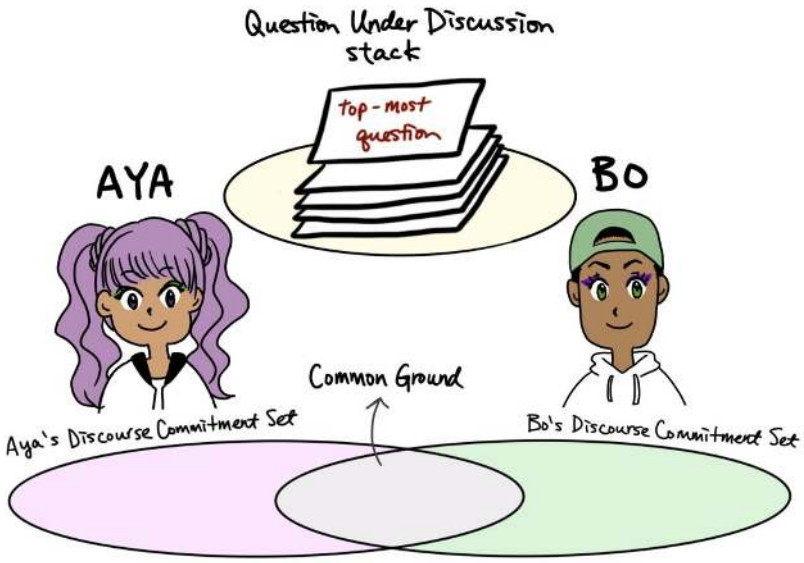


Figure 8.5. A context consisting of the Common Ground, the Question Under Discussion stack, and Discourse Commitment sets.

One of these sets in the context is called the **Common Ground** (CG). The Common Ground is the set of propositions that all discourse participants in that conversation agree to be true. We can think of the goal of the game of discourse as **increasing** the common ground: to add as many propositions as possible to this set so that we have as many facts about our world as possible.

Because discourse is a collaborative game, normally, one does not simply get to add propositions to the Common Ground singlehandedly. In other words, you can't just add a proposition to the Common Ground just because *you* think it's true; you have to get the agreement of other discourse participants first. This means that there is another place (set) in the context, separate from the common ground, where this negotiation takes place. This set is called the **Question Under Discussion (QUD) set**. As the name suggests, the QUD set contains the questions (or topics) that are being discussed in the discourse. The QUD set is a special kind of set that is a **stack.** Usually, a set is just a collection of things: there is no order to the members in the set. A stack is a special kind of set that has more internal structure than a regular set. Let's explain this metaphorically first. Think of the QUD stack as a stack of papers, where each paper has a question written on it. Every time you ask a question in a conversation, a "paper" (an **issue**) gets added to this stack.

When we say **issue** in this context, we don't mean it in any negative way. We don't mean 'issue' as in a problem. *Issue* here simply means topic of discussion. When something is **at-issue**, it means it's the topic of discussion. You may recall this term from Section 8.1.

The top-most issue in the stack is the issue currently being discussed in the discourse. Sometimes the top-most issue is called ***the* QUD**, although it should be noted that the QUD stack itself is also often called "*the QUD*". For clarity, we will call the stack ***the QUD stack*** in this textbook. Once that top-most issue has been resolved (i.e., someone answered that question), then that issue gets removed from the stack. We of course don't mean that you literally have a stack of papers during conversations! This is just a metaphor to help you understand this theory of discourse, and to better visualise what we mean when we say that illocutionary meaning "does" something with a proposition.

Sometimes, we can't come to an agreement in a conversation and the Common Ground doesn't get increased. Perhaps the QUD is "Is coffee better than tea?" and the discourse participants can't come to an agreement about it. This means that neither "Coffee is better than tea" nor "Tea is better than coffee" gets added to the CG. But of course, each participant is entitled to their own belief. This suggests that there is another kind of set that is specific to each discourse participant's beliefs. We can call this kind of set the **Discourse Commitment** (DC) set of each discourse participant (sometimes also called their **Public Belief** set). Let's say that there are two people having a conversation: Aya and Bo. The Discourse Commitment set of Aya is the set of propositions that Aya has publicly committed to as being true. The Discourse Commitment set of Bo is the set of propositions that Bo has publicly committed to as being true. There are as many Discourse Commitment sets as are there are discourse participants. If each Discourse Commitment set is the set of things that each discourse participant believes to be true, then the Common Ground can actually be thought of as the **intersection** of all of the Discourse Commitment sets in the context (set theory strikes again!). For example, in Aya and Bo's conversation, there are things that Aya believes to be true, and things that Bo believes to be true: call these sets DC_A and DC_B , respectively. Take the intersection of DC_A and DC_B : that's the stuff the both of them believe to be true, or the Common Ground.

In summary, the **context** is the collection of all of these sets that we just mentioned: the Common Ground, the QUD stack, and each discourse participant's Discourse Commitment set.

Now we have a set of tools to talk about what illocutionary meaning is, and what we mean by you "do" something when you make an utterance. What illocutionary meaning does is take a proposition, and place it *somewhere* in one or more of these sets in the context: the Common Ground, the Question Under Discussion stack, or a Discourse Commitment set. The relevant question then, is where the ASSERT morpheme places a proposition in the context vs. where the INTERR morpheme places it in the context. This will be addressed in the next two sections.

Check your understanding

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8.12: Assertion

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One major component of the illocutionary meaning of an assertion as contributed by the ASSERT morpheme is that you are publicizing that you believe the proposition to be true. It is absurd to make an assertion, only to say that you don't believe the propositional content, as in (1).

(1) ?? It's snowing, but I don't believe that it's snowing.

(1) is distinctly odd to say, but it isn't exactly a contradiction — at least not obviously so. Conceptually, it's possible for it to be snowing and simultaneously for someone to not believe it. But it's weird to assert this, as in (1). This phenomenon (the absurdity of sentences of the form *p, but I don't believe that p*) is called **Moore's Paradox**. When you try to negate the illocutionary meaning of a sentence, it results in Moore's Paradox. Illocutionary meaning is something that "happens" when you make an utterance, so its impact is immediately perceivable. For example, once you make an assertion, by virtue of making that utterance, you've committed to the fact that you've publicized your belief. In this way, you cannot "cancel" an illocutionary meaning because it just happens; and in (1), that's exactly what the speaker/signer is trying to do, unsuccessfully.

Let's revisit the conversation about Aya and Bo's dinner plans from earlier to see how ASSERT works. The illustration of the context has been reproduced below as well.

(2) (Context: Aya and Bo are roommates, and are trying to decide what to make for dinner.)

Aya: Should we have spaghetti for dinner?

Bo: **We have tomato sauce and ground beef in the fridge.**

Aya: Yeah. Can we make pasta bolognese with those ingredients?

Bo: Yeah, I think so.

Aya: OK, cool. We'll do spaghetti then.

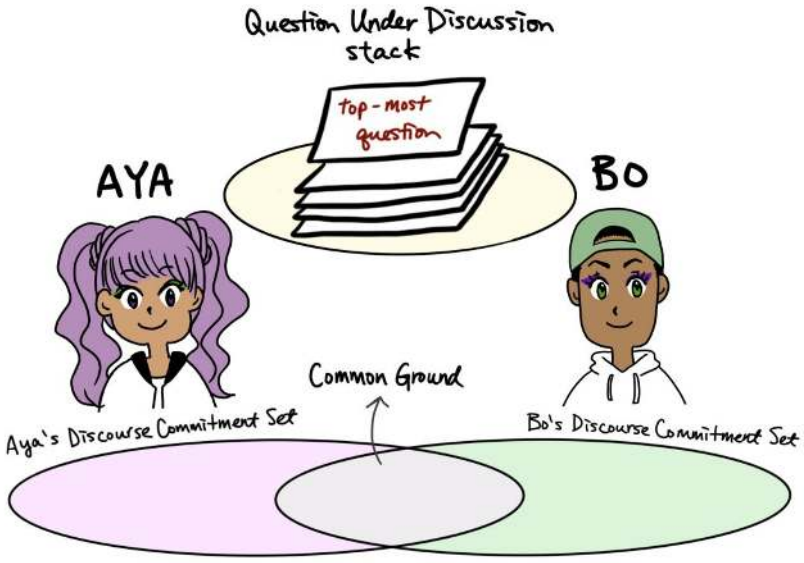


Figure 8.6. A context consisting of the Common Ground, the Question Under Discussion stack, and Discourse Commitment sets.

As a reminder, compositionally, the bolded assertion breaks down into *ASSERT [**we have tomato sauce and ground beef in the fridge**]*. What we are trying to find out is where ASSERT puts the proposition ***We have tomato sauce and ground beef in the fridge*** within the context, which is composed of the Question Under Discussion (QUD) stack, the Common Ground, Aya's Discourse Commitment set, and Bo's Discourse Commitment set.

When Bo makes this utterance, he is publicizing that he believes this proposition to be true. So naturally, the relevant part of the context is Bo's Discourse Commitment set. If p is a proposition, then ASSERT p puts p in the Discourse Commitment set of the speaker/signer.

That is not all that an assertion does, however. Remember that the whole point of any conversation is to add propositions to the Common Ground. This means that Bo is not making this assertion for the sake of publicizing his own beliefs: he is trying to get the addressee (Aya) to agree with him. In other words, Bo is also raising an issue for discussion in the discourse by making this utterance.

You can observe that assertions raise an issue because in (1), Aya responds "Yeah" to it. This easily could've been "No we don't" in another context. What this shows is that people can agree or disagree with assertions, which means that assertions introduce a proposition as the topic for discussion in the QUD stack.

You may recall from earlier in this chapter that the "literal" meaning of the sentence is called the **at-issue** meaning. The literal meaning of the sentence is "at-issue" because that's the content of the sentence that is up for debate in the QUD stack.

To reiterate a point from earlier, just because you believe something doesn't make it a fact about the world. This means that asserting p doesn't automatically put p in the Common Ground; you have to get the agreement of other discourse participants first. So the second thing that ASSERT p does is put p up for discussion as the QUD.

(3) summarizes the illocutionary force of ASSERT. To apply it to our example in (3), replace p with the proposition ***We have tomato sauce and ground beef in the fridge***.

(3) ASSERT p =

(i) Put p in the Discourse Commitment set of the speaker/signer

(ii) Put "is p true?" at the top of the QUD stack

In the next section, let's see how this compares to the illocutionary force of questions.

Check your understanding

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8.13: Question

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We now return to Aya and Bo's dinner plan in order to analyze the illocutionary meaning of INTERR, the interrogative illocutionary operator. The conversation is reproduced below, as well as the visualisation of the context.

(1) (Context: Aya and Bo are roommates, and are trying to decide what to make for dinner.)

Aya: Should we have spaghetti for dinner?

Bo: We have tomato sauce and ground beef in the fridge.

Aya: Yeah. **Can we make pasta bolognese with those ingredients?**

Bo: Yeah, I think so.

Aya: OK, cool. We'll do spaghetti then.

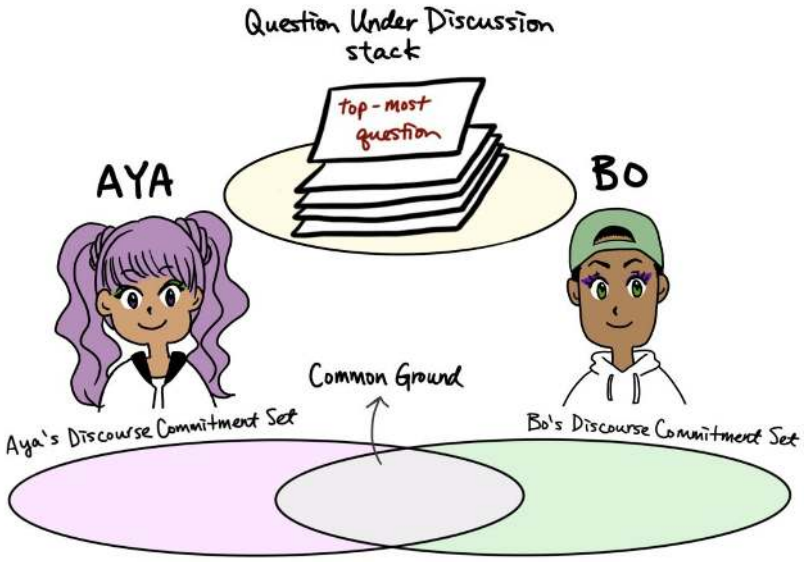


Figure 8.7. A context consisting of the Common Ground, the Question Under Discussion stack, and Discourse Commitment sets.

In this section, we will analyze the bolded question in (1). The compositional breakdown is *INTERR **we can make pasta bolognese with those ingredients***, with the illocutionary operator acting on the proposition ***we can make pasta bolognese with those ingredients***. Where does this proposition go in the context (Figure 1) for a question?

Unlike an assertion, a question does not commit the utterer to any particular proposition. Aya can ask *Can we make pasta bolognese with those ingredients?* without any belief that they indeed can make pasta bolognese with those ingredients. In fact, in this context it is natural to think that she is asking this question because she genuinely doesn't know. So this means that INTERR p does not update the speaker/signer's Discourse Commitment set with p.

Questions, like assertions, do raise a topic for discussion. With a yes-no question like this, the speaker is asking whether the proposition ***We can make pasta bolognese with those ingredients*** is true or false. Because the issues in the QUD stack are ultimately about what proposition should be added to the Common Ground, this question can be reframed as "Which one is true (= should go in the Common Ground): ***We can make pasta bolognese with those ingredients***, or ***We canNOT make pasta bolognese with those ingredients***?". So, the effect of INTERR is summarized below in (2). ¬ is the logical symbol for propositional negation, or 'it is not the case that'. To understand the illocutionary meaning of the question *Can we make pasta bolognese with those ingredients?*, try replacing the variable p with **we can make pasta bolognese with those ingredients**. So, ¬p is read as "It is not the case that **we can make pasta bolognese with those ingredients**," which is just a long-winded way of saying "We cannot make pasta bolognese with those ingredients." (3) shows ASSERT p again for comparison.

(2) INTERR p =

Put "is p true, or is ¬p true?" at the top of the QUD stack

(3) ASSERT p =

(i) Put p in the Discourse Commitment set of the speaker/signer

(ii) Put "is p true?" at the top of the QUD stack

Notice that for *ASSERT p*, just "is *p* true?" is the QUD, while the QUD for INTERR is "is p true, or is ¬p true?". This difference captures the intuition that when you assert p (e.g., *It's snowing*), the speaker/signer is biased towards putting p in the Common Ground. With a polar question INTERR p (e.g., *Is it snowing?*) the speaker/signer is open to putting either p OR ¬p in the Common Ground.

In the next section, we will put everything together to see how illocutionary meaning works in a conversation as a whole, using the illustration from Figure 8.7 as a guide.

Check your understanding

References

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8.14: Analysing meaning dynamically

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[Note: It is highly recommended that you watch the video for this part!]

Here is our example discourse again in (1). The illocutionary meaning of *ASSERT p* and *INTERR p* have been reproduced in (2) and (3), respectively, as well.

(1) (Context: Aya and Bo are roommates, and are trying to decide what to make for dinner.)

Aya: Should we have spaghetti for dinner?

Bo: We have tomato sauce and ground beef in the fridge.

Aya: Yeah. **Can we make pasta bolognese with those ingredients?**

Bo: Yeah, I think so.

Aya: OK, cool. We'll do spaghetti then.

(2) ASSERT p =

(i) Put p in the Discourse Commitment set of the speaker/signer

(ii) Put "is p true?" at the top of the QUD stack

(3) INTERR p =

Put "is p true, or is ¬p true?" at the top of the QUD stack

The idea with illocutionary meaning is that every time a discourse participant makes an utterance, something changes in the context. Let's start with an empty context: what the context looks like before anyone has said anything. Let's call this context Context 1.

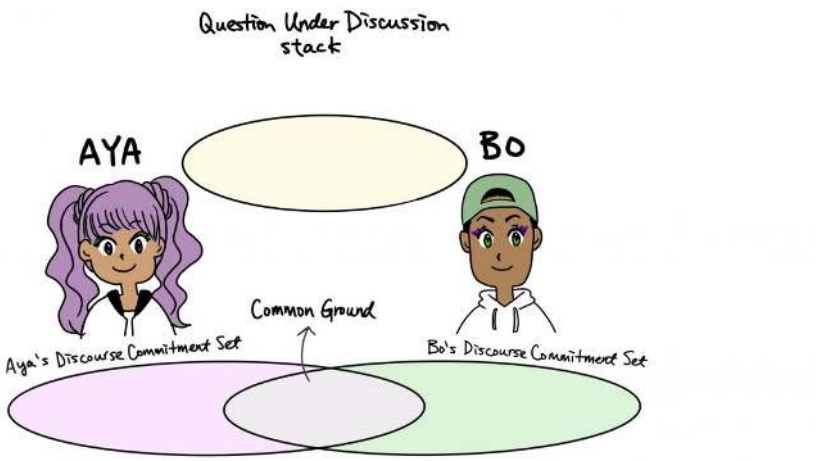


Figure 8.8. Context 1: An empty context consisting of the Common Ground, the Question Under Discussion stack, and Discourse Commitment sets.

Currently, all of the sets are empty because no one has said anything. Note that there could be trivial assumptions like "we are in the kitchen" "Aya and Bo both speak English" in the Common Ground already, provided that both Aya and Bo take them for granted. These propositions that exist in the Common Ground already prior to an utterance are actually what we have been referring to as **presuppositions** (see Section 7.3). For simplification, we won't include these trivial presuppositions in the Common Ground in this section.

Re: Set theory notation

We are using circles to represent sets in the diagrams in this chapter, because it's easier to visualise what is going on this way. Remember from Chapter 7 that in set theory notation, sets can be represented using curly braces. For example, the set containing the propositions p and q can be represented as {p, q}.

Now, imagine that Aya made her first utterance, *Should we have spaghetti for dinner?*. Since this is a question, the QUD gets updated. Of course, as the only question that has been raised so far, this issue is the topmost issue in the QUD stack. Context 1 has now been **updated** to look like Context 2.

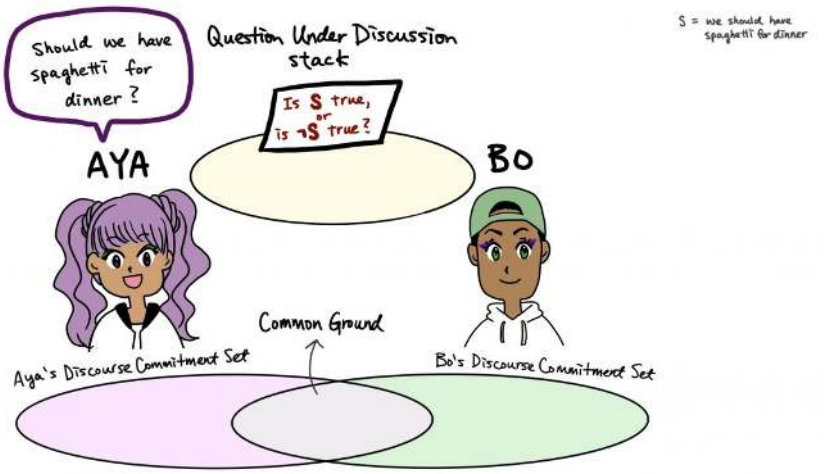


Figure 8.9. Context 2: Aya asks "Should we have spaghetti for dinner?" (INTERR s, where s = we should have spaghetti for dinner.)

Let's take a moment to appreciate what has happened between Context 1 and Context 2. The change between Context 1 and Context 2 is what the **illocutionary meaning** of this question (*Should we have spaghetti for dinner?*) is. This is one way of analyzing what "happens" when you ask a question. Aya has changed the status of the discourse by virtue or making that utterance. Under this kind of theory, we are analyzing illocutionary meaning as updates to contexts.

Dynamic semantics

This theory of meaning, where the meaning of sentences is treated as context updates, is sometimes called **dynamic semantics**. It's dynamic (as opposed to static) because this kind of theory looks at meaning cross-sententially: that is, how meaning is interconnected between different utterances in discourse. Dynamic semantics is useful for analysing any kind of phenomenon where you have to examine the relationship between the meaning of two utterances — for example, pronoun reference (Heim 1982). There are various formal frameworks within dynamic semantics, but the one that we are using in this section is inspired by Farkas & Bruce (2010)'s work in particular. If you are interested in learning more about dynamic theories of meaning, Taniguchi (2017), Chapter 1 has an accessible overview of various frameworks.

Let's continue with Aya and Bo's conversation. Next, Bo makes an assertion: *We have tomato sauce and ground beef in the fridge*. So we take Context 2 and update it some more. Context 3 below is the newly updated context after Bo's assertion.

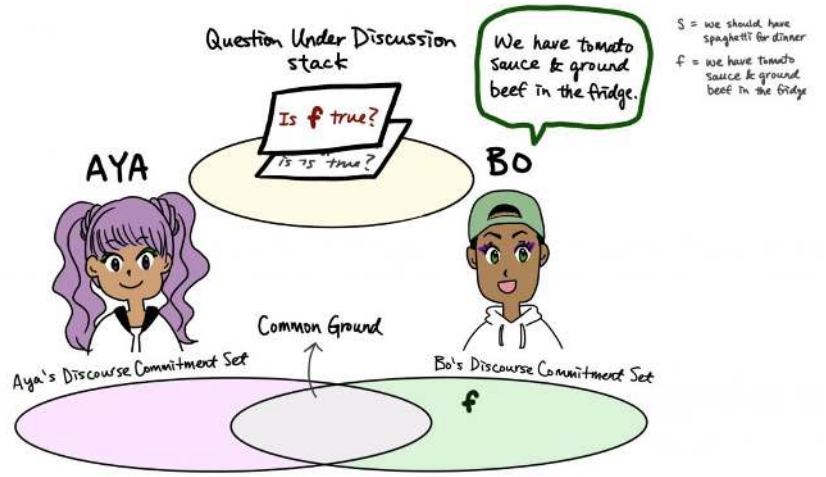


Figure 8.10. Context 3: Bo asserts "We have tomato sauce and ground beef in the fridge". (ASSERT f, where f = we have tomato sauce and ground beef in the fridge.)

Note that since Bo made an assertion, both his Discourse Commitment set and the QUD stack get updated. The previous question that was in the QUD stack gets pushed down. Now the topmost question is whether they have tomato sauce and ground beef in the fridge. The idea with the QUD set being a stack is that you can only address one question at a time with each discourse move: the topmost question.

Now, Aya responds to Bo: *Yeah*. This is a reaction to the topmost question in the QUD stack. This updates Context 3, producing Context 4.

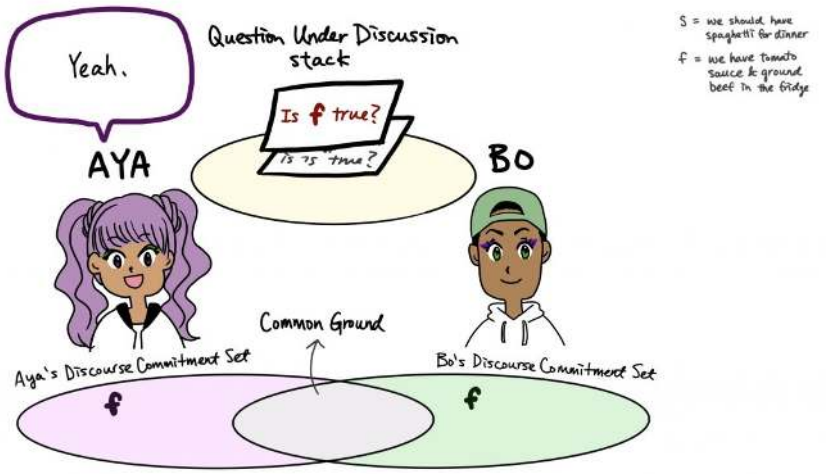


Figure 8.11. Context 4a: Aya responds "Yeah (we have tomato sauce and ground beef in the fridge)."

Aya responding affirmatively publicizes her belief that she too believes **we have tomato sauce and ground beef in the fridge** to be true; so this proposition gets added to her Discourse Commitment set, too.

Recall that the CG is the intersection of Aya's Discourse Commitment set and Bo's Discourse Commitment set. This means that if **we have tomato sauce and ground beef in the fridge** is in both of their Discourse Commitment sets, then it's in the CG. So Context 4a can be simplified into Context 4b. This means Aya and Bo have agreed on one thing being true about the world they are in: they have tomato sauce and ground beef in the fridge.

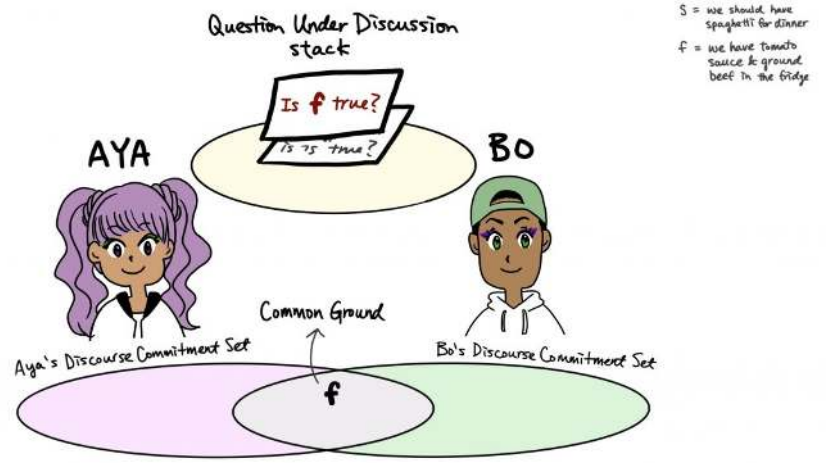


Figure 8.12. Context 4b: Aya responds "Yeah (we have tomato sauce and ground beef in the fridge)" (continued).

Updating the Common Ground causes another effect at this point. Since the Common Ground has been increased with **we have tomato sauce and ground beef in the fridge**, the topmost QUD in the stack has been resolved. So this question gets eliminated from the stack:

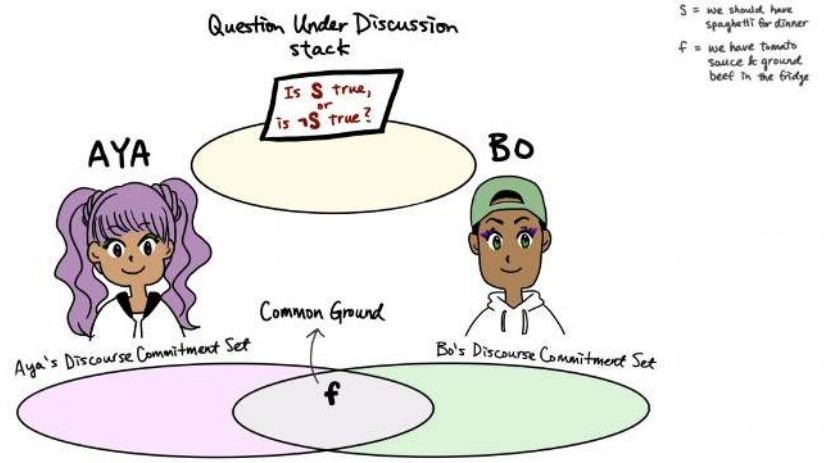


Figure 8.13. Context 4c: The QUD "Is **we have tomato sauce and ground beef in the fridge** true?" gets resolved.

Henceforth, affirmative context updates like this will just be abbreviated as one single step (i.e., steps (a) through (c) combined as one step).

This brings us back to the original issue that was raised in this conversation: *Should we have spaghetti for dinner?* In order to answer this question, Aya raises a related question: *Can we make pasta bolognese with [tomato sauce and ground beef]?*. This update is shown below. Let's call this Context 5.

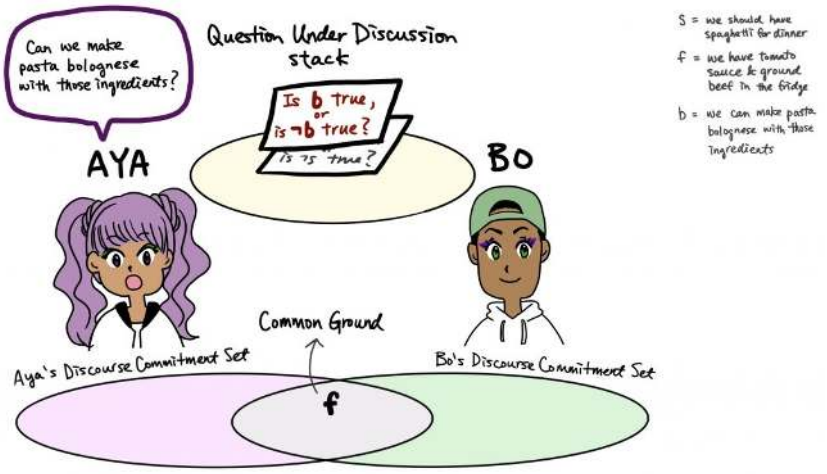


Figure 8.14. Context 5: Aya asks "Can we make pasta bolognese with those ingredients?" (INTERR b, where b = we can make pasta bolognese with those ingredients.)

Bo reacts affirmatively to this, producing Context 6.

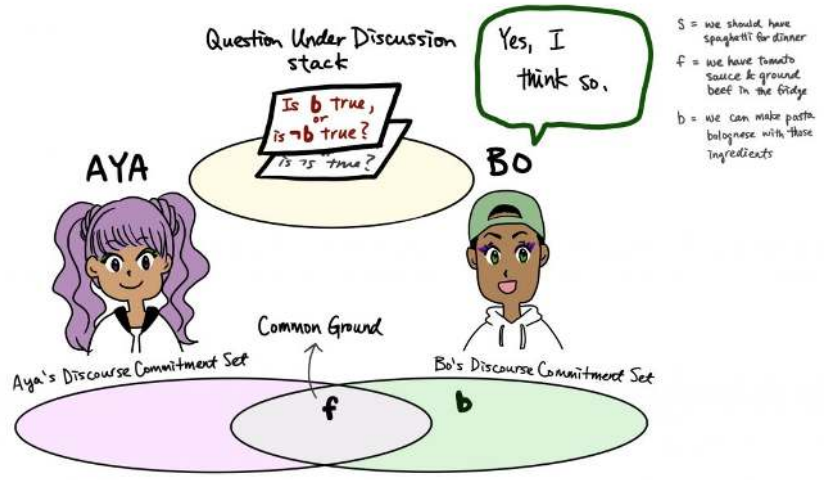


Figure 8.15. Context 6: Bo responds "Yes, I think so."

Then, Aya responds affirmatively to this ("Ok, cool"), thus committing to the positive proposition as well. This effectively means the Common Ground gets updated with this proposition, and the top-most QUD gets eliminated.

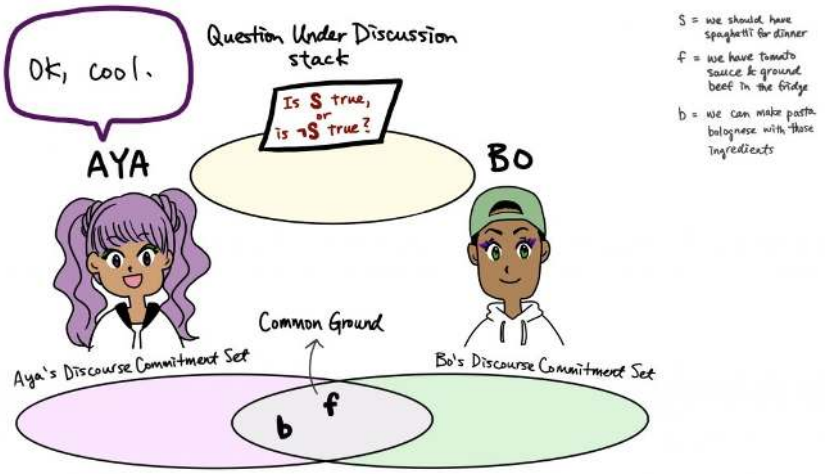


Figure 8.16. Context 7: Aya responds "OK, cool".

We're back yet again at the original question: Should Aya and Bo have spaghetti for dinner? To confirm, Aya asserts that they will have spaghetti.

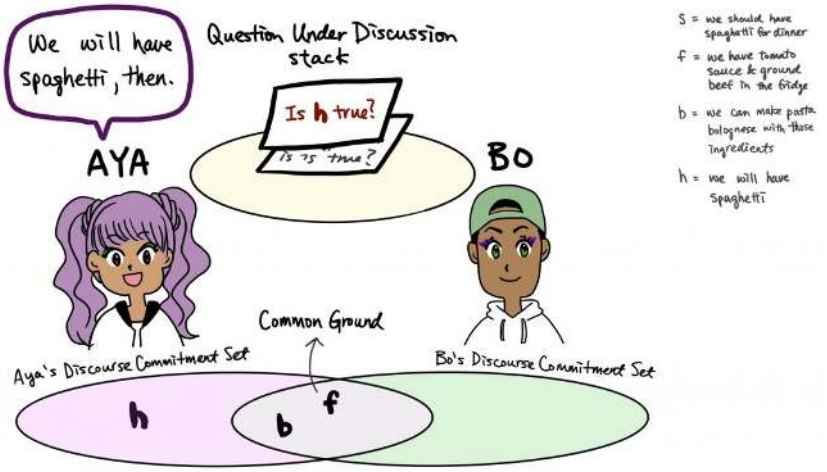


Figure 8.17. Context 8: Aya asserts "We will have spaghetti, then." (ASSERT h, where h = we will have spaghetti)

Bo reacts affirmatively to this, confirming their commitment to the same proposition. This updates the Common Ground and resolves the top-most QUD.

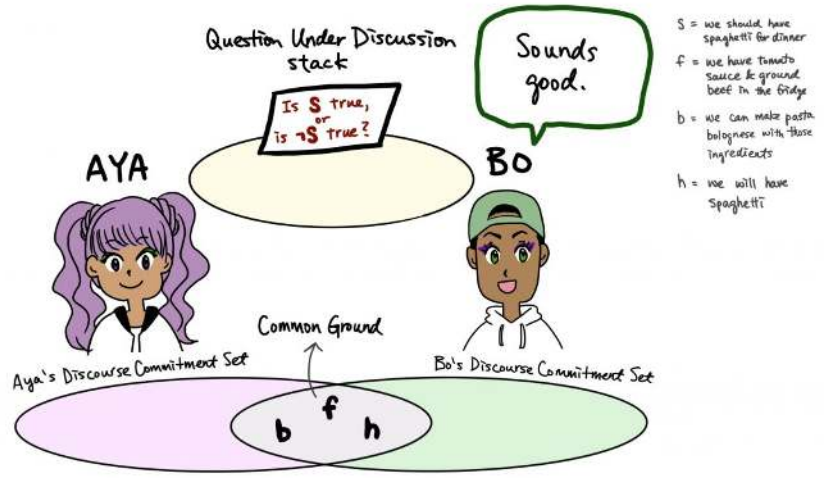


Figure 8.18. Context 9: Bo responds "Sounds good".

And now, there are enough propositions in the Common Ground for them to infer the answer to the original question: *Should we have spaghetti for dinner?* The answer is yes, they should. The QUD stack is finally empty, and the discourse reaches a natural ending point. This is shown below as Context 10.

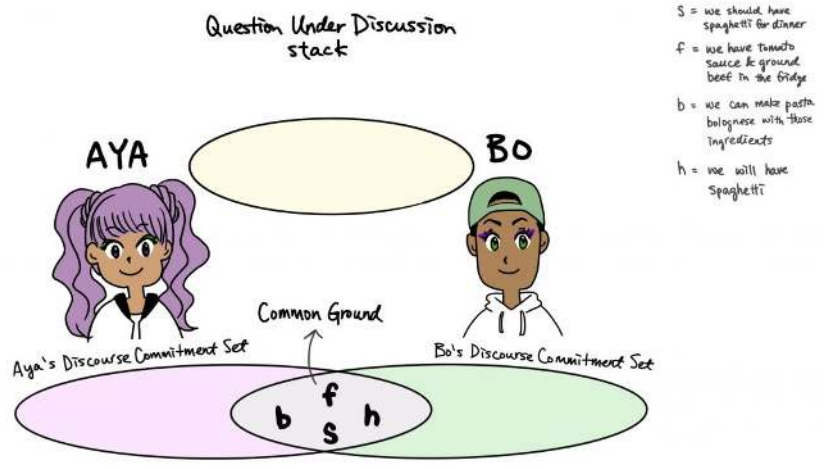


Figure 8.19. Context 10: The QUD stack is empty.

This is a fairly ideal conversation in which both discourse participants have agreed about all of the propositions. But this kind of system also allows for us to model what happens if they disagreed, too. For example, let's say that Aya and Bo had this conversation over spaghetti:

(4) (Context: Aya and Bo are having spaghetti for dinner.)

Aya: This bolognese sauce has no salt in it.

Bo: Yes it does! I totally put some in.

Aya: I don't believe you.

Bo: Ugh, fine. Whatever you say. I know I put some in.

Aya: Fine.

After this discourse, the context might look like this:

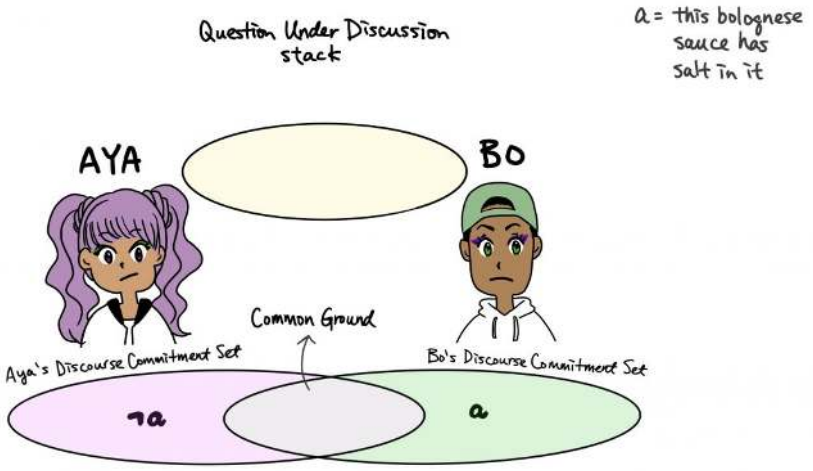


Figure 8.20. The result of the conversation in (4).

This is a case where discourse participants "agree to disagree": each of their Discourse Commitment sets are updated, but since they couldn't agree on the same proposition, the Common Ground does not get updated.

In summary, discourse can be thought of us sequential updates to the context, as a result of the illocutionary meaning that the various discourse contributions carry.

Check your understanding

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8.15: Summary (and further questions to consider)

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In this chapter, we explored various kinds of meaning, with a lot of emphasis on non-at-issue meaning. Here is a summary of the various kinds of meanings we encountered in this chapter:

- **At-issue meaning**: the "literal" meaning of a sentence that is explicitly "put up for debate"
- **Non-at-issue meaning**: the kinds of meanings that are not explicitly asserted, broadly construed.
- **Entailment**: What is necessarily true from a sentence being true.
- **Implicature**: A non-entailment that is "suggested" by a sentence; depends on context; non-at-issue.
- **Presupposition**: A special kind of entailment; what is assumed to be true prior to uttering the sentence; what's already in the Common Ground before the utterance is made; non-at-issue.
- **Illocutionary meaning**: What you "do" in making an utterance; non-at-issue (in the sense that illocutionary meaning just "happens" by you making the utterance; e.g., the fact that you made an assertion is not "up for debate")

Combined with Chapter 7, what we have learned is that the question "What does that *mean*?" is a complicated question to answer! There are many kinds of meaning, each showing us the complex systematicity of what we communicate when we make utterances.

We leave you with an invitation to think about what other kinds of meanings there might be in language. In asking this question, consider the various "parts" of the discourse context that we introduced: the Common Ground, the Question Under Discussion stack, the Discourse Commitment sets. There are various types of sentences that we did not discuss in depth in this textbook, like **imperatives** — commands like *Pet the cat!*. What do you "do" to the context in giving commands? Are the tools that we introduced in this textbook sufficient for accounting for imperatives, or do we need additional parts?

You might even start thinking about what kind of meaning things like **emojis** contribute! Is using the laughing-crying emoji 😂 at the end of a sentence the same thing as *asserting* 'That's funny'? Or is it an implicature? Or a presupposition? Or something else? What's the difference between the regular laughing-crying emoji (😂) and the version that is tilted to the left (🤣)? The possibilities for research are limitless!

The last chapter (Chapter 7) and this chapter (Chapter 8) introduced concepts that are foundational to linguistic meaning. The next time you encounter the question "What does that mean?", we hope that what you have learned here will help you approach the question like a linguist!

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8.16: Exercise your linguistics skills

Exercise 1. *Basic; 8.5-8.7.* What's the difference between violating a maxim and flouting a maxim? Use the Maxim of Politeness (a fifth maxim that has been proposed by some linguists; see Section 8.7) to give an example of each. You can use your first language in formulating this answer. Just imagine that the Maxim of Politeness was actually a maxim in your language community; what would violating and flouting this maxim look like in that case?

Exercise 2. *Intermediate; 8.3-8.7.* Recall the "lawyer dog" case (State of La. v. Demesme) from 8.3. Why do you think it feels unreasonable for many people that the police thought Demesme meant "Give me a canine lawyer"? Relate your answer to the Cooperative Principle.

Exercise 3. *Advanced; 8.5-8.8.* Grice mentions in his paper *Logic and Conversation* that it's possible that the conversational maxims have different rankings in terms of importance. This would mean that following one of the maxims may be considered "more critical" than following some of the other maxims. Grice himself suggested that Quality could be the most important maxim in a conversation, suggesting that "other maxims come into operation only on the assumption that this maxim of Quality is satisfied" (Grice 1975, p.46). What are some reasons why Quality might be a privileged maxim like this? Imagine a discourse with a well-known liar; if Quality is not observed, what problems does this pose for the other maxims?

Exercise 4. *Advanced; 8.9-8.14.* Recall from 8.13 that the illocutionary meaning of a yes-no question can be thought of as putting a question at the top of the Question Under Discussion (QUD) stack, and that this question is represented as a disjunction (= connected with "or") of possible answers to the question. So if you ask *Is that a bean casserole*? The question at the top of the QUD stack is represented as "Is **That is a bean casserole** true, OR is **That is not a bean casserole** true?", because a yes/no question only has two options for the answer. Now, consider a WH-question like *Who brought the bean casserole?* . For the purposes of this question, let's assume that this question was asked in the context of a potluck party, which was attended by Aya, Bo, Cai, and Deo. Similar to yes/no questions, linguists have analyzed the illocutionary meaning of WH-questions like *Who brought the bean casserole?* as putting a question at the top of the QUD stack, where the question is represented in terms of the possible answers to the question. With this in mind, what might this question at the top of the QUD stack look like, if represented as a disjunction of possible answers?

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CHAPTER OVERVIEW

Chapter 9: Reclaiming Indigenous Languages

As we saw in Chapter 1, Canada's settler government has engaged for many decades in deliberate strategies to eliminate the languages spoken by Indigenous peoples. Indigenous people have been working for years to try to preserve their languages by increasing the number of people who can speak them, and since the 2015 report of the Truth and Reconciliation Commission, the federal government has more openly acknowledged the importance of these efforts.

This chapter includes interviews with several Indigenous experts who are doing the work of preserving and reclaiming their languages, and the work of helping other members of their Nations become speakers.

9.1: Preserving Mohawk
9.2: Learning Mohawk
9.3: Mohawk culture and language
9.4: Creating materials for teaching Mohawk
9.5: Speaking Mohawk and reconciliation
9.6: One view on the future of Indigenous languages
9.7: Reclaiming Michif
9.8: Reclaiming Hul'q'umi'num'
9.9: Growing up speaking Nishnaabemwin
9.10: Learning Nishnaabemwin at University
9.11: Resources for teaching and learning Nishnaabemwin

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9.1: Preserving Mohawk

David Kanatawakhon-Maracle

The next several units are excerpts from a conversation with David Kanatawakhon-Maracle, a Turtle Clan Mohawk and a professor at Western University. In this unit, Dr. Kanatawakhon-Maracle talks about how, for a language to survive, it must be widely spoken.

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Video Script

I've been a language teacher for years, you know, and trying to teach and there's always been this segment of people out there who "really support what you're doing" and stuff like that and I've gotten into the habit of just ignoring them because their support is verbal; they're not in my classes; they're not learning the language. Real support for an Aboriginal language is getting out there and learning that language and learning to speak it, you know, so, to help bring that language back into its own. I don't expect any community to work towards, you know, sole monolingualism — that's that's just not doesn't make sense — however, bilingualism is a fairly normal way to be with a large percentage of the world's population. And, and, for, you know, my grandparents, my grandfather was bilingual, you know, and my great-grandparents were bilingual and they could use English when they needed to and they used Mohawk when they needed to and, or by choice or whatever.

I speak Mohawk and English so the thing is I can also, you know, use both languages. I … the difference I guess is that I also read and write Mohawk as well. So I'm a speaker and I'm literate which is the sort of thing that we would want to teach students especially at the university level because there's a lot of stuff written in Aboriginal languages that are presently not available in English or, you know or probably doesn't necessarily have to be available in English if they're speakers of the language.

People have always said you know, "Oh yeah, we know that the language should be in the home." No! The language should be in the street! If the language is surviving — if the language is truly an important part of being — it's in the street; it's in the stores; it's outside of the home. When you keep the language in the home it dies, because the speakers of the language eventually leave that home and then they go into the street where they're speaking English all the time and they meet somebody else who is also speaking English and eventually … the next generation is being raised by two English-speaking people and of course then the language is, is gone.

> [CA: Would you say that that attitude that says "oh the language is for at home," is that, is that another legacy of colonialism where it was shameful to speak an Aboriginal language?]

Yeah well let's keep it.

> [CA: Yeah, it's private, but not outside the house.]

Yeah and the real problem is that when when the language is only spoken in the home especially in contemporary society where people are, spending more and more time at home in front of some sort of technical device — in times past they were out going from home to home and all people were speaking the language and visiting and the language is very much alive — but once it becomes ensconced within the home and people get to the point where, sure they can talk to their parents, but they can't really understand their neighbours.

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9.2: Learning Mohawk

David Kanatawakhon-Maracle

Some Mohawk people have learned to speak Mohawk by growing up among fluent speakers. Many others are trying to learn to speak Mohawk in school or in university. Having some knowledge of linguistics can make learning a second language easier in some ways.

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Video Script

One of the things about language is — I understand Mohawk and I speak Mohawk because I've heard hundreds of people speaking it.

> [CA: Right. So that's how you learned it, was growing up in the community where it was spoken?]

Yeah I basically grew up with Mohawk and English and as I got to be a teenager I spent a lot more time with the older folks because they were more inclined to be speakers. Also, I find old people a lot more entertaining than younger adults, you know, they no longer have the sort of worries that, and the stress, that younger people have. And the stories, I mean, the really funny thing is that I find with older people, with the old folks, they're not very trusting, you know you basically have to visit them a lot before you kind of crack that shell and you get access to, to what they what they know. And I suppose to a certain degree that's self-serving but at the same time these people have got, they've got tradition to pass on; their responsibility is to be passing on this stuff and if they've decided that well nobody wants to hear that you know and so they stop telling it then it, it dies with them. So I found that spending a lot of time with the older folks you hear a lot of stories.

And the funny thing too about, one of the things that I found with the language is they were a lot more fun in Mohawk than they were in English. They get cranky and grumpy and unhappy when they speak English and I don't know why because, it just, I had an uncle used to visit and, well, boy I mean this he had a complaint about everything he had a gripe about everything and stuff and it always seemed to be so grating in English but when he was speaking Mohawk we spent a lot more time laughing. Because that was the language of his childhood and that was how he grew up and he's, you know, he would tell stories from that time where it's often you know were, were a lot more amusing or a lot more interesting than what he was having to deal with presently in English.

I've had students that have come in that have taken a number of years in the immersion program at Six Nations. They seem to have a sense of the language but they're not speakers. The course that I teach right now is a fairly heavy grammar-based course because I find that if I mean you can you can learn all the vocabulary you want, but if you have no sense of the grammar of the language, how are you going to utilize that vocabulary? What are you gonna do with it? And the thing is that the students that have come in that have some language, they know a lot of vocabulary… can't do a thing with it! They know how to say expressions; they know dialogues; they know a whole lot of things that I find is, okay, great, so you at least know the pronunciation, which is a good place to start. Anglophones can't get past what they see written. "Well, but that's a 't' it's written as a 't'." I says yeah, it's pronounced [d].

> [CA: And here's where, actually, thinking of my students the having a bit of Introduction to Linguistics would help to say, well, look, this is a, this is an allophone and it's voiced in these circumstances and voiceless here, someone who has Intro Linguistics might get that.]

Yup. I had students who will comment on the fact that they've taken a linguistics course and it has helped their pronunciation it does make them more aware of it. […]

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9.3: Mohawk culture and language

David Kanatawakhon-Maracle

In this unit, Dr. Kanatawakhon-Maracle mentions some of the elements of Mohawk culture that are embedded in the grammar of the language, and we discuss the idea that living languages are always changing.

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Video Script

What I also do too is that I include culture with the language. I'll be teaching them a particular word or phrase or expression but then I'll tell them where it comes from — why it is this way — why we say it that way — why we don't say this word. I mean, the word *nyaweh* in Mohawk gets interpreted as 'thank you' in English but that's kind of the beginning and the end of it. We don't, the reality is, if you follow older tradition, which is the way I was raised, you don't say *nyaweh* for every little thing; you don't use it the way it's used in English. In English it's just thank you thank you thank you — it becomes meaningless; it becomes a grunt, quite literally, in the English language, because people just use it so freely that it starts to lose its meaning. In Mohawk, *nyaweh* is used, or should only be used, between yourself and the Creator even when you say *nyaweh*, you know you see something beautiful, you see a sunset, a beautiful flower, nice majestic scenery or whatever, stuff like that, then you say *nyaweh* because now that *nyaweh* is directed towards the Creator and it's showing appreciation for what you're dealing with. When we sit at the table and we eat, the first one that gets up says *nyaweh*, not for the food, you know, but for, for the opportunity to sit with other people and share food. We're getting into the habit of using it much the same way it's used in English — you'll hear young, young speakers, more contemporary ones that are using or learning the language, they'll use *nyaweh* the same way they do and I said, No! (laughter).

> *[CA: Well I wonder, is there, is there a tension there that, so, on the one hand, you want to honour the traditions and the things you've learned from the Elders and from the older people and, on the other hand for a language to stay alive it has to change, right? Is that, so, if people are changing the language some, it's because it's still a living language…]*

I don't know — there are certain things that we don't, we don't want to change, that we don't particularly want to update because then it starts to erode our uniqueness. If you're going to speak Mohawk the way you speak English, why don't you just speak English? You can update certain things but other things you can't. Like negating a future situation — in English, you can say, "Oh, it will not snow today!" How presumptive you are! (laughter) Because, just because the sky is blue, but there's a cloud and you know the clouds — if there's one cloud there's another cloud and another cloud and another cloud and by the end of the day we could see snow, which is all within the realm of the "will" because the "will" is in the in future. We cannot negate the future.

> [CA: So that's, so that's a cultural attitude that shows up in the grammar of Mohawk? That you don't use negation with the future?]

You can construct a negative future. Nobody does. Fluent speakers don't. I mean, why would you? You know, because it interferes… We have other ways of kind of getting around it right but … most people just wouldn't. You just would not say, "it will not snow." We can create what amounts to it, a negative sort of thing and we use it with the non-definite, which is like saying "it would not" or "there's a possibility that it won't" It would not… but the thing is that you cannot directly say, "it *will* not" so we go to a very fuzzy sort of a non-definite situation and we negate that. Cheating in a way but at the same time, it is an important cultural part of the language. I mean, the fact that you have a culture that that doesn't negate the future — they deal with the future in a different sort of way — so those sorts of things, I think they have to be kept in language because they are the sort of things that add to the uniqueness of a particular language.

Word order in Mohawk. English has a set word order: subject-verb-object. Mohawk… Mohawk's word order is, is quite literally whatever comes out of your mouth. What joins it all together are pronominal prefixes and that works. But because the pronunciation of Mohawk, the pronunciation of a word in Mohawk is set; however, due to the situation in which that word may occur within, within a statement or sentence, the accent on that word may shift. So okay fine, so if I say *kahiatónhsera* for "book" then the accent is on *tón*. *Kahiatónhsera*, okay fine, but if I say *kahiatonhseráke*, "on the book" that accent shifted to the

penultimate syllable. So accent shifts on a word depending upon where that word occurs. English is a language blessed with one or two syllable words which actually puts English speakers in an odd situation since most of them seem to have a hard time pronouncing a word that has more than one, more than two syllables, (laughter) which makes my name really hard for them, “Oh, Kanatawakhon, oh, I can’t say that!” It’s worse if they see it written.

But the thing is, in Mohawk, word organization, word position is dependent on emphasis, so if I want to say, “The boy is walking on the road,” what am I saying?

“The BOY is walking on the road?” “*raksá:’a ire ohaháke*“.

or am I saying,

“The boy is WALKING on the road”? “*ire raksá:’a ohaháke*“.

Or am I saying,

“The boy is walking on the ROAD”? “*ohaháke ire raksá:’a*“.

So I shift my words around, there’s actually six arrangements of that, the three words and it’s all depending on, on emphasis. Also dependent upon if you’re answering a question. Because, “What did you buy?” “A COAT I bought.” Because the question *what* is asking, is asking for information which is then placed first which puts it in an emphasized position. That’s a very important part of the uniqueness of a language. So there are three very unique things with the language that we don’t want to, we can’t lose by modernizing it or contemporizing it. The language is set.

The culture that goes with the language … if you stop using a stone axe then eventually the word for stone axe is going to disappear unless for some reason … And then some vocabulary we’ve created in the past that we’ve carried through into the future like *oháhsera*, “a light” now is used primarily in reference to artificial lighting but originally it referred to something that looked very much like this bone *oháhsa* with the *–ra* suffix so then *oháhsera* just kind of gives the impression or gives the appearance of this particular bone and if you look at that bone and you look like a candle — yeah — so the thing is so we called the candles *oháhsera*, then lamps showed up. Well, more or less the same shape, *oháhsera*. Then lights, lamps, you know, living room lamps and stuff showed up, okay, *oháhsera*. Nowadays *oháhsera* refers to anything that throws artificial light, you know, ceiling lights, wall lights, the whole bit. So that is a word that has followed through time because even though we had your basic application but the shape kept changing.

[CA: That’s a natural semantic drift that happens in most languages…]

Yeah.

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9.4: Creating materials for teaching Mohawk

David Kanatawakhon-Maracle

Dr. Kanatawakhon-Maracle has developed his Mohawk textbooks and exercises over his many years of teaching Mohawk, but when he started teaching, there were very few books or materials available. In this unit, we talk about the kind of linguistics work that can be helpful in creating textbooks and other teaching materials.

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Video Script

Over the years I've been teaching Mohawk since '91 … '90-91 and I wanted to, I initially taught the course here, got the opportunity to teach the course because I wanted to see if the text material that I had developed for a language course would actually work. So I had developed a textbook and we used it the first year in that language course — mmmyeah, it did — as I modified it and I did things to it. That one sitting there that's the most recent within the last five years. There is an audio that goes with that on a USB stick. That's just the teaching text; there's another one that's called Supplements and it's divided into ten, ten supplement areas, where you've got everything about numbers, everything about locations, everything about… And it's equally as thick as that…

And then the band council back home, they finally got the opportunity to offer the Mohawk language in the public school there, so they wanted me to come home and teach it because I was quite literally the youngest speaker there and we didn't have a lot of old folks in the community to draw on. So I said okay fine, I'll, well I went back home and of course they said, "Okay there's, here's the Eastern school, here's the Central School, here's the Western school and then here's the main school one, Grades 1, Grade 2, Grade 3 and then 4 to 8 and I drove to each one every day for a half an hour, about a half an hour of language in each one, sometimes 40 minutes. So my first year of teaching was Kindergarten to Grade One — Kindergarten to Grade 8, you know of course having to deal with an attitude all the way through, worst at the 7/8 level because they started to be a lot more like their parents, and a lot more annoying. And then your little guys you know, just soaked it all up and were a lot of fun.

But then, the band council says well here's, here's your job, here's where you're teaching, and here's a hundred dollars a week. (laughter) No materials whatsoever, so I bought, I had to buy any materials that I needed for flashcards, for doing things within the class to help the kids learn and that sort of thing but one thing that there wasn't was a textbook. There was, there was no available materials that they were using and that was pretty much everywhere, so you pretty much had to develop your own material so I started doing more and I got thinking well the language is a lot more than just words. And there are a lot of words that seem to be very much the same.

I taught for five years and about the fourth year came across this book published by Günther Michelson called *A Thousand Words of Mohawk* and it was all about the roots. And I bought a copy of this thing and I started looking at it, "Oh, wow, this makes so much sense." So then I started, well maybe that is the better way to teach the language course.

> [CA: So he had done the linguistics research to assemble the roots?]

Yeah, he was a linguist himself and of course, a lot of the linguistic work done on Iroquoian languages at the time was for the most part unreadable. (laughter) I didn't have the education to deal with all that sort of weird and wonderful vocabulary. If I got a book, I had some linguistic stuff on the language, but as long as it provided enough examples that I could, then I could figure out what they were talking about … but … I really needed to have the examples. So I started doing his stuff and then gradually working this into, to doing the class, classroom stuff.

> [CA: So it sounds like there could be a valuable role here for people who may not have, who may not know languages, Indigenous languages but know some linguistics to work with speakers of the language to create materials?]

Oh yeah, I think, if they, and if they're going to be working with speakers they really do have to be somebody who has a sense of the grammar of the language. One of the things I learned how to do by trial and error was, learned how to ask the right question. Because speakers will tell you what comes to their mind. So we say, well what's the word for "tree"? "Oh, *kerhitáke*". Okay, eventually I learned that means "on the tree". *Kerhitákon*, eventually I learned that was "in the tree", and then, you know, they

would give me all of these, *tkerhitoke*, “There’s a tree standing there,” and eventually I figured out that, *kérhite* was the word for “tree”. Oh, yeah, yeah, you’re telling us *kérhite*, yeah, that’s “tree”. (laughter)

But the thing is that, and when you’re asking them something, you know, a question like, you know, “I trust him.” You trust him for money? You trust him for what he says? You trust him for what he’s doing? You trust them to get the job done? What? Because those are all different, you know?

And, and the business of using pronominals — we have a subjective, objective and transitive, and they would mix them. Now this is a problem that was happening in the, in the language programs in the schools, is because the fluent speakers were suddenly, oh Aunt Maisie there, she’s a fluent speaker. Yeah, she’s 85 but she can teach these kids — what a horrible thing to do to an old woman (laughter) — but anyway, she could use the money, so. But the thing is that she had, as a fluent speaker she had no sense of the grammar of the language.

> [CA: Right, didn’t have the metalinguistic awareness.]

Constantly mixing categories, constantly mixing, you know, mixing things up. “How come you said, *wahahní:no* yesterday and today you said *rohahní:no* for ‘he bought’?” They both kind of mean that, *wahahní:no*, “he just bought it”, *rohahní:no*, he bought it, but quite a while ago”.

> [CA: Yeah, that’s something that my students in, in first-year linguistics struggle with making this, this unconscious implicit knowledge about how their language works and making that explicit. It’s a real challenge. Whatever, I mean, we mostly do it in English but whatever your native language is, it’s hard to become conscious…]

Yeah, so learning – learning to ask the right question, you know and, even when, when doing a sentence, you really have to pay attention to, to how they’re organizing the sentence, how they’re putting it together, and even though when they would say things, I would, “yeah, yeah, I know”. I have a sense of what they were saying, but (laughter), it just, sometimes it was so confusing, sometimes very frustrating, sometimes you would ask three or four different speakers the same thing and they would all tell you something different. Is it because there are four ways to say the same thing or is it not really the same thing but simply refers to similar situations?

Now, I mean, that, that textbook there is all about the grammar of the language — what you use where, how you organize it, what you say when, and stuff.

> [CA: And it’s over your years of experience that you’ve assembled…]

Yeah. Over the years I’ve written five different language learning textbooks complete with, with exercises, drills and all the sort of stuff. That also has a book of exercises and drills to go with it. The difference is that is on, on audio, so it’s … you can, you’ll find the exact same textbook on screen which you can highlight the audio and get a pronunciation.

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9.5: Speaking Mohawk and reconciliation

David Kanatawakhon-Maracle

In this unit, Dr. Kanatawakhon-Maracle shares his view that language will play a vital role in reconciliation efforts, and talks about some of the challenges of maintaining a language when English is so dominant in Canadian society.

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Video Script

> [CA: I mean I was thinking about your students, like, are, are they going to speak Mohawk to their kids when they have kids, do you think?]

I think it's really up to, up to the student, I mean, they may have thought you know learning the language is difficult. Finding a compatible partner who also speaks the language is going to be the real test. And some of them have, have found partners who, and they have raised kids, they're raising kids together.

> [CA: So are there kids who are growing up who are learning to speak it as they're growing up?]

Yeah.

> [CA: That's starting to happen more?]

Yeah.

People don't realize that learning language is a lifelong… I, every now and then I'll run across vocabulary — oh yeah, wow this word — and then just … learning new vocabulary, words I hadn't heard before or words that I'd heard but I didn't have time to figure out the context and so, always in a state of language learning you know even after you're a speaker.

We need language. I don't know how we function without language. And nowadays with Native people you know, so much of this, this reconciliation thing going on and that sort of thing. Years ago in my home community, a lot of farmers that lived around the territory also spoke Mohawk. Very minimal in a way and stuff like that because they hired a lot of people from the territory to work on their farms. So they learned Mohawk. They learned it to a degree — you could go into stores in Deseronto and shopkeepers would, you know, would deal with, with the people in Mohawk. Now, it was Mohawk that would be related to the whole buying and selling and this sort of thing that but they did that. Now, to me, that's an aspect of reconciliation. That's where two groups have reconciled with each other — okay you're there, you speak your language but I will learn to speak with you mostly because I want your money — and … we, you know, we'll speak your language because we need your goods. I mean there's always a give and take on any, any two groups that have reconciled with each other but I think at the same time, too, when people take time to learn your language, they do have a certain respect.

> [CA: That's what I was thinking — it certainly shows respect, that I value interacting with you enough to do it in your language.]

Yeah, and the ones that want to interact more, learn more of the language.

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9.6: One view on the future of Indigenous languages

David Kanatawakhon-Maracle

In this unit, Dr. Kanatawakhon-Maracle speaks eloquently about how vital each Indigenous language is to the identity of each First Nation, and about the long-term effects of colonization by the English and the French.

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Video Script

Canada is a bilingual country … and I think if Canada learns to extend itself, we'll start including more and more Aboriginal languages. I think Canada is, would be better to tout itself as a multilingual country. Because I think when doing that, even if they, if their definition of multilingualism is, is the two founding languages and then the Indigenous languages, you're still looking at you know like fifty-five languages. And then because the difference, I think too, Native people have to be included in all that because we were here when English and French showed up. Okay, English and French showed up and they created the present-day institutions and stuff like that, okay fine. Everybody else who has come to this country basically has read the brochure and understood that English or French are the languages, therefore come to this country understanding that, okay I'm going to have to learn English or French because that's how the company is organized, country is organized. Or if maybe I'll go learn an Indigenous language as well. But the Indigenous languages have to be at the table.

> [CA: The English and French arrived and didn't say oh well we're gonna have to learn the language that people speak — they said we're here, now you're gonna speak our language.]

Yeah, but you know initially they did learn our languages to deal with us because they didn't have much choice. We had what they didn't have and when we got to a point where we no longer had what they wanted, and of course, they wanted the land which meant pushing us off anyway, so the respect for the languages and stuff, kind of went out the door. Then it became well everybody here speaks English only. … I find that we need we need to have the languages. I think that gives us a greater sense of who we are — the language!

And, and the thing is that for, for Native people in this country we have spent so many years under the colonial thumb and so many years being convinced that our own languages and our traditions and everything that's about us is inferior or not as good as … And the thing that I've found is that if you're a Native person you can work your butt off to become as much like you know the non-native Canadian; at the end of the day your skin is still brown and that's not going to change. If I focus on speaking Mohawk then in the process of learning my language I'm also learning Mohawk culture and what it is to be a Mohawk person and that's, I think is something that is very important. We've gotten into the habit of being Indians or Natives or Aboriginals or Indigenous. Nowadays the word's 'Indigenous'. I think I keep telling my students, I said you know, I said, when I was born I was born an Indian but then I became a Native and then I became Aboriginal and then I became First Nations and now I'm Indigenous, yay! You know, Indigenous is the word of the 21st century and I'm sure they'll find another one, but the word I would really like them to find and stick to is Mohawk, Oneida, Ojibwe, Chippewa. Know us by our nationalities, know us by our distinct cultures, know us by what makes us unique in the world.

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9.7: Reclaiming Michif

Chantale Cenerini and Martin Kohlberger

Chantale Cenerini is an assistant professor at the Department of Linguistics of the University of Saskatchewan. She is a citizen of the Métis Nation Saskatchewan. Her work revolves around language reclamation, maintenance, description and documentation, focusing on the languages of the Michif/Métis people, Algonquian languages and French spoken in Manitoba and Saskatchewan.

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Martin Kohlberger: Hello everybody, my name is Martin Kohlberger. I'm an assistant professor at the University of Saskatchewan. And today, I am delighted to have the opportunity to have a conversation with Chantale Cenerini, who is also an assistant professor at the Department of Linguistics of the University of Saskatchewan.Chantale works with languages of the Michif people, Algonquian languages, language reclamation, language description and documentation, and I'll simply let you introduce yourself a little bit more, Chantale. Why don't you please tell us a little bit about you, your nation and your languages?

Chantale Cenerini: For sure! Thank you so much for the invitation, I'm very happy to be here and to be sharing my experiences, so like like you mentioned, I work with languages of the Michif or Métis people. I myself am a citizen of the Métis Nation Saskatchewan. It's one part of my heritage. I am equally proud, I would say, of each Nation which I've come from and to do research on languages of the Michif/Métis people for me has been a really special way to celebrate my ancestors and that part of my heritage and my roots because I've had the opportunity to visit so many wonderful communities and to speak with many people that are so hard working and so dedicated to their language and to their community. And not only preserving the knowledge and the languages that they speak and the knowledge that they have, but also to pass it on to the next generations.

One thing I think I would like to say about the Métis or the Michifs is that they've always been multilingual people and multilingual nation as a post-contact Indigenous people, they would come into contact with not only European traders and settlers but as well as their relatives such as the the Cree, the Ojibwe, the Saulteaux Nations. And so to be able to communicate and to have a relationship with all these different peoples, they always have spoken many, many languages and that speaks to me to their adaptability as a people. And also what what that is that has made is that the Michif and Métis people are also very spread out.

The Michif homeland is very large across the western provinces and the United States, North Dakota and so on. And so we have we have a Nation that is extremely spread out that is multilingual and so they actually don't share one language across the entire Nation. There is a common consciousness as a Nation that seems to have emerged beyond sharing one single language. So I think one of the things that I've found to be really important when working with Michif/Métis communities has been to really learn about the linguistic history and context of each community and learn from the people what language is spoken and has been spoken in the communities and which languages have become part of their identity as Michif people. So there's really a need when we're talking about Michif or Métis communities to focus efforts locally often because of that fact. So I think that's something that I really found to be a really fascinating question about working with languages of the Michifs and it's very rich in terms of differences in diversity, but also like I said, there is again still that common consciousness.

Martin Kohlberger: So with such a diverse nation, I imagine, from what you're saying, that the roles that people can have in language reclamation can be quite different, depending on the communities and the geographic regions and so on. And so I'm curious – I know that you work a lot with language reclamation and language documentation, so I'm curious what your role specifically is in language reclamation and in what ways you have carried out your work.

Chantale Cenerini: Absolutely, well you're right in terms of saying that there's all kinds of things that you end up being able to do, and I think again that experience for me has somewhat varied depending on the community and the speakers that I end up working with so my role has been in my own research I've been able to work with documenting stories as told in the community's language. These are stories of growing up in the community. They are stories about their family, about the community themselves, and I did get a lot of interest from people with this kind of project, because not only does it bank and document the language, but it also it also promotes it, it also puts it, you know on a plane of prestige, I guess, I would say.

Martin Kohlberger: Right.

Chantale Cenerini: Any documents and history that sometimes has not been included in other community accounts, for example. And just on a personal level as well, it was a way for for people sometimes to just document their own family history. So it's a family legacy, even if it doesn't go beyond the family, that's worth it all in itself. So on that side of things that's definitely been for me really rewarding work. So that that idea of language documentation and banking, but, as well as sharing, dissemination. So taking those stories and then publishing them in some way that's for the families and for the communities themselves.

But then also my role sometimes expands to beyond that, in terms of then becoming a facilitator or a technician for other community-driven projects. So that would include here in Saskatoon community classes. For the last four or five years as more and more people are interested in hosting classes for the community, especially for adults that want to learn their ancestral language. This has been really high demand. So then they reach out to speakers who at this point are Elders for the most part, and of course they have all the intuitive knowledge as fluent native speakers. But then it's nice – I think it can become a much more positive experience for them, when you have other people that come in to support you on the other side of what it means to teach a class to a group of adults.

So I definitely feel like I've been very fortunate to be part of these kinds of groups where we have teachers, linguist such as myself, and speakers that are working together. We're bringing all our specialized skills and we're delivering the best class that we can together. And that can be a very rewarding relationship as well.

And then from that, you kind of start falling into resource development to support these kinds of classes. So I can talk about it a little bit later, too, but that resource development as well, has been a really important part of of what I've done to try to support especially adults trying to achieve fluency in their learning.

Martin Kohlberger: And from what it sounds like, a lot of this work really revolves around fostering and reinforcing relationships, right? I guess in terms of when you were talking about the documentation of stories and how it's about people documenting their histories, but I guess, in turn, the documentation reinforces their relationships that people have in their communities with their own memories. So that that sounds like a really multifaceted work. So it must be rewarding but I'm guessing it's also a challenge!

Chantale Cenerini: It's a lot of work, but absolutely! It's something great to work with.

Martin Kohlberger: And i'm wondering – you mentioned the fact that a lot of adults are wanting to learn their heritage language and that that often happens in collaboration with multiple different people, whether it's linguists or Elders, or a combination of that, and I'm wondering what is it like, do you think, for adult learners to go through this experience? Do you have any personal insight into that? Because I imagine it's quite a different process to learn a heritage language as an adult than learning it at a younger age.

Chantale Cenerini: Oh, absolutely. Well, I think, for me, that's something that I went through myself, because it was important for me to learn these languages that I'm working with that my family doesn't speak anymore, but that they would have spoken just a few generations ago. So for me it's really personal journey to be part of the learning process myself so and then I have that personal experience and i'm going through maybe what the other students are going through as well, as adults.

In the case here of Saskatoon there's quite a few descendants of the wintering camp called Round Prairie or La Prairie Ronde, and these were Michif families that would have originated from the Red River. They spoke a mixed language that they called Michif. And so there's a lot of interest, for example here in Saskatoon, to learn this language, because it's the language of the families, of their ancestors, so a lot of adults are are looking for opportunities to to learn this language. And there are a lot of challenges. Most adults are native English speakers, and of course English doesn't have a very complex verb structure. But a mixed language like Michif, the verbs come from Cree, so it's an Algonquian verb structure and that's a whole nother animal than the English verb! So, then, to be faced with a complex gender system, a complex verb system, these are things that they have no basis on if they only know English. So those are huge challenges in terms of trying to get people to slowly try to learn.

So the main way that I think people are trying to approach their language learning here as adults is there are a lot of online resources that are getting created for the language, some online beginner courses, lots of videos, online dictionaries, lessons and so on. So I think that's the resource that a lot of people end up depending on. As well as the opportunity to take these community classes taught by a speaker and supporting team. And the goal that we're working on here in the city is how do we take these people that have been taking beginner classes or beginner content for a couple of years now, but are really desperately trying to break through – the next the next step, the next stage, exactly. How do you get to become a fluent speaker if the only material that's

really at your disposal is either the beginner stuff or the really complex fluent language videos or children's books that are fully translated, but that aren't really broken down or anything?

So that's actually something that I've really tried to work on in terms of resource development is through a non-profit organization that I'm part of. We're actually developing a verb game so people can actually start to broach the topic of the Algonquian verb and the structure and how do we stratify their learning and make it seem as painless as possible through a series of exercises and, in this case, this is an interactive game where you're manipulating pieces of the verb and building a full sentence using the verb in a sentence. So the goal is to really try to make the verb not so scary, not so intimidating and to really introduce the idea of those regular patterns which then you start seeing in the verb. And that's the key in this case to going from a beginner to someone who can actually hold a conversation in the language and can feel confident in using the language. So we are definitely thinking about ways to do that and ways to support that with the adults, especially.

Martin Kohlberger: I guess that's one of the key changes that happens there is the difference from being an early student to bringing the interaction in? So is that why that game is interactive to bring a little more conversation into the picture? Or are the early classes also pretty immersive?

Chantale Cenerini: Well, to various levels I think in our journey here in the community classes I've been offered in Saskatoon and even out of Saskatoon – because now with Zoom you can offer the same course to people in British Columbia, to people in Regina, and that's kind of what we've been doing as well. And so we're starting from Saskatoon but then we're distributing content elsewhere in the country where Métis people are spread out.

Martin Kohlberger: Judging from what you were saying about the the geographic distribution of the Métis Nation, I imagine that that's actually been quite a positive development over the past couple of years: having the the Zoom possibilities.

Chantale Cenerini: Oh well yeah, because speakers that are willing to teach a language class is getting harder and harder to find. I think, in the case of of Michif, for example, I mean speakers are in their 70s at least. And with more and more interest and more and more funding available for work on Indigenous languages, the people that are active in language work, speakers that are active in language work, they often get quite busy. Right? With the amount of work that's available to them and they're in hot demand! It's nice if there's ways like Zoom where you can connect with with a speaker if you don't have one in your own community that is doing that kind of language instruction, then it allows you to reach reach out. And the funny thing with all being Michif or Métis people is then you find connections with people that are all the way living, for example on the West Coast. They're all from Saskatchewan, Manitoba, and there's a lot of relations happening there, so it allows you to connect with people that are from your own family that you wouldn't have connected with otherwise.

Martin Kohlberger: Wow, yeah! Hmm. I'm also curious because you mentioned the fact that you have these multiple hats, you have these many roles. On the one hand you're a member of the community yourself, you talked about how the language journey was part of your own journey, but you're also obviously a linguist, a researcher, in terms of your career and also your research interests. But I'm also wondering, in general, what is the your community's experience with linguists – like academic linguists – or even the field of linguistics? Has there been much interaction there? What are the views of community members about linguistics? Do you have any thoughts on that?

Chantale Cenerini: Well, I think, I think, like in many cases, it's a mixed experience sometimes, but there have been some really positive experiences, I think. With many communities in Western Canada, a lot of people have remembered… The linguist that published probably the most foundational work on languages of the Michif/Métis people has been Peter Bakker and he's very well thought of still. And I think one of the things that people mention, for example, they talk about him or other people that have come after him is there seems to be always more of a positive thought towards the linguist or the researcher that came and was interested in your language if they themselves made an effort to learn the language and made an effort to speak the language. I know as linguists we don't like to get asked how many languages do we speak and assume that we're just studying to learn how to speak languages, but when it comes to doing language reclamation or revitalization work, that's actually a really important part of building a positive relationship: become a learner yourself. And I think it allows you to to have a different perspective on the language.

As well, when you do try to become a learner, it allows you to see the language a little bit more from the inside, rather than an outside perspective, and it is just… I've found anywhere that I've gone that that's just generally something that people notice and really appreciate if they see that you've come, you've stayed for however long, a while, but while you were there you did make that

genuine effort to try to communicate in the language, try to use the language, try to show an interest in learning the language and a sincere one, of course. And I think that plays a really important role in in building a relationship.

And I think for me that's one of the things that struck me the most coming into my own research and my own work, something that I was told or that I heard. And, well, otherwise it is a lot about building that personal relationship. I think, if you can show yourself, not only as a researcher, but a human being and a person, that you find those commonalities and you build that person-to-person relationship, that just generally tends to be a lot more positive than trying to stay to a certain point too professional. I think that that's something as well that that I see. But of course it depends. It depends on the expectation of the people that you're working with and what they need or want out of the relationship as well, so it doesn't always look the same.

Martin Kohlberger: And like you mentioned,with such a diverse Nation, the meet the needs and expectations are presumably going to be different in all the different cases. Thank you for that point! And I'm wondering if there was one thing,or a few things that you would want linguistics students to know about either the kind of work that you do, or about the languages of the Michif/Métis people? Is there something that you would want linguistics students to definitely kind of know about or come out with?

Chantale Cenerini: Well, I think if they are interested in this kind of work and anything that is related, for example here in North America or elsewhere in Indigenous language revitalization and reclamation, and this is something that students are interested in and that's the direction that they want to take in terms of their their their career in linguistics, I think one of the things that maybe I would want to share again, it has to do if you do want to work with people and you want to work on languages that have this complicated history with disciplines such as linguistics and where relationships are really important, I do like to share something that actually really struck me or marked me the most when I was going through the early stages of my PhD program. I went to a one week institute at the University of Carleton and one of the organizers was John Medicine Horse Kelly, and they had put up a whole week on ethics of research with Indigenous peoples, and it was people from all different fields that came to this this institute so not only from linguistics or social sciences, but we had people in the field of agriculture, in the field of medicine, and everything like that, we kind of all came together. And one thing that he shared with us during that time that honestly just stayed with me the entire time was just: "Come in with a good heart." "Have a good heart." And he says, "If you make mistakes or you make errors in protocol, or different things like that, it will always be better received if you came in with a good heart."

Martin Kohlberger: Wow, yeah.

Chantale Cenerini: And it's really simple advice, but for me it stayed with me the entire time and it's still something that I think about regularly, in terms of sometimes you don't know how to approach something, or you don't know how to go about something. It's just something that always pop back into my head and almost as a reassurance that, okay, take a break and just that simple thing of always checking how you're going into something and your intentions when you're going into something and that sometimes can just make all the difference in terms of even how you approach it. So there's a lot of unknowns when working in language revitalization reclamation documentation, and I think to keep that in mind is maybe just a steadfast something to think about that anyway stayed with me the entire time after I heard it, and it will probably be in my mind, for the rest of my life honestly. So that's something that I like to think about and that struck me to share.

Martin Kohlberger: Thank you so much! Thank you so much for your time, for your insights into your own work, your community and for the lessons.I can say personally, I appreciate that lesson: "Come in with a good heart." I think that that will likely mark me too.So I thank you once again for sharing all this with us! And thank you for being here today!

Chantale Cenerini: Thank you so much for inviting me! It was great, thank you!

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9.8: Reclaiming Hul’q’umi’num’

Rae Anne Claxton

Rae Anne Claxton was born in Quw’utsun (Cowichan) on Vancouver Island, and was raised there and in SȾÁUTW̱ (Tsawout First Nation). She holds a Masters Degree from Simon Fraser University and is currently a Ph.D. student in Linguistics at the University of Alberta. Rae Anne is engaged in the First Peoples Cultural Council’s Mentor-Apprentice Program with her si’lu (grandmother). She has worked extensively on the reclamation and revitalization of Hul’q’umi’num’, and in Summer 2022 will be teaching a course on the use of phonetics software and technology for Indigenous language learning.

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Margaret Grant: So welcome to this segment of Essentials of Linguistics. My name is Margaret Grant and I’m a Lecturer at Simon Fraser University in the Linguistics Department and Cognitive Science Program. And today, we’re very happy to be presenting an interview with Rae Anne Claxton and I will let Rae Anne introduce herself.

Rae Anne Claxton: Huy ch q’u Margaret. ‘Een’thu Rae Anne Claxton [portion to be translated]. My name is Rae Anne Claxton, I’m from Tsawout and Cowichan, and I live in Cowichan.

Margaret Grant: Rae Anne thank you so much for being here. First, I’d love it if you would tell us a little bit about you, your nation and your language or languages.

Rae Anne Claxton: Well, I was born in Quw’utsun, which is referred to as Duncan BC here on Vancouver Island, and I was raised between here and my other home community of Tsawout First Nation. And as a child, I lived with my grandmother who was a Hul’q’umi’num’ speaker, but I also lived with my mother who lived in, Tsawout and worked at ŁÁU, WELN̓EW̱ Tribal School. So I learned a little bit of SENĆOŦEN from my time in Saanich, but I spent a lot of time here in Quw’utsun, where both of my grandparents were L1 speakers of Hul’q’umi’num’. So although I wasn’t able to learn the language from them directly, I heard them speak and was spoken to in the language but never encouraged to speak back. So the language that I’ve been focusing on primarily is Hul’q’umi’num’ and it is a dialect of Halkomelem and the dialect that we speak here is referred to as Island Halkomelem but there’s also two dialects on the lower in the Lower Mainland.

Margaret Grant: And what is your role in the language reclamation process of Hul’q’umi’num’? And What work are you doing in this role?

Rae Anne Claxton: So for the past four years, I have been working on reclaiming language within my family and that was inspired with the loss of my grandmother, the last fluent speaker in my direct family. Since then, I returned to university, Simon Fraser University, where I attained a certificate in language proficiency of Hul’q’umi’num’. And at that time, I had also begun working within the community, we had offered programs such as Language House, I was involved in establishing a Language Nest here in in Cowichan. What else have we done? There was so much that that we’ve done over the years. I’m also a part of First People, First Peoples Cultural Council’s Mentor-Apprentice Program, where I am in the third year of my apprentice program with my si’lu, grandmother, Sarah Modeste. I have worked within the community providing language learning opportunities for children in care through Cowichan Tribes, Lalum’utul’ Smun’eem, their Child and Family Services. I’ve also worked on developing resources for language learners in the form of books and songs and poems. Just basically anything that I could work on in providing for language learners. That’s what I’ve been doing. Currently, I’m working on my PhD through the University of Alberta, in linguistics, and that’s kind of been the – that’s taken a lot of my time within the past two years. But I’ve continued my own personal language learning journey throughout that as well as teaching within my own family.

Margaret Grant: You started to mention this being an adult learner of the language yourself. What is it like for adults in your community to be adult language learners of Hul’q’umi’num’?

Rae Anne Claxton: As an adult language learner of Hul’q’umi’num’, the work is very emotional. I find the work to be very emotional. It’s very hard work. It’s very difficult work and you really need to to take all of the courage and all of the strength that you have to continue moving forward. In a time when we’re losing our first language speakers, it takes a lot of, a lot of self discipline, to encourage yourself to step forward, maybe when you might want to step back. It takes a lot of strength and conviction, and a lot of a lot of time, I have dedicated a lot of the past four years away from my family, learning the language to the best of my ability and providing services that I can to our community. It takes a lot of time, building relationships, in community,

and with the remaining elders, to continue to learn to learn from them. I think that the major challenge that you may not anticipate when you think about learning your language is really just the emotional toll. And you may make connections with elders that will pass and while still trying to maintain work within the community, you have to go through the grieving process. And there are also minimal spaces for us to converse, in our language, especially throughout the pandemic, we have lost the spaces that were meant for us to connect. And the fear that we have of anything happening to our elders has been compounded by current circumstances. So that's the reality of being an adult language learner, of an Indigenous language, during this time, I think is really, it's, it's a heavy job. And it really requires a lot of community involvement and a lot of moral support from wherever you can find it.

Margaret Grant: Oh, thank you for sharing that.

Rae Anne Claxton: As as an adult language learner, it has been a challenge to overcome the fear of speaking. And that is something that I think gets passed down in our blood memory, from the traumatic experiences that we've had. And it's something that we will all overcome in our own way if we keep at it. And that is something that I've had to overcome, not being afraid to open my mouth and tried to speak. And still, almost four years later, I'm still working on not being afraid to open my mouth and speak and to make mistakes. And something my granny always tells me is that you can't, you can't do anything without making mistakes. Making mistakes is how you learn. And I think that within our communities, there's been… there's been generations of language loss, so there are generations of insecurities. And I think that approaching our language learning in any way that we can is very helpful. And that's how it's been helpful for me through learning linguistics. My grandmother, couldn't explain to me why she would call my my eldest daughter sts'a'muqw, but she would call my youngest daughter [transcript in progress]. And she was passed away by time I've learned that that was a diminutive form. When you actually have a way to say it, a way to explain what is going on, explain the phenomenon explain the language, it makes it much easier to retain and to share.

Margaret Grant: You mentioned before we started recording, that you had been working within the Linguistics program and Indigenous Languages at SFU. But I wonder if you could comment on what your community's experience has been like with linguists and the field of linguistics in general.

Rae Anne Claxton: What my community's experience has been like? I can speak from my own familial experience within my family. I know that there's documented language that I would love to have access to. I would say that relationships have not always been easy. And that that is something that I work for, as a student of linguistics, and something that I always try to remind myself, my family and my community, that we haven't always had great relations either with institutions for education. And those are things that we have overcome, that we have collaborated with, that we have voiced our own needs within. And that's something that I strive to do within linguistics, is to be a voice for my people, and for what we need at a community level. And what we really need at a community level is access to documentation that was done by previous linguists at a time when it might have been illegal for our people to practice our language. So at a time when children were taken to residential schools, children like my parents, language is being documented in our communities. And it's very important that that language makes it back into our communities, and that any barriers to that language are removed.

Margaret Grant: Yes, absolutely.

Rae Anne Claxton: Especially at times when when we're losing access to our elders, we need documentation of our previous elders accessible.

Margaret Grant: Yeah, so I'm hearing that there's, yeah, some lack of trust.

Rae Anne Claxton: Yes, there's lack of trust. And it's, it's actually something that inspired me to take on language. Knowing that I have a grandfather, for instance, whose mother had worked extensively on documenting the language. And he and his family obviously, would, would love to benefit from that wealth of knowledge. That's always brought up in our communities, how when we lose an elder, we lose a library. Coming from an oral tradition, that we may not have the written documentation, and we may not have had access to technology, or the skills, in past times, to do what we can today, there was one thing that my grandmother had used to tell me all the time. And she used to always tell me that I live in a different time, that I am able to access things that our people may never have been given access to, that I may not be smarter than my ancestors, but I have abilities that they were denied. I have accessibility that they were denied, and I have opportunities that they were denied. And she always encouraged me to do the best that I could and to remember that in every step that I took, that there were, I'm taking steps that we weren't allowed to take before. And I find that really inspiring. My grandmother is a fluent speaker. There were many, many stories that she wished that she could tell me, but she didn't have the skills and English to do so. And I didn't have the skills in Hul'q'umi'num' to hear them for

her. Especially now that I'm studying the language, I wish I had recorded my grandmother anyway. But I didn't have the foresight to know that I would be able to read, to hear, to translate and transcribe the stories that my grandmother was to share with me. And so that's when I think that's what I think of personally. And I think that's what many Indigenous people think of when they think of the field of linguistics, is that there are stories that are documented, there is history that is documented. And it's about one of my current mentor, my mentor right now my granny Sarah Modeste always tells me that "you're a bridge rayon, you have to act as a bridge" and and bring people together and bring things together. So I like to think of it that way.

Margaret Grant: And find any materials that could be brought back to the community then.

Rae Anne Claxton: Yeah, and not only that, but to make it accessible. Because there are many things that are publicly accessible, but it's about delivering it in a way that is meaningful to where we are in revitalizing our language. I just wanted to say also that my own individual experience with linguists has been… I'm very grateful for the opportunities that I've had. And for the people that have helped me along within the field of linguistics. I just wanted to add that.

Margaret Grant: Is there anything else that you would like linguistics students, and introductory linguistics, students to know about your work and your language?

Rae Anne Claxton: I want linguistics students to know that I believe our people had a culture of understanding linguistics, and that we had a strong appreciation for linguistics. I wants Indigenous linguistics students to know that many of our people were fluent in many languages, and we spoke to each other in the language that we were comfortable with. We never forced others to conform to other languages. And many times, I've heard of our people say a couple was married from two different areas, and it was quite commonplace for the one the one partner to speak in one language, and the other to respond in the other language. So that's something that I hope that is brought back to our people is a greater understanding of linguistic diversity, and acceptance. And what I would like linguistics students to know about our language is that it is live. And that as long as we are here, that it will remain alive. It can be intimidating to take on learning your Indigenous language, or the linguistics of your Indigenous language. But I do really find that the field of linguistics really helps break it down into manageable chunks. And just as I had made the parallel to education, I make the parallel to medicine. With breaking breaking down in different fields, it's it's quite similar.

Margaret Grant: So looking at different systems within the language.

Rae Anne Claxton: Mmmhmm yeah.

Margaret Grant: Yeah. Well, thank you very much for your participation today. And you know, for all the wonderful information you've given us about your personal journey and also about your communities journey. I can't thank you enough for being part of the project.

Rae Anne Claxton: Thank you. Thank you for having me.

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9.9: Growing up speaking Nishnaabemwin

Mary Ann Corbiere

Mary Ann Corbiere grew up in Wiikwemkoong unceded territory on Manitoulin Island. In 2021 she retired from her long career teaching Nishnaabemwin at Université de Sudbury. In this unit Dr. Corbiere talks about growing up in Wiki and about how she became a language teacher.

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My name is Marianne Corbiere. I'm originally from Wiikwemkoong unceded territory at the east end of Manitoulin Island. It's one of the bigger Nishnaabe communities in Ontario, um, perhaps, um, in both Ontario and in the States. And the 1960s, which is when I started school, I was in grade one in 1961, our community was still, yeah, every household spoke the language. That was our first language. So I was very fortunate to grow up at that time.

Um, learned English through basically immersion before we threw around the term *immersion*, because we were just taught in English. Um, yeah. So Wiikwemkoong is, like I said, among might be the biggest or at least one of the biggest Nishnaabe communities. At the time it might've had a population of on Reserve of maybe a few thousand, maybe 2,500 or so I'm just roughly estimating. So we had our own schools up to grade eight. So I went to school for the first eight years in my home community. So I, we learned English only in the classroom, used it only with the teachers. Um, otherwise I would, at recess time out in the school yard and after school hours playing with friends, we all spoke the language.

So, uh, that's why it has survived so long. Although our, our parents or, and our grandparents had gone to the residential school in Spanish. Um, I mean, we hear a lot about how, uh, the major role that residential schools played in destroying the languages, many of the languages, so Wiikwemkoong and also M'Chigeeng, another, the other bigger, bigger community on Manitoulin which is, uh, population-wise is a bit smaller than Wiikwemkoong.

Likewise, there the language survived in the households. So it might have been just the notion of critical mass, right? That although the students who are over in Spanish, uh, presumably around from September to June, two months back home, um, it seems, was sufficient to, for the kids to get their language back and to keep that up because certainly my mother and the woman who became my mother-in-law, who had both gone to Spanish, like both our households, that's all we spoke. It was our first language.

Can I just clarify one thing, when you say "Spanish", that's the name of the place where the school was?

That's the community where the residential school was. I see the actual name of the school in, um, writings about it. I can't remember offhand.

And the kids would have been speaking, or the schools would have been run in English.

Yeah. That's where my mother learned English and my mother-in-law, or whoever went there. Yeah. So, um, we were very lucky in that regard. Yeah. Yeah. So that's right from, uh, I ended up teaching the language in 1989, very much by happenstance. That's the last thing I ever expected to be doing in my life because, um, in, in grade seven I discovered I really liked science.

I can actually remember with a little science experiment our teacher had us do, that I found very intriguing. And after that, and I grew up on a farm, so it was always outdoors, which might have been, like also explained my interest in the love of natural things, you know? Um, yeah, so I majored in science in university, Earth and Environmental Sciences, and then did some, found a job back home, totally different, for four years.and I wasn't very good at that job. So I thought, okay. I think some business administration training might be good. So I applied for an MBA program and I got in on the second try. They didn't let me in the first time. I said, well, I really need to do, learn to, need to learn some useful skills. And I'm not in the sciences, working in the sciences anymore.

Yeah, anyhow. So after I finished my MBA, ran into an old friend from my grade eight days in Wiki (Wiki is what we call Wiikwemkoong for short). And this other position came up, contract job, And then coincidentally, the interviewers were, it was for a program at Laurentian, Native Social Work jointly created by the Department of Native Studies, as it was then known and the School of Social Work.

So the interview committee included members from both programs. So one of them asked me about my language and it turned out and I said, oh yeah, I love it. That's why I came back home after all these years away for high school and university I missed hearing it every day and it turns out they were also feeling me out for, okay, we need a part-time language teacher here to teach at least one course in the evenings.

So after I was offered the contract job with the social work feasibility study, uh, they asked me, oh, would you also teach the language? Oh, I don't know about that. I never imagined myself teaching university. It seemed like a really it's like, wow, you need to be a genius to be teaching university. It does help to have some brains but you don't have to be a genius, like Einstein. So anyhow, so I said, okay, well, and they said, well, you speak the language. You'll yeah, you'll figure it out. And I said, oh, okay. I'll give it a shot. And I fell in love with it. I thought, oh, this is fun.

Now, this might be the good thing about not having taken linguistics. And I don't know what state linguistics was at the time in terms of the research on Indigenous languages, or Ojibwe, my own language. This is 1989. I do see that Richard Rhodes had produced a dictionary in 1985 and Rand Valentine filled me in, on some of the linguists who had worked on our language.

And actually one of them, I discovered, had actually come to Wiki when I would have been maybe in grade eight or grade nine. Grade eight I was still in Wiki, grade nine I was in North Bay for high school. Um, and Piggott, I think is the, the linguist. And apparently he had been interviewing or working with a farmer two or three miles down the road from our farm, Sam Zelmick

With that work, that's how Piggott figured out why these changes, um, changes like, you know, when we say "he's eating", *wiisini* becomes *niwiisin* for "I'm eating". Piggott worked out the, I guess, phonological basis for that, through his talk with Sam Zelmick apparently. So, but I didn't know that I didn't know what linguistics was out there in the journals or wherever.

So I was trying to figure out, organize the language on my own, like for teaching purposes. Okay. Where do I start? This is introductory course I'm teaching. Where do I begin. Yes. Yeah. So that's what made it so much fun, you know, that problem solving. Hey, how do I? Yeah, rather than just talking at students to say, okay, repeat after me.

And just like, um, sort of like spiels of conversations, snippets to memorize eh, my name is so-and-so I come from this place, I like to do this or whatever, you know, I have stuff like that. It's like I could, I decided, okay. Um, I just figured out, like by trial and error. Okay. I'll do it. I'll try teaching this way.

Give them the patterns and being scientific with a science, more of a scientific, I guess, inclination that's like perhaps if that was why I gravitate to that kind of more like in a sense, a formulaic approach, like what's like word methods, like yeah. You know this pattern, you just need to change the verb to say, "I want to go skating tomorrow",

"I want to go skiing tomorrow", "I want to go for a walk". Here's what stays the same, but what are you changing? The action! So we'll find the verb and I figured out a way to explain, okay, these verbs, nothing, if the verb ending doesn't change, you know, but these words, the verb ending disappears, and this happens with long, the thing disappears with short vowel endings, when the end of the verb is a short vowel. It doesn't disappear if it's a long vowel! So I sort of figured that out on my own, just from like looking at a bunch of examples that would come up, eh, I don't, I didn't know why it was happening, but at least I could see that there was some kind of consistent pattern that made it somewhat predictable for learners.

So that that's what made the thing really fun. And I guess that's part of why I fell in love with the job of trying to teach it

The year after teaching part-time, um, uh, at the same time, the university like this, the, the social work program, the Native social work program, they had committed to making it available by distance for, especially for First Nations, because many can't relocate readily to go to university.

So, and people had said, well, any, uh, Native social worker, uh, should ideally know the language of the community. This is a professional program. There's so many other things you have to learn as a social worker, You can't reasonably expect people to also gain at least advanced proficiency during four years of social work training.

So they figured we'll at least have them make sure they take at least one course on Cree or Ojibwe. Since they committed to offering it by distance at the time. This was before all these fabulous technologies of course. it was correspondence eh?

So they mail you the tapes?

Yeah. So they asked me to be the writer of the distance course on Ojibwe. So I worked with an instructional designer, which is another really good thing for me to learn because I did the usual thing, I said, okay, Lesson One, here's the spiel. He says, okay,

let's backtrack. We can start. Okay. That's the lesson. Let's just have the students start with these patterns. So anyway, so that was really useful for me.

Yeah. So yeah, after that, you know, that was just for that one course. But so the person that I was filling in for, why I was teaching part time, decided not to come back to the university. So they now needed a full-time faculty member and they decided a full-time faculty member should also be somebody also able to teach the language. But that's how I ended up lucking into that position. And at the time there were not very many first language speakers of our language who happened to have a graduate degree as well, I already had an MBA. So totally unrelated to language but at least it was a Master's. So, um, yeah, so that's how I got that position. So that really was helpful to have the time to think through and, um, flesh out a curriculum beyond introductory. I decided, okay. At the time there was just two courses in our program. There was an intro Ojibwe course, and then there was an advanced Ojibwe course.

Well, I also had taken French, a couple of courses in French on the side while doing my MBA, because I do have an interest in languages and French had, of course, logically you can't jump from intro to advanced. There should be an intermediate, okay, let's create an intermediate course. And then since we're offering distance courses in the intro course, well, let's also enable them, those who really want to learn the language, let's give them an intermediate course and an advanced course by distance. So that was like my, those were the projects for basically the first ten or fifteen years of my teaching career.

So I'm just thinking about you. So, so you grew up speaking the language, you had all this, you had your, your mental grammar. This unconscious knowledge about the language

Yeah I had acquired the patterns.

Right. And then to be able to teach it, you kind of had to figure out how to do the phonological and morphological analysis yourself to teach to your students. Yeah. So you had to learn how to do linguistics without ever taking linguistics.

I think a very rudimentary linguistics. Some of them anyway, like I said, like Piggott, sorted out the explanations for some of the things for me.

Yeah. Neat. But then you could use that for teaching your students.

Exactly. Yeah, exactly. Yeah.

So most of those students would have been, so they were seeking a professional degree and they wanted to be able to communicate with their clients.

Um, well, the communities wanted them to, but they were expected to. They had to know the basics of the language, whatever "the basics" are …

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9.10: Learning Nishnaabemwin at University

Mary Ann Corbiere

Mary Ann Corbiere grew up in Wiikwemkoong unceded territory on Manitoulin Island. In 2021 she retired from her long career teaching Nishnaabemwin at Université de Sudbury. In this unit Dr. Corbiere talks about what it meant for her students to learn Nishnaabemwin in university.

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So you started off teaching these students who needed it for their professional qualification and has the, the makeup of your students changed over time?

Sort of, um, it's always been like, a language course was also needed of course, for a BA in Native Studies. So most of the students were, um, would have been people, uh, seeking a concentration. We just had a three-year BA at the time, when I first started, a concentration in, in Native Studies, and then once the Native Social Work program was established, then those students were also in it. And then there's always the usual, you know, whatever other program you're taking, if you're sciences, you need to take a humanities like I had to, when I was doing earth and environmental science, and a social science credit. So always, uh, um, at least a few students from who were just needing this for their overall degree requirements.

In terms of, um, their backgrounds, I think on average, I would say it was typically half and half. Like half of the enrollment would be Native students or at least like what I would figure. Well, some of them clearly were Native. They would be from the same community I was from, or they would be from communities I know in the area. And then, um, and then some of them would like, although they might have non-Native last names, they would point out, oh yeah, like my mother's Native from wherever, some community. Um, and then half, would just be yeah, like non-Native students, some of them like with an interest in an Indigenous language. Yeah. So I think like, um, that was the pattern that, ever since I started teaching.

The class size, um, changed, increased, um, hugely about six or six or five years ago, I can't remember, because Laurentian added a new require-, modified the BA requirements, that all students needed to take a course, um, designated as Indigenous content. Um, and there was another one, oh, linguistic awareness because being a bilingual area like, uh, Laurentian is officially bilingual. Um, but it wasn't necessarily to take French if you were a Anglophone or vice versa.

Uh, at the time, uh, Laurentian also offered courses in Spanish. And, um, um, I think for a time, like when I first started there, there were also courses in German. Um, so the idea was that people should at least learn, learn something about another language, whatever language courses are available. So, and students are very smart so they figured, oh, these two different requirements I can take, then I can meet both with one course.

So your courses got really popular!

So, uh, up until then the average enrollment in total for the on-campus course, uh, would maybe we'd start out with maybe 20, 22 students each year. And then as students found out that, um, Nishnaabemwin, as we, as we began calling it instead of Ojibwe, was not as easy. It was a bit harder than they anticipated! Yeah. Always a bit, dropped down a bit by exam time and maybe 15 or so would show up for the exam.

And then the distance course, same idea, roughly, maybe 15 or 17 students starting out and then maybe 12 or 13 students showing up for the exam. Um, so that was the enrollment annually each session. Yeah. Up until this new requirement, I never thought to check the numbers in advance after the new requirement kicked in, new requirements kicked in, but late July, I said, okay, let me see how many students I have in my class, or whose names I might recognize, like the last names as there were 40 or over 40 students registered already!

I thought, oh, in the on-campus course alone! It's kind of hard to teach a language with 40 students. So the university fortunately agreed to create a second section on very short notice and we managed to find a teacher to do the second section of the same course that year. Yeah.

Yeah, that changes the classroom quite a bit to have double the students.

Yeah. Yeah. And it changes the dynamics a bit too, because with that kind of requirement, and there's already like, as I, as maybe others have mentioned or you've come across reference to yeah. Like, I mean, not everybody is keen to learn about the Indigenous aspect of Canadian history or something about Indigenous people. They come in at these, whatever negative preconceived notions. Oh, you have now a body of some students who are in it thinking, first of all, okay, "I have to take this thing and this is the only thing I can fit in my timetable". And second. Yeah. "Well, this is probably an easy course and I'm an A student, so why am I not getting an A" you know, so it complicates things a little bit on that side, but always, there's always a small number who are really genuinely interested in learning the language and committed to it, despite discovering that it didn't come as easily to them. So that makes all the difference. As long as you have a few students like that.

So did you have some students who, um, who were from the community who were Native students who wanted to become speakers?

Oh, yeah. Yeah. Usually that is a good number of them in the class. Now, the other, um, I guess hard thing it is for students to learn is that, I mean, just like, I mean, you have an aptitude for certain kinds of subject matter, right? It's like, I wish I could be an astrophysicist, but I just don't have a head for physics. Some students, um, and of course with language learning, there's basically four kinds of skills, right: the pronunciation, um, the comprehension of what's said, and then the reading comprehension and then the ability to write. So, um, yeah, and it's rare that a person has, uh, the same level of skills or aptitude for all four skills.

So, um, and so for some, and then, and then there's this sort of added sort of, um, I guess just part of the situation that I guess in a similar way that somebody with French ancestry might assume, or at least wants to believe that "I'm French, French will come readily to me", even though they may not have been raised in it, they discover, well, it doesn't come readily. I just don't happen to have an aptitude just because I'm French doesn't mean it comes readily. So now and then I would detect the same kind of thing that there'd be expectations from Native students, that, "I won't need to have to work as hard on this one because I'm Native, I'm Ojibwe, I'm Nishnaabe."

And unfortunately they would find that no, it doesn't guarantee that you have that kind of aptitude and they would really struggle, right. Some would really have a hard time. I remember in my earlier years, and then conversely, and this is where we, when you talk about these power dynamics and this history of colonial colonialism, extraction of knowledge, all this, all these other dynamics that compound things for a person at an individual level, not only do you feel that, okay, "the language will come easily to me because I'm Ojibwe," there's also this thing that, oh, what are, and I said about 50% of the class would be typically non-Native and coincidentally, sometimes you can't help it. If you have a knack for languages. I mean, you have some good linguistics students in your class, I'm sure, and then some who have a hard time with the linguistics.

I would have non-Native students who happen to be good at the second language. And they would do really well on the written test. And some of the Native students would not do well on the written tests. So I remember one student at one time, I guess, happened to see their non-Native classmate's mark and the non-Native classmate was always doing really well. And this native student was not doing all that well, usually, really struggling.

Well, yeah. And this is the university's system of, of assessing knowledge is this power structure. So you've got a student who's, who's unhappy about their mark on the one hand and also struggling with what that means about their identity.

Exactly, exactly. And that's, and that's what I find the hardest is that, um, some, like many of the Native students, um, they want to learn the language, not so much as a thing of linguistics interest. Oh, isn't this a neat language. Here's how it works. It's a way, because they were deprived of the language because their parents either hadn't learned it, um, for various social factors, like residential schools being part of it, but not exclusively. The other thing was, many of these communities are very small and they didn't have schools like we did where you could stay in the community up until grade eight. Like when the Spanish school was closed, then they, you have these tuition agreements with school boards provincial school boards. So if you're in a little town like Shawanaga, a little First Nation, you're being bussed to Parry Sound to go to a non-Native school, I think from what I understand, basically from day one. You're never in a context where you're, where you can hear your, your language during recess time. So there's, uh, some of the students are coming in with that real need to reconnect with who they are by taking the language. And unfortunately for some of them, it doesn't come easily. So it's a real struggle. I feel now.

And then what other opportunities are there for people to practice using the language? So of course, you know, you, you, you go to class and you learn from your teacher and your, your curriculum and your, I dunno, are there textbooks even? But then are there opportunities to practice using it outside of class?

Exactly! It's a complex issue, like these learners who really want their language back, they, they have so many barriers. So that certainly is one of them. I mean, um, those students from my own community, um, a good number of them would had a good ear already because they'd heard it quite, most of them heard it, like their parents or grandparents are using it regularly, you know? So they're at least recognizing a good amount of it and they've picked up the rhythms of it. But for those from the really small communities, you know, they don't have, they never had that kind of extensive exposure. So they're really struggling. So all these compounding factors.

Now, even from, even those coming in from Manitoulin, where you would have this language taught, like up to Grade 12, basically, if they went to the high school on the island, the teachers who teach, there's not the resource system there. Like when I took French, there was the Bescherelle handbooks, to help with the the grammar patterns, there was, there's been nothing like that.

Thanks to the instructional designer, Cheryl Cranley, who, where I learned by doing with her, she basically mentored and coached me, um, like examples, explain what's going on, give them a chance to practice this little concept, move on to the next level. Examples, explain what's going on, give them a little learning activity. At the end of a lesson, give a self test. So that's a pattern. That's a template that I followed, but forever after.

So it was very structured and very like step-by-step and they could see the pattern. They saw this, the students, I remember one of them remarking, "This is the first time I've seen the language, explained, shown in that way. And I feel like I'm able to use it to actually communicate because I, I can see the patterns and I know what I need to change to change my sentence. I never had that, all the way through High School."

So that's the unfortunate part of that. The teachers being so overloaded that they are not only because they don't have resources, they're forever coming up with stuff to use in their classes, secondly, not having much in the way of linguistics background.

Yeah. It sounds like that might be, um, that it would have been valued to have some, someone with some linguistics training to, you know, to partner with the people who were teaching the language.

Exactly. And one of the courses that we developed in Native Studies was a general course, on, uh, Native, Native language issues. Like not only like, why are they under threat, but also what's being done. And I remember, whereas in certain communities or there's, I guess there's an openness to relying or working with linguists. In my community, there seems to be not that openness of that. There seems to be, and it's not, I don't think it's a real animosity per se, I might have, part of been, um, is I think, as we discussed briefly, part of just coming up from the history of knowledge extraction by scholars, where the scholar gets the name on the book, like Piggott. And what does the, the Native person get? An acknowledgement as being an "informant". Period. You know? Um, so that kind of, yeah, just, uh, I guess impatience is a mild term for it, annoyance at that kind of treatment, eh, by, um, academia at large.

Um, and then, coupled with that, the sense of that, well, like the notion that Elders have all the knowledge, so therefore anybody wanting to learn the language, uh, Elders are in the best position to help them. It's not to say that Elders can't help — certainly if I hadn't heard the language from my parents, my mother, and her peers and the people of that generation, uh, I would not have acquired what I did, you know, but at the same time, it's like, yeah, I was fluent in the language, but I didn't know how to teach it. And as an adult learner, as a teacher of adults, now we are teaching, we're trying to facilitate learning by acquisition as much as possible. We have immersion programs, but again, funding issues and so on and, um, having a hard time coordinating, how do we do these and so on and so forth. Yeah. There's only very limited things, uh, that we're able to do now to foster an acquisition type of learning, we're teaching, you know?

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9.11: Resources for teaching and learning Nishnaabemwin

Mary Ann Corbiere

Mary Ann Corbiere grew up in Wiikwemkoong unceded territory on Manitoulin Island. In 2021 she retired from her long career teaching Nishnaabemwin at Université de Sudbury. In this unit Dr. Corbiere talks about the importance of culture and materials to language teaching and learning.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/essentialsoflinguistics2/?p=3110#oembed-1

Um, what I find problematic is like, when you look at culture, what is culture from a general sense? It's like, it's, it's, um, it can mean many things. you think of say, mainstream or whatever, European-based culture and you, when you hear *culture*, um, you don't think of knights and King Arthur and chivalry. You think of things like, um, the arts, uh, film, um, theater, ballet, opera, like it's a huge thing. But when the term *culture* is applied to Indigenous peoples, it's this static thing about the notion of authenticity and authenticity is thought of in terms of what was the Native lifeway, what was the Native worldview, and so on, in this time that people consider "traditional times" before contact. So that shapes what ends up being covered in the classroom. So it's like people getting, to do, okay, moccasin-making, beadwork, and so on, which of course is an aspect of material culture. Uh, and there are people who do those things, but certainly it's not something that everyone automatically does.

Hockey is a major part of our community life now. Although it's considered a culture, cultural aspect per se, it's a sport, but it's a major part of community life. We have baseball as well. So the spoken language talked about not … you talked about beadwork, if that's what you did, you talked about moccasin-making if that's what you did. But if you didn't do those things, I grew up with a hefty store of farming terminology because my father was a farmer, you know, um, others or their parents or their grandfather or whatever it was were did a lot of hunting, did a lot of fishing. Yeah. And those two particular, yeah, they sort of aligned with people's conceptions of Indigenous culture, Indigenous lifeways, but then there were also Nishnaabeg who worked in the mines. We have a term for mining. We have a term for going on strike.

Uh huh, that's part of mining! So are there, Ojibwe terms for hockey and baseball for the, you know, the equipment and the, and the rules of the game and stuff?

Some terms, for some of them, but not for all of them, you know, it's like you score a goal, we have a verb for that, being hit, yeah, you know? Um, but you can talk about it. It's like, like who won? Yeah. "Oh, they were beaten. Oh, they were skunked." Both kinds of verbs are in the lexicon. I created to go with a manual and it's like, so that's why in the, like in the, when I was teaching, I would say, I'm not going to say you should learn these particular 10 or 15 or whatever, 20 verbs by the end of this course. You use whatever verbs are relevant to you. I'm just going to show you the patterns to enable, to equip you to talk about any hings that are more relevant to you, of interest to you. If you let me set the, the verbs to learn, you would just learn a bunch of things about figure skating, because that's my favourite thing to watch!

Um, but what I would detect when I, from what I see of the materials I've come across for K to 12, the content is focused on… It generally does not include those other kinds of aspects of life, eh. It's the term for *bear* the term for, um, , *birch*, *birch bark*, *birch trees* and so on. And again, and that's where the students who have remarked about the word list basis, that's where that comes in, they can say, "Oh yeah I know this term and I know that term", but can you say anything communicatively about it, right. My notion of language learning is helping learners make sense in the language, in, in, uh, communicatively, to use it in actual communication every day.

Yeah, yeah. For a language to be, to, um

…to revitalize it, to reclaim it or …

Right, for it to be vital, you need to be able to use it!

Yes, you can go down the dictionary and memorize all the terms and you know, the language, but can you do anything communicatively with it?

Right. And can you, um, adapt it to your everyday situation? You're not necessarily working with birchbark, but maybe you need a ream of printer paper.

Yeah. Yeah. And I mean, quilting was, is an activity of interest to some women in Wiki and it's mostly women, I mean, in case somebody thinks I'm being sexist, no, it was done mostly by women, you know? Um, yeah. My mother made quilts. I hope to get into quilting now that I'm retired and we have a verb for that, *badakiiga`ige*, you know, we can talk about a blanket being so beautiful, you know, that person is such a good quilter, you know, if that's of relevance to you, you know the patterns and you get to talk about quilting, if you want, you know?

Um, yeah. So that's the, so that's why I find the way the language and cultural connection is often construed for curriculum development purposes, for K to 12 teaching purposes problematic.

Now of course, from the students' perspective, if a student is in the course, not only to, um, feel more rooted in who they are, they're individual identity. And did, when did they want the greater rootedness in their Indigenous identity? Of course, an integral part of that rootedness is where did we come from historically as a people who were we before contact, before colonialism. It makes total sense for that kind of approach to be appealing. It would serve their broader learning needs. I'm just not sure just to learn the language, how to make sense. It's part of their individual project and doing that is going to help them connect me to who I am.

Now, now the internet poses something interesting. We can form internet communities. Especially with zoom now, which is another like sort of new area to interrogate. That could be done! Because, um, especially now, like I mentioned, those learners, those really avid learners who email me sometimes to say, okay, about the language and they're emailing me in the language, of course they're making missteps because they don't have 100% grasp on the grammar. I mean, when you learn grammar, you sort of learn the basic patterns that seem by which proper sentence structure is gauged. Whoever the authority is that decides that's proper sentence structure. Conversationally, who gives a hoot? It's like, all you're concerned about is, do I make, make sense to the person I'm talking to? Yeah. Little mis-grammatically, patterns that don't conform to the examples presented in a grammar book, appear all over the place and you just let them ride. It's like, oh yeah, still make sense of what you were saying. So we're doing that by email. Yeah.

So did you get on a zoom call and just talk to them about the questions?

Yeah, exactly. Yeah. And people, they could form a community where they were just doing zoom just to visit each other. Just like you in the old days, when we all lived in the community, you would just go knock on somebody's door when you had not much to do in the afternoon and pop in and visit, you know, two or three hours, you know,

So that's the other aspect of this, what is a community? In that when we, when I was growing up, I mean, there was a family and then there were the neighbours and being a First Nation. Many of the neighbours I learned later were like, okay, that man was my father's second cousin. That's why they were hanging around together so much. They weren't just buddies, you know.

These learners, they come from different communities. They haven't grown up together. Their families didn't, weren't living together, like in the same community. So it's like, they have to sort of create a new kind of community. That's not rooted so much in actual blood kinship. Yeah. So it's a, it's a very interesting thing to sort of extrapolate. Okay. What will the Nishnaabemwin speech community look like or consist of fifteen years from now?

Because, um, speakers who could be resources to language learners, um, are in many communities there's no more of them first of all, some communities there's only a handful, like maybe four or five, so like you mentioned earlier about yeah, uh, students, um, if they have opportunities to hear the language outside of the classroom… For many learners, many Nishnaabe learners, they don't. They're, they're just not in a household or if they're living in Toronto or their, their grandmother might be living up in North Bay or wherever, they're not in contact with them regularly.

Um, so my sense is about, and language can survive. I mean, ideally we want it to survive as a spoken language, but a language can also survive as a written language. You know, it's like, we can read Shakespeare. It might not be our ideal of English, but for some people that might be their only connection, like 10, 15, 20 years from now, to their people's language. Um, if it were, if more and more of it were written.

So, uh, we, we fortunately do have a writing system that was devised by linguists, by Fiero. Um, and, uh, however, this came about, it was his system that was, um, adopted when they created the Native language instructors program that I think it used to be at the University of Western Ontario, but early on, back in the day. But at some point relatively early, it moved to Lakehead. That's where

it's been ever since I was at the U of S, that's where I would hear about people going off to train to teach the language. So that's, that's, what's, that's what the teacher trainees are learning and it's, it's, it's quite straightforward.

It marks long vowels, which I think the linguistic consensus is it's really useful for a language like Ojibwe because of its, um, polysynthetic nature you have that can have such long words, you need to know which syllables get the accent. And that, and long vowels always get accented, the primary accent. Short vowels, this is from Piggott's analysis, short vowels get destressed or unstressed when you add certain morphemes. And the sh-, the short vowel syllable ends up in a particular spot in words. And he brilliantly worked this out, that there's a, there's a metrical footprint, that basically short vowels are arranged in pairs. And like, again, this is the magical thing about a language, eh, that these rhythms evolve organically. So that, I'm trying to think of an example in Nishnaabemwin. Anyhow, if I think of an example, I'll mention it. But it's like when the word form has changed, um, yeah. Oh, the short vowel pairs, the second pair tends to get the accent. The second in the pair, if I recall correctly, but anyhow, there's a phonological logic to that.

And it's in the writing system that shows up?

Yes and no. It depends on the community and the writer's notion of what they are hearing, and then the other thing is because of our, um, the way we form sentences, not with separate pronouns, separate tense markers, like auxiliary verbs, and then the verb it's like, it's like it's all one word.

So what hasn't happened and again, because of the time pressures that K to 12 teachers have, uh, how scattered we are throughout Ontario and never having a chance to get together for any intensive series of sessions to work out how we're going to apply the system exactly to longer pieces of discourse. It's relatively to, easy to apply it to lists of isolated words.

Even there, like even a short word, like *mko*, learners, depending on who their teacher is, or what little booklet they're using from the Ojibwe Cultural Foundation or wherever. You'll see the word for *bear,mko* written in possibly three ways. M K O as I would write it, *mko*, and M A K W A as I've seen it in something this *makwa*, and then maybe M A K O perhaps from another source. So very hard on students, like "which is the correct spelling? And I would tell them, it's like, sorry, but they're all correct.

This spelling is how it sounds from my mouth, which is how it sounded from the mouth of the, those who were around when I was growing up. So, so there's quite a, so the challenge would be when we say we need more resources, it would be ideal if everybody decided, okay, here's how we're going to approach it. But how do you decide that when it varies within the community and the last thing like we, the last thing any of us I think wants to do is either appoint ourselves as, well, "I am the equivalent of the L'Académie Française."

"I decide what's correct!"

None of us wants to do that. And then people will say, well, the Elders are our authorities, they're our experts. But among Elders, again, many of them do not write much. And there's, uh, also on another, uh, another aspect is the resistance to writing the notion that, well, we shouldn't write our languages. Some people will, uh, in the past I've heard like ascribe, uh, sort of a spiritual component to that. It's like our languages and our Creator didn't mean for our language to be written. It was always oral so it should stay oral. Again, that worked fine when that's all we heard. But English intruded and so on and so forth.

> So if you want to preserve it…

We've found, I've, some of us have found writing very helpful.. So that's where we're at. And well, and teachers anyway, are familiar with the double writing, the double vowel system. They don't, they don't have any problems using that, but some Elders that's like gobbledygook to them.

Again, the K to 12, their opportunities to write the language is very constrained because they're writing for basically rudimentary-level learners. I'm writing more expansively because I'm reading for learners who, uh, whose interests I anticipate are widely varying. So I have to write about various things. Although I do write a bit about figure skating, I also write sample dialogues about hockey, because hockey is a big thing. It's like, have you heard of the Little NHL, the Little Native Hockey League?

No, I hadn't!

Big huge event! There's always a mass exodus from Nishnaabe communities, not just Nishnaabeg, Cree too, and Mohawk, Haudenoshonee. Um, it's, it's held in Brampton these days. You rotate, the host would rotate. Um, yeah. Minor hockey is a big thing. So these First Nations, all send this range of teams to compete at the Little NHL! So it's a natural part of our discourse. It's

like, oh, you know, is your grandson competing with the Little NHL, uh, did his team win, did they win and so on and so forth? You know, uh, so and assorted things, I try to cover other things as well, besides sports, um, movies, again, who does not watch movies these days?

So having to do that, create those kinds of things is it has given me lots of practice with applying that double vowel system and my decision that, and letting the students know, um, I'm spelling these the way they sound to me from what I heard.

So, so that's the other challenge. If, and I do premise my work on the language is going to survive largely as a written language. I don't know that many others premise language revitalization that way, I think many, most seem to be still sort of wedded to the ideal of "it will be spoken as we spoke it". Like I'm thinking, okay. Yes, that would be great. But for some people, some people are adept at reading stuff, and that might be like, I mean, literature supplements what we hear on TV and in the movies, literature is an aspect of a culture, you know? So if we're preserving the language, let's also preserve it in that fashion, not just focusing on oral.

Yeah. So, um, so that's the litera- literacy aspect of it. If they're going to have written resources that are going to be helpful to second language learners, it would be great if they could all use it in one systematic fashion. So those are the things that ideally would have been great if us teachers had had time since 1972 to confer, have an opportunity to confer extensively enough, often enough, before we walked into any classroom. Of course like the language teaching theories evolve, of course you would have had to tweak what we did, but at least to have some good, solid basis to start with, rather than just throwing speakers into their individual classrooms throughout Ontario. Okay, well you go teach a language

And yeah, the Ministry did come up with a curriculum that was being reviewed several years ago. I got involved in the workshop to review it and it's like, yeah, I was very dismayed because it was like not, not much in the way of actual communicative use, in the curriculum. It was very grammar-structured, which shows its origin, like back in the day, back in the day the grammar-translation method was a common way of teaching a language and over the years, they've said, okay, That's not, that's not the best way. There's other ways we should try and experiment with. And they've got, they found a variety of ways.

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CHAPTER OVERVIEW

Chapter 10: Language Variation and Change

Learning Objectives

When you've completed this chapter, you'll be able to

- Explain the difference between cross-linguistic and sociolinguistic variation.
- Define important concepts in sociolinguistics.
- Recognize linguistic variables in language data.
- Discuss some of the major findings of variationist sociolinguistics.
- Interpret basic patterns of quantitative sociolinguistic data from graphs.

This chapter explores sociolinguistic variation and how it has been analyzed. We'll be introduced to the concept of the linguistic variation, we'll see how to analyze data from a variationist sociolinguistic perspective, and we'll survey some of the major social factors that correlate with sociolinguistic variation.

10.1: What is variationist sociolinguistics?

10.2: Language varies

10.3: Language changes

10.4: Language conveys more than semantic meaning

10.5: Variationist methods and concepts

10.6: Sociolinguistic correlations - Place

10.7: Sociolinguistic correlations - Social status

10.8: Sociolinguistic correlations - Gender

10.9: Sociolinguistic correlations - Ethnicity

10.10: Exercise Your Linguistics Skills

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10.1: What is variationist sociolinguistics?

Why do some Canadian English speakers say *eh* at the end of their sentences while others opt for right? In what contexts is one person more likely to say *eh* or more likely to say *right*? What kinds of information about someone can we glean if we hear them say *eh*? Or *right*? Or even *innit*? Have these patterns changed over time? These are variationist sociolinguistic questions. **Variationist sociolinguistics** is a methodological and analytical approach to understanding the relationship between language and its context of use. We call it sociolinguistics because both social and linguistic (e.g., grammatical, structural, articulatory) factors, are equally important; sociolinguistics, unlike many formal approaches to language, does not focus on an idealized grammar (sometimes called 'competence') but rather analyzes language in use (sometimes called 'performance'). We call it *variationist* sociolinguistics because it's concerned with the *variable* nature of language in use. In this chapter we will see how variationist sociolinguistics has analyzed the interplay between language variation, the development of linguistic systems, and the social meaning of language. In Chapter 2, sociolinguistic issues are explored more broadly.

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10.2: Language varies

There is substantial variation in language: both within and across language varieties. We'll see some examples of both of these kinds of variation and I'll introduce one of the central concepts used in variationist sociolinguistics: the linguistic variable.

All languages exhibit variation

Many linguistic approaches to the study of language are concerned with language variation. As you've read about in other chapters, theories about how language works rest on evidence that comes about by contrasting the way something is said or signed in two or more different languages, dialects, or varieties.

Language, dialect, variety. Colloquially, the term **dialect** is used to refer to ways of speaking that people perceive to be substandard, low status, associated with working class, non-prestigious, geographically-isolated, or some derivation or aberration from a 'standard' version of the language. The linguistic fact though is that everyone has a dialect. Rather than think about languages and dialects in a hierarchical way, linguists think about dialects as subdivisions of a language. Sometimes, linguists might talk about the "standard dialect" but it's important to emphasize that no dialect, not even what we might call the "standard dialect" is objectively (linguistically) superior to any other dialect of the language. Another term, '**variety**' doesn't have the same negative connotations that 'dialect' has, and so we'll usually use that to refer to subdivisions of a language in this chapter.

For example, consider the Icelandic and Danish sentences in (1) and (2). Both sentence express the same meaning.

(1)	Ég	(*ekki)	spurði	ekki	[af hverju	Péter	(*ekki)	hafði	ekki	lesið	hana]
	I	(*NEG)	asked	NEG	[why	Peter	(*NEG)	had	NEG	read	it]
	'I didn't ask [why Peter hadn't read it]' (Icelandic)										

(2)	Jeg	(*ikke)	spurgte	ikke	[hvorfor	Peter	ikke	havde	(*ikke)	læst	den]
	I	(*NEG)	asked	NEG	[why	Peter	NEG	had	(*NEG)	read	it]
	'I didn't ask [why Peter hadn't read it]' (Danish)										

Obviously some of the lexical items and morphemes differ between (1) and (2) – as expected given that they come from two different languages. At the same time, you can see similarities between them – also as expected since these two languages are quite closely related (they are both North Germanic languages). One syntactic difference between the two examples is the order of the negative marker and the main verb in the embedded clause (*hafði ekki* 'have not' in Icelandic and *ikke havde* 'not have' in Danish). If we were looking at this data like a syntactician, we might look at (1) and (2) and use the two different word orders (i.e., VERB-NEG vs. NEG-VERB) as evidence in an analysis of verb raising. We'll call this **cross-linguistic variation**: different ways of doing the same thing in different languages or varieties.

But within a single language or variety – or even a single person – the specific realization of abstract structures (like word order) can vary. Consider the rhyming couplet in (3) from Shakespeare's *Romeo and Juliet* (386, 670).

(3)	Juliet:	Saints do not move, though grant for prayers sake.
	Romeo:	Then move not while my prayers effect I take.

Example (3) shows the same word order variation that we see in (1) and (2) but here, the two different ways of doing the same thing appear within the same language! And while technically spoken by two different characters, the two sentences were written by the same person! This isn't that surprising though because Early Modern English allowed for both options: an Icelandic-like/Romeo-like VERB-NEG order and a Danish-like/Juliet-like NEG-VERB order (together with 'do-support', see Chapter 6 and Chapter 14). Within this one rhyming couplet, we see **sociolinguistic variation**: two or more ways of doing the same thing within a language, variety, and individual.

What's a linguistic variable?

When we approach language from a variationist sociolingistic perspective, we call the choices between a set of options that mean the same thing a **linguistic variable**. The individual options that people choose between in the course of language use, we call **variants**. Linguistic variables exist in all languages and varieties, in all modalities, and at all domains of language from the phonetic to the pragmatic. A linguistic variable is an abstract set; there's nothing out there in the world that we can point to and be like "hey, that's a linguistic variable!". We only ever see or hear the abstract variable as one of its concrete variants. Let's have a look at some examples of linguistic variables from different languages and different domains of language.

In Auslan, NZSL, and ASL, some signs that are prescriptively located at the forehead, like KNOW, THINK, and NAME, have variable location: at the forehead or lowered to near the cheek (Bayley, Schembri, and Lucas 2015). You can see these two variants in Auslan/NZSL in Figure 12.1 and watch a video at this link in ASL.

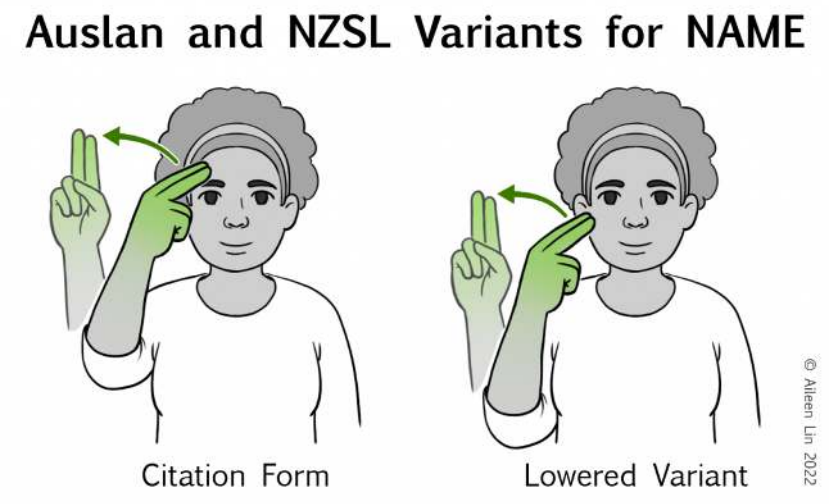


Figure 10.1. Two Variants of NAME in Auslan/NZSL (based on Bayley, Schembri, and Lucas 2015).

This is an example of phonetic-phonological variation with variants differing with respect to an articulatory parameter (in this case, location). Another kind of phonetic-phonological variable involves variation between the presence and absence of a sound segment. In Beijing Mandarin, open syllables (i.e., syllables without a coda) can variably be rhotacized (i.e., produced with a rhotic coda). For example the word meaning 'bag' can be said with the open syllable variant (包 *bao* [paw]) or the rhotic coda variant (包儿 *baor* [pawɾ]) (Zhang 2008). We also find linguistic variables in the morphophonological domain of languages. Standardized English contains a categorical alternation with the indefinite article between *an* and *a* with *an* occurring prior to a vowel and *a* occurring elsewhere (cf. *an apple* vs. *a pineapple*). However, in contemporary London English, especially among immigrant youth of colour, the pre-vocalic context exhibits variation between *an* and *a*; both *an apple* [ənæpl] and *a apple* [əʔæpl] are possible (Gabrielatos, Torgersen, Hoffmann, and Fox 2010).

We can also find morphosyntactic variables in languages. In North Baffin Inuktitut, transitive constructions can variably occur with ergative alignment or antipassive alignment. These alignment types differ in terms of the morphological case that arguments have and the kind of agreement that appears on verbs. With ergative alignment, as in (4a), the object is marked with absolute case (which appears as a null morpheme *-ø*) and the verb agrees with both subject and object (which appears as the morpheme *-jara*). With antipassive alignment, as in (4b), the object is marked with an oblique case (it occurs with the morpheme *-mit*) and the verb agrees only with the subject (which appears as the morpheme *-vunga*) (Carrier 2020).

(4a)	surusiq-ø	taku-jara
	child-ABS	see-PART.Sub1SG.Obj3SG
	'I see a child' (North Baffin Inuktitut)	

(4b)	naarraajim-mit	taku-vunga
	frog-MOD.SG	see-IND.Sub1SG
	'I see a frog' (North Baffin Inuktitut)'	

Languages can also have linguistic variables with variants that differ in multiple ways, across different domains. For example, in Tagalog, the meaning of adjectives can be intensified with several variants that differ lexically, morphologically, and morphosyntactically from each other variant, as in (5) (Umbal 2019).

(5a)	**sobra**-ng	tsaa**p**k**a**r**a**
	INT-LINKER	1**p**a**s**s**i**N**p**o**s**
	'My ears are **very** painful' (Tagalog)'	

(5b)	**bagay**	**na**	**bagay**	sa	iyo
	suitable	**NA**	**suitable**	DAT	2p.sg
	'It is **very** suitable for you' (Tagalog)				

(5c)	**napaka**-ganda	ng	*transit*	natin	dito
	INT-beautiful	GEN	transit	1p.pl.pos	here
	‘Our transit here is **very** beautiful’ (Tagalog)				

(5d)	ang	*opportunity*
	NOM	opportunity
	‘The opportunity is **very** small’ (lit. “how small of an opportunity”)	

One variant, in (5a), uses a free morpheme *sobra* (similar to English *very*, *really* etc.). Reduplication of the adjective in (5b) and affixation of the morpheme *napaka* (5c) are two morphosyntactic variants. Finally, the exclamative construction in (5d) is a fourth, syntactic, variant.

These are just a small handful of examples of linguistic variables in different languages and in different domains of language. All languages have variation like this in all the different parts of a language’s grammar.

What *isn’t* a linguistic variable?

Whatever domain of language a linguistic variable exists in, the variants ‘do the same thing’ in some way. This should give you a good idea about what a linguistic variable is, but before moving on, it’s important to point out a couple of linguistic concepts that are similar to but are not linguistic variables: 1) synonyms and 2) categorical alternations.

Synonyms are a concept that is often confused with linguistic variables – and for good reason: some synonyms can be linguistic variables, but not all of them! Synonyms are pairs or sets of words that share the same or similar meaning like *car*, *automobile*, *ride*, *horseless carriage*, *jalopy*, *hooptie* and *paddock basher*, which all denote those four-wheeled, motor-powered vehicles that many people drive. These options certainly seem like two or more ways of doing the same thing but critically, different synonyms are generally not interchangeable in the same way that variants of linguistic variables are. As we saw in Chapter 7, languages have only very few **absolute synonyms**. The different options may have different connotations or social meanings that make one option much more suitable than another option. For example, *jalopy*, *hooptie*, and *paddock basher* connote that the vehicle is old or run-down; ride might be used in informal contexts and automobile in formal contexts. Some options may also only appear in particular regional or social varieties. For example, *jalopy* is an older North American English term (you’ll find it used several times in Jack Kerouac’s *On The Road*, written in the late 1940s), *hooptie* is typically associated with Black English (having been the topic of the 1989 hip-hop song, ‘My Hooptie’ by Sir Mix-a-Lot), and *paddock basher* is a term mostly only found in Australia, referring to a car only suitable to drive around on a farmer’s field (which, non-coincidentally, is referred to as *paddock* there). Some of these options have become obsolete: you might only hear *horseless carriage* today if you’re watching something like *Downton Abbey*. Because of the differing connotations or limited regional and social usages, synonyms like these are not generally interchangeable in the same way as linguistic variables. However, sometimes they can be! Critically, if the choice between options systematically co-varies with social and/or linguistic constraints, synonyms can be analyzed as linguistic variables. For example, in English adjectives of positive evaluation like *cool*, *awesome*, *sick*, *neat*, and *great* have been found to correlate with linguistic and social constraints (Tagliamonte and Pabst 2020).

As you’ve already seen in previous chapters, languages are full of **categorical alternations** (e.g., the phonological rules discussed in Chapter 4). Categorical alternations are a second concept that can be easily confused with linguistic variables. Now it’s true: categorical alternations represent variation within a language and the options are indeed two or more ways of doing the same thing. However, they depend strictly on the linguistic context that they appear in. In other words, the choice between the options is **deterministic**. A linguistic rule like Canadian Raising (the nucleus of the /aɪ/ and /aʊ/ diphthongs is raised to [ʌ] before voiceless consonants) in Canadian English is an example of a categorical alternation: if we know what phoneme comes after the vowel then we know if the nucleus will be [a] or [ʌ]… it’s predictable! This differs from linguistic variables because a variable can be realized as its different variants *even within identical linguistic contexts*!

That said, even though linguistic variables are not deterministic they also aren’t random! Instead, linguistic variables are **probabilistic** in nature. To use the wording of one of the foundational studies in variationist sociolinguistics, there is *order* amid the heterogeneity (Weinreich, Labov, and Herzog 1968: 100). The choice between different variants of a linguistic variable is subject to probability given many different possible **conditioning factors** (also called **constraints**). Like with categorical alternations, these conditioning factors can include aspects of the linguistic context. So think about (6).

(6) I’m *fishin’* this *morning*.

You’ve probably noticed that the end words like *fishing* and *morning* that end with *-ing* sometimes get pronounced as [ɪn] instead of [ɪŋ]. That’s another linguistic variable! Like all linguistic variables though, the choice between [ɪn] and [ɪŋ] isn’t random. In most varieties of English, the [ɪn] variant is more likely to occur in verbs (like *fishin’*) than in nouns (like *morning*). That’s a conditioning factor for this variable! However, where the *socio-* comes into variationist sociolinguistics – and why the analysis of linguistic variables is so important to the field – is that these conditioning factors also include social factors as well. In other words, whether someone uses [ɪn] or [ɪŋ] in a particular moment depends on social facts about the speaker/signer, their **interlocutors** (the other people in the conversation), and other aspects of the sociocultural context of the interaction. By counting and quantifying variants of a linguistic variable, social facts, in addition to linguistic facts, can be uncovered.

Sources of linguistic constraint

You might be wondering… where do these linguistic constraints on variation come from? Why is [ɪn] more likely to occur in a verb than in a noun? These constraints have many different sources for different variables but some are rooted in historical structural patterns found in earlier versions of the language. Believe it or not, there's good evidence that the reason English speakers are more likely to use [ɪn] in a verb than in a noun today goes all the way back to a pattern in Old English, spoken between the 5th and 11th centuries CE! The modern *-ing* morpheme came about through the coalescence (or merger) of two different grammatical morphemes found in Old English: *-ende*, which marked the present participle (*I am teaching today* > Old English *tæċende*) and *-ung* the verbal-noun marker (*Teaching is fun* > Old English *tæċung*). In the Middle English period, these two morphemes started to merge together as *-ing* but the alveolar nasal found in the Old English present participle marker stuck around as a variant! As the morphemes merged, people lost track of the older categorical 'alveolar-in-verbs and velar-in-nouns' pattern and both variants were used with verbs and nouns. However, traces of the old pattern are still apparent in the form of a conditioning factor!

There are many different types of linguistic variation. Some variation distinguishes varieties from each other (cross-linguistic variation), other variation exists within a single variety or person (sociolinguistic variation). Variation within a single variety between variants of what we call linguistic variables is subject to probability given social and linguistic conditioning factors that favour or disfavour certain options.

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10.3: Language changes

Language is constantly changing. Speakers of English today do not speak like the authors of *Beowulf* (c. 700 CE) or *The Canterbury Tales* (c. 1400 CE) or *Hamlet* (c. 1600 CE) just in the same way that speakers of Japanese today do not speak like the authors of the *Kojiki* (c. 700 CE) or the *Genji Monogatari* (c. 1000 CE). In some ways, English and Japanese speakers today do not even speak the same way that people spoke English or Japanese a century ago or even just a few decades ago. English, Japanese, and really all languages have changed and continue to evolve.

Language change is important for variationist sociolinguistics because language variation will always be present during language change. It's not like one day in the early sixteenth century all English speakers woke up and went "hey, you know what? I think I'll start putting my negative marker BEFORE my verbs like they do in Danish embedded clauses instead of after like they do in Icelandic embedded clauses!" Rather, the linguistic change from *move not* to *do not move* happened gradually. Over time people began using the new *do not VERB* option more and more and using the old *VERB not* option less and less. During this period both options were possible – the two options were variants of a linguistic variable. Sometimes we have **stable variation** where two or more variants are present but one isn't replacing the other. So while not all examples of linguistic variation involve language change in progress, all examples of language change in progress involve a period of sociolinguistic variation. Studying changes in progress is sociolinguistically informative because changes in progress guarantee the presence of linguistic variables. But linguistic change is interesting in its own right because language change is also intimately linked with social factors and with social change.

Analyzing language change. Perhaps the most obvious way to analyze a linguistic change is to consider language use at one period of time and compare it to language use at a different period of time. If we notice differences in the frequency of use of variants of a linguistic variable between the earlier data and the more recent data, this is a good indication that a change has taken place or is taking place. This approach, examining data that represent the same community at two different times, is called **real time** analysis. This approach is great when we have older data available to us. But what about when we don't? Good news: There's still a rigorous way to analyze change in data that comes from a single time period! We can compare older and younger people! This is called **apparent time** analysis and it rests on the observation that individuals' grammars stabilize in late adolescence. This means that (typically) we use language in basically the same way we did when we were about 18. We can certainly learn new words after this age, and we might adjust some aspects of our grammar in the direction of the community we live in, but by and large, the patterning of linguistic variables we had at 18 will stick with us through our lifespan. By considering the pattern of linguistic variables in the language use of people of different ages, we can make inferences about linguistic change.

In addition to the distinction between stable variation and language change, sociolinguists also distinguish two kinds of language change. **Changes from above** are linguistic changes that take place above the level of social awareness (i.e., language users are aware of them). A change from above typically takes the form of the adoption of a prestigious or standardized variant from outside of the community. A classic example of a change from above is the importation of '*r*-fulness' to New York City English (Becker 2014). From the 18th century into the early 20th century, NYC English was generally *r*-less. Words like *cart* and *star* would have standardly been pronounced something like [kʰɒət] and [stɒə]. However, by the middle of the 20th century, the norms of General American English, including its *r*-fullness, began to influence New Yorkers' speech. The new, prestigious *r*-full variant (like [kʰɒɹt] and [stɒɹ]) began to compete with the older (and increasingly stigmatized) *r*-less variant, slowly spreading and advancing through the community. On the other hand, **changes from below** are changes that represent the operation of articulatory or grammatical pressures within a linguistic system that people are generally not aware of. For example, in Canadian English the vowel in the word *goose*, which would be transcribed as the high, back, rounded vowel [u] in a dictionary, has been gradually moving toward the front of the vowel space to something more like [ʉ] or even [y]. Chances are, any given speaker of Canadian English would be unaware that their *goose* vowel is more front than older Canadians' *goose* vowel!

Just as all languages exhibit variation, all languages also change over time. Because change involves variation, variationist sociolinguists often examine changes in progress in addition to stable variation.

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10.4: Language conveys more than semantic meaning

All kinds of information about people are revealed through the ways they express themselves linguistically. Much of that information goes beyond the semantic and even pragmatic meaning of the sentences they sign/speak. All kinds of social meanings are revealed through language! Some of this social meaning relates to how language functions in relation to social structures and power. We've talked a bit about this in Chapter 2. For example, different **forms of address** – that is, labels we use to refer to our interlocutor – in many different languages reflect the social ranks of those involved in the interaction or the social circumstances of the interlocutor. For example, in Canadian English, referring to someone as *sir* or *buddy* reveals several sociological facts including how the speaker perceives the addressee's gender, how the speaker perceives the power dynamic between themself and the addressee, and how the speaker perceives the formality of the interaction. In fact, language doesn't just reflect these things but also works to enact this kind of sociocultural significance. Imagine you're at a café and you witness a dispute between a male-presenting customer and a barista. At first, the barista refers to the customer as *sir* and says "*sir*, I know you're upset but generally we don't add steamed milk to iced coffees." But, after a few minutes of being yelled at and insulted by the unruly customer, the barista exclaims "listen *buddy*, it's time for you to leave!". This change in form of address, from *sir* to *buddy*, signals a change to the interactional context. The barista signals that they will no longer tolerate being treated poorly and along with that they abandon the general expectation of politeness and formality that comes along with the 'customer is always right' mandate of most service work.

Beyond forms of address, many languages encode information about social structure into pronominal reference. Many Indo-European languages make a distinction between familial/informal/lower rank and formal/polite/higher rank second person, singular pronouns. This is often referred to as a T/V distinction on the model of French's distinction between familial *tu* and formal *vous*. Romance languages like French, Slavic languages like Russian, and Germanic languages like German (and even Old and Middle English!) mark this distinction. If you do not know a language that marks this kind of distinction, its social significance may not seem particularly… significant! But for people who do use languages with such distinctions, the real life consequences of language as it relates to social power is clear. Consider this quote from a French woman of Algerian immigrant roots, speaking about her experience growing up with racist policing in France:

> *"I encountered racism with the police every time I went out at night. They controlled our identity with tommy guns, speaking with lots of racial insults, and using tu instead of vous. I understand now why young people hate the police, because those controls are very degrading." (D. Tazdait, quoted in Olson 2002: 177)*

Ms. Tazdait places the use of *tu* rather than *vous* on the same level as the symbolic violence of racial insults and the physical violence of being threatened at gunpoint.

Language can also tell us something about the cultural values of its users. For example, both what we discuss and with who is culturally-determined. What counts as a **taboo subject** (i.e., an inappropriate topic of discussion) differs by culture and context. In Euro-American culture, it is often considered taboo to talk about sexuality and death around children for example. Connected with this is how we interact: conversational styles (including the amount of interactional overlap, tolerance for interruptions, eye-contact expectations, etc.) are also culturally variable. It's critical for linguists and language-pathologists to be aware of the culturally-specific nature of interactional norms because too often English and Euro-American norms are interpreted as universals and thus, differences from those norms can be misinterpreted as deficiencies. For example, in their exploratory study of First Nations English, language-pathologists Jessica Ball and B. May Bernhardt (2008) note that where silence from a child is often interpreted as an indication of a lack of knowledge, rudeness, or shyness in Euro-American interactional norms, for many First Nations children, their silence is a sign of respect to elders. As one of Ball and Bernhardt's participants says:

> *"I think in general, if I'm talking to someone who's older than I am, if they come to visit me or I go to visit them, I tend to listen a lot. I value what they have to share with me, I listen to their stories." (Ball and Bernhardt 2008: 581)*

A teacher or language-pathologist who trains a child in accordance with Euro-American norms might unwittingly be harming the child's connection with their family's culture.

Contextual information is another kind of social meaning that is revealed through language and linguistic variation. **Contextual style** is intimately connected with the formality of the interactional context. This formality relates to 1) the familiarity of two interlocutors with one another, 2) the social similarity/difference and power relations between them, and 3) the context of the interaction. Conversations between friends who share common experiences and identities are more likely to have a casual style whereas conversations between strangers of unequal social rank and who share little common ground are more likely to be formal. This varies on a continuum. But what do we mean by formal and casual language? There are several aspects of conversation that are linked with formality including the frequency of use of different variants of linguistic variables. Variants that are standardized tend to be more frequent in formal contexts and variants that are not standardized tend to be more frequent in casual contexts.

A 1958 study by the anthropologist John Fischer was one of the first demonstrations of this correlation. His analysis, which was part of a larger study of child-rearing in semi-rural New England (co-investigated with Ann Fischer), examined the frequency of use of the two variants of the *-ing* variable in English (standardized [ɪŋ] and non-standardized [ɪn]) among 24 children under age 10. Fischer recorded some of these children speaking in three contexts: during a formal psychological test, during a semi-formal, structured interview, and during an informal, unstructured interview. Fischer reports on the use of the variants of *-ing* by one boy in these three contexts. In the most formal context, the psychological test, the boy used the standardized variant [ɪŋ] 97% of the time, in the formal interview, his use of [ɪŋ] dropped to 49%, and in the most casual context, the informal interview, he used [ɪŋ] only 37% of the time. Fischer even speculates that among his friends, the boy's rate of the standard variant would be even lower. This adjustment to the frequency of use of variants in different contexts is called **style shifting**.

Since Fischer's study, style shifting has been found across different social cohorts, different places, and different languages. Contextual style, as a sociolinguistic factor, was further refined and theorized by William Labov in his 1966 book *The social stratification of English in New York City*, a foundational text for variationist sociolinguistics. Labov's idea was that the formal-casual continuum correlates with the standardized-non-standardized continuum because both of these more directly correlate with the amount of self-monitoring that takes place while speaking/signing. In more formal situations, we pay more attention to the details of the language we use and when we are paying more attention to the language we use, we are more likely to avoid features of our language that are stigmatized. In other words, we're more likely to speak/sign the way we have been socialized to think we *should* be speaking/signing when we are paying attention to our language. In casual contexts, we pay less attention and are less likely to conform to the standard.

Different styles. The understanding of style described by Labov is called the **attention-paid-to-speech model** but there are other motivations for style shifting too. We might style shift in response to our interlocutor (more formal with a stranger and more casual with friend) or even in response to people who might be eavesdropping on our conversation. This is called the **audience design model**. We might also shift to a more or less casual style or we may use a higher or lower frequency of variants of a variable associated with different social factors to achieve certain interactional goals or to express and highlight different aspects of our identity. This is called the **speaker design model**.

Finally, sociodemographic information is also revealed in language use and linguistic variation. By sociodemographic information, we mean the traits that we share with the social cohorts that we belong to. The language we use, just like the clothes we wear, the activities to do, the places we go, and the things we own, marks our social identity. The use and frequency of use of linguistic variables correlates with a huge array of social factors including age, social class/status, race, ethnicity, gender, education, place, caste, sexuality, social network, and local communities of practice, among other aspects of our identities, both macrosociological and microsociological. Later in this chapter, we'll look at four of these factors in detail: place, social status, gender, and ethnicity.

Our language use and variation within our languages reveals aspects of the social structures and sociocultural norms that those languages are embedded within as well as sociodemographic information about the interlocutors and facts about the interactional context.

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10.5: Variationist methods and concepts

Participants

Variationist methods are closely linked to earlier **dialectology** – the study of the variation found across dialects and, in particular, regional varieties. A major distinction between dialectology and variationist sociolinguistics has to do with the nature of the study participants. Because early dialectologists were coming from a historical linguistic tradition that was more interested in 'older' language varieties, the 'optimal' participant for them was a N.O.R.M. – a Non-mobile, Older, Rural, Male (Chambers and Trudgill 1998: 30). This was based on four assumptions:

1. People who had not moved around much during their life were assumed to be more likely to maintain a way of speaking that represented the speech of the place they were from (hence non-mobile);
2. The older a speaker is the older their speech was assumed to be (hence older);
3. There is a lot of movement in and through urban areas that might influence the way people in those areas speak whereas rural areas were assumed to preserve tradition (hence rural), and;
4. Women's speech was assumed to be more self-conscious and status-conscious than men's speech (hence male).

The result of this bias toward N.O.R.M. participants in early dialectology meant that by the middle of the twentieth century, there was a gap in research on language variation in urban areas (not to mention the language use of women and innovative language practice). This changed with the advent of variationist sociolinguistics which brought not only a focus on urban dialects (and hence that's why variationist sociolinguistics is sometimes referred to as urban dialectology), but it also brought a much wider array of social factors, beyond place, into consideration. In other words, a highly-mobile, younger, urban, woman is just as likely to be of interest as a N.O.R.M.!

Dialectology: Then and now. One of the most influential European dialectological projects was the *Atlas linguistique de la France* ('The Linguistic Atlas of France'). For four years, between 1898 and 1901, a linguistically-trained field worker named Edmont Edmont travelled all over France (by bicycle!) and spoke to 735 people in 638 places about their language. He conducted interviews and transcribed people's speech in fine phonetic detail. The result was a wonderful and huge book of maps of France that each plotted the specific realizations of a linguistic variable that varied across the country. The atlas has been digitized and anyone can browse high-resolution scans of all the maps on the project's website!



Figure 10.2. Portrait of Yang Xiong (Public domain image)

But well before Edmont Edmont cycled across France, Han dynasty philosopher Yang Xiong (53 BCE–18 CE) spent 27 years compiling a dictionary of regional words, called *Fāngyán* 方言 ('regional speech, variety, dialect'), in which he catalogued the many various terms and pronunciations of thousands of Chinese characters across China. From this work, twentieth century linguists have inferred six main dialect groups spoken during that time.

Dialectology has continued into the 21st century in its own right making use of and developing new digital tools (e.g., GIS, Google Maps, social media APIs, rapid online and mobile app data collection, automated acoustic analysis etc.). For example, check out the *Algonquian Linguistic Atlas*. It includes not just transcripts of regional variation but hundreds of audio recordings of speakers of 18 Algonquian varieties and 9 dialect maps based on the regional patterning of variation.

Sociolinguistic interviews and corpora

Just about any collection of language in use (audio/video recorded, transcribed, or written) can be analyzed with a variationist sociolinguistic lens: collections of hand-written letters, text messages, television shows, or even every single one of Queen Elizabeth II of the United Kingdom's annual Christmas messages over several decades! However, the most common method of data collection in variationist sociolinguistics is the **sociolinguistic interview**. The sociolinguistic interview is not like what we normally think of as an interview (i.e., a set of questions asked by an interviewer of an interviewee with the intention of gathering information or understanding a topic from the interviewee's personal experience and perspective). In its original formulation, the sociolinguistic interview was composed of different tasks including a Minimal Pairs task, a Reading Passage, and Casual Speech. These tasks were specifically designed to correlate with an interviewee's degree of self-monitoring.

How might you modify the tasks of the sociolinguistic interview if you were studying variation in a signed language?

During a **Minimal Pair task**, the interviewee is asked to read aloud from a list of words that have been carefully organized into pairs. In Chapter 3, the concept of a minimal pair was already introduced: two words that differ in just one specific way. So for example, in Southwestern Ojibwe (spoken in Minnesota), *giiwe* [gi:we:] ('he goes home') and *giiwenh* [gi:wẽ:] ('so the story goes') are minimal pairs, differing only with respect to whether the final vowel is nasalized or not (Nicolls 1980). In the context of the sociolinguistic interview, minimal pairs also differ in only one specific way, however, one of the words contains a linguistic variable, such that the articulation of *one* variant of the word will result in the two words in the pair becoming *identical*. That's a mouthful but an example will help! In New York City English, '*r*-dropping' (or the variable deletion or vocalization of non-prevocalic *r*) is a prevalent linguistic variable. So for example the word *sore* can be pronounced as [sɔɹ] or [sɔə], where the <r> is realized as a schwa. The first variant here forms a minimal pair with the word *saw* (pronounced [sɔə] in NYC English), differing only with respect to [ɹ] and [ə]. However, the second variant of *sore*, the one without [ɹ], is phonetically identical to the word *saw*. When participants are asked to read pairs of words like *saw~sore*, *udder~other*, *bag~beg*, and *bruin~brewing* they pay a lot of attention to their language to make sure each member of the pair is pronounced distinctly, especially when the variant that would make the words sound identical is stigmatized.

In a **Reading Passage task**, participants read a paragraph out loud. This context also elicits a high degree of self-monitored language, but the requirement of reading coherently deflects some of the focus from the choice between variants to the content of the passage. Reading passages are written so that they contain a sufficient number of examples of the linguistic variables that the researcher is interested in.

In more casual conversation participants put much more focus on the content of what they are communicating and much less attention is paid to how they are speaking. At the same time, because being interviewed (often by a stranger) is not an everyday occurrence for most people, this context is still less casual than people's everyday way of speaking, what we call their **vernacular**. The vernacular represents someone's unmonitored language. In other words, the vernacular is the way we use language when we *aren't* being recorded by linguists! In a sociolinguistic interview, a participant's vernacular can came out during moments of **Casual Speech**. Moments of casual speech appear when people momentarily 'forget' that they are being monitored, like when a third-party interrupts the sociolinguistic interview. Certain questions, especially those that prompt an emotional reaction, can elicit casual speech. For example, "was there ever a time you got blamed for something you didn't do?" or "do you remember what you were doing when [a major community event, like when the Toronto Raptors won the NBA championship] took place?". These kinds of questions can elicit high-emotion responses and also often result in the participant telling a story. When we are engaged in story-telling, we pay much less attention to linguistic variables in our language use! But still, there is no fool proof way of eliciting someone's vernacular and this is such a fundamental methodological problem for the field that it has a name: the **observer's paradox**. Labov (1972: 209) describes it as such: "The aim of linguistic research in the community must be to find out how people talk when they are not being systematically observed; yet we can only obtain this data by systematic observation". Today, the main method of overcoming the observer's paradox is to interact with participants in a genuine, interested, and organic way by asking good questions, following up with curiosity, and by building rapport and trust.

The nature of a sociolinguistic interview. The sociolinguistic interview has been modified and tailored to the specific needs of different linguists over the years. For example, if your research question is not about contextual style, there's no need to record people across different tasks. Likewise, if you are examining syntactic variation, a minimal pair task just isn't going to provide you with relevant data. In fact, many sociolinguists approach the sociolinguistic interview with just one goal – record a natural conversation. The interviewer may have certain questions in mind going into the conversation but unlike the oral history

methodology or qualitative/ethnographic interviews, the goal isn't to uncover the answer to specific questions but rather to simply chat for a bit!

One sociolinguistic interview might reveal certain things about how one person style-shifts or perhaps may tell us something about the linguistic constraints on variation in their grammar. But how one person uses language doesn't tell us how linguistic variables pattern within a community. What we need is multiple sociolinguistic interviews with multiple people. Ideally, we would record sociolinguistic interviews from across a representative, socially-stratified sample of the communities we are investigating. Depending on the questions we are asking, a representative sample would include an equal number of participants from the cross-sections of all relevant social groups. For example, if we were asking questions about social class, we'd include roughly equal numbers of speakers from across a range of social classes. This collection of sociolinguistic interviews forms a **sociolinguistic corpus**. Sociolinguistic corpora (note the irregular plural) can be used to study a multitude of linguistic variables and sociolinguistic phenomena. Some of the most important sociolinguistic corpora , in terms of how much the analysis of its data has advanced our understanding of language variation and change, are Canadian! For example, the Sankoff-Cedergren corpus of Montreal French was one of the very first large-scale corpora of sociolinguistic interviews and the first of its scale to represent a language other than English. Analysis of this corpus led to important methodological, analytical, and theoretical developments in the field. Sali Tagliamonte's Toronto English Archive is a more recent project that has already produced over 70 publications on a huge variety of topics.

Diversity. The vast majority of variationist sociolinguistic studies have considered only three languages: English, French, or Spanish (see Stanford 2016). There are many reasons why this is the case, including a historical lack of diverse representation in academia. However, over the last few years, a much wider diversity of languages have been considered. In this chapter we try to highlight some of the research on this wider diversity of languages.

Quantitative analysis

Okay, so now we have a corpus of sociolinguistic interviews at our disposal. What's next? How do we actually analyze linguistic variables, the main object of study? Remember that the choice between variants of a linguistic variable is subject to probability. That means an analysis of linguistic variables must be quantitative in nature. The quantitative approach of variationist sociolinguistics rests on the **Principle of Accountability**. The idea is pretty simple. We don't just want to look at the variant that is interesting to us (whether it's new or non-standard or whatever). We also have to consider all of the other variants that make up the linguistic variable. For example, just like Fischer did in 1958, if we were interested in the [ɪn] variant of *-ing*, we can't just count up how many times our participants said [ɪn]. Instead, we need to know how many times they said [ɪn] out of the total number of times they *could* have possibly said [ɪn] and that means we also have to count up the times they said [ɪŋ] and not [ɪn]. With that information, we can calculate the percentage of **tokens** – each individual instance of a variant in our data – of variable *-ing* that were realized as [ɪn]. This is the Principle of Accountability in action.

Sociophonetics. In some cases, particularly with phonetic variation, the variable being examined doesn't fit into discrete variant categories. For example, the vowel in *nyuz* 'news' and *shuts* 'shoots' in Hawai`ian Creole varies between [uː] and [ʉː] and anything in between (Grama 2015). We could listen to each token of this vowel and classify it as belonging to one of two categories (back or central), but a more accurate approach is to use acoustic phonetic tools to measure the second formant of each vowel which corresponds directly to how front or back the tongue is in the mouth. Treating the variable as **continuous** rather than **discrete** requires slightly different quantitative techniques, but the approach is essentially the same!

This principle applies at every step of the analysis too. Imagine you want to compare the frequency of [ɪn] in a reading passage to the frequency of [ɪn] during the interview task. You would need to count the number of [ɪn] tokens in the reading passage and the number of [ɪŋ] tokens in the reading passage to calculate the proportion of [ɪn] in the reading passage, and likewise count both [ɪn] and [ɪŋ] in the interview to determine the proportion of [ɪn] in that context. Just counting the number of [ɪn] tokens in each context doesn't tell us enough information. Table 12.1 demonstrates why the principle of accountability is so important. If we don't follow the principle of accountability it seems like [ɪn] is more frequent in the reading passage than in casual speech (10 vs. 8) but of course this doesn't take into account how frequently the variant could have occurred but didn't. If we add a denominator that indicates how many tokens of [ɪn] and [ɪŋ] occurred in each context to our table, we get a more accurate picture of the effect of contextual style (25% in the reading passage vs. 40% in casual speech). The principle of accountability applies to every linguistic and social factor we might consider.

Table 10.1. Why we must follow the principle of accountability

	Not following the Principle of Accountability	*Following the Principle of Accountability*
Reading Passage	10 tokens of [ɪn]	10/40 tokens of *-ing* = 25%
Casual Speech	8 tokens of [ɪn]	8/20 tokens of *-ing* = 40%

In this section, we've learned about the methods, data, and analyses used in variationist sociolinguistics to the study of language variation and change. The hallmarks of the variationist method are the sociolinguistic interview (for collecting data) and the principle of accountability (for analyzing data).

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10.6: Sociolinguistic correlations - Place

If you sit back and think about how different people speak or sign the same language in different ways, the first social distinction that comes to mind just might be region or place. As dialectologists have been aware of for a long time, people from different places tend to have different regional varieties. Egyptian Arabic and Syrian Arabic are distinct; Continental French, Quebec French and Moroccan French are distinct; Spanish in Mexico, in Puerto Rico, and in Spain are all distinct. Within one nation there are also dialect differences, Acadian French (a variety spoken in the Maritimes) differs from Laurentian French (a variety spoken in Quebec, Ontario, and Western Canada); New York City English differs from Chicago English; nêhiyawêwin (Plains Cree) differs from nîhithawîwin (Woods Cree). In some cases, a particular variety has been put on a pedestal as the 'standard' and most prestigious representation for the language. However, the standardization of one variety over another is never about the linguistic nature of the variety and is always rooted in power structures and politics. A stereotypical feature of standard British English is the deletion of non-prevocalic *r* (or '*r*-dropping') as in *dark* [dɑːk] and *car* [kɑː]. This "Queen's English" (note the explicitness of power and politics right there!) is perceived as the standard, prestigious, and most posh way of speaking for people in, for example, Brixton and Hammersmith. However, the same phonological feature, deletion of non-prevocalic *r*, which is also common in New York City English, is perceived as non-standard, low-status, and lacking prestige in Williamsburg and Greenwich Village. Same linguistic process, diametrically different perceptions!

Do you say 'soda' or 'pop'? 'Cottage' or 'cabin'? In 2013, the most read piece published by the *New York Times* was "How Y'all, Youse and You Guys Talk", an interactive 'dialect quiz' that asked readers a series of questions about the lexical items they used for various concepts (e.g., 'a large, wild cat, native to North America', 'a small road parallel to a highway', 'a small gray bug that curls up into a ball when touched'). Upon completion, readers were given a map pinpointing the quiz's best guess at their location (within the United States) based on their responses. The piece highlighted the diversity of regional varieties of American English. Of course, regional variation exists within languages other than English too. For example, the words BIRTHDAY, STRAWBERRY, and PIZZA (among many others) have several regional variants in ASL (Lucas, Bayley, and Valli, 2003). You can see four regional variants of BIRTHDAY in this YouTube video and six regional variants of HALLOWE'EN in Figure 12.3. based on an image originally shared by the Canadian Language Museum on social media.



Figure 10.3. Six examples of regional variation of the HALLOWE'EN sign in ASL found across Canada

Taking this example further, it's safe to say that r-dropping is strongly associated with London English and New York City English (regardless of its other local associations). This association comes about through **indexicality**, the semiotic concept that a sign (in our case, a linguistic feature) points to (think, *index* finger ☞) some meaning. Language makes extensive use of indexicality as discussed in Chapter 7. For example, some words, called 'deictics', can only have meaning within specific context: what *tomorrow* refers to is going to change in 24 hours! This is referential indexicality. But language also makes use of non-referential indexicality: linguistic features can index **social meanings** like place! Indexicality like this arises through the process of **enregisterment** or the linking of a particular feature of language with some cultural expectation. For example, according to the prevalent Euro-American gender ideology, there are two genders and those two genders behave differently. The result of mapping language to this "ideological schema" (Johnstone 2009) is that some linguistic features come to be gendered (i.e., they index masculinity or femininity). For instance, among Canadian English speaking adolescents, the intensifying adverb *pretty* as in *pretty cool* tends to index masculinity, whereas the intensifying adverb *so* as in *so cool* tends to index femininity (Tagliamonte 2016: 91). The same thing happens with place. The cultural expectation is that people in different places are different, and the result of mapping language to that expectation is that some linguistic features come to have regional associations.

Settler Colonialism and Canadian English. General Canadian English is perhaps the geographically most widespread homogeneous regional variety of any language. It is spoken by people from the Ontario-Quebec border in the east to Vancouver Island in the west (roughly 3800 kilometers!). The geographic size and shape of regional varieties depends on a wide-range of factors like physical geography, infrastructure, and political borders. In the case of Canada, we can point to historical migrations and colonialism.

Canadian English is typically traced back to early European settlers of southern Ontario who arrived from the United States as refugees of the American Revolutionary War. Over the decades, these "Loyalists" and their descendants migrated westward and took with them the same variety of English.

But that's not the whole story. Typically when two languages come into contact, borrowings happen and the languages change in convergent ways. But the fact that Toronto English and Vancouver English are extremely homogeneous only came about because this contact-induced change *didn't* happen despite the huge diversity of Indigenous languages spoken across this same area. For example, there's no trace of contact with Nishnaabemwin in Toronto English and no trace of contact with hən̓q̓əmin̓əm̓ or Sḵwx̱wú7mesh sníchim in Vancouver English (though a pidgin trade language called Chinook Jargon, which incorporated elements of Chinookan, Wakashan, Salishan, and, eventually, Indo-European languages, did exist on the west coast until the late 19th century).

Why? Settler colonialism. Settler colonialism is a type of colonialism. Its goal is the acquisition of land for the purpose of permanent repopulation of settlers from the parent state to the colony. In Canada (as well as the United States, Australia, New Zealand and elsewhere), settler colonial expansion required not just the displacement of Indigenous peoples but also their erasure. Through physical and cultural genocide, the settler colonial state of Canada has actively worked to erase Indigeneous peoples cultures, and languages from this land. The homogeneity of Canadian English is an insidious testament to settler colonialism (see Denis and D'Arcy 2018).

Within the Canadian context, probably the most well known enregistered feature of Canadian English is the pragmatic marker *eh*. Today, the Canadian indexicality of *eh* is ubiquitous. You can buy t-shirts, mugs, and magnets with *eh* on them, often accompanied with other national symbols like a red maple leaf. In fact, *eh* is so closely linked with Canada that when the Government of Canada created a Twitter account (@Canada), its very first tweet was ".@Canada's now on Twitter, eh!" But just because a linguistic feature is enregistered as a feature of a regional variety, that doesn't mean that that linguistic feature is actually used all that much! *Eh* has several different uses in Canadian English but in one of its most common uses, it is a variant of a linguistic variable, together

with other pragmatic markers like *right*, *you know*, and *you see*. When analyzed through the Principle of Accountability, *eh*'s frequency of use is eclipsed by these other variants. That said, this varies in different regions. In an analysis of oral history recordings of Canadian English speakers born between the 1860s and 1930s in Southern Ontario and Southern Vancouver Island, British Columbia, Denis (2020) finds that *eh* represents less than one percent of tokens of this variable on Vancouver Island but 12% in Southern Ontario.

Want to know more?

The Dictionary of Canadianisms on Historical Principles is a freely available dictionary of Canadianisms (words unique to Canadian English or used uniquely in Canadian English). You can learn more about the history of the dictionary in Stefan Dollinger's book *Creating Canadian English* published by Cambridge University Press.

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10.7: Sociolinguistic correlations - Social status

You probably have an intuition about social class and a hierarchy of status in society that is linked with the unequal distribution of wealth and power. You probably also recognize that this inequity is not arbitrary and intersects with other social factors. At the same time, social class is less tangible than other social facts about people like their age, their gender, and their ethnicity. In Euro-American society since the Industrial Revolution, people have been categorized into three groups: 'upper class', 'middle class', and 'lower class'. The implied hierarchy of these traditional categorizes reflects the distribution of wealth and power: the 'upper' or ruling class holds the most and the 'lower' or working class holds the least. Sociological definitions of social class look to objective measures like property ownership, wealth, income, and occupation and subjective measures like life chances, prestige, and reputation in categorizing class membership. In the Canadian context, social class seems that much more intangible because, while we are largely a middle class society, when we consider those at the bottom of the social class hierarchy, there are important interactions and intersections with both geography and other social factors, especially race and ethnicity. Geographically speaking, there tend to be specific areas both within cities and in remote areas that are socioeconomically less advantaged. With respect to race and ethnicity, Black, Indigenous, and other people of colour (especially those who have immigrated recently), are also, on aggregate, in a more socioeconomically precarious situation.

While social class can be a fuzzy concept, it's still an intuitive reality. To investigate the role of social class as a conditioning factor of linguistic variation, we need to come up with ways of 'diagnosing' or measuring it. Often times, someone's occupation (or sometimes their parents' occupations), their education, their income, or their residence can be used as an indication of their social class. In William Labov's (1966) study of variation in the English spoken in the Lower East Side of Manhattan, he made use of three parameters to categorize people into different social classes: occupation, education, and income. Labov examined many different linguistic variables in his data and found extensive correlations between the frequency of use of different variants and an individual's social class, according to his measure.

In Figure 10.4. below, based on one of Labov's results, we can see that the frequency of use of the [ɪn] variant of *-ing* exhibits **social stratification**. Participants in the working class speakers have the highest rate of this variant, upper class speakers use [ɪn] the least, and people in the middle of the social class spectrum are somewhere in-between with respect to *-ing*.

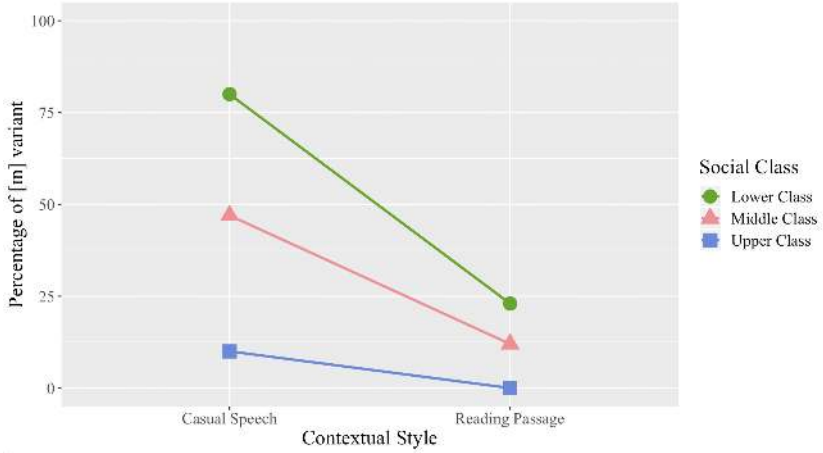


Figure 12.4. Frequency of [ɪn] variant of variable -ing in NYC English by contextual style and social class, based on Labov (1966, 259).

Importantly, Figure 10.4. also demonstrates systematic style shifting as discussed in section 10.4. Where Fischer observed one young man shifting his frequency of use of [ɪn] as the formality of the context shifted, here we can see that this happens across the board: in all social classes, the casual speech context contains more [ɪn] tokens than the reading passage context.

How to be a linguist: Tips for interpreting patterns of data in graphs

Variationist sociolinguistics is a quantitative field and numbers and graphs can be really intimidating for some people! Here are four tips for helping you to discern the most out of the kinds of graphs you see in this chapter.

- **Tip 1: Carefully read the caption**
  - Good captions should clearly identify what data is visualized in the graph. The caption should tell you what was measured (the dependent variable) and what the researcher manipulated or controlled (the independent variables). This is usually expressed in the form of a 'by-statement': dependent variable by independent variables. A good caption should also identify the source of the data.
- **Tip 2: Carefully read the legend (if there is one) and the labels of the axes**
  - This will tell you what exactly the graph is showing. Usually the dependent variable is plotted on the y-axis (the vertical one) and the independent variables are plotted on the x-axis (the horizontal one) or, if there is more than one independent variable, with distinctions demonstrated in the legend (like colour, shape, or line type). In variationist sociolinguistics, the y-axis is usually the proportion or percentage of one variant of a linguistic variable (relative to the other variant or variants).
- **Tip 3: Try to determine the patterns in the graph before reading the author's description**
  - A good graph will be accompanied by a description of the patterns in the graph. The best way to become more comfortable with reading graphs is to try to understand the pattern before reading the author's description. If your interpretation differs, look at the graph again and see if you went wrong somewhere.

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10.8: Sociolinguistic correlations - Gender

Our gender is a social acquisition that comes about through socialization over our lifetime (and sometimes even prior to our start of life… I'm looking at you 'gender reveal' parties). Sex on the other hand is something that is assigned to us based on aspects of our (usually external) biology at birth. You've probably heard that "gender is the socially-constructed counterpart of biological sex" (Cheshire 2002: 427). That's only half true though: binary sex is also a social construct (see Eliot 2011 and Fausto-Sterling 2012). Although sex is colloquially spoken about as a biological binary, its anatomical, endocrinal, and chromosomal criteria all exist on continua; the two discrete categories of 'male' and 'female' are split at a socially-constructed and fuzzy boundary. For cisgender people, their gender identity (i.e., as a man, as a woman, as masculine, as feminine) is (largely) consistent with the sex that they were assigned at birth (i.e., male, female). For transgender people, their gender identity differs from the sex they were assigned at birth and often differs from the gender identity they were socialized into earlier in life. For nonbinary and genderqueer people, their gender identity does not (always) map to the spectra of masculinities and femininities. In cultures across the world, gender is not restricted to a binary (e.g., two-spirit people in some Indigenous communities in North America and hijras in India).

Understanding the distinction between gender and sex is important because past variationist sociolinguistic research often collapsed the difference. As Eckert (1989: 246–7) observed over 30 years ago: "Although differences in patterns of [linguistic] variation between men and women are a function of gender and only indirectly a function of sex …, we have been examining the interaction between gender and variation by correlating variables with sex rather than gender differences." Eckert's main point here is that although variationists frequently talk about two groups based on 'sex differences', the linguistic difference between men and women is not a biological fact but a social one: men do not use certain variants in a certain way because of their particular anatomy, hormones, and chromosomes but because they have been socialized into using language 'like a man'. In the early years of the field, little attention was paid to the complexity of gender and the normative binary was taken for granted. Moreover, participants in earlier variationist work were typically categorized based on their **gender presentation** (i.e., how the researcher perceived the participant's gender) rather than their self-identification.

Gender and vocal pitch. One aspect of spoken languages that seems to have a clear link to our anatomy is vocal pitch. People with larger, heavier vocal folds have lower pitched voices because their vocal folds require more energy to vibrate and thus, vibrate less quickly than smaller, lighter vocal folds (which on average produce higher pitched voices). However, even this seemingly biologically-based difference is also socially-sustained. Prior to puberty, when endocrinal changes trigger the larynx to grow differentially depending on a person's specific combinations of hormones, all children's vocal folds are anatomically roughly similar. And yet, as early as age four, boys and girls (consciously and unconsciously) conform to the norms of masculine and feminine speech: boys manipulate their vocal tract to produce more masculine-sounding voices and girls manipulate their vocal tract to produce more feminine-sounding voices (Sachs et al. 1973).

The complexity of gender helps to explain well-observed gendered-patterns of variation. These patterns have been found over and over again in so many studies that Labov (2001) codified them as *principles of linguistic change*. (There is one, pretty big, caveat here though: the vast majority of the studies where the pattern has been found represent languages embedded in Euro-American culture!)

- Principle I: In stable variation, women use more of the standardized variant than men do.
- Principle Ia: In changes from above, women favour the incoming prestige variant more than men.
- Principle II: In changes from below, women are most often the innovators.

Principles I and Ia are named as such because they similarly involve women using more of the overtly prestigious variant. An example of Principle I in action can be seen in Figure 10.5 from Wolfram's (1969) study of *th*-stopping in Black English in Detroit. This is a stable variable that involves the variable realization of /θ/ as [θ] or [t] in words like *think* [θɪŋk~tɪŋk] and *with* [wɪθ~wɪt]. Figure 10.5 shows the frequency of the non-standard [t] variant of variable *th*-stopping among men and women across four different social classes. Critically, even in the face of social stratification, men have a higher rate of the non-standard variant [t] than women who favour the standard form [θ].

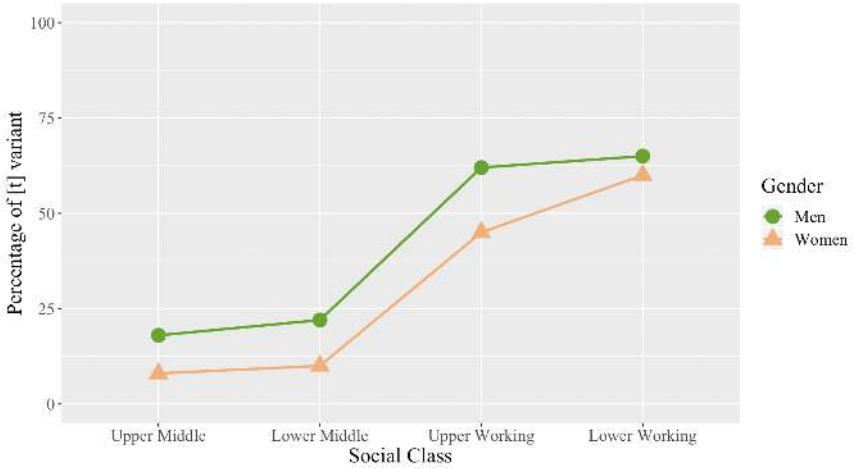


Figure 10.5. Frequency of [t] variant of th-stopping among Black speakers of Detroit English in the 1960s by gender and social class, based on Wolfram (1969).

One proposed explanation for Principles I and Ia appeals to (Euro-American) gender ideologies (in interaction with social class). Eckert and McConnell-Ginet (2013: 253) identify two character tropes on the extremes of the gender binary that serve as imaginary reference points in the performance of femininity and masculinity. You can think of these as extreme stereotypes of the 'ideal' woman and 'ideal' man; no real woman or real man exists who fit these stereotypes, but their characteristics serve as a baseline for expressions of normative femininity and masculinity. First is the *girlie-girl*: "her body is small, delicate, she moves gracefully, she smells faintly of delicate flowers, her skin is soft, she is carefully groomed from hair to toenails. She dresses in delicate fabrics, she smiles, she is polite, and she speaks a prestige variety. Wealth refinement is central to canonical femininity". Think early-era Taylor Swift. On the other end of the binary is the *manly-man*: "grounded in the physical – in size and strength, in heavy and dirty work, in roughness, toughness, and earthiness. The stereotypical man is working class." Think *Born in the U.S.A.*-era Bruce Springsteen. In general, these are the gender ideals against which men and women are evaluated, socialized into, and often consciously and unconsciously conform to. But what is feminine about prestige language? For one, as we saw above, people in higher social classes use more standard variants and wealth refinement is a central aspect of canonical femininity. Moreover, Deuchar (1989) suggests that standard language can protect "the face of a relatively powerless speaker without attacking that of the addressee". In the context of patriarchal male dominance, standard speech functions, in some ways, as a survival strategy.

At the same time, further expectations are put on women's language. In one of the most influential papers on the sociocultural study of language and gender, Robin Lakoff defined **the double bind**: women are socialized not just to use standard language but powerless and tentative language… to talk 'like a lady'. But, in Lakoff's (1972: 48) words, "a girl is damned if she does, damned if she doesn't." Her tentative, powerless language will be seen as a reflection on her (in)ability to participate in serious discussion but if she resists and subverts this expectation, she runs the risk of being deemed unfeminine.

Double bind in action. Check out this satirical list of 'Non-Threatening Leadership Strategies for Women" to see examples of the double-bind in action. My favourite is #9!

In a study based in Norwich England, Peter Trudgill (1972) compared people's actual frequency of use of standard and non-standard variants with those people's own perceptions of how standard or non-standard they thought their speech was. The majority of women in the study over-reported their use of the standard. Trudgill concluded that women are more linguistically standard because they are more status-conscious than men. But it would be an error to assume that only women are linguistically status-conscious, the only ones adjusting their language in reaction to these norms and ideas of standardness. Men too are status-conscious but in reaction to canonical masculinity. Most of the men that Trudgill interviewed believed they were more non-standard than they actually were! Men

of all social classes and backgrounds make use of non-prestigious working class language and white men often adopt features of non-prestigious Black language in the name of **covert prestige**. The use of these linguistic forms indexes the toughness and physical dominance that class and racial ideologies assign to working class and Black men – characteristics of the canonical masculinity that is desirable to all men.

So an appeal to gender, class, and racial ideologies offers an explanation for Principles I and Ia: that women tend to use more standard variants and men tend to use less in stable variation and in changes from above. But Principles I and Ia contrast with Principle II, which essentially notes that women deviate from the standard (i.e., they innovate away from the current norm) more than men when no one is looking! Labov (2001: 293) calls this the **gender paradox**: "women conform more closely than men to sociolinguistic norms that are overtly prescribed, but conform less than men when they are not". The complexity of gender again offers explanation. The gender paradox is true only in the aggregate: only when we collapse all men and all women together does the pattern emerges. But it is not categorically true: there are women who deviate more from the standard than some men, and vice versa.

Penelope Eckert demonstrated this idea in her groundbreaking work on linguistic variation among adolescents in a suburban Detroit-area high school (see Eckert 1989, 2000). Like just about every high school across North America, this high school had two major cliques. First, were the 'jocks'. The jocks included the athletes of the school, as you might imagine, but the group was a bit broader. They included the students who were involved in all school-oriented activities: sports, band, academic societies, and school council. Jocks generally express overt respect for the hierarchical system of the school and the authority of their teachers and principals. The other group, the 'burnouts', were anti-school and their interests fell outside of school (things like sex, drugs and rock 'n' roll!). The 'burnouts' were also overtly anti-authority. These two groups can be understood as two different **communities of practice**: groups that share common interests, concerns, and goals. While the jocks embody middle class ideals and the burnouts embody working class ideals, a student's social class and community of practice did not always align. That is, there were working class jocks and middle class burnouts.

Regardless of group, the boys in Eckert's study expressed their group identity through their actions, like being on the football team for the jocks or, for the burnouts, 'cruising' (getting in a car and driving in and around downtown Detroit, maybe getting out and going to a bar or a rock concert). Girls on the other hand relied on projecting an image to express their identity. Jock girls must be friendly, outgoing, all-American, clean cut, and preppy, while burnout girls need to be tough, urban, and 'experienced' (that is, sexually active). This plays out linguistically as well as can be seen when we look at the patterns of variation in the school around the five variables of the **Northern Cities Chain Shift**.

Chain shifts. Chain shifts are a kind of change that affects several linguistic features in a systematic and serial way. A common kind of chain shift is a vowel chain shift, like the Northern Cities Chain Shift. The idea is that once one vowel starts to move away from its older position, other vowels are pushed or pulled around the vowel space to accommodate: just like when you pull at one link of a chain, all the subsequent links move too. The Northern Cities Chain Shift, found in urban areas across New York state, Michigan, Illinois, and elsewhere, involves a change in both the height and backness of five vowels. The vowel in BAT [æ] moves higher, so it sounds more like [ɛ]; the vowel in BOT [ɑ] shifts forward and is pronounced more like [æ]; the vowel as in BOUGHT [ɔ] lowers to sound more like [ɑ] (note though that in Canadian English, these two vowels have merged); the vowel in BUT [ʌ] moves back and sounds more like [ɔ] and the vowel in BET [ɛ] moves back and sounds more like [ʌ]. Each of these changes triggers the next one, so there is a chronological order to the changes. BAT started to move first, followed by BOT, then BOUGHT, then BUT, and most recently BET began to move, as you can see in Figure 10.6.

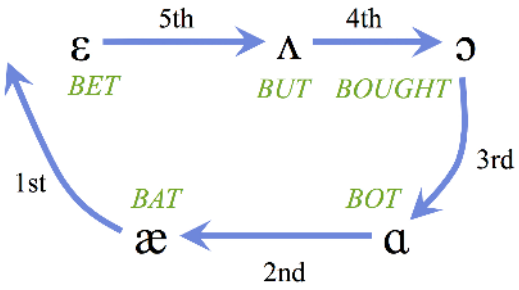


Figure 10.6. The Northern Cities Chain Shift

Figure 10.7 plots the frequency of the innovative variant of each of the five changes associated with the Northern Cities Chain Shift as used by four groups in the high school: burnout boys, burnout girls, jock boys, and jock girls. The five variables are arranged along the x-axis from oldest [æ] to newest [ɛ]. With the older changes, the gender of the speaker is a better predictor of variation than community of practice; but with the newer changes, it's community of practice that's most important with the burnouts on the forefront of innovation and the jocks lagging behind (regardless of gender). What you can also see in this chart, as indicated by the arrows, is that for all variables except the oldest, the difference between community of practice is much larger for the girls (blue arrows) than the boys (pink arrows).

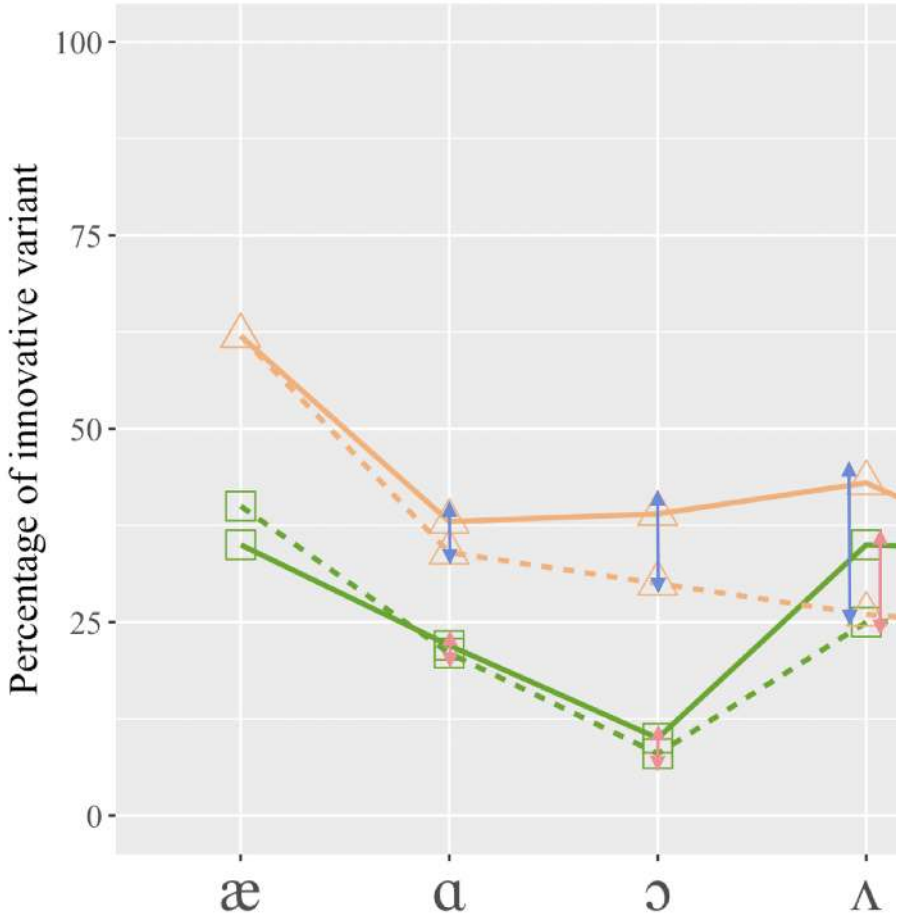


Figure 10.7. Distribution of the innovative variants of the five Northern City Chain Shift vowels by socia

And here's the solution to the gender paradox: 'women' (and 'men') are not a cohesive, homogenous group! It's the subset of "non-conformist" women (like the burnout girls here) who are the leaders of changes from below. The difference between men and women, on aggregate, is not about status consciousness, but the fact that women are more status bound. While men's status depends on their accomplishments, possessions, and institutional status (i.e., what they do/have), women are evaluated on their symbolic capital (i.e., who they are/appear to be). Both men and women accumulate symbolic capital, but it is "the *only* kind that women can accumulate with impunity" (Eckert 1989: 256). The upshot is there is a wider range of linguistic differentiation (reflecting social category distinctions) among women than among men. Women "maintain more rigid social boundaries, since the threat of being associated with the wrong kind of person is far greater to the individual whose status depends on who she appears to be rather than what she does" (Eckert 1989: 258).

You'll notice that this section has said nothing about the language use of transgender, nonbinary, and gender diverse people. For decades the linguistic practices of transgender, nonbinary, and gender diverse people were either ignored or studied only because they subverted exceptions of previous theories of language and gender (Konnelly 2021). Most, if not all, of this research was also conducted by cisgender linguists. However, over the last decade or so, transgender and nonbinary linguists have begun to study language within their own communities and from a far more affirming perspective (Zimman 2020). Some of this work has shown how linguistic variation can be used as a means of constructing a nonbinary identity. Gratton (2016) looks at the the use of variable *-ing* by two Canadian English speaking nonbinary people in two different contexts: one, a safe queer space and the other, an unfamiliar, non-queer space. Gratton finds that in the safe, queer context both speakers use each of the two variants around 50% of the time. However, in the non-queer spaces where they express legitimate fear of being misgendered, the two speakers diverge sharply from each other. One speaker, in reacting to the threat of being misgendered as a woman, used a very high rate of the masculine-associated [ɪn] variant, while the other speaker, reacting to the threat of being misgendered as a man, used a very high rate of the feminine-associated [ɪŋ]. Gratton (2016: 56) argues that it's not the case that these two speakers are attempting to align with cis-masculinity or cis-femininity respectively – they are both non-binary! – but rather, they "utilize resources that they associate with cis-normative masculinity [and femininity] … in order to distance [themselves] enough from cis-normative femininity [or masculinity respectively] that they [are] not misgendered as such." In this way, both linguistic variation provides both speakers a means of "perform a non-binary identity" (Gratton 2016: 57).

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10.9: Sociolinguistic correlations - Ethnicity

Like gender, ethnicity is socioculturally and sociolinguistically complex. Language and ethnicity are intricately linked and often co-constitutive. That is to say, each is often circularly defined; divisions between languages are often defined with reference to divisions between cohesive cultural groups that use those languages and ethnic groups are often defined with respect to the language that the group uses (e.g., think about how Czech and Slovak are mutually intelligible but understood as distinct languages, spoken by distinct ethnic groups). Around the world, people tend to live in close proximity to other members of their ethnic group. This is true both in places where that ethnic group is indigenous or in contexts of colonialism and diasporic migrations. This means that people often – but certainly not always – have social networks that are ethnically homogeneous. The linguistic consequence of this is that, because we tend to use language in the same way as the people we interact with most, **ethnolects** of many languages have emerged. Ethnolects are varieties of an ambient (standardized) community language used by a minoritized ethnic group. That's not to say that the ambient standard doesn't also have ethnoracial associations though! In North America for example, while people tend to assume that the ambient standards of Canadian English, Quebecois French, American English, and ASL are ethnically-neutral, they are ideologically associated with whiteness and European settlers.

I don't have the space to dive into the complex intersections of language, ethnicity, race, and prestige but what I want to do is demonstrate the importance of linguistic variation with respect to ethnolects. The Lumbee Tribe of North Carolina is an Indigenous group in the United States and in fact, with 45 000 members, the Lumbee Tribe is the largest Indigenous group that lives east of the Mississippi River. The majority of Lumbee people live in Robeson County, North Carolina, a multiethnic area: 40% of residents are Lumbee, 35% are Anglo-American, and 25% are African American (Wolfram, Daugherty, Cullinan 2014). These three groups, though living in close proximity, each live mostly selectively-segregated within the county. The Lumbees' political situation is thorny; they have state-recognized Indigenous status in North Carolina but are not federally recognized with formal tribal status by the US Government. For almost a century and a half, the Lumbees have been unsuccessfully petitioning for full federal recognition. A major roadblock for the Lumbees' petition has been their language history. Knowing one's ancestral language is a key piece in demonstrating descent and is key to federal recognition. However, the Lumbee people's ancestral language was taken from them very early on in the settler-colonial history of North America (they were documented as speaking English as early as 1730!). In an effort to combat this mitigating factor, a group of sociolinguists have been documenting the uniqueness and time depth of the Lumbee English ethnolect to help provide evidence of Lumbee Tribe's culturally distinctive language that will satisfy the settler-colonial state.

Many of the lexical, phonological, and morphosyntactic characteristics of Lumbee English are shared by their Anglo-American and African American neighbours, or by nearby Appalachian English or North Carolina's Outer Banks English. However, Lumbee English is composed of a unique mix. For example, the /aɪ/ phoneme in Lumbee English is raised and backed to [ɑɪ], something shared with Outer Banks English but none of the others; while Lumbee English's 'for to' complementizer (e.g., *I want for to get it*) is shared with Appalachian English, but no others; and, Finite *be* (e.g., *she bes there*) is only shared with their Anglo-American neighbours. There are also a few features that are completely unique and point to the Lumbees' long history of use of English. One of these is perfective *be*. Until the mid-seventeenth century or so, standard English exhibited a categorical alteration between *be*

and *have* as markers of perfect aspect depending on the main verb of the sentence. Eventually, in most varieties of English, perfective *be* was lost, but in German, a language closely related to English, the alternation still happens, as in (6).

(6a)

Sie	**hat**	ihren	hund	mitgebracht
she	**has**	her	dog	brought

'She has brought her dog' (German)

(6b)

Sie	**ist**	gegangen
she	**is**	gone

'She has gone' (German)

In Lumbee English, like in German, many main verbs retain perfective *be* both in present and past tenses as in the examples in (7) from Wolfram (1996: 9) and Dannenberg (1999: 67).

(7a)	If I**'m** got a dollar, I**'m** got it.	[have got]
(7b)	I**'m** told you all that I know.	[have told]
(7c)	We **were** got a few white folks up here.	[had got]
(7d)	I don't have to ask if you **were** been there.	[had been]
(7e)	It **was** had a blue dot on it.	[had had]

While perfective be in the present tense is shared with a small handful of other isolated English-speaking communities (none near Robeson County), perfective *be* in the past tense appears to be completely unique to Lumbee English. The presence of perfective *be* in Lumbee English suggests that the language has been in use within the community for a very long time: at least as long ago as when perfective *be* was more generally common among English speakers.

Lastly, several linguistic variables in Lumbee English demonstrate further evidence of its uniqueness. Both consonant cluster reduction and *was/were* levelling are variables shared by Lumbee English and their African American and Anglo-American neighbours. But for both variables, Lumbee English exhibits a unique pattern of conditioning factors.

Variable consonant cluster reduction involves variation between complex codas and reduced codas. So a word like *disk* may variably be realized as [dɪsk] or [dɪs] and a word like *grilled* might be realized as [gɹɪld] or [gɹɪl]. There are two important linguistic conditioning factors that correlate with this variation. First is the morphological complexity of the word: is the word monomorphemic like *disk* and *mist* or bimorphemic like *grill-ed* and *miss-ed*? Second is the following segment: is the next sound a vowel, a consonant, or a pause? The three varieties spoken in Robeson County differ in terms of how these factors interact and which variant is favoured in specific contexts. For example, Lumbee English patterns with African American English and differs from Anglo-American English in one way: in both Lumbee English and African American English the reduced variant is less likely to occur in monomorphemic words that appear before vowels like in *rest* [ɹɛst] *easy*. At the same time, Lumbee English patterns with Anglo-American English and differs from African American English in another way: in Lumbee English and Anglo-American English, the reduced variant is more likely in bimorphemic words that come before pauses like *she's blessed* [blɛs] (Torbet 2001: 381).

Like with consonant cluster reduction, *was/were* levelling, the variable realization of *were* as *was*, as in *we were/was* and *they weren't/wasn't*, is shared by everyone in Robeson County. However, only in Lumbee English does the polarity of the sentence constrain the variation (such that affirmative sentences favour levelling to *was* and negative sentences disfavour levelling) (Wolfram and Sellers 1999: 103).

The evidence for the uniqueness and long history of the Lumbee ethnolect of English is strong. If a unique ancestral language is a requirement for purposes of federal recognition by the US Government, it seems that Lumbee English should qualify as such. Unfortunately, although in November 2020 the Lumbee Recognition Act of 2019 was passed in the House of Representatives it failed to pass in the Senate. However, in April 2021, a bipartisan group of lawmakers from North Carolina introduced new bills to try again.

Want to know more?

The *Language & Life* project, a team of linguists and videographers based out of North Carolina State University, have been producing fascinating, accessible, and linguistically-informed documentaries about different American language varieties for over almost three decades now. Many of their documentaries focus on ethnolects: Signing Black in America focuses on Black ASL, Talking Black in America focuses on Black English, and Voices of North Carolina considers the wide diversity of spoken varieties in the state including ethnolects. Each of these are available to watch for free on YouTube.

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10.10: Exercise Your Linguistics Skills

Exercise 1. In addition to *saw~sore*, a few other minimal pairs in New York City English were listed in section section 10.5: *udder~other, beg~bag*, and *bruin~brewing*. In each of these pairs, the second word contains a different linguistic variable. Can you identify each of the three variables and their variants based on the minimal pairs? Would all of these pairs of words be minimal pairs in the variety/varieties of English that you're familiar with?

Exercise 2. Different points throughout this chapter contain 'reported speech' – a representation of some past or hypothetical speech or thought. In English, reported speech is typically introduced with a quotative verb like 'to say'; orthographically reported speech appears within quotation marks (""). Skim back through the chapter looking for all instances of reported speech and document the **quotative verbs** used to introduce each token. How many variants did you find? Can you think of other variants?

Exercise 3. Not all variables that correlate with social class also correlate with contextual style like in Figure 10.4. Labov makes a theoretical distinction between variables that are **markers** (they correlate with both social class and style) and variables that are **indicators** (they correlate with social class but do not correlate with style). What do you think is important about this distinction between markers and indicators? Hint: Think about the fact that the correlation with contextual style is also a correlation with attention paid to speech.

Exercise 4. You and your colleague are conducting a study of variation between the citation form variant and lowered variant of the KNOW, THINK, and NAME signs in Auslan. You've collected a corpus of sociolinguistic interviews and counted up the number of tokens of these signs used during casual conversation. You have data from people who identify as men, women, and nonbinary. Your colleague has put together Table 10.2. and and Figure 10.8 based on the data in the corpus.

	Tokens of citation form	Tokens of lowered variant
Men	60	60
Women	45	55
Nonbinary	30	50

Table 10.2. Tokens of citation form and lowered variant of KNOW, THINK, and NAME in a corpus of Auslan. (Hypothetical data)

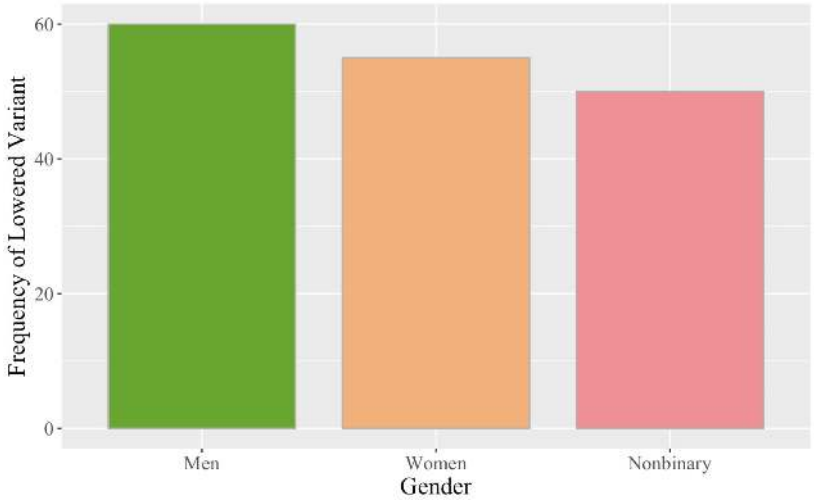


Figure 10.8. Bar plot that your colleague has produced based on Table 10.2. (Hypothetical data)

(Politely,) explain to your colleague why Figure 10.8. is not the best way to represent the data presented in Table 10.2. (Your explanation should make use of the concepts and terms introduced in this chapter.) Then, draw an alternative graph based on Table 10.2. What can you say about this variable and gender? Which group is most likely to use the lowered variant? Which group is least likely to use the lowered variant?

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CHAPTER OVERVIEW

Chapter 11: Child Language Acquisition

Learning Objectives

When you've completed this chapter, you'll be able to:

- Identify children's typical language development milestones.
- Interpret data from various experimental methods to draw conclusions about children's mental grammar.
- Explain how development in signed language parallels that of spoken language in an accessible language environment.
- Discuss some of the benefits of acquiring more than one language.

This chapter looks at how children develop the various components of mental grammar: phonetics, phonology, morphology, syntax and semantics. As we'll see, children's minds are equipped to acquire grammar very quickly as long as they have other language users to observe.

11.1: Tiny, powerful language learners
11.2: When does language learning start?
11.3: Phonemic contrast
11.4: Early language production
11.5: The Language environment and the so-called word gap
11.6: Understanding word combinations
11.7: Syntax in early utterances
11.8: Developing word meanings
11.9: Growing up bilingual (or multilingual!)
11.10: Language milestones in the first two years
11.11: Exercise your linguistics skills

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11.1: Tiny, powerful language learners

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/essentialsoflinguistics2/?p=515#oembed-1

If you've ever taken care of a newborn, you'll know that they're so busy growing that they can't do much else. They can sleep, they can eat (as long as their food is in liquid form), they can pee and poop, and they can cry. That's pretty much it. When they're just born, they can't even really focus their eyes or control their limbs! But by the time they start school at age four or five, most of them can walk and run and jump, some can swim and ride bikes, and they can hold fairly sophisticated conversations with complex sentences and multi-syllable words. Here's an example of an utterance by one of my twins when they were about four and a half years old:

> *"Mummy, do you remember that time we made chocolate pudding? Maybe we could make some on Saturday. This Saturday, in the afternoon. I don't need to take a nap. Let's do it together, and maybe then we can eat some!"*

As awesome as my kids are, there's nothing remarkable about their language development. Every typically-developing child who has access to language will become fluent in the language (or languages!) used around them, mostly without explicit teaching. So how do kids' minds get from the newborn stage where the only sounds they make are crying and hiccuping to this stage of being able to bargain about naptime and kitchen projects? There must be an awful lot of learning that happens in those first few years. As we'll see in this chapter, that learning can start even before birth! In this chapter we take a look at some of the elements of grammatical knowledge that children acquire, and we ask what that tells us about mental grammar.

Children's rapid language development can look quite magical from the outside, but it results from immense brain activity in response to the language environment, also known as the ambient language, the language used by the family members, caregivers, adults and older children that a child spends time with. The baby brain tracks the patterns in the language environment and uses them to build up the child's own mental grammar. If the language environment is English, the child develops a mental grammar for English. And obviously, children in a Tamil-speaking environment develop a mental grammar for Tamil, children in a Mandarin-speaking environment develop a mental grammar for Mandarin, and so on. If the ambient language is American Sign Language (ASL), then the child will develop a mental grammar for ASL, regardless of whether they're deaf or hearing. If a child is in an environment where two or more languages are used, they'll develop mental grammars for both those languages.

The Language environment and oralist culture

There is one group of children who don't have access to the language environment. About 90-95% of babies who are born deaf or hard of hearing are born into families where the primary language modality is speech (Mitchell & Karchmer, 2004). In some cases, families who learn that their child is deaf choose to start learning a sign language like ASL. If they use sign in their interactions with their child, then the baby has access to an ambient language in the visual modality and will develop a mental grammar from that input. But some families of deaf children choose not to use signed language, which means that their child does not get access to any ambient language: neither auditory nor visual. Why might a family make that decision? To answer that question, we need to talk a bit about **cochlear implants**.

A cochlear implant (CI) is an electronic prosthetic device that is implanted surgically. It takes sounds from the environment and converts them to electrical signals. Those signals then get transmitted to the brain via the auditory nerve (NIH NIDCD, 2021). In developed countries, it is very common for deaf children to receive a CI between ages one and three years. Even so, most kids with CIs still score well below hearing kids on standard tests of language proficiency, even when they've had the implant for several years – not because of any deficit in the children, but because the electrical signals from a cochlear implant are not a sufficient language environment for typical development (Mauldin, 2019). But in spite of this evidence, there's still a persistent stigma around sign languages and deafness, and many parents, teachers, and medical professionals consider it so important for children to "pass" in a hearing world that they don't offer access to signed language because they fear that it might interfere with the child's eventual acquisition of spoken language. Because of this belief that vocal language is better than sign language, known as **oralism**, many deaf children have no exposure to language before receiving a CI, and after implantation have access only to the atypical electrical signals produced by the device. This language **deprivation** leads to long-term impairments in social and cognitive

function and, ironically, to lower scores on tests of vocal language comprehension (M. L. Hall et al., 2019; W. C. Hall, 2017; Humphries et al., 2016; Lillo-Martin & Henner, 2021). In contrast, when deaf children of hearing parents have access to ASL by age six months, their vocabulary develops at a comparable rate to deaf children of deaf signing parents (Caselli et al., 2021).

This evidence from deaf kids shows us just how vital the language environment is, and how important it is that children have access to an ambient language as early as possible. The neural connections that make up mental grammar can only form in response to language input from the environment. Without that input in the first year of life, it's much harder for the brain to build a mental grammar.

A note on notation. When we're talking about very young children, their age in months is often more relevant than their age in years. The convention in this literature is to use a semi-colon between the years and months of a child's age. So a child aged 1;6 is one year and six months old, or one-and-a-half.

Check your understanding

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11.2: When does language learning start?

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We saw earlier that early exposure to language input is super-important because the mind starts building a mental grammar from a very young age. Just how early does language learning start? For hearing babies, it can start even before birth! If we measure the heart rate of a fetus in the uterus, we find that the heart rate increases in response to external sounds at about the seven-month point in pregnancy, so we know that a fetus can hear outside noises even while it's still inside the uterus. Not only can fetuses hear, but they're also remembering some of what they hear: by eight months of pregnancy, a fetus's heart rate increases more in response to their pregnant parent's voice than to a stranger's voice (Kisilevsky et al., 2003). This means they've stored some memory of what their parent's voice sounds like.

Ok, so by looking at fetal heart rates we can conclude that hearing babies have already stored some auditory memories by the time they're born. But that doesn't necessarily mean they have any mental grammar, does it? How can we tell what newborns know about their language? After birth, there are so many more interesting stimuli in their world that measuring heart rate isn't as informative, but they certainly can't tell us what they know. What can we observe that would tell us something about mental grammar?

How to be a linguist: Observing High-Amplitude Sucking

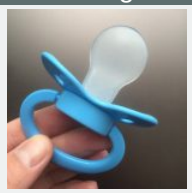


Figure 11.1. A pacifier.

Babies can't do much, but one thing they're very good at is sucking. Using an instrument called a pressure transducer, which is connected to a pacifier, we can measure how powerfully they suck. When a baby is interested in something, like a sound that she's hearing, she starts to suck harder. If you keep playing that same sound, eventually she'll get bored and her sucking strength will decrease. When her sucking strength drops off, we say that the baby has **habituated** to the sound. But if you play a new sound, she gets interested again and starts sucking powerfully again. So we can observe if a baby notices the difference between two sounds by observing whether her sucking strength increases when you switch from one sound to the other.

Using this **high-amplitude sucking** habituation method, researchers have found that newborns whose parents speak French notice the difference between French and Russian sentences spoken by the same person (Mehler et al., 1988). The fact that these newborn infants are sensitive to this difference tells us that they must have some memory of the patterns of French, to be able to tell it apart from Russian. What could these babies with French parents have learned about French before they were born? A lot of the sound information they receive in the uterus is quite muffled, but what they do have access to is the **prosody**. The rhythmic pattern of French depends on syllables of similar length, while that of Russian depends on syllable stress. That prosodic rhythm is audible to a fetus in the uterus, so by the time they're born, babies can tell the difference between the rhythm they've heard before and an unfamiliar rhythm.

In fact, if the pregnant parent speaks more than one language, a newborn can even tell the difference between those two languages! In a high-amplitude sucking study in British Columbia, babies born to Thai-English bilingual parents noticed when the spoken language switched from English to Thai (Byers-Heinlein et al., 2010). This suggests that their minds are already starting to set up two different mental grammars for the two languages they'll be acquiring!

So even when they're just born, hearing babies have not only learned what their parent's voice sounds like, they've also already learned some of the **prosody** of the language (or languages!) spoken in their environment.

I also want us to remember, though, that language acquisition is not a race. In some cultures, parents like to believe that their child is "advanced" in some way: smarter or stronger than other babies. Even though this chapter talks about general patterns of

acquisition, remember that there is huge variation across individual children, and learning something earlier isn't necessarily any advantage. The reason I mention that here is there's no evidence that a fetus that doesn't have access to speech sounds in utero, either because the fetus is deaf or the parent uses signed language, is disadvantaged in any way. As soon as they're exposed to language in a modality they can access, they start building their mental grammar.

Check your understanding

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11.3: Phonemic contrast

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There's another part of the mental grammar that hearing babies start to learn well before they can speak. Remember from a previous chapter that the phonology of each language is specific to that language: the patterns of which features and segments contrast with each other and which are simply allophones is different in each language of the world. So, for example, we know from that in English, aspirated [pʰ] and unaspirated [p] are both allophones of a single phoneme. But in Thai, these two segments contrast with each other and are two different phonemes. The phonetic difference is the same, but how that difference is organized in the mental grammar is different in the two languages. Phoneme contrasts are a classic example of unconscious linguistic knowledge: in all likelihood, nobody ever had to teach you that [k] and [b] are different sounds and that the words *cat* and *bat* refer to two different animals! But if no one ever taught it to you, how did you learn it? How did the phonology of your first language come to be in your mental grammar? We saw one kind of habituation technique in the previous unit. Researchers use a different habituation method for slightly older babies.

How to be a linguist: Observing conditioned head turns This method works on the same kind of logic as the high-amplitude sucking method, but instead of measuring sucking strength, the researchers observe where the child looks. When the sound first starts to play from a speaker, the baby usually looks towards the speaker. Once they habituate to that sound, they get bored and look away. If the next sound that's played is the same as the first one, they stay habituated. But if the next sound is different and they notice the difference, they look back towards the speaker. So just like with the sucking method, if we observe that head-turn, we conclude that they noticed a difference between the two sounds.

Using this technique, linguists and psychologists have learned that babies are very good at noticing phonetic differences, and they can tell the difference between all kinds of different sounds from many different languages. But this ability changes within the first year of life. Janet Werker, at the University of British Columbia, looked at children and adults' ability to notice the phonetic difference between three different pairs of syllables: the English contrast /ba/ and /da/, the Hindi contrast between a retroflex stop /ʈa/ and a dental stop /t̪a/, and a Nłeʔkepmxcín contrast between glottalized velar /kʼi/ and uvular /qʼi/ stops (Werker & Tees, 1984). Each of these pairs differs in place of articulation, and within each language, each pair is contrastive. The researchers played a series of syllables and asked English-speaking adults to press a button when the syllables switched from one segment to the other. As you might expect, the English-speaking adults were perfect at the English contrast but did extremely poorly on the Hindi and Nłeʔkepmxcín contrasts.

Then Werker tested babies' ability to notice these three phonetic differences, using the head-turn method. These babies were growing up in monolingual English-speaking homes. At age six months, the English-learning babies were about 80-90% successful at noticing the differences in English, in Hindi and in Nłeʔkepmxcín. But by age ten months, their success rate had dropped to about 50-60%, and by the time they were one year old, they were only about 10-20% successful at hearing the phonetic differences in Hindi and Nłeʔkepmxcín. So these kids are only one year old, they've been hearing English spoken for only one year, and they're not even really speaking it themselves yet, but already their performance on this task is matching that of English-speaking adults. The difference between retroflex [ʈa] and dental [t̪a] is not contrastive in English, so the mental grammar of the English-learning baby has already categorized both those sounds as just unusual-sounding allophones of English alveolar /ta/. Likewise, the difference between a velar and a uvular stop, which is contrastive in Nłeʔkepmxcín, is not meaningful in English, so the baby's mind has already learned to treat a uvular stop as an allophone of the velar stop, not as a separate phoneme.

The research on babies acquiring signed language came later, but it showed exactly the same pattern (Baker Palmer et al., 2012). Babies younger than six months noticed the difference between phonemically contrastive ASL handshapes even without any exposure to ASL, just like the babies without Hindi experience noticed the Hindi spoken contrast. By age 14 months, ASL-acquiring babies had retained their ability to recognize phonemically contrastive handshapes, but the English-learning babies without ASL experience had lost that sensitivity.

So for either sign language or vocal language, a child's mind has built up phoneme categories in their mental grammar by about age one, according to the contrasts that they have experience with in their language environment. One thing to note here is that this

doesn’t mean that it’s impossible to learn new phonemic contrasts in a new language, but that later learning will be shaped by the learning that has happened in the first year. More on that in the next chapter!

Check your understanding

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11.4: Early language production

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Figure 11.2. Crying Babies.

We saw in the previous unit that babies are already learning a lot about their language even before they can talk. If they're learning so much so fast, why don't they talk right away? When babies are just born, their bodies just aren't ready yet. Newborns can certainly cry, which uses the lungs and the vocal tract. But a newborn's larynx is higher in the vocal tract than an adult's: it starts lowering around age six months. And newborns just aren't very good at controlling their bodies yet! It takes them a few months to begin to learn how to move their articulators. They begin to gain control of their fingers, hands and forearms first, and their ability to control their jaw, tongue and lips comes a bit later. So in those first few months after birth, their hand movements and vocal productions are kind of random: mostly wiggling and gurgling.

Babbling

Once babies start to get their bodies organized, their productions tell us that their mental grammars are starting to get organized, too. Starting around age six months, the sounds babies make begin to have some syllable structure. They start to produce reduplicated consonant-vowel syllables. Usually the vowel in these syllables is the low [a] made with the jaw fully open, and the consonants are usually voiced stops. Why voiced stops? They're still learning to control their vocal tract, so it's easier to alternate between fully open for vowels and fully obstructed for stops than to produce the consonants with partial obstruction like fricatives or approximants. Same thing for the voicing: if they just keep the vocal folds vibrating for vowels and voiced consonants, it's easier than alternating between voiced vowels and voiceless consonants. So the classic baby babbling sound, which linguists call **canonical babbling**, is [babababa] or [dadadada]. As they continue to grow and gain control of their muscles, they start to vary the vowels and consonants, and their babbles might sound more like [badibadi] or [ɡudaɡuda].

Vocal babbling starts at about age six months for both hearing and deaf babies, but deaf babies gradually produce less vocal babbling as they continue to grow. When the language environment is a signed language, babies start to babble using their hands. Both hearing and deaf babies who grow up with sign as an ambient language produce reduplicated syllables using handshapes from the language environment (Petitto et al., 2004; Petitto & Marentette, 1991). Sign-acquiring babies' first productions more often use the **proximal** articulators (the ones closer to the torso, like the elbows and wrists) than the **distal** ones (the articulators farther from the torso like fingers and knuckles) (Chen Pichler, 2012).

So we have some evidence that babbling isn't just random sounds: whether the language environment is vocal or sign, babies start to produce forms that are organized similarly to the language in the environment:

- Their babbles are made up of repeated patterns that have the structure of syllables.
- They alternate between handshape and path movement or between a closed and open vocal tract.
- Their babbles use a subset of the segments/handshapes that appear in the language environment.

So when you see or hear a baby babbling, it might look or sound like random nonsense, but what they're really doing is exercising their mental grammar!



Figure 11.3. Baby Bottle.



Figure 11.4. Balls.

When babies babble, they're practicing making the forms, that is, the signs or sounds of the language they're acquiring. Remember that a word links a form with a meaning. So how can we tell if a child who produces a form has a meaning linked to that form? In other words, how can we tell if they're babbling or producing words? We have to look at the context. If an English-acquiring child says [baba] when they're reaching for their bottle or for a ball then they're probably using that form to refer, so it counts as a word even though it doesn't have the same form that the adult word [bɑɾəl] or [bɑl] does. But if they're producing [baba] just for the fun of making the sounds, then their utterance is non-referential, – it doesn't have meaning, so it counts as babbling.

Babies acquiring sign languages often sign their first words at about age 0;8 or 0;9, while it's usually later than that for babies acquiring a spoken language, closer to age 1;0. This difference might be because babies develop muscle control of their hands and arms earlier than of their tongues and lips. It could also be because sign words more often have iconic forms than spoken words.

When children start to produce and understand words, the first words in their vocabulary are quite similar even when we compare across languages and modalities. Usually the first word meanings they acquire are for referring to things that are common and observable in the immediate environment, like names for their family members and pets, the word *baby*, and words for common objects like *milk*, *ball*, *shoe*. It's also common for their first words to include greetings like *hi* and *bye*, and other expressives like *uh-oh* and *no*. If there are verbs in their set of first words, the verbs are likely to refer to actions like *cry* or *eat*.



Figure 11.5. Pumpkin.

Of course, because one-year-olds don't have a lot of experience with the world yet, they often haven't got adult-like meanings in their mental grammar. For example, I know a toddler who saw a pumpkin for the first time and declared, "Apple!". If the child hasn't yet got a mental representation for pumpkins, gourds and squashes, they might well **overextend** the meaning of *apple* to include many other roundish fruits. It's also common for children's word meanings to be **underextended**, so, for example, the word *elephant* might refer to a particular stuffed animal but not to any other elephants, real ones or toy ones. In short, children develop meanings for words based on their experience of encountering the word in their environment.

Landau and Gleitman (1985) provide some very interesting examples of how children's word meanings are shaped by their experience of the environment, from their research comparing blind children to sighted children. You might guess that a blind child doesn't really have a concept for the verb *look*, since they can't see, but that's not actually the case. In one experiment, the researchers asked children to "look up!". Sighted kids tilted their heads to face the ceiling, even if they were wearing a blindfold. But when they asked a blind child, whom they called Kelli, to "look up", she kept facing forward and put her hands up toward the ceiling! So does that mean that Kelli's meaning for the verb *look* is the same as for the verb *touch*? In the next experiment, the researchers put an object in front of Kelli and said, "You can touch this but don't look at it." She tapped or stroked the object, and then once they told her, "Now you can look at it", she ran her hands all over the object to explore it. So just like sighted children,

Kelli's mental grammar had two distinct meanings for the two verbs *look* and *touch*. It's just that her meaning for the verb *look* was different from that of sighted children, since her experience of the world was different.

Check your understanding

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11.5: The Language environment and the so-called word gap

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We've seen all kinds of examples of how important the language environment is for young language learners. Hearing babies start learning the patterns of speech sounds from the environment even before they're born, and deaf babies start learning the patterns of sign language as soon as they get access to it in their environment. On a really simple, obvious level, the particular language that children acquire depends on the language that is in the environment. So it makes sense to wonder whether, for kids who are acquiring the same language, differences in their environments make a difference to their language development.

In the 1990s, Hart & Risley (1995) compared the English-language environments of American kids from different socioeconomic and racial groups, and reported what their book calls "staggering contrasts" between rich and poor families. The most-often quoted finding from their very influential study is the claim that, by the time they're three years old, children in poor families have heard thirty million fewer words than children in middle-class and affluent families. That phrase, the "30 million word gap", is used all over the place, and has led to all kinds of policy decisions and interventions to try to bridge the gap. There's been more research on the factors that lead to disparities in school performance, and more investment in early childhood education programs for low-income families.

But that catchy phrase has also led to a lot of stigma for low-income parents, since it seems to blame them for not talking to their kids enough. (Figueroa, to appear) Calling their reported difference a "gap" reinforces the stereotype of a neglectful parent who ignores their kids and lets them watch tv all day. And a closer look at Hart & Risley's data reveals that what they called a gap might be just a side effect of they way they counted words. In 2018, Sperry and colleagues (Sperry, Sperry & Miller, 2018) conducted a followup to Hart & Risley's study, but they used a different way of counting.

The 1995 analysis only counted words that were spoken by the mother directly to the child. They didn't count words spoken to the child by anyone else, and they didn't count words from conversations that happened nearby but weren't directed at the child. In other words, they used a measure for number-of-words that favours the way that white, middle-class, stay-at-home moms interact with their children. The other factor in their so-called 30-million word gap is that the affluent families they had studied were largely white, while the poor families were almost entirely Black. So in addition to income differences, there would also have been cultural and linguistic differences in the ways adults interact with children, which the analysis didn't account for.

In contrast, the authors of 2018 study argued that children can learn from language they overhear in the environment, not just from what adults speak directly to them, so they included more measures in their analysis. When they counted using the 1995 measure, that is, speech by the primary caregiver to the child, the 2018 researchers found no clear pattern that depended on socioeconomic status. And when they counted speech by all caregivers to the child – parents, grandparents, older siblings, aunties and uncles – they found that the households with the greatest number of words per hour were the poor Black families. The same was true when they considered all the language used in the environment, not just what was directed at the child. Here's what the researchers say about their findings:

> *"Not only did the Word Gap disappear, but also some poor and working-class communities showed an advantage in the number of words children heard, compared with middle-class communities. Our study also revealed a great deal of variation among communities within each socioeconomic stratum." (Sperry et al., 2018, p. 11)*

That last point is important: there's a ton of variation in how parents interact with their children. A recent meta-analysis (Anderson et al., 2021) found that the nature of the language environment does indeed play a big role in children's language development, but concluded that socioeconomic status was not a good predictor of what that language environment is like. In other words, whether you're rich or poor doesn't affect how much you talk to your kids!

This "word gap" controversy is a classic example of how scientists, including language scientists, can reach biased conclusions from supposedly objective quantitative measurements. Both studies used what seems like a pretty objective measure: the number of words spoken per hour. But the choice of whose words to count led the two research teams to quite different findings. So even the

decision of what to measure is not purely objective. The other issue here is that, if you're interested in researching the language environment, the number of words spoken per hour is maybe not the most important thing to observe. Language use isn't just about quantity, where more is better. Language is used in conversations, in relationships within communities that have specific cultural practices and expectations. So if we want to get a picture of the factors that support children's language development, it's a good idea to consider those complex relationships and communities too.

Check your understanding

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11.6: Understanding word combinations

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We've seen that babies start to learn the phonology of their first language very early — as soon as they're born and maybe even earlier than that! And they're starting to learn some lexical semantics before their first birthday. What about syntax? What do babies and young children know about the syntax components of their grammar? And how can we tell? We know that children start to speak or sign their first word around twelve months, and they start to combine two or more words around eighteen to twenty-four months. But if you've ever spent any time with young children, you know that they can understand a lot more than they can say! Their comprehension is often much more advanced than their ability to produce spoken or signed words. But comprehension is much harder to observe. How can we tell what babies and toddlers understand about language?

How to be a linguist: Observing Preferential Looking

One simple technique is called preferential looking. In this kind of experiment, researchers use a large screen or television. The baby or toddler sits strapped into a booster seat, facing the screen. The screen is split so that two different pictures appear, one on each side of the screen. While the pictures or are on the screen, a recorded voice speaks a sentence, maybe something like, "Look! Can you find the bear?" The idea is that if the baby understands the word *bear*, they're going to look at the picture of the bear, not the picture of the bus. The researchers keep track of the direction of the baby's head-turn, or they use eye-tracking to measure the baby's eye movements. This kind of experiment has shown that babies pretty reliably look at the named object by about ten months, and even as young as six months, they're looking at the named object more often than chance would predict. So at the age of six months, babies are already beginning to link up word forms with their meanings.

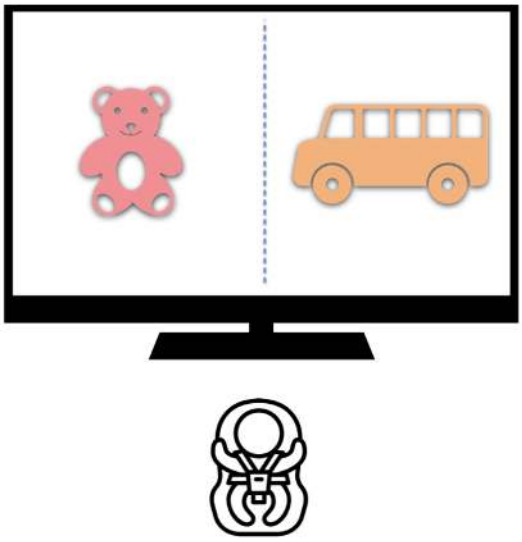


Figure 11.6. Preferential Looking.

We can use this technique to figure out what kids know about syntax if we use the split screen to display two similar scenes instead of pictures of a single items. I've just put a simple picture here, but researchers often use short videos. The two scenes involve the same participants, but in different configurations. In the images here, the one on the left shows the adult chasing the kid, while on the right the kid is chasing the adult. The recorded sentence that plays, "Look! The kid is chasing the woman!" matches only one of the scenes. So if children look towards the matching scene, does that mean they know something about syntax? Or are they just paying attention to the word meanings?



Figure 11.7. Preferential Looking.

Do you remember the idea of compositionality? It says that syntax matters for sentence meanings — the meaning of a sentence comes not just from adding together the meanings of the words, but also from the way those words are combined, that is, from the syntax. As adults, we know that the sentence, "the kid is chasing the woman" can only mean this one, the one on the right. But if kids were understanding the sentence just by paying attention to the meanings of the words, well both scenes would be plausible: after all, both scenes show a kid, both scenes show a chasing event, and both scenes show a woman. It turns out, though, that children as young as 15 months, just a little over one year, look more often towards the correct image or video (Hirsh-Pasek & Golinkoff, 1996). That suggests that they're not just adding together the meanings of the words in the sentence, but that they're also sensitive to the way those words are combined, to the syntax, because that's what distinguishes the kid chasing the woman from the woman chasing the kid. So kids who are just a little older than twelve months are already sensitive to syntactic constituent structure and its relation to meaning.

What else do young children know about syntax? Some experiments with young children don't involve screens, but actual toy items. In this experiment (Booth & Waxman, 2003), researchers introduced 14-month-old children to novel, made-up words, that the children would not already be familiar with. The experimenter presented small toys to the child and said, "These are blickets. This one is a blicket and this one is a blicket." So the child has a couple examples of what a blicket is. Then the experimenter presents two new toys, one of which is from the same category as the earlier ones — in this case, the category of animals — but in a different colour, and the other of which is the same colour, but from a different category.



Figure 11.8a. Blickets.



Figure 11.8b. More blickets.

When the experimenter says, “Can you give me the blicket?“, if the child reaches for the new toy of the same category, that tells us they’ve figured that *blicket* means animal. But if they reach for the same colour, they’ve concluded that *blicket* means pink thing. The 14-month-olds reached for the new animal of a different colour more often than they reached for the toy that matched in colour. But the pattern was reversed for children who heard a different syntactic frame. If the toys had been introduced with the new word in an adjective position, “These are blickish. This one is blickish and this one is blickish,” then when the experimenter asked, “Can you give me the blickish one?”, the children were much more likely to choose the one that matched in colour. These results indicate that when one-year-olds hear a new word in a noun position, they conclude that it has a noun-like meaning, and refers to a thing or a category of things. But if it’s in adjective position, then its meaning is probably something more like an attribute or property. In short, one-year-olds seem to be sensitive to the differences between syntactic categories.

There’s so much learning happening in that second year. Kids are learning new words very rapidly, and learning how words pattern in the morphological and syntactic behaviour. In fact, by the time they turn two, kids are sensitive to verb **arguments** and **subcategories** too! In another split-screen experiment (Arunachalam & Waxman, 2010), when experimenters presented the novel verb *mooping* in a transitive frame, like “The lady is mooping my brother,” then two-year-olds looked more often to the scene where one participant is doing something to the other, like pushing. But when the novel verb appeared in an intransitive frame, like “The lady and my brother are mooping,” then the children looked more often to the scene where the two participants are doing the same activity together, like waving.



Figure 11.9. Possible meanings for ‘mooping’

This suggests that, by age two, children are sensitive not only to syntactic categories, but also to subcategories! So to go back to the question we started with, “What do kids know about syntax?” It turns out the answer is that, even before children start combining words to make phrases in their own speech or signing, they already know quite a lot about how words combine in the grammar.

Check your understanding

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11.7: Syntax in early utterances

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Beginning at about age 1;6 to 2;0, most children start to combine words into phrases of two or even three words. At this early stage, their utterances are usually telegraphic[1], containing mostly content words like nouns and verbs, with few function words and few inflectional morphemes. It can be hard to figure out whether these short utterances have any syntactic structure to them. Let's look at some of the evidence.

Syntactic Categories

Even children's first short sentences give us evidence that their mental grammar has already grouped words into syntactic categories. In a couple of large **corpus** studies of children's utterances (Cazden, 1968; Maratsos, 1982), researchers looked for examples where the children had used a word in a way that violated its syntactic category, for example, if they had used a noun as if it were a verb. In over 200 hours of recorded speech, the researchers found almost no examples of children producing syntactic category errors. Here are a few of the examples they found:

- Mummy trousers me.
- I'm crackering my soup.
- I want to comfortable you.



Figure 11.10. Crackers.

I suppose these sentences are technically "errors". The word *cracker* is a noun in English but the child in this example has used it as a verb. But the grammar of English often allows verbs to be derived from nouns. For example, *salt* is a noun but there's also a verb form *to salt*, which means to sprinkle salt onto something. So the child who uses the same process to derive the verb *crackering* from the noun *cracker* is maybe not really making a mistake, but is actually using their grammar generatively.

So the evidence from these and other large corpus studies shows that syntactic categories are quite robust in English-acquiring children's grammars, even in their early utterances. They rarely use words in positions that would be ungrammatical in adult English, and their few productions that aren't adult-like give evidence of generativity.

Asking Questions

Corpus data (StromswoId, 1995) show that English-acquiring children start to ask questions not long after they begin combining words in their utterances. Simple questions like, "Where kitty?" and "Who crying?" are common in children's speech, with the wh-word moved to the beginning of the sentence just like in adult English. *Why* questions show up a little later, but as any parent of a preschooler will tell you, the *why* stage feels like it lasts forever!

This kind of question is a little harder to observe in sign-acquiring children's productions because there are several different grammatical ways to form them, but a careful analysis found that children produced wh-questions as young as age 1;7 in ASL and in Brazilian Sign Language (LSB) (Lillo-Martin & de Quadros, 2006).

For simple structures that are frequent in children's language, corpora are valuable for providing a large volume of data. But what about more complex structures like embedded clauses and questions? You could record an awful lot of hours of kid speech without ever capturing an example of a question with an embedded clause, but that doesn't necessarily mean that these structures don't exist in kids' mental grammar.

How to be a linguist: Elicitation

Researchers sometimes use puppets and toys to elicit sentences of interest from children, that is, to encourage them to produce a particular kind of sentence. Often this involves asking the child to ask the puppet something. For example, in an experiment

about embedded wh-questions, Rosalind Thornton had a bear puppet wearing a blindfold. While the bear was blindfolded, Thornton asked the child to choose small toys to hide inside a set of small boxes. Once each box contained one toy, she removed the bear's blindfold then asked the child to ask the bear to guess what was in each box. There are many different ways that children might form this question, but this elicitation context at least makes it likelier that they'll produce the wh-question of interest, whereas in a free play situation they're relatively unlikely to produce these complex questions.

Crain and Thornton (1991) were interested in whether children's grammars included questions where the wh-word originates was from an embedded clause, like these ones:

- Who do you think ___ will win the election?
- What did Lexi say she wanted ___ for lunch?

In these sentences, notice that the wh-word at the beginning of the sentence logically originates in a position inside the embedded clause: this becomes obvious if we compare the declarative versions of the sentences:

- You think someone will win the election.
- Lexi said she wanted something for lunch.

(If you need a refresher on how wh-questions are formed, look back at the Syntax chapter!)

Crain & Thornton used elicitation to try to get preschoolers aged three to five years to produce complex questions like these. The kids rarely produced adult-like examples questions, but their questions still revealed something interesting about their mental grammar. Some of the children in this study asked the bear puppet questions like these:

- Who do you think who wants to hug Grover?
- What do you think what's in that box?

While these preschoolers hadn't really mastered this complex structure, their utterances suggest that their mental grammar contains a structure that parallels that of adult grammar. They've moved the wh-word to the beginning of the question the way adults do, and they're also pronouncing that wh-word in its original position in the embedded clause.

Check your understanding

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1. Before the days of email, text messages, long-distance phone calls, if you needed to send an urgent message over a long distance you could send a telegram. You had to pay per word in the message, so you'd use as few words as possible. ↵

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11.8: Developing word meanings

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We've seen that young children are already developing quite sophisticated phonology, morphology and syntax. There's also evidence that kids have subtle semantic intuitions at a young age.

One Kind of Noun Meaning

We saw earlier that children's early meanings for nouns are often over- or under-extended. Their concepts become more adult-like as they get more experience of things and categories of things in the world. something something noun classes.

A previous chapter illustrated the difference between **count nouns** like *pencils* and *cookies* and **mass nouns** like *rice* and *money* and showed that different languages encode this meaning distinction using different morphosyntactic strategies. In English, singular count nouns must have a determiner, while plural count nouns can appear without one. Mass nouns, don't really allow a plural form, but are grammatical without a determiner in their singular form.

count nouns	**mass nouns**
I want a cookie.	*I want a rice.
*I want cookie.	I want rice.
I want cookies.	*I want rices.
I want three cookies.	*I want three rices.

These morphosyntactic properties are salient enough that English-acquiring children distinguish between count nouns and mass nouns very early in their productions. Researcher Peter Gordon looked at a corpus of speech from two English-acquiring children between ages 1;9 and 3;6 (Gordon, 1988). He found that even before age 2;0, these children rarely produce pluralized mass nouns. In other words, their speech included many pluralized count nouns like *dogs* and *balls*, but almost no ungrammatical mass plurals like *milks* or *sands*. They did, on the other hand, produce some singular count nouns without determiners (like "I want cookie"), because of the telegraphic nature of their speech. Their production of obligatory determiners for singular count nouns became reliable only after age 3;1.

The evidence from this corpus study suggests that the mass/count distinction is part of the syntax of English-acquiring children quite early. But how can we tell what meanings children associate with these two different syntactic patterns? One experiment (Barner & Snedeker, 2005) used objects like string that could be interpreted flexibly, with either a count or a mass meaning. The researchers showed children pairs of pictures like this one, which depicts a single pile of string on one side and several short pieces of string on the other.

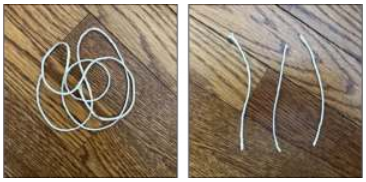


Figure 11.11. Two photos. A pile of tangled string on the left. Three short individual pieces of string on the right.

They asked the children one of two questions. and the results were clear: the four-year-olds nearly always chose the picture of several small strings when asked "Who has more strings?" and the picture of the single pile of string when asked "Who has more string?", showing that they had consistent mental representations of the two different meanings.

How to be a linguist: Puppets!

> By the time they've reached preschool age (around three years), children can answer questions that reveal how they understand words and phrases. To reduce kids' shyness and make the experiment feel like a game, many researchers interact with the kids using a puppet. In some experiments, the children "teach" the puppet something about language by pointing to certain pictures or toys in response to questions from the researchers. In others, the puppet describes a scenario using an ambiguous phrase that the researchers are interested in. The children's response to the puppet's phrase indicates what interpretation they've assigned to it.

In Mandarin Chinese, the semantic mass/count difference is not encoded morphologically but with classifiers. Classifiers are function words that indicate the semantic category of nouns. We can't get into the details here, but linguists have shown that some Mandarin classifiers correspond to count meanings and others to mass meanings. Chien et al. (2003) used a puppet experiment to observe children's interpretations of classifiers.

In the classifier experiment, children were told that a Mickey Mouse toy was just learning Chinese and needed their help asking for what he wanted. On each trial, there were three choices for what Mickey might have been asking for: two individual objects, such as a pencil or a hat, and one substance like rice. The experimenter then said a sentence of the form shown below.

Mǐqí shuō tā yào ___ *something*. Gàosù lǎoshī mǐqí yào ___ shénme.
Mickey says that he wants ___ something. Tell teacher what ___ Mickey wants.

In the part of the sentence shown as a blank, the experimenter spoke either a count-classifier or a mass-classifier. The sentences ended with a word the children didn't know (the English word *something*), so they had to use their understanding of the rest of the sentence to figure out what Mickey wanted. With three things to choose from, just guessing would have led to about 33% correct answers. But even the three-year-olds were about 60% correct in making a choice of object that corresponded to the classifier. Four- and five-year olds were even more accurate, with the six-year-olds reaching adult-like performance. The researchers interpret their results to indicate that the mass/count distinction is present in the mental grammar for Mandarin-acquiring children.

Some Kinds of Adjective Meanings

Recall from a previous chapter that gradable adjectives indicate some degree along a scale that depends on the context. For example, a five-year-old child is probably shorter than most adults, but it still makes sense to refer to that child as *tall* if they're tall relative to other kindergarteners. On the other hand, a non-gradable adjective like *wooden* doesn't suggest a scale and is, if not ungrammatical, definitely strange-sounding if we try to make a comparison out of it.

gradable	**non-gradable**
Zainab is tall.	This table is wooden.
Zainab is **very** tall.	#This table is **very** wooden.
Zainab is tall**er than** Xavier.	#This table is **more** wooden **than** that chair.

Do the mental grammars of young children represent these two kinds of adjective meanings differently? In an experiment investigating children's comprehension of gradable adjectives, Kristen Syrett and her colleagues (Syrett et al., 2010) asked children aged three to five years old to help teach a puppet how to ask for things. Each trial included two objects, and the puppet would ask for one of them. The child's job was to say whether they could give the puppet what he asked for, and if not, to say why not. Here's an example.

There are two plastic shapes on the table, one red circle and one blue circle. The puppet says, "Please give me the red one." Children as young as three years old pass the red circle on nearly every trial. But if there's one red circle and one red square and the puppet says, "Please give me the red one," then there's no single answer that's appropriate. In this case, even the three-year-olds behave the same way adults do. They don't just pick one of the red ones and hand it over; instead, they say something like, "But I have TWO red ones!" or "What red one?"

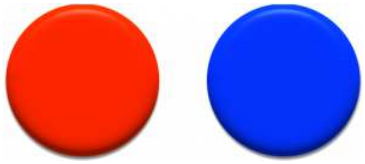


Figure 11.12a. A red circle and a blue circle.



Figure 11.12b. A red circle and a red square.

In the second part of the experiment, the researchers use this technique of having the puppet ask for something to see how kids interpret gradable adjectives. So instead of items that differ in colour or shape, they have pairs of blocks. In one condition, both blocks are big but one is bigger than the other. And in the other condition, both blocks are small but one is bigger than the other. The puppet asks, “Please give me the big one.”



Figure 11.13. Two large blocks and two small blocks.

If kids interpret the adjective *big* the same way they interpreted *red*, then we’d expect them to get stuck: the phrase *the big one* wants them to pick one block, but there are two big ones in the first case and zero big ones in the second case. But the kids don’t get stuck! In both conditions, they choose whichever block is bigger than the other and pass it to the puppet. This tells us that their interpretation of the gradable adjective *big* does indeed depend on the scale determined by the context. Even if both blocks are big, they interpret *big* to mean the relatively bigger one.

We can interpret the findings of this experiment to conclude that children’s semantics for gradable adjectives includes some measure of degree along a scale, and the scale they choose depends on the context in which the adjective is uttered.



Figure 11.14. A variety of buttons

Speaking of adjectives, Syrett (2015) used a similar technique to investigate a different element of adjective comprehension. This experiment used pictures rather than actual objects. First, children saw a picture of several different buttons, in various sizes, colours and shapes. The puppet pointed out the different shapes and colours. The next picture showed the buttons arranged into the outline of a shape. In the picture shown here, about thirty star-shaped buttons are arranged into the outline of a star.



Figure 11.15. Star-shaped buttons arranged in a star shape.

Then at the test phase, the children saw two pictures side-by-side. One picture showed triangle-shaped buttons arranged into a circle, and the other showed circle-shaped buttons arranged into a triangle.

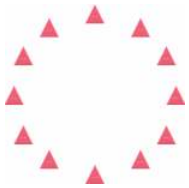


Figure 11.16a. Triangle buttons arranged in a circle.



Figure 11.16b. Round buttons arranged in a triangle.

The puppet asked the child, “Point to the round buttons.” Children more than three years old reliably pointed to the round buttons, not the triangular buttons arranged in a circle, and even two-and-a-half year olds chose the round buttons three quarters of the time. Syrett concluded that children know that a predicate like *round* applies to individual items, not to a group of items.

Looking at both these experiments together, we can see that children’s mental grammars have quite sophisticated representations for the semantics of adjectives: They have adult-like interpretations of context-dependent gradable adjectives, and they understand that adjectives used with count nouns apply to individual items.

Check your understanding

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11.9: Growing up bilingual (or multilingual!)

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There's a bias in the literature on children's language acquisition: a lot of it focuses on kids who are acquiring just one language, but monolingual kids are not the norm around the world. It is just as common for children to grow up with more than one language in the environment. Some children have one language in the home environment and another at daycare. In some families, one adult speaks one language and another adult speaks a different one. And some kids grow up in an environment where all the adults switch between two or three languages. In Canada and the US, where English has privileged status, it has been common for English-speakers to believe that being bilingual is a disadvantage, or even harmful! Bilingual kids were thought to be less intelligent and at greater risk for developmental delays and so-called "emotional disorders". Even today in Canada it's not unusual for a teacher or a doctor to advise parents who speak another language that they should speak English at home so their child doesn't get confused. This is also the kind of thinking that leads hearing parents of deaf kids to worry that if their child learns a signed language, it'll interfere with their acquisition of a spoken language. So is it risky for kids to be bilingual? Instead of opinions, let's look at the evidence.

Remember that children's mental grammars develop in response to input from the language environment: whatever language is used by the people around them, that's the language that a child learns. The amount of language input plays a role in kids' rate of acquisition. As we saw above, deaf children who don't have access to language input in a vocal language environment can't develop a mental grammar for that vocal language. And on a much smaller scale, an only child who is at home with one adult all day might not get a lot of language input and so might not show much language use until they start going to daycare where they get exposed to lots of language in the environment.

Let's compare the language environments of two hypothetical children. To make this example simple, let's say they're each awake for twelve hours a day, and as long as they're awake, they're exposed to language input. The child in the monolingual environment gets twelve hours of Language A every day. The child in the bilingual environments gets, say, six hours of Language A and six hours of Language B: they just don't get the same quantity of either language as the monolingual child does. So it takes a little longer for them to have encountered enough language to build up the mental grammar for each of their two (or more) systems. In other words, if you measure a bilingual child's language development in one of their two languages, they might be a little delayed relative to a monolingual child's development. Their vocabulary in the one language is a little smaller, and it takes them a little longer to reach the typical milestones in grammatical development (Hoff et al., 2011). But that's only if you compare the one language! If you compare the size of a bilingual child's vocabulary across both their languages, it's the same or even bigger than that of a monolingual at the same age (Hoff et al., 2014). So it's true that there's sometimes a slight delay in bilingual kids' development in each of their languages, relative to monolingual kids, when measured using the tests that are standardized for monolinguals.

But remember that language acquisition is not a race! Reaching a milestone a few weeks later than other kids needn't be cause for concern. There is a lot of variation between children and between language environments. Some research indicates that the delay is within the normal range of variation for monolingual kids, and some suggests that most bilingual kids catch up to monolingual kids in both their languages by about age ten. In that case, why would there be pressure on parents who have immigrated to Canada to speak English at home? If you think back to previous chapters, it probably has more to do with power and privilege than with children's development. The stigma associated with non-English languages and with so-called "foreign" accents also extends to children, which means that monolingual teachers and doctors sometimes perceive "problems" in bilingual kids that they don't notice in monolinguals.

So the evidence shows us that bilingual kids might have some slight delays in their language development, but these delays aren't harmful and the kids usually catch up with their monolingual peers eventually. The evidence also suggests that there are advantages to acquiring more than one language. A lot of research has looked at **executive function**, the set of mental processes that govern your attention and control your impulses. There is a body of evidence that suggests that bilinguals score higher than monolinguals on measures of executive function (Bialystok, 2009; Byers-Heinlein et al., 2017; Peal & Lambert, 1962). The idea is that, when you're bilingual, your mind is always busy suppressing one language in order to process information in the other language, and this

skill transfers to other areas where the mind needs to inhibit irrelevant information to focus on something. I should make it clear that there's a lot of argument among psychologists and linguists about these effects, because there are so many different ways of defining "bilingualism" and because so many other factors besides language contribute to executive function, but it seems to be the case that being bilingual is one of the factors that can support executive function. If you'd like to learn more about this debate, you might be interested in reading Valian (2015) for a useful summary.

Besides the executive function research, there's also evidence that acquiring more than one language shapes kids' expectations about people. Well before age 1;0, children tend to expect other humans to be cooperative: they show surprise (evidenced by longer looking times) when an adult is trying to reach an object and another adult passes them something different (Vouloumanos et al., 2014). If the adults in this scenario speak an unfamiliar language, 14-month-old bilingual children are still surprised: it seems that they expected the adults' speech to be communicating a message so they're surprised at the lack of cooperation. But monolingual children react differently: if the adults speak a language that's unfamiliar to the children, then the children don't show surprise when the adult is uncooperative, which kind of suggests they didn't expect that unfamiliar speech to be conveying any meaningful message (Colomer & Sebastian-Galles, 2020). There's also recent evidence that bilingual toddlers and preschoolers show less racial bias than monolingual kids on tests of implicit bias and of spoken word recognition (Singh, Quinn, et al., 2020; Singh, Tan, et al., 2020).

For families who immigrate, one of the most important benefits to raising kids bilingually is retaining the connection to older relatives. Whether or not bilingualism leads to executive function benefits or slight delays in vocabulary size, it's incredibly valuable for kids to be able to communicate and have a relationship with their grandparents. Overall, there's no evidence that growing up bilingual or multilingual does harm, while there is evidence that it can be beneficial, and it results in you knowing more than one language, which is pretty neat! If you're interested in knowing how to support families in maintaining children's bilingualism, Jürgen Meisel's (2019) book is useful for non-specialists.

Check your understanding

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11.10: Language milestones in the first two years

This table summarizes some of the typical language development milestones that children reach in the first two years of life. Remember, though, that language learning is not a race! Children vary immensely from each other, and with appropriate access to other humans using language, nearly every child will develop a mental grammar in due time.

Age	Babies can…
Before birth	respond differently to pregnant parent's voice than other voices (hearing fetuses only).
0;0	respond differently to prosody of pregnant parent's spoken language than to other language (hearing infants only).
0;6	notice differences in handshapes (sighted infants only) and speech segments (hearing infants only).
0;6	begin to produce rhythmic babbling with syllable structure.
0;9	produce first words (sign-acquiring babies).
1;0	categorize phonetically different segments into phoneme categories of the ambient language.
1;0	understand meanings of about ten common words.
1;0	produce first words (speech-acquiring babies).
1;2	interpret novel words differently depending on syntactic category.
1;3	assign compositional meaning depending on syntactic structure.
1;6	produce utterances of two or three words.
1;6	understand meanings of about 50 words.
2;0	interpret meanings for novel verbs depending on syntactic frames.
2;0	ask questions.

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11.11: Exercise your linguistics skills

Exercise 1. Here are some examples of utterances by young children reported by Bowerman (1988).

a. **Button** me the rest.
b. I don't want any more grapes. They just **cough** me.
c. I want to **comfortable** you.

In each example, the child has used a word (bolded) in a way that is unusual when compared to adult English grammar. For each example, describe the word's category and/or subcategory in adult grammar, then compare how the child's use of the word differs.

Exercise 2. Ambridge et al. (2006) conducted an elicitation experiment to observe preschool children's production of wh-questions. Here's an example of what the researcher said to the child:

- Mickey and Minnie are drinking something.
- I wonder what they are drinking.
- Ask the dog what they are drinking.

The children often responded with an adult-like sentence, such as, "What are they drinking?". But they sometimes made errors like these ones:

a. What they are drinking?
b. What are they are drinking?

Draw a tree diagram to represent the adult version of the question. Then compare the children's errors to it. How do the children's grammars, as evidenced by their errors, differ from the adult grammar?

Exercise 3. Imagine your cousin's young child starts kindergarten at age 3;10. Before starting kindergarten, the child has spent half-days in an English-language daycare, and the rest of their time at home with their parents and grandparents, where the adults most often speak Farsi. At the first parent-teacher interview, the teacher points out that your cousin is behind the other children on some of the typical milestones, and advises the parents to start speaking English at home. What power structures are at play in this advice? What biases does the teacher have? What advice could you give to your cousin, informed by what you know about language acquisition and about power and privilege?

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CHAPTER OVERVIEW

Chapter 12: Adult Language Learning

Learning Objectives

When you've completed this chapter, you'll be able to:

- discuss the ways that learning a language as an adult differs from acquiring a language from birth,
- understand some of the motivations and challenges of learning an additional language,
- identify processes that are typical of learning any language as an adult,
- predict how an adult learner's first language can affect their learning of an additional language.

Many linguistics students know more than one language – in fact, the metalinguistic awareness that goes along with bilingualism, multilingualism, or language learning is often what attracts learners to linguistics in the first place. While Chapter 11 considered how humans acquire language from birth, this chapter examines how we learn a language after the first one.

12.1: Adults are not children

12.2: Motivations for adult language learners

12.3: Gaining proficiency

12.4: Cognitive processes in language learning

12.5: Learning a New Modality

12.6: Learning Phonetics and Phonotactics in a Later Language

12.7: Learning Phonemes and Allophones in a Later Language

12.8: Exercise your linguistics skills

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12.1: Adults are not children

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In many Intro Linguistics textbooks, this chapter would be titled *Second Language Acquisition* (SLA), which is also the common name for the subfield of linguistics that studies adult language learning. The label **SLA** encodes an assumption that the typical learner is proficient in exactly one language — the first language, which was acquired "natively" — and that the subsequent language is therefore the second one. That assumption is quite narrow, given that about one-third of people in the world use two different languages regularly, and many of those people use three or more languages (Wei, 2007). A similar assumption is embedded in academic programs that require credit in a "foreign" language: foreign to whom? These terms reveal the Anglocentrism of the field by implicitly assuming that a typical learner speaks English as their first language and learns something other than English, that is, something foreign, as their second language.

The same assumption is contained within in the label *English as a Second Language* (**ESL**), which highlights the otherness of those who learn English in adulthood. Some teachers of English to adults use terms like *additional language* or *other language*, which don't encode quite the same assumptions. And so-called foreign languages are now sometimes referred to as *world languages*. As we learned in Chapter 2, there are few, if any, truly neutral terms for discussing human differences. In this chapter we'll use the terms **L1** or **first language** for any language learned from early childhood, even if the learner acquires more than one at once, and **later language** for any language learned after the first one(s).

In fact, that's one key difference between learning a first language and learning a later one: you already have one mental grammar when you start acquiring another one. In a later unit we'll consider how the grammar of your L1 influences the grammars of your later languages. The other key difference is that adults are different from children.

Cognitive and Linguistic Differences

As the previous chapter showed, language learning is not usually difficult or effortful for young children. As long as they're in an environment where they have access to language used by adults, they'll learn it pretty quickly. One reason it's so easy for little ones is because of their **neural plasticity**: their brains are super-keen to make new connections in response to their experiences. The older you get, the harder it is for your brain to grow new neural pathways, so the harder it is to learn new things. It's not impossible by any means, it just takes more effort!

On the other hand, adults have some advantages over children. We have metacognitive skills we can apply consciously to language learning, such as memorizing new vocabulary and morphology, choosing to study a little bit each day, or seeking out books, movies, podcasts or other media in our new language. We also have metalinguistic awareness that we can employ. For example, we can consciously practice placing our articulators in new positions, or we can compare and contrast the syntactic structures in our new language with those from our L1.

Socioemotional Differences

Another factor that can make language learning harder for adults than for children is our self-consciousness. Learning a new language usually involves interacting with other people, including other people who are more proficient than us. If you're adult who's used to being seen as competent, it can be embarrassing to feel like a beginner and to make mistakes.

Like the field of Linguistics as a whole, the subfield of Second Language Acquisition is often narrowly focused on grammar, especially on acquiring phonetics, morphology and syntax. This approach to teaching and learning is related to colonial ways of thinking that treat language as an object or asset that can be acquired in isolation from people, communities, and relationships (Czaykowska-Higgins et al., 2017; Lukaniec & Palakurthy, 2022; MacKenzie et al., 2022).

But as we've been learning throughout this book, language is not just a collection of structural properties! Chapter 2 showed that our language use is interwoven with our emotions and identities. And unlike babies developing an L1, adult language learners bring all kinds of cultural knowledge, traditions, expectations and, yes, emotions to our language learning, which we may or may not be consciously aware of. The next unit will look at these socioemotional factors in more detail .

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12.2: Motivations for adult language learners

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It wouldn't make sense to think about the motivations of infant language learners: they can't help learning whatever language they have access to. In contrast, adult language learners may have any number of different reasons to learn a language, and their motivations affect the ways they learn.

Migration, Employment, and Education

As we saw in Chapter 2, many employers in Canada expect their employees to be proficient in English. If you immigrate to Canada for work or for school, you have a pretty clear economic motivation to learn English. Unfortunately, the common approaches to teaching English to adult learners are often built on standard language ideologies with racist and colonialist assumptions. Such classes frame English as a fixed asset contained in textbooks. In their analysis of ESL classes, Swift argues, "the language that students saw and heard seemed to be designed to represent prescriptive norms (sometimes to the point of hyper-formality/correction) rather than believable examples of real-life practice." (2022, p. 317). In these contexts, the teacher is the ultimate arbiter of correctness, and as Ramjattan (2019b) shows, white people are perceived as better teachers than people of colour.

Rosa & Flores (2021) point out that a prescriptivist approach to teaching ESL is usually intended benevolently. The underlying reasoning is that adult learners, often people of colour who have immigrated, need to learn standardized forms of English so they can have workplace success and be included in mainstream society. But this logic is flawed: we know from Chapter 2 that listeners' perception of a "foreign" accent in English is influenced by the speaker's appearance as much as by their speech (Babel & Russell, 2015) and Ramjattan (2019a) reminds us that employers disguise their racial discrimination by cloaking it in terms of accent. Rosa & Flores sum it up this way:

> *"even when marginalized people within these contexts engaged in linguistic practices that seemed to correspond to mainstream standards, they continued to be perceived as deficient and in need of remediation." (Rosa & Flores, 2021, p. 1164)*

In other words, even so-called "perfect" English – that is, English that matches the prestige standard – is often not enough to escape raciolinguistic stigma. A growing body of literature considers how ESL teachers might embrace variation in English and resist stigmatizing their students' language practices. If you're interested in language teaching, maybe you'll be interested in working towards social justice in an ESL class!

Cultural Enrichment

Rather than employment, your primary motivation for learning a later language might be for intellectual or cultural enrichment. The idea is that your worldview can be expanded by learning about a culture other than your own. There might be the incentive of international travel, an exchange or a semester abroad. The languages taught and learned in this context used to be labelled as *foreign languages*, with the unspoken implication that anything not English is foreign. These days you more often see the terms *international languages* or *world languages* to refer to languages other than English.

Regardless of the label, curriculum and teaching materials for this kind of later language learning tend to assume that the learner is a white speaker of English. Anya (2021) showed that the curriculum for college Spanish in the USA systematically excluded Black learners in several ways: not only were African-American cultural occasions and news stories disregarded, but even the Spanish vocabulary for describing people's appearance did not include appropriate terms for African descendants. Black students in these classes felt that learning Spanish was irrelevant to them.

You can see from the dates of the research I've mentioned here that the field of adult language learning is only recently beginning to grapple with the racist assumptions embedded in its practices. If you're learning a later language, maybe you can challenge some of those assumptions in your own class. Or if you go on from studying linguistics to become a language teacher, maybe you can work to incorporate racial and social justice into world language learning!

Community Connection

The languages spoken by Indigenous peoples in North America don't usually fall into the category of "world languages" because of their particular status. As we saw in Chapters 1 and 9, the colonial Canadian government engaged in systematic and often violent efforts to eradicate these languages and assimilate their speakers into the colonizers' white English-speaking society. This is why learning the languages of their Nations is vitally important for many Indigenous adults who did not have the opportunity to learn their language as children. Learning it as an adult allows them a connection with their Elders' stories and teachings. Many strive to gain enough proficiency so that their children can learn their language at home, in childhood: this is one of the best means of ensuring that the language continues to be used.

Ferguson and Weaselboy (2020) explain eloquently how many Nations' traditional teachings about culture and about the Land are thoroughly embedded within each Nation's language. They argue, "Land must be experienced through Indigenous language in order to fully appreciate those layers of meaning and appreciate the nuances of what sustainable relations are within that Indigenous culture." (2020, p. 3) Jenny Davis discusses the ways that people working to reclaim Indigenous languages embed their work in "the robust geographic, linguistic, spiritual, and social dynamics of languages" (Davis, 2017, p. 49); she describes these strategies as a means of **survivance**, blending survival of the language with resistance to colonial oppression.

One of Wesley Leonard's language reclamation activists expressed this idea of the rich connections between language and community by taking about morphology. In the myaamia language, the verb that means "to speak a language" is a **bound morpheme**. One myaamia speaker pointed out that the verb *–aatawee–* "can't stand alone; we have to attach it to the people" (Leonard, 2017, p. 30)

Because Canadian universities are by and large founded on Euro-Western colonial ideals, a typical university course is not necessarily the most effective or appropriate venue for adult learners of Indigenous languages. Czaykowska-Higgins and her colleagues (2017) describe how the language programme at the University of Victoria strives to be "responsive to the needs and directions expressed by First Nations community partners, and by doing so, to support the empowerment and self-determination of those communities." (2017, p. 142)

One way that adult learning of Indigenous languages might differ from other later language learning is the specific barriers that Indigenous learners may encounter. In Chapter 9, Mary Ann Corbiere and David Kanatawakhon Maracle both talk about the fact that there simply aren't many opportunities for learners to practice their languages, because there are few speakers and few materials like books, reference grammars, and curriculum resources. And McIvor (2020) points out that Indigenous learners often carry multi-generational trauma specifically about their languages, because of their or their relatives' experiences of violence in colonial schools.

On the other hand, some Indigenous language learners also report substantial benefits to their mental and physical health as they gain proficiency in their language. For example, Oster et al. (2014)'s quantitative analysis of 31 First Nations in Alberta showed that the Nations with higher language proficiency had lower rates of diabetes. Similarly, in an analysis of First Nations in British Columbia, Hallett et al. (2007) found that the communities with the highest numbers of speakers of the language had the lowest suicide rates among youth.

Of course, it would be too simple to interpret these results to mean that grammar leads to good health. Instead, these quantitative measurements align with what Indigenous Elders and experts say about the deep connections between their languages and the traditional cultures of their communities. One of the participants in Oster et al.'s interviews of members of the Piikani Blackfoot Nation and Ermineskin Cree Nation explains it this way:

> *"Elders always speak of the importance of our language. Who we are is determined through our language. We speak our language and that determines where you come from, what your culture is, and even how we used to go with the different seasons in terms of following those traditional paths. Regardless of where you go, if you have that language our culture is in there… So once you lose that, what do you have left? Because our beliefs come from that in terms of how we govern ourselves. It comes in terms of how we eat, and*

> *in terms of how we educate ourselves and conduct ourselves in that full circle." (quoted in Oster et al., 2014, pp. 3-4)*

And Gisele Maria Martin, a Nuu-chah-nulth learner quoted by McIvor (2020), says it even more simply and eloquently. She says:

> *"I have found a part of my soul that was missing. I just feel so grateful. I feel like it's one of the biggest, most meaningful things I've ever done in my life." (quoted in McIvor, 2020, p. 89)*

How's that for motivation? Reclaiming your language might mean finding part of your soul.

Check your understanding

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12.3: Gaining proficiency

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Learning a language as an adult is a lot of work! It takes a huge amount of effort and practice to construct another grammar in your mind. Many later language learners often feel like they never quite reach the level of fluency they'd like. Given everything we've learned about language so far, do you think that notion of "fluency" is maybe a little problematic? Who decides what counts as fluent? What level of proficiency in a later language is enough to count as proficient or fluent?

As we saw in the previous sections, adult language learning is deeply intertwined with the issue of language standards. Recall from Chapter 1 that a standardized variety of a language isn't any better than other varieties: it's just the variety that has higher social status, and has more grammar books and dictionaries associated with it. Language teachers usually understand their job to be helping adult learners meet the standard. In fact, the government of Canada publishes standards, known as **Benchmarks**, for English and French proficiency. (Citizenship and Immigration Canada, 2012; Citoyenneté et Immigration Canada, 2012) These benchmarks define, in a lot of detail, what counts as Basic, Intermediate or Advanced proficiency in listening, speaking, reading and writing the two official languages. Likewise, the American Council on the Teaching of Foreign Languages publishes Proficiency Guidelines (ACTFL, 2012) with five levels, the two highest of which are *Superior* and *Distinguished*. The value judgment is right there in the name!

As soon as you label some language users as "superior", you're automatically implying that some other users are "inferior", aren't you? It's easy to see how the accent prejudices we learned about in Chapter 2 arise. It's a short leap between perceiving someone as an inferior language user and viewing them as an inferior human.

The notion of fluency is even more complicated for Indigenous languages. On the one hand, many learners want to use their language in a way that is consistent with the traditional, ancestral form. On the other hand, a language that is in regular use inevitably changes over time (see Chapter 10). Megan Lukaniec is working with archival documents to reawaken Wendat, the language of her Nation, the Huron-Wendat. She describes the tension this way:

> *"In the case of reawakening dormant languages, since there are no speakers to learn from, there is simultaneously a pressure to remain as true as possible to the language as it is found in the archival documentation and a freedom to forge a new path for the language and its emerging speakers."*
> *(Lukaniec & Palakurthy, 2022, p. 347)*

Wesley Leonard, a citizen of the Miami Tribe of Oklahoma, is likewise working to reawaken the Tribe's sleeping language myaamia. While his work relies crucially on the archival documentation by non-Indigenous linguists, he points out the irony that the documents themselves represent yet another reenacting of colonial power, arguing, "part of colonialism entails socially dominant groups asserting the right to determine what counts as valid knowledge". (Leonard, 2020, p. e285) In other words, the definition of fluency or proficiency in myaamia, and many other Indigenous languages, depends on how colonial linguists have documented and defined the grammar of the language.

To add one more dimension to this complicated notion of proficiency, standardizing documents can also be useful in the work of learning and teaching Indigenous languages. Some language-learning programs like the Kanyen'kéha school Onkwawenna Kentyohkwa, use benchmarks like ACTFL's Proficiency Guidelines or the *First Nations Language Benchmarks* (Johnson, 2013; Miller, 2004) as goals for learners to work towards.

As we saw above, different learners have different goals and motivations for learning a language as an adult. Maybe your goal is to read scholarly work, to watch a film without subtitles, to have conversations with your relatives, or to pass a test. Maybe standardized benchmarks will help you reach that goal, and maybe they won't. Whatever your goals are, you're the one doing the work of learning a new language, so you get to decide what counts as proficient for your purposes. If you've learned enough to watch that film or talk to your aunties, then you get to call yourself proficient!

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12.4: Cognitive processes in language learning

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So far we've focused a lot on the social side of adult language learning. This section considers the psychological side: what cognitive processes occur when you're learning a later language? Just like in L1 learning, the overall goal is to construct a mental grammar for the language. What has to happen for the mind to arrive at a useable grammar?

One crucial ingredient seems so obvious that we might even overlook it: a language learner needs **input**: they need to see the language signed or written, or hear it spoken. The more input, the better, but input isn't just about quantity – the learner also needs the input to be used communicatively, so that the mind links the forms of the language (the signs, sounds, words and phrases) with a meaningful message.

There's quite a lot of debate in the literature as to whether the patterns of a later language are learned from overt instruction, or unconsciously from the language input. Researchers in this subfield often contrast **declarative** knowledge with **procedural** knowledge (Levelt, 1989; Paradis, 2009; Ullman, 2005). Declarative knowledge consists of things you know explicitly, such as your postal code, how to do laundry, or how to get to your Linguistics classroom on campus. On the other hand, procedural knowledge is unconscious – it's the kind of knowledge that allows you to recognize your sibling even if you haven't seen them in months, or to shift your weight so you don't lose your balance when you're climbing stairs. (In the Exercise section at the end of this chapter, you'll think about which parts of your grammar are declarative knowledge and which are procedural.)

Regardless of whether your mind is learning the grammar implicitly or explicitly, the input is only useful if your mind can process it. When you first start learning a language as an adult, you can probably only pay attention to a small part of the input. Here are a couple examples of languages that are probably unfamiliar to most of you:

- a user of Auslan (Australian Sign Language) describing an event happening in Melbourne in January 2022 [YouTube video], and
- a user of Kaurna (an Indigenous language of South Australia) introducing himself on the radio [Audio at First Languages Australia].

Unless you know some Auslan or some Kaurna, you probably can't make much use of the input: you can't recognize individual words or morphemes, and maybe you can't even tell where words begin and end. What these two examples illustrate is that an adult learner's **intake** is often considerably less than what's available in the **input**. Your mind can only construct a grammar from its intake: the language input that it actually processes. And it can only process a limited amount at a time because your **attention** and **working memory** have a finite capacity.

Because processing constraints limit the intake a learner can obtain from the input, many adult learners' early grammars consist disproportionately of content words, rather than function words or inflectional morphemes. When you're trying to understand or express a certain idea, the semantic content of nouns and verbs gives you more crucial information than, say, conjunctions or tense morphemes!

Limitations on processing capacity also affect how adults **produce** the language they're learning. When adult learners of signed languages are starting to sign, they tend to make systematic simplifications in their utterances. The most common articulation errors are in handshape, especially in signs produced with two hands, and all the more in signs where the two hands move independently (Marshall, 2020; Ortega & Morgan, 2015). Notice that these errors happen even though adults usually have a fully developed motor system: it's not that the learners haven't yet mastered the control of their articulators, it's that they haven't yet mastered the complex phonology of the language they're learning.

For both comprehension and production, gaining proficiency in a later language involves moving from conscious, effortful processing to rapid, automatic processing. And that takes practice – lots and lots of practice. The only way to build up robust neural pathways in the brain for the new grammar is to use the language. At first, an adult learner's grammar is likely to include a lot of memorized phrases. To develop a grammar that can be used productively, generatively, you'll want to practice using the language in complex, naturalistic settings, not just the structured dialogues of a classroom (Götz, 2013).

Interlanguage

When you're learning a later language, there's a period during which you have some degree of competence in producing and understanding, but your grammar is still quite different from that of an L1 user. This not-yet-fluent grammar is called **interlanguage** (Selinker, 1972), and some researchers have argued that interlanguages have a lot in common with each other, no matter what your L1 is, and no matter what later language you're learning (Klein & Perdue, 1997). The idea is that the process of learning a later language is similar across many languages because the human mind is similar.

This interlanguage phase has some interesting consequences when it comes to speech accents. A team of researchers in Chicago worked with international students who had just arrived in the USA to begin graduate programs (Bent & Bradlow, 2003). The students had arrived from many different countries and spoke many different languages as their L1. The researchers asked these adult English learners to record a set of simple English sentences, and had some L1 English speakers do the same. Then they mixed the sentences with white noise, played them back to a variety of listeners, and asked the listeners to write down what they heard.

For each talker, the researchers calculated an **intelligibility** score. The word *intelligibility* sounds like it refers to some objective, acoustic measure of speech clarity, but in this case what it means is how many errors listeners made in writing down what a talker said. If listeners make few errors, you have a high intelligibility score, and if listeners make a lot of mistakes, your intelligibility score is low.

The obvious prediction is that that the L1 English speakers would have the highest intelligibility scores. And that was partly true: for L1 English listeners, the L1 English talkers were the most intelligible. But that was not the case for the later learners! When the listeners were adult learners of English with L1s as diverse as Bulgarian, Dutch, Greek, Hindi, Spanish, and many others, the late-learning English talkers were more intelligible than the L1 English talkers! Bent and Bradlow (2003) called this effect the "interlanguage speech intelligibility benefit" (2003, p. 1608). They argue that, because the effect was observed even when the talker and listener had unrelated L1s, the benefit is probably not due to similarities in the L1s, but due to shared experience in learning English as a later language – in other words, the talker and listener probably have some common properties in their **interlanguage**.

Check your understanding

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12.5: Learning a New Modality

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One of the biggest differences between first language learning and later language learning is that, when you start learning a language as an adult, you already know at least one other language! The mental grammar of your L1 can influence the mental grammar that you're developing in your later language: this is called **transfer** (Weinreich, 1953). If the grammar of your L1 includes a structure that's similar to your later language, your learning might be facilitated by **positive transfer**: your mind can transfer that part of your L1 grammar and apply it to your later language.

But if the structures in the grammar that you're learning are different from those in your L1, then you might experience **negative transfer** (also known as **interference**). In this case, the grammatical knowledge from your L1 could make it more difficult to learn the structures of your new language. And of course, you might experience both positive and negative transfer to your new language from various elements of your L1 grammar.

Suppose the new language you're learning also has a new modality. Maybe your L1 is spoken and the new language you're learning is signed. You might think there wouldn't be much transfer from one grammar to the other, but there's evidence that, for adult learners of signed language, **iconity** can have both positive and negative transfer effects in their developing grammar.

Iconicity

A word's iconicity has to do with the similarity between the form and the meaning of a word.

For a lot of words, the relationship between form and meaning is entirely arbitrary. For example, the word for the vegetable that's called *onion* [ʌnjən] in English is *Zwiebel* [tsvibəl] in German and *κρεμμύδι* [kɾɛmydi] in Greek. There's nothing particularly oniony about the spoken forms of any of those three words: the connection between the sounds and the meaning is **arbitrary**.

But some words have a form that isn't totally arbitrary; instead it has some iconic relationship with the word's meaning. In spoken languages, we sometimes observe iconicity in the forms of words that refer to sounds. Here are some examples from Japanese (Dingemanse et al., 2015)

[koɾo]	コロ	a small light object rolling in a single circle
[koɾokoɾo]	コロコロ	one or more small light objects rolling around continuously
[ɡoɾo]	ゴロ	a large irregular object rolling in a single circle
[ɡoɾogoɾo]	ゴロゴロ	one or more large irregular objects rolling around continuously

These words illustrate two elements of iconicity: the reduplication of the form iconically represents the repetition of the sound, and the the distinction between voiceless [koɾo] and voiced [ɡoɾo] represents the difference between a small, pleasant sound and a loud, rumbly noise.

Iconic forms are more common in signed languages than in spoken languages because the visual modality allows many elements of word meaning to be represented visually (Taub, 2001). Consider, for example, the words for beard in British Sign Language (BSL), Turkish Sign Language (Türk İşaret Dili) and Icelandic Sign Language (Íslenskt táknmál). The three signs are all different from each other, but all three of them iconically represent the shape and location of a beard.

Iconicity affects signed language learning

For fluent signers, high iconicity facilitates word recognition and word production in both ASL (Thompson et al. 2009) and BSL (Vinson et al. 2015). But for later learners of signed languages, the effects of iconicity are more mixed.

In one study (Marshall & Morgan, 2015), adult learners of BSL were asked to describe scenarios where two objects changed location. (For example, at first a ball is in front of a pen, and then the ball is moved behind the pen.) These learners made plenty of mistakes when signing their descriptions, but most of their mistakes were in the handshape, which is an arbitrary component of the sign. They almost never made mistakes in the location or orientation of the signs, which iconically represent the location and orientation of the objects. So in this study, the iconicity of the location and orientation parameters facilitated the learners' productions of phrases that referred to spatial relationships.

On the other hand, iconicity can also interfere with adults' learning. Ortega & Morgan (2015) asked beginner BSL learners to watch videos of individual signs then imitate each sign as accurately as possible. The researchers coded the accuracy of the learners' productions. Unsurprisingly, the learners were less accurate at imitating signs that were more complex. But for the signs with the greatest complexity, the learners signed iconic words much less accurately than arbitrary ones. The researchers offered a couple possible explanations for this surprising result.

Maybe the iconicity of the signs made it easier for learners to remember their meanings, so they paid less attention to the forms and were therefore less accurate in signing them. On the other hand, it's possible that the existence of an iconic non-language gesture interfered with learning the iconic sign. For example, after seeing a video of the sign for write, the learners did not imitate the BSL handshape, but instead used a gesture that imitated their handshape and movement when actually writing.

It's clear from these results that beginner signers are transferring some of their existing, iconic, non-language knowledge to their learning of a signed language. Sometimes that transfer facilitates their learning, and sometimes it interferes. In the next couple sections we'll look at other ways that existing knowledge transfers to a learner's developing grammar for their new language.

[self-test]

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12.6: Learning Phonetics and Phonotactics in a Later Language

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If your first language is a spoken language, you've had a lot of practice at articulating the speech sounds in your **phonetic inventory**: the set of segments that are present in the grammar. For example, most varieties of English have somewhere around 25 consonants and a dozen or so vowels. That's a lot of vowels, compared to many other languages, so learning to articulate English vowels can be particularly challenging for adult learners of English.

In contrast, Hawaiian, the Indigenous language spoken in the Hawaiian islands, has only eight consonants and five vowels. And on the other end of the spectrum is Adyghe, one of the Circassian languages spoken in Russia and Türkiye. Adyghe has only three vowels, but (depending on the dialect), between 50 and 60 consonants, including 18 different plosives, ten affricates, and 24 fricatives!

If the language you're learning includes segments you haven't yet learned to articulate, you might make a substitution with a segment from the phonetic inventory of your L1. If you have a name that isn't English, you've probably had the experience of English-speakers making substitutions in your name. For example, the Hebrew name *Baruch* [baɾʊx] ends with a velar fricative [x], but English speakers often pronounce it with a velar stop instead [baɹuk]. Likewise, the Tamil name *Kavitha* [kaviṯa] has a dental stop in the onset of the last syllable, which English speakers often turn into a flap [kəviɾʌ] or into a dental fricative [kəviθʌ].

Another challenge for adult learners comes from your L1 **phonotactics**. Phonotactic constraints are restrictions in the mental grammar on what sounds can appear in what positions, and what syllable structures are possible. For example, the velar nasal [ŋ] is part of the phonetic inventory of English, but it never appears in the onset of a word, only in coda position, like in *lung*, *tank*, and *singer*. The phonetic inventory of Vietnamese also includes the velar nasal, but it's grammatical in onset position, like in the very common surname *Nguyen* [ŋwɪn] and the word *nghe* [ŋɛ] which means *listen*.

Phonotactics also constrain the possible syllable structures in a grammar. In Chapter 3 we learned that English can have a whole lot of consonants in syllable onsets and in syllable codas – consider the word *strengths*, [strɛŋkθs] which has three consonants in the onset and four in the coda! English also allows much simpler syllables, like *nice* [naɪs], or *odd* [ɑd], and even syllables with nothing in the onset or coda, like *eye* [aɪ].

But some languages have much tighter phonotactic constraints on their syllable structure. When you're learning a later language, you often adapt the shape of the words to fit the phonotactics of your L1. Likewise, when a language borrows words from another language, the **loanword** gets adapted.

A famous example comes from Hawaiian, which has only two possible syllable structures: a syllable can have either one or zero consonants in its onset, no coda consonants and no consonant clusters. So when Hawaiian borrows the two-syllable English word *Christmas* [krɪs.məs], there's a lot of adaptation to do.

The only position a consonant can occupy is the onset, and onsets can't have more than one consonant. So the [krɪ] from English becomes [kali] with the [l] substituting for English [r] and [i] for English [ɪ]. Then the [s] from the coda of [krɪs] gets a substitution and its own syllable to become [ki]. The [s] from the coda of the second English syllable [məs] becomes another onset, and result is that the Hawaiian adaptation of the English word *Christmas* is [kalikimaka].

Besides loanwords, English speakers also tend to adapt proper names to conform to English phonotactics. For example, when English speakers are talking about visiting the Polish city of Gdańsk [ɡdaj̃sk], they usually epenthesize an extra [ə] between the first two consonants, because [ɡd] isn't a grammatical onset in English. Or when English borrows the German name *Pfeiffer* [pfaɪfɐ], the plosive [p] at the beginning gets deleted because [pf] isn't a possible onset.

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12.7: Learning Phonemes and Allophones in a Later Language

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In Chapter 11 we learned that babies have set up the phoneme categories of their L1 by the time they're only twelve months old. So by the time you're an adult learning a new language, those phoneme categories are pretty deeply embedded in you mental grammar. Psycholinguist Catherine Best has proposed a theory, called the Perceptual Assimilation Model (Best, McRoberts & Goodell, 2001), that predicts which phoneme contrasts will be hard for adult language learners, and which will be easy. The theory centres around the concepts of phonemes and allophones.

Best predicts **positive transfer** for phoneme contrasts happens if the new language has a phoneme contrast that maps onto a contrast in the adult learner's L1. In this case, the new phoneme contrast should be easy to learn. She also predicts that it should be easy to learn a new contrast in the case where there's no transfer at all: if the new language has contrastive phones that don't exist at all in the learner's L1, then the learner can set up two new phoneme categories from scratch.

The situation that leads to **negative transfer** arises when two contrasting phonemes in the later language map onto a single phoneme category in the learner's L1. In this case, the learner will have spent a lifetime treating the phonetic difference as allophonic variation, and not a meaningful contrast, so it's a challenge to learn to pay attention to the difference as meaningful.

Best and her colleagues (Best, McRoberts & Sithole, 1988) tested this theory by investigating how English-speaking adults learn phonemic contrasts in Zulu. Zulu is a language that has about 27 million speakers, most of them in South Africa. First, researchers asked the English-speakers to notice the difference between voiced and voiceless lateral fricatives [ɬ and ɮ] in Zulu. English doesn't have lateral fricatives, but English does have lots of pairs of fricatives that contrast in their voicing, so the theory predicts that it should be easy for English listeners to map the voicing difference between the Zulu fricatives onto those English voicing contrasts and recognize this phonetic difference. And that prediction was upheld: The English listeners were about 95% correct.

Then they asked the English speakers to tell the difference between three Zulu clicks: a dental [ǀ], an alveolar [ǃ], and a palato-alveolar [ǂ] click. English doesn't have any clicks at all, so the English listeners should be able to simply pay attention to the phonetic differences between these segments, without any interference from their English phonology. The English listeners were about 80% correct at these sounds.

Last, they asked the English listeners to notice the difference between two different kinds of bilabial stops in Zulu: the plosive stop is similar to the English [b] sound. The other is an implosive [ɓ], which is made by obstructing airflow at the lips, but when the stop is released, air flows into the mouth instead of out of the mouth. The English adults were not much better than chance at hearing this difference.

These results are consistent the predictions of the Perceptual Assimilation Model: Because the English listeners have only one phoneme category for voiced bilabial stops, their mental grammar simply treats the implosive as an allophone of the plosive. It's difficult for the adult learners to hear the phonetic difference between the two sounds in their new language because the mental grammar of their L1 categorizes both segments as members of the same phoneme.

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12.8: Exercise your linguistics skills

Exercise 1.

The phonetic inventory of French includes a pair of tense and lax high, front, rounded vowels [y] and [ʏ], as illustrated in the following words:

[lʏn]	*moon*
[tʀʏk]	*thing, trick*
[lynɛt]	*glasses*
[tʀyke]	*to rig or falsify*

These two vowels are not part of the English phonetic inventory. What substitutions are L1 English learners of French likely to make when they pronounce these words? Explain the reasoning for your predictions.

Exercise 2.

German includes the following phones:

- the voiceless post-alveolar fricative /ʃ/, which contrasts with
- a phoneme that has two allophones: voiceless velar fricative [x] and voiceless palatal fricative [ç].

Given what you know about English phonology, how easy or difficult will it be for an L1 speaker of English to learn this contrast in German? Explain how you arrived at your conclusion.

Exercise 3.

Think about your mental grammar in your L1. Consider the phonetics and phonology, lexicon, morphology, syntax, semantics and pragmatics. What parts of your language knowledge would you classify as declarative knowledge? What parts are more like procedural knowledge?

Now think about any language you've learned later than your L1. Would you classify the parts of your grammatical knowledge in your later language the same ways?

Exercise 4.

Think about your experience of learning a later language. What parts of your L1 grammar led to a positive transfer to your later language? What parts of your L1 created a negative transfer to your later language? Consider phonetics and phonology as well as morphology and syntax.

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CHAPTER OVERVIEW

Chapter 13: Psycholinguistics and Neurolinguistics

Learning Objectives

When you've completed this chapter, you'll be able to:

- Describe several important experimental methods in psycholinguistics and neurolinguistics,
- Support claims from theoretical linguistics using experimental evidence, and
- Explain why the field of linguistics is viewed as a part of cognitive science.

In this chapter, we will explore experiments in psycholinguistics and neurolinguistics that give us information about the way language works in the human mind. We will show how experimental evidence can support the concepts in linguistic theory introduced in the previous chapters.

13.1: The mind makes language

13.2: Evidence for phonemes as mental categories

13.3: Evidence for language-specific phonology

13.4: Evidence for 'top-down' effects of word knowledge on perception

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13.1: The mind makes language

Linguistics is a part of the field of **cognitive science**. The hypotheses that we have developed in this book about important linguistic elements, like phonemes, morphemes, phrase structure etc. are in some sense really hypotheses about how the human mind represents language. A classical view of cognitive science holds that the mind has symbolic representations, and operations that transform these representations. Connecting this larger framework to linguistics, we can think of our mental grammars as the means by which linguistic representations (like our phonemes, morphemes etc.) are transformed. For example in spoken languages, a *phoneme* is encoded into the appropriate *phone* according to the phonological rules of the language prior to being spoken.

Sometimes, the intuitions of native speakers provide enough evidence for the importance of a particular linguistic element or rule as a part of the mind's capacity for language. But sometimes linguists are interested in different kinds of evidence for these important concepts in linguistics, or they want to know how the important concepts are deployed during language production or comprehension. **Psycholinguistics** is an interdisciplinary field in which researchers devise experiments to test hypotheses about linguistic representations and processes in the human mind. Psycholinguists normally use behavioural methods, for example measuring how quickly someone can make a decision about a word after seeing it on a computer screen (we will explore this particular method later in the chapter). In this chapter we will focus on the relationship between psycholinguistic findings and linguistic theory, but psycholinguists also propose and evaluate theories of mental processes like language production and comprehension.

As a basic assumption, we will assume that the human mind has a biological basis in the brain. **Neurolinguists** conduct similar research to psycholinguists, but with a focus on figuring out how language as a cognitive system is organized and implemented in the biology of the human brain. They use experimental methods from cognitive neuroscience as well as examining disorders of language that arise from problems in the brain, for example following a stroke or other brain injury. Neurolinguists may be interested in evaluating linguistic theory, but also have neurolinguistic theories in their own right, similar to psycholinguists.

The fields of psycholinguistics and neurolinguistics are too vast to be summarized in one chapter of one book. So in this chapter, we will focus on experiments that provide further evidence for some of the important concepts from earlier chapters. We will also highlight some of the key experimental methods used in these fields.

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13.2: Evidence for phonemes as mental categories

In Chapter 4, you learned that every human language has a phonology, but that the phonology of each language is distinct. For example, two sounds that are allophones of a single phoneme in one language might be separate phonemes in another language. The conclusion that we reach, then, is that each language has its own way of organizing speech sounds into a phonological system. This system is part of the mental grammar of a speaker of that language. In this section, we will examine some evidence from psycholinguistic and neurolinguistic experiments that provide further support for phonology as something that the mind and brain do.

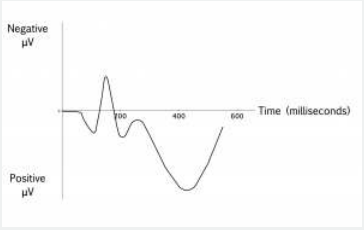
Chapter 4 defined a *phoneme* as the smallest unit in a language that can create contrast, such that exchanging one phoneme for another can create a minimal pair. The English words *pat* (/pæt/) and *bat* (/bæt/) differ only in the initial phoneme (/p/ or /b/), but have different meanings. This makes them a *minimal pair*, and the fact that we can make a minimal pair shows us that /p/ and /b/ are separate phonemes in English. Another way of thinking about phonemes is to say that a phoneme is a mental category of speech sounds (signed languages also have categories that permit variation, so this isn't something special about spoken language). It was also noted in Chapter 4 that English voiceless stops like /p/ are produced with aspiration (written [p^h]) at the beginning of a stressed syllable. But the difference between an aspirated and unaspirated voiceless bilabial stop ([p^h] vs. [p]) cannot create contrast in English. This is because [p^h] and [p] are two variants of a single phoneme. When a speaker of English hears either [p^h] or [p], the mind of that speaker maps the sound onto the same category /p/. Of course there are many other languages that treat [p^h] and [p] as separate phonemes, for example Hindi and Thai.

We can make conclusions about the categories a speaker of a given language has in their mind by doing phonological analysis. We can look for minimal pairs, for example, or try to characterize the phonological environments in which a given speech sound appears. But in this chapter we are exploring the idea that these categories are exist in the mind and brain of a speaker. We might ask then, can we find evidence that our brains map sounds to the category they belong to. In other words, we might ask whether our brains treat sounds that vary a little bit in their acoustic qualities as the same, because they are examples of one phoneme.

One group of researchers (Phillips et al., 2000) looked for this kind of evidence by examining whether our brains show a 'surprise' response to a new sound that is in a different phonological category to the others.

How to be a linguist: The use of electro/magneto-encephalography in linguistics

You have likely seen visual representations of electroencephalographic (EEG) recordings in medical or scientific settings. These look like wavy lines and are recordings of electrical activity from electrodes placed on the surface of the scalp. The overall character of the wavy lines varies depending on a number of factors, for example whether the person whose scalp is being recorded is awake, asleep, or having a neurological problem like a seizure. Psycholinguists, however, are typically interested not in these overall differences but in very small changes in the electrical field generated by the brain in response to a stimulus. These are called Event-Related Potentials, or ERPs. To compare ERPs to different stimuli, researchers must typically collect a number of responses from one participant, and collect responses from a number of participants. In the end, an average response to a stimulus might look something like the following:



Sample averaged ERP wave from a single electrode.

Notice that in this diagram, negative electrical potentials are plotted up; this is merely a convention in this type of research. The horizontal axis represents time, beginning at the time the stimulus is presented to participants.

Several decades of research into Event-Related Potentials have shown that there are characteristic brain responses to, for example, seeing a printed word on a computer screen or hearing a spoken word of a vocal language. Researchers have shown that ERPs are sensitive to, for example, whether a word is expected versus unexpected in a sentence (see e.g., DeLong, Urbach

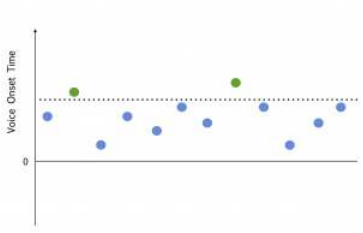
and Kutas 2005), or when it is an ungrammatical continuation of a sentence versus a grammatical continuation (see e.g., Friederici, Hahne and Mecklinger, 1996), etc.

ERPs are a useful source of information to psycho- and neurolinguists because they record the brain's activity with high *temporal resolution*: they record the brain's responses as they are happening with timing accurate down to the millisecond. However, although differences in ERPs can be found at different electrode locations on the scalp, typical ERP studies cannot tell us very much about where in the brain the critical response is happening. In other words, its *spatial resolution* is poor.

Another method that, like EEG, has excellent temporal resolution is magnetoencephalography (MEG). This method examines changes in the magnetic field generated by the brain (which is of course related to the electrical field). The main advantage of MEG over EEG is that MEG allows researchers to draw better conclusions about where in the brain the response of interest originated.

Previous research in ERPs had shown that there is a measurable brain response to auditory stimuli (sounds) that stand out from the rest. For example, if you have people listen to tones, where most of the tones have an identical frequency but a small proportion have a different frequency, the tones in the minority are associated with a specific brain reaction that gets called the **Mismatch Negativity**: Mismatch because the tone mismatches what is normally heard, and negativity because the measured brain reaction is a negative-going wave in the measured electrical signal. The Mismatch Negativity can be measured even if a person is not really paying attention to the sounds, for example if they are watching a silent movie during the experiment (see Näätänen and Kreegipuu, 2012 for a review findings regarding the Mismatch Negativity).

Using magnetoencephalography (MEG), Phillips and colleagues (2000) asked whether presenting stimuli that had the structure in terms of phonological category, but importantly not in terms of a mere acoustic difference, would elicit the MEG version of the Mismatch Negativity, called the Mismatch Field. The specific contrast they examined was a voicing contrast – whether a sound would be categorized as /dæ/ or /tæ/. The difference between these two comes down to a difference in the time between the release of the stop consonant and the beginning of voicing the vowel, or the Voice Onset Time. Critically, speakers of English perceive a /t/ sound when Voice Onset time is above about 25ms, and a /d/ sound when it is below – the switch is sharp rather than gradual. But within those categories, the millisecond value of VOT can vary. Take a look at this figure. Each dot represents one syllable sound, with the vertical axis representing Voice Onset Time. You can see that there is a variety of Voice Onset Times in the diagram. None of them would stand out in particular if we hadn't marked the perceptual boundary between /ta/ and /da/ with a dotted line. The green dots represent sounds that would be identified as /ta/ and the blue dots as /da/. This diagram shows that the important many-to-one relationship isn't there when considering acoustic values only. But from a phonological point of view, there are a lot of sounds in the /d/ category and only a couple in the /t/ category.



Syllable sounds that vary in Voice Onset Time. The dotted line represents the perceptual boundary between the phonemes /da/ and /ta/. Green dots represent syllables likely to be identified as /ta/, and blue dots represent syllables likely to be identified as /da/.

By presenting their participants with sounds that varied in their millisecond value of VOT, but where only a small subset crossed the boundary to be perceived as /t/, Phillips et al. were able to test whether a mismatch effect would occur at the phonological level. This is because the critical many-to-one relationship that leads to a Mismatch Negativity only existed at the phonological level, not at a purely acoustic level. Phillips et al. found a phonological Mismatch Negativity, and they further showed that this effect originated in a part of the brain that processes auditory information. The fact that the Mismatch Negativity was present in this part of the brain shows that the brain processes phonological contrasts quite 'early' in perceptual processing, before other brain areas more typically associated with language processing get involved.

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13.3: Evidence for language-specific phonology

In Section 13.2, we examined some evidence that the part of the brain that processes auditory information is sensitive to phonological categories. Critically, in the study by Phillips and colleagues (2000), the participants were English speakers who have separate /t/ and /d/ phonemes as a part of their mental grammar. We could expect that for a speaker of a language that doesn't have that distinction, the pattern of brain reactions could be quite different.

Researchers have studied how a person's native language could influence their processing of vocal language. For example, Marslen-Wilson and Lahiri (1991) asked whether Bengali speakers and English speakers would process nasal and non-nasal vowels differently. Both English and Bengali have nasal vowels, but the nasal/oral distinction is only phonemic — in other words it can only create contrast — in Bengali.

For example, the English word *ban* is typically pronounced with a nasal vowel ([bæ̃n]) because of a phonological process called nasalization. The vowel becomes nasal because of the influence of the upcoming nasal consonant /n/. The vowel in *bad* is not nasalized because /d/ is an oral consonant. So in English, nasal vowels are predictable based on the phonological environment they are in: before a nasal consonant, the vowel is nasalized, and elsewhere the vowel is oral. Therefore, [æ̃] and [æ] are variants — *allophones* — of one phoneme.

Bengali also has a rule nasalizing vowels before nasal consonants, but is different from English in that having a nasal versus an oral vowel is not completely predictable based on the phonological environment. For example, Bengali has the minimal pair /bãd/ (which means 'dam') and /bad/ (which means 'difference') that differ only in the nasal/oral status of the vowel /a/ and yet have different meanings. This means that in Bengali, /a/ and /ã/ are separate phonemes.

Marslen-Wilson and Lahiri showed that this difference in the phonemic status of nasal and oral vowels between English and Bengali has an influence on how speakers of these languages recognize spoken words. Before we get to their experiment, let us introduce some background about spoken word recognition and their experimental method, the **gating task**.

Spoken words unfold over time. The human mind doesn't wait for a word to be over before recognizing it, but rather activates potential matches from the very beginning of hearing the word. Upon hearing the first sound of a word, there will be a large number of potential matches. This number will get smaller and smaller as more of the word is heard, because potential candidates will be ruled out. For example, imagine that a listener hears the word *report* (/ɹipoʊɹt/). The first phoneme, /ɹ/, is compatible with lots of words: *report*, *red*, *reach*, *robot*, etc. Once /i/ is heard, then *red* and *robot* would be ruled out because they are no longer compatible with the input. The set of all potential matches that overlap with the beginning of a word up to a given point is called an **onset cohort**. One influential model of spoken word perception, the Cohort Model (see Marslen-Wilson & Tyler, 1980) claims that members of the onset cohort of a word become active during the hearing of the word, but that the activation for a potential match drops off once the evidence is no longer compatible with that word.

At a certain point in each spoken word, listeners (on average) will be able to correctly identify what the word will be. This is called the **recognition point** for that word. One way to determine a word's recognition point is through an experimental method called a **gating task**. In the gating task, a recording of a word is presented to experimental participants in progressively bigger fragments. After hearing a fragment of the recording, participants are asked to guess what the word is, perhaps by writing down their guess. As you might imagine, these guesses become more accurate as the fragments become longer. Eventually a particular fragment length will provide enough information to reach a threshold where most people correctly identify the word, so the end of that fragment can be said to be the word's recognition point.

Marslen-Wilson and Lahiri asked whether a listener's knowledge of the phonology of their native language would influence their ability to recognize words as they unfold. They found that English listeners could identify whether a word was *ban* or *bad* before they heard the last consonant, because the nasal or oral quality of the vowel helped them predict what the upcoming consonant would be. Bengali listeners, on the other hand, needed more information before identifying a word with a nasal vowel, leading to a later recognition point for those words. This is presumably because, in Bengali, a word with a nasal vowel could end in a nasal consonant, like /n/, or an oral consonant, like /d/. Bengali speakers do not use the nasal or oral quality of the vowel to predict the upcoming consonant because, in their mental grammars, nasal and oral vowels are separate phonemes.

Further language-specific phonological knowledge has been found using ERPs and again, the Mismatch Negativity. Dehaene-Lambertz and colleagues (2001) asked whether sequences of syllables would be processed similarly by speakers of languages with

different **phonotactic constraints**. Remember from Chapter 4, Section 4.2 that languages have restrictions on what syllables they allow. In Japanese, for example, nasals are the only consonants allowed at the end of a syllable – oral consonants cannot be syllable codas, in other words. English and French, however, allow a variety of consonants in coda position. So what happens when a Japanese speaker listens to sequences of syllables that have an illegal coda consonant?

Following up on earlier work by Dupoux and colleagues, Dahaene-Lambertz et al. presented French native speakers and Japanese native speakers with fake words like *igumo* and *igmo*. The first one, igumo, is possible with either Japanese or French phonotactics because it can be split i.gu.mo (here I have used '.' to indicate a syllable boundary). The second one only fits the phonotactics of French. The sequence /gm/ is not a good syllable onset in either language, so the only potential syllabification is ig.mo. This is a possible word of French but not Japanese, because it has the a /g/ as a coda consonant.

In their experiment, participants listened to sequences of fake words while the electrical signal from the surface of the scalp was recorded (EEG). The participants heard one word several times, which was then followed by either the same word again, a word that differed only the presence or absence of /u/, or a completely different word /igimo/. They found that for the cases that differed only in the presence of /u/, French speakers indicated that the last word in the sequence was different from the rest, whereas Japanese speakers largely thought they were the same. The brain's response echoed the responses – the French speakers showed a response that can be interpreted as a Mismatch Negativity for the 'deviant' items but the Japanese speakers did not. So why would the Japanese speakers not notice a difference between /igmo/ and /igumo/? One interpretation of this finding is that because /igmo/ doesn't fit with the phonotactic constraints of their language, Japanese speakers mentally insert a vowel to correct the illegal coda. In other words, Japanese speakers "hear" /igumo/ rather than /igmo/. So our mental grammar can influence the way we perceive speech.

This experiment is part of a body of evidence demonstrating that our knowledge of the phonology of our native language, as a part of mental grammar, has an influence on how our brains process language.

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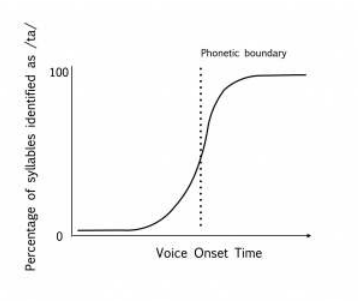
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13.4: Evidence for 'top-down' effects of word knowledge on perception

The preceding sections provided evidence for how a speaker's knowledge of the phonology of their language can influence the way they perceive speech. In this section, we will see that a speaker's knowledge of the words of their language also has an influence on the way language is perceived. In particular, we will focus here on ways in which a speaker's word knowledge has an influence on the speech sounds that they hear.

The first example comes from an influential experiment by Ganong in 1980. Remember from Section 13.2 that the difference between a voiced stop like [d] and a voiceless stop like [t] is the stop's Voice Onset Time, or in other words the time between the release of the stop closure and the beginning of the following vowel. Many years of research have shown that although Voice Onset Time is a continuous variable – it can take on any millisecond value – listeners perceive a sharp boundary between speech sounds like [d] and [t]. So in an experiment that presents participants with different values of Voice Onset Time and asks them to indicate whether they heard [d] or [t], you would get nearly all [d] responses below a threshold and nearly all [t] responses above that threshold, with only a small area of uncertainty in the middle. This figure shows a typical pattern found by experiments that vary Voice Onset Time in increments. Below the boundary between [d] and [t], nearly all participants would identify the sound as [da]. Above the boundary, the responses would be all or nearly all [ta]. There is only a short window around the boundary where responses are not all one way or the other.



Graph showing a typical pattern found in phoneme identification tasks. This particular graph does not show real data, but rather an idealized pattern.

This pattern is called **categorical perception** and holds for a variety of phonetic continua other than Voice Onset Time as well. Categorical perception was initially thought to reflect phonological knowledge, but subsequent studies provided evidence against that interpretation. For example, categorical perception is found for contrasts that are not a part of the phonology of a listener's language, for babies who have not had sufficient time to tune their mental grammar to the phonology of their language, and even for non-human animals, who we presume do not have human-like phonology (see Kuhl and Miller, 1975, for a study on chinchillas). This is why, in this section, we use the square bracket notation for [d] and [t].

Building on the robust findings of categorical perception, Ganong examined whether presenting sounds on a continuum from [d] to [t] as a part of words would influence participants' perception of the sounds. In particular, words were chosen such that at one end of the continuum, the word was a real word of English (e.g., *dash*), while at the other end, the word was pronounceable but not a real word of English (e.g., *tash*). The critical hypothesis was that listeners might be more likely to categorize a sound that was intermediate between [d] and [t] as the sound that would create a real word. This is what Ganong found. When a sound near the threshold was presented as part of *Xash*, where X represents the critical stop consonant, it was more likely to be perceived as *dash*; (the real word of English) rather than *tash* (which is pronounceable but not an English word). When the same sound is presented with *Xask*, it would be more likely to be perceived as *task* (a real word of English) rather than *dask*. So people's knowledge of words of English influenced which speech sound they heard, even when the acoustic signal is the same. This finding, which now gets called a **Ganong effect,** is an example of a **top-down** influence on perceptual processing. We call information that flows to the brain from the outside world through sensory surfaces, like the vibration of the inner ear or an image on the retina, **bottom-up** information. It is no surprise that bottom-up information has an influence on processing, as it couldn't really be any other way. What we call top-down influences are cases where our knowledge, for example our knowledge of words, has an effect on perceptual processing. In this chapter we have seen several ways in which our knowledge of language has an influence on the way we process linguistic input from quite early stages of perception.

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CHAPTER OVERVIEW

Chapter 14: Historical Linguistics

Learning Objectives

When you have completed this chapter, you will be able to:

- Explain that language change does not, overall, affect the complexity of language.
- Demonstrate that language change often has complex effects and occurs cyclically.
- Explain how the methods of historical linguistics can be used to demonstrate and document the historical relationships between and within languages
- Analyze and classify language changes according to their type and cause, using technical terminology

Language is always changing. Many people find it inherently interesting to discover historical connections and common origins between words and grammatical structures. But studying language change can provide us with more than just interesting connections. The kinds of change that occur can also tell us a lot about the nature of language. For example, many kinds of language change happen in cyclical patterns. This indicates that there is not an overall trend towards simplification or complexity, but rather that the range of variation in human language is somewhat stable. We cannot travel back in time to see how people used to speak, but in this chapter we will discuss some of the ways that languages have changed, and also what kind of evidence we use to figure it out.

People sometimes have strong opinions about the effects of language change, and advocate for the older, ‘pure’ version of a language. But how far back do we have to go to find the ‘pure’ language? Is 100 years enough? How did that compare to the language from 1000 years ago? The fact of the matter is that, just like different dialects aren’t necessarily any better or worse than each other, neither are different historical stages of a language. Language changes occur in systematic ways that compensate for each other and preserve overall the level of complexity and expressiveness of language.

14.1: Why do languages change?
14.2: Lexical change
14.3: Phonological change
14.4: Morphological change

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14.1: Why do languages change?

A need for change

Consider the English sentence in (1):

(1) I found a new app for my phone that I read about on a life hack blog.

This sentence would be readily understood by many users of English in the early 2020s, but just 30 years earlier, it would have been very difficult for anyone to decode it, because some of the expressions used here did not exist or did not have the same meaning in the 1990s. In the following discussion and throughout the rest of this chapter, all etymological information for English is from the *Oxford English Dictionary Online* 2023, unless otherwise noted.

For example, the word *app* as a short form of *application* had just started being used, but it was only used for computer programs. Smartphones were still very new, and *app* was not yet used to refer to programs for phones, since the very concept of installing programs on phones was not widespread. Online journals existed, but they wouldn't be called *blogs* until the late 1990s. And the term *hack* had long been used to refer to infiltrating computer systems, but it would not be combined with *life* to refer to cleverly modifying one's routine activities until the 2000s. If we go back even further in time, this sentence would essentially be uninterpretable.

The sentence in (1) demonstrates one important pressure that can cause a language to change. The world around us is constantly changing, with new technology, cultural shifts, and growing scientific understanding, and we want to be able to talk about those changes. We could just use cumbersome descriptions, but the more common a concept is, the more likely we are to dedicate or adapt specialized terminology for it for more efficient communication. No one wants to keep saying *clever modification to routine activities* when they could get by with the much shorter expression *life hack*.

Variation and change

Changes in the world around us are not the only reasons that a language might change. As discussed in Section 2.5 and Chapter 10, languages naturally vary, and different linguistic variants can carry different social meanings. However, while variation may be stable over time (see Section 10.3), any given instance of sociolinguistic variation could eventually collapse, leaving older forms obsolete and forgotten, while the newer forms are now considered unremarkable rather than socially meaningful.

For example, to describe the construction of a new house, speakers of English in the 1600s would have said either *the house is building* or *the house is in building* (as depicted in Figure 14.1, left). But by the 1700s, a new variant had emerged, with some speakers saying *the house is being built* instead (Figure 14.1, centre). This new variant was looked down upon by the educated elite at the time, who viewed it as "clumsy" and "at war with the genius of the English tongue" (Marsh 1862: 461–465).

However, the newer form has now replaced the older forms, overcoming the prescriptive pressure against it, so that it no longer has any negative perception (Figure 14.1, right). Instead, the older forms are now the forms that would be out of place. Today, *the house is building* could only mean that the house is somehow building some other structure, while *the house is in building* just seems ungrammatical.

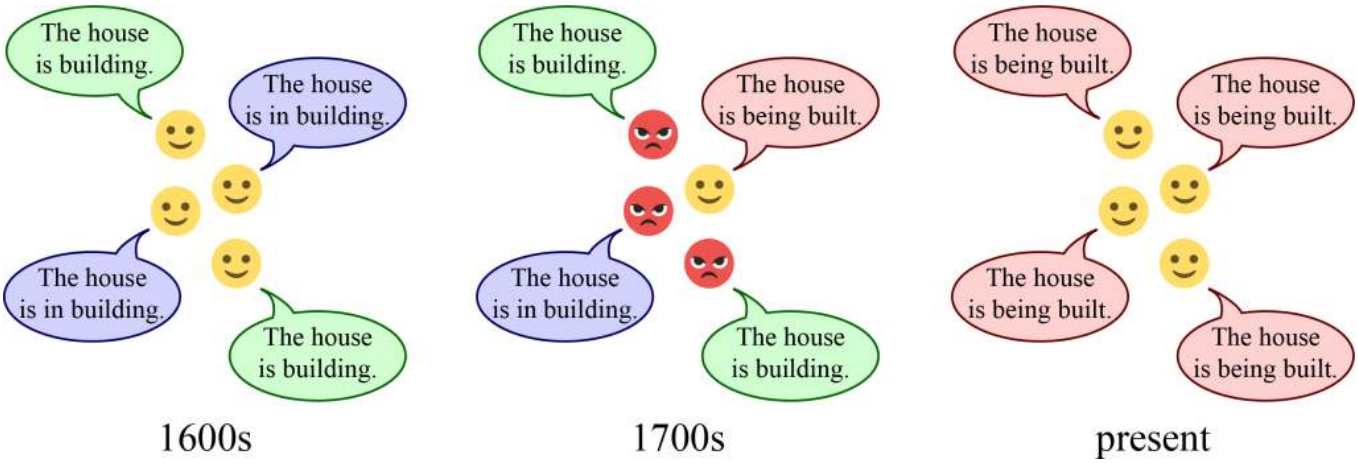


Figure 14.1. Representation of change over time in the relative usage of **the house is building**, **the house is in building**, and **the house is being built**.

Much of the discussion is this textbook has focused on **synchronic** linguistics, which is the study of language patterns at a single point in time, such as how *the house is being built* is grammatical right now. In this chapter, we turn to **diachronic** linguistics, which is the study of changes in language patterns across two or more points in time, such as how *the house is in building* used to be grammatical in English 500 years ago but is no longer grammatical today.

Historical periods in a language

As changes in a language build up over time, the language may become sufficiently different that it is convenient to use distinct labels for its historical forms. The terms **Old**, **Middle**, and **Modern** may be added before a language name to indicate different periods in a language's history, as in the following periods of the history of English (Baugh 1951):

- **Old English** (AD 450–1150): The beginning of Old English corresponds to the earliest known English writing, which was mostly short runic engravings (names, greetings, prayers, graffiti, etc.) dated to the 400s. One of the most notable pieces of Old English literature is the epic poem *Beowulf*, of unknown authorship and date (but the earliest surviving manuscript is the Nowell Codex from around 1000).
- **Middle English** (1150–1500): Due to influence from Norman French after the Norman conquest of England (1066), as well as from Old Norse after hundreds of years of Scandinavian invasions during the Viking Age (800–1150), English vocabulary and grammar underwent significant changes. There was also much regional variation in Middle English. One of the most notable pieces of Middle English literature is the collection of stories *The Canterbury Tales* by Geoffrey Chaucer, published shortly after his death in 1400.
- **Modern English** (1500–present): A key feature of the transition from Middle to Modern English is the Great Vowel Shift, which drastically changed the pronunciation of English vowels beginning in the 1400s (see discussion in Section 14.3). This was unfortunate timing, because the spread of printing in English in the late 1400s helped standardize the written form long before the Great Vowel Shift was completed around 1700. The result is a significant divergence between spelling and pronunciation. Notable early pieces of Modern English literature include the works of Williams Shakespeare, which were written from about the 1590s to the 1610s.

Sometimes **Early** and **Late** are also added before the name of a historical period of a language to make finer distinctions within that period when needed. For example, because Modern English spans almost 600 years, it is often useful to distinguish between Early Modern English (such as Shakespearean English) and Late Modern English (the English used in this textbook), given how different they are.

Note that this terminology is typically used only for **attested** languages, that is, languages that we have direct evidence of from writing or audiovisual recordings. See Sections 14.8, 14.9 and 14.10 for discussion of how we can deal with **unattested** languages for which there is no direct evidence.

There is no universal timeline for the use of this terminology. It is based on differences in the attested forms of the language, not by any particular year. For example, the earliest attestation of Old Chinese are engravings on ox bones and turtle shells that date back

to 1200 BC (Boltz 1986), well before Old English.

In addition, there is normally no distinct single point in time at which a language strictly transitions from one period to the next. For example, Old English is sometimes considered to have ended in 1066, with the Norman conquest. However, the influence of Norman French on Old English was not instantaneous, and distinctly Old English linguistic patterns persisted until the 12th century. Thus, the transition from one period of a language's history to another is like a smooth spectrum with no sharp divisions between periods, as shown in Figure 14.2 for English.

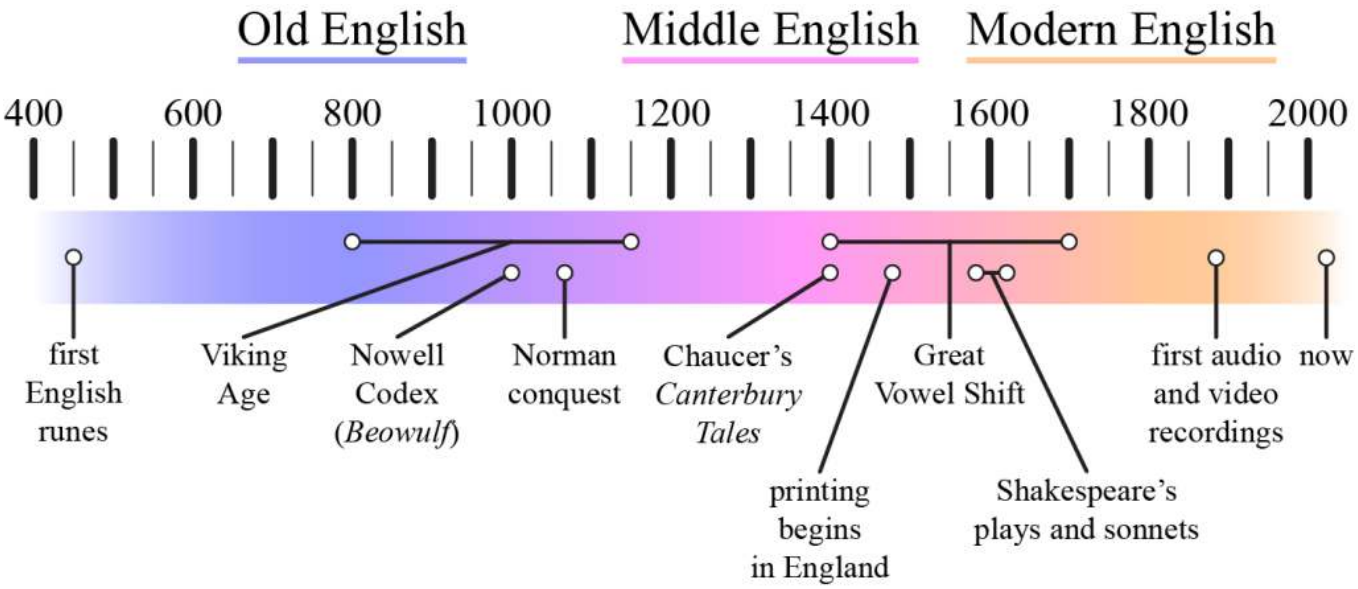


Figure 14.2. History of English.

Furthermore, all languages naturally vary regardless of historical period, so there was no single consistent version of Middle English or Old Chinese or any other language. There was always some sort of variation based on class, age, gender, region, and/or other social factors. So when we talk about Middle English or Old Chinese as languages, we have to remember that they varied: the Middle English of royalty was different from the Middle English of farmers, the Old Chinese of western China was different from the Old Chinese of eastern China, and so on. Some of this variation is even attested in written records.

Notation of language change

We may represent a language change with a **greater than sign >** pointing from the older form on the left to the newer form on the right. For example, the change in structure from early modern English *the house is building* to modern *the house is being built* could be represented as (2).

(2) *the house is building* > *the house is being built*

This notation can be used for any kind of change in any aspect of a language. For example, the pronunciation of the word *prove* used to be something like [prʌv] in Early Modern English, as needed for the rhyme with *love* in the final two lines of Shakespeare's final sonnet, Sonnet 154 (Crystal 2011):

Came there for cure, and this by that I prove,
Love's fire heats water, water cools not love.

The pronunciation of the vowel in *prove* eventually changed to [u], while the corresponding vowel in *love* did not, ruining Shakespeare's perfect rhyme. We can notate this phonological change as [prʌv] > [pruv], with the older pronunciation on the left the greater than sign and the newer pronunciation on the right. Sometimes, a **less than sign <** is used to indicate the reverse direction of a language change. Thus, we could write [pruv] < [prʌv] to indicate that the modern pronunciation [pruv] of *prove* originates from the older pronunciation [prʌv]. This means exactly the same thing as [prʌv] > [pruv].

Changes in meaning can similarly be represented with this notation. The word *nice* was borrowed into Middle English from Old French in the late 1200s, and its original meaning at the time in both languages was 'silly'. Over time, its meaning changed in

various ways, to ‘delicate’ (in the 1400s), then ‘careful’ (1500s), and eventually ‘pleasant’ (1700s). This overall sequence of change in meaning can be represented as (3).

(3) *nice* ‘silly’ > ‘delicate’ > ‘careful’ > ‘pleasant’

Additional information may sometimes be added to this notation, such as the name of the language or language variety at each stage. For example, to show a deeper history of the word *nice*, we could go back to the original Old French source and show its development from Latin, as in (4).

(4) English *nice* ‘pleasant’ < Old French *nice* ‘silly’ < Latin *nescius* ‘ignorant’

Note the use of the less than sign < in (4), which means this should be read as going further back in time as we read from left to right. This representation is equivalent to (5), which flips the order and the sign.

(5) Latin *nescius* ‘ignorant’ > Old French *nice* ‘silly’ > English *nice* ‘pleasant’

Note the similarity in usage between the greater than sign > and the arrow → → for indicating a change in some linguistic structure. The difference is that the greater than sign > represents a *diachronic* change from one time period to another, while the arrow → → represents a *synchronic* change at a single point in time, such as how a phonological rule converts an underlying representation into a surface representation.

Etymology

The historical development of a word or expression is called its **etymology**. The etymology of *nice* is an example of how the modern meaning of a word can be very different from its etymological source. In this case, *nice* started with a negative meaning in English but eventually developed a positive meaning.

This is a reminder that a word’s meaning is defined by how the word is used *now*, regardless of how it may have been used 500 years ago, 50 years ago, or even 5 years ago. See also related discussion in Section 3.1 about the term *phonetics* and other scientific terminology. It is an **etymological fallacy** to make a logical argument that relies on using an etymological meaning of a word in a context where its current meaning is what is relevant.

For example, if someone is told that their behaviour is transphobic, they may try to derail the conversation and downplay the offensiveness of their actions by focusing on the meaning of *transphobic* instead. They might argue that they could not be transphobic because they are not literally afraid of trans people.

However, this is an etymological fallacy. The suffix *–phobic* is used in modern English to refer to being averse in a more general sense, not necessarily due to fear specifically. We see this modern meaning in various words referring to social intolerance or discrimination, such as *transphobic*, *Islamophobic*, and *xenophobic*, as well as other words referring to physical incompatibility or intolerance, such as *hydrophobic* (which refers to being water-repellant) and *photophobic* (which refers to being physically sensitive to light).

Other reasons for change

There are two broad categories of sources of language change, external and internal. **External change** is change caused by something from outside the language itself, such as cultural changes, new technology, etc. An important external source of language change is **language contact**, when two or more cultures who use different languages interact with each other, which results in influence between the two languages. There are many different ways that cultures may interact, some more egalitarian than others, and there are consequently many different ways that language contact can cause language change. Some of these are discussed in Section 14.7.

But in many cases, a language may change for no external reason, which results in an **internal change** that happens spontaneously within the language due to its structure or modality. For example, when two phones are adjacent, it is often easier to pronounce them by assimilating some phonetic property from one to the other, so that they are more similar (see discussion of assimilation in Section 4.9). There is no external reason from the surrounding culture that causes assimilation. Assimilation is just something that is physically easier for human bodies to do, so this is a kind of change that could happen to any language at any time.

Many internal changes likely happen during the acquisition process. The earliest claim of this idea is probably Paul 1880, and there has been much work on this topic since, such as Ohala 1981, Crain et al. 2006, and Niyogi and Berwick 2009. During acquisition,

children may articulate the language in a slightly different way than their parents. The change may be subtle enough that no one really picks up on it consciously. However, the change could still be robust enough that it persists into the next generation, who themselves may then push it just a bit further, and so on, for many generations. Although ordinary language users may not notice these subtle, incremental generational changes, linguists are often able to measure them in real time with modern instruments.

Complexity and change

Many people believe that ancient humans must have used simpler language, and that modern languages are more complex. But many people also believe that younger generations are ruining language by simplifying it through a combination of laziness and ignorance. These contradictory views may even be held at the same time by the same person. It is probably no coincidence that many people believe that their own personal version of a language happens to be the best version.

In truth, language complexity and language change are not actually related. In part, this is because language complexity is not a single well-defined concept. Languages may be complex in one way but simple in another. For example, English has fairly simple verb morphology, with most verbs having only a small number of distinct forms (for example, *sign*, *signs*, *signed*, *signing*), but it has a complex vowel system with over a dozen vowels, including multiple diphthongs. In contrast, Georgian (a Karto-Zan language of the Kartvelian family, spoken in the Republic of Georgia) has only five vowels (Shosted and Chikovani 2006), but it has incredibly complex verb morphology, with as many as a dozen positions that can be filled by many different morphemes marking verb tense, agreement, etc. (Makharoblidze and Leonard 2022).

In addition, each aspect of a language can change in different ways. We find that some changes may reduce complexity, some may increase complexity, and some may have no obvious effect on complexity at all. Furthermore, while a change could continue along the same path, growing increasingly complex over time, it might instead reverse at any time, and even reverse again and again and again. Thus, there simply is no universal relationship between language change and complexity.

Check your understanding

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14.2: Lexical change

Sporadic change

Many internal language changes are **sporadic**, which means that they affect only one, or maybe a few, individual words or expressions. For example, the shortened form *app* for *application* in English is a sporadic change, because most other similar words, like *complication*, *implication*, and *multiplication*, are not shortened to **comp*, **imp*, or **multip*.

Furthermore, the shortened form *app* is not used for all possible meanings of *application*. We can use *app* when referring to computer programs, but we would not normally shorten an expression like *daily application of ointment* to **daily app of ointment*, because this use of *application* refers to a different meaning, the addition of a substance to the exterior surface of some object.

Another example of sporadic change is the shift from two-handed to one-handed signs in American Sign Language (ASL). Some two-handed signs, such as COW, have changed over time to use just one hand (Frishberg 1975). However, this change did not affect all two-handed signs, like BOOK or HALLOWEEN.

COW (older): https://www.signingsavvy.com/sign/cow/3217/2
COW (newer): https://www.signingsavvy.com/sign/cow/3217/1
BOOK: https://www.signingsavvy.com/sign/book/9549/2
HALLOWEEN: https://www.signingsavvy.com/sign/halloween/1448/1

An important kind of sporadic change is **lexical change**, which is a change to a language's lexicon, especially through the addition of new words. See Sections 1.1, 7.4, and 7.5 for further discussion of the lexicon.

Root creation

When a new word is created entirely within a language without direct influence from another language, the new word is called a **neologism**. We often say that the act of creating a neologism is **coining** it, especially when we know who first did so. The most basic type of neologism is **root creation**, where the new word is not derived from any other existing word. Root creation is relatively rare, as it is difficult for humans to coin completely new words without some influence from other words.

Root creation often gets its influence from being **imitative** or **echoic**, so that the articulation of the word mirrors its meaning in some way. An example of imitative root creation is the English word *zap*, which was coined in 1929 for Phillip Francis Nowlan and Dick Calkins's newspaper comic strip adaptation of Nowlan's 1928 and 1929 novellas starring pulp science fiction hero Buck Rogers. The buzzing [z] at the beginning of the word and the short sudden end with a voiceless plosive work together to evoke the sound of a short energetic burst, used by Nowlan as the sound of a laser pistol. There are many examples of imitative root creation in English, such as *glug*, *cuckoo*, and other instances of onomatopoeia.

Imitative root creation is very common in signed languages, because much more of the world is visible than it is audible. Lots of signs in ASL are clearly imitative, and that imitation may even change if the nature of the object itself changes. A notable example is PHONE, which was originally signed with two hands to match how a user handled original two-handed telephones in the early 1900s. Over time, telephones changed to a different shape that required only one hand, so the ASL sign changed as well, this time with one hand imitating the new shape of the phone rather than how it was handled. But as smartphones replaced corded phones in the early 2000s, a new version of the ASL sign emerged, with one hand imitating how the phone is handled (just a bit too late to be included in Sternberg's 1998 dictionary of ASL). The changes in the ASL sign for PHONE can be seen in the links below, matching the evolution of telephones depicted in Figure 14.3.

PHONE (original): https://www.signingsavvy.com/media2/mp4-ld/33/33587.mp4
PHONE (newer): https://www.signingsavvy.com/media2/mp4-ld/33/33586.mp4
PHONE (newest): https://www.signingsavvy.com/media2/mp4-ld/27/27823.mp4

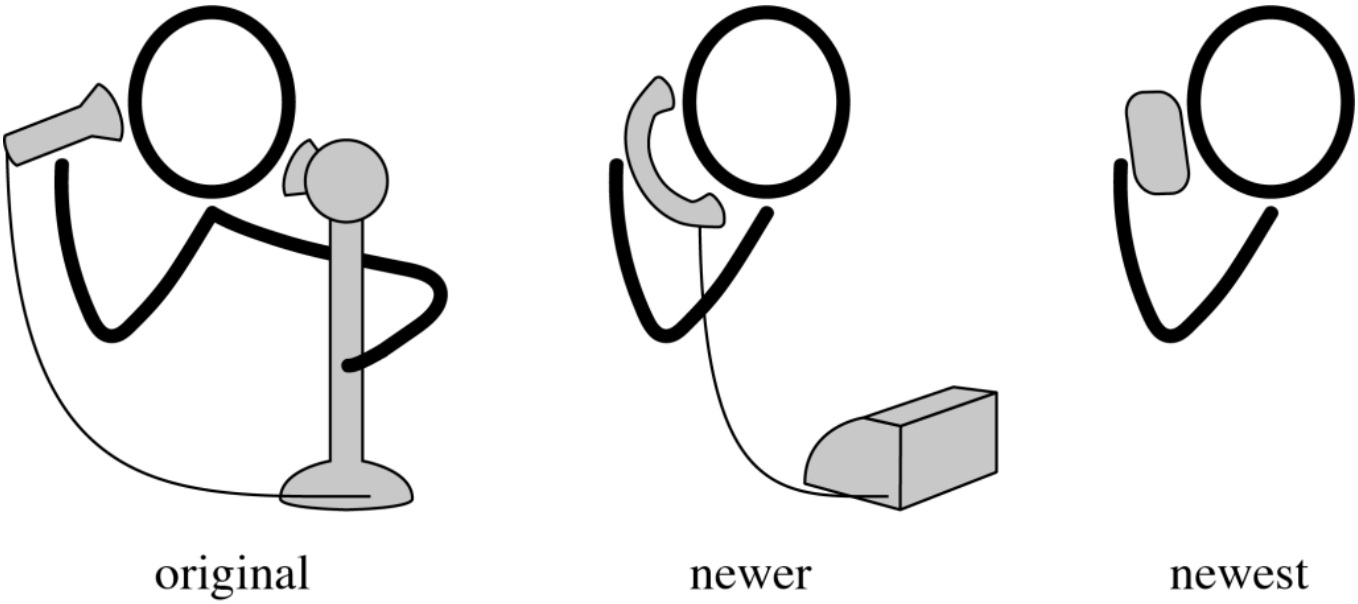


Figure 14.3. Evolution of the shape and handling of the telephone: original two-handed telephones (left), newer one-handed telephones with a large receiver (centre), and the newest small smartphones (right).

Other examples of root creation have no obvious imitative origin and are sometimes said to have been coined **ex nihilo**. An example of ex nihilo root creation in English is the word *googol*, which was coined in 1938 when Edward Kasner asked his nine-year-old nephew, Milton Sirotta, to invent a new word for the number 10^{100}, which is equivalent to the number expressed as the digit 1 followed by one hundred zeroes (Kasner and Newman 1940). Other examples of ex nihilo root creation in English include the following:

- *yahoo* 'brute' > 'uncultured or unintelligent person' (coined by Swift 1726)
- *blurb* 'short summary or description' (coined by Matthews 1906)
- *grok* 'understand' (coined by Heinlein 1961)

Derived neologisms

More frequently, neologisms are derived from other words that already exist in the language. Proper names are a particularly rich source of neologisms, and some come about in surprising ways.

The Canary Islands are a group of islands off the coast of Morocco. They are home to a particular species of bird called *canary* in English, which is named after the islands. Interestingly, the English name *Canary Islands* itself is derived from the Latin name for the islands, *Canariæ Insulæ*, which means 'Islands of the Dogs'. The Latin name was given to the islands by Pliny the Elder in his encyclopedia *Naturalis Historia* (AD 77) due to the presence of large dogs on one of the main islands. Thus, canaries are indirectly named after dogs, by way of a Latin proper name for a group of islands they are both native to.

Sometimes, a brand name for a specific product is the source of a neologism. If the neologism shifts the meaning of the brand name to refer to any similar product regardless of brand, this is called **genericization**. This has happened with English words such as *dry ice*, *dumpster*, *escalator*, *heroin*, and *zipper*, all of which were originally trademarked brand names that referred to specific products. But now, any dumpster is called *dumpster*, regardless of which company manufactured it.

In some cases of genericization, the trademark still exists. This is the case for *chapstick*, *frisbee*, *realtor*, *thermos*, and *velcro*. So there is technically a legal difference between true ChapStick (which is manufactured by the company Haleon) and generic lip balm (which can be manufactured by any company), but few people bother to make this distinction.

There are many other ways that new words can be created from existing words. One important type is a **compound**, which is a neologism derived from putting two or more individual words together, often with a resulting meaning that is **non-compositional** or **idiomatic**. That is, the meaning of the compound is not predictable as a transparent combination of the meanings of the component words. See Sections 5.8 and 7.4 for further discussion of compounds.

Clipping (a.k.a. **compression** or **truncation**) is a neologism derived by shortening a longer word. The creation of the neologism *app* from *application* is clipping, and there are many other examples from English. Clippings can come from the front of a word, as in English *exam* < *examination*, or from the end of a word, as in English *burger* < *hamburger*. In some very rare cases, clippings can even come from the middle of a word, as in *flu* < *influenza*. Other examples of clippings in English include the following:

- *gym* < *gymnasium*
- *lab* < *laboratory*
- *phone* < *telephone*
- *bot* < *robot*
- *fridge* < *refrigerator*
- *rona* < *coronavirus*

A **blend** (sometimes called a **portmanteau**) is a neologism derived by putting together pieces of two or more words to create a new word that shares pronunciation and meaning with the original words. This is like a combination of clipping and compounding. For example, the English word *brunch* is a blend of *breakfast* and *lunch*, with [br-] and [-ʌn͡tʃ] as the clipped forms that are put together as [brʌn͡tʃ], and with a meaning that combines the meanings of *breakfast* and *lunch*: a breakfast-style meal served around lunchtime. Other examples of blends in English include the following:

- *blog* < *web* + *log*
- *frenemy* < *friend* + *enemy*
- *guesstimate* < *guess* + *estimate*
- *mansplain* < *man* + *explain*
- *podcast* < *iPod* + *broadcast*
- *romcom* < *romantic* + *comedy*
- *smog* < *smoke* + *fog*
- *soylent* < *soy* + *lentils* (coined by Harrison 1966)

In some blends, all of the original words may be clipped (*podcast*, *romcom*, etc.), but in other blends, some of the original words may remain whole (*blog*, *frenemy*, etc.). In addition, sometimes there is overlap between the original words (*frenemy*, *guesstimate*, etc.), but not always (*blog*, *podcast*, etc.). If none of the original words are clipped, and if there is no overlap between the original words, then the resulting neologism is a compound rather than a blend.

Acronyms are neologisms derived from pieces of the spelling of a word or phrase rather than from its pronunciation. Acronyms may be pronounced as a normal word based on the derived spelling, as with the English acronym *scuba* < *self-contained underwater breathing apparatus*, which is pronounced [skubə].

Acronyms may instead be pronounced letter by letter, in which case, they are sometimes called **initialisms.** An example of initialism in English is the word *SO* < *significant other*, which is pronounced [ɛs o], letter by letter, rather than *[so], like the ordinary word *so*. An initialism may even be respelled to better match the pronunciation, as with *MC* < *master of ceremonies*, which is pronounced [ɛm si] and so is sometimes spelled with the alternate spelling *emcee*.

Some acronyms may be pronounced either way, as with *ASAP* < *as soon as possible*, which can be pronounced either [esæp] or [e ɛs e pi]. Finally, some acronyms may be pronounced as a mixture of the two methods, as with *HVAC* < *heating, ventilation, and air-conditioning*, which is pronounced [aɪ͡tʃ væk], not *[aɪ͡tʃ vi e si]. Other examples of acronyms and initialisms in English include the following:

- *fomo* < *fear of missing out*
- *laser* < *light amplification by stimulated emission of radiation*
- *snafu* < *situation normal, all fucked up*
- *ASL* < *American Sign Language*
- *BLT* < *bacon, lettuce, and tomato*
- *POV* < *point of view*

Acronyms are relatively modern phenomena, and nearly all claims about acronym-based etymologies for words before the mid-20th century are usually false. For example, *coma* is sometimes claimed to be an acronym for *cessation of motor activity*, but it

actually comes from the Greek word *κῶμα (kôma)* 'deep sleep'. One of the few possible early English acronyms is *OK*, which was coined in the early 1800s and might have been an acronym for *oll korrect*, a joking misspelling of *all correct*. But the actual etymology of *OK* is unknown!

As discussed in Section 2.2, **taboo avoidance** is another way that the lexicon can change. Taboo words can be replaced with existing words (as with *sugar* and *shoot* for English *shit*), which effectively adds a new meaning to the replacement, a type of semantic change (see Section 14.6 for further discussion). However, taboo avoidance may be accomplished by creating a neologism rather than using an existing word. This is how the neologisms *dang* and *gosh* entered English, as they were coined as alternatives to *damn* and *God*, respectively.

Other lexical changes

In this section, we have focused on internal neologisms. However, words and morphemes that already exist in the lexicon can also undergo various other kinds of internal change that affect their pronunciation, structure, position, or meaning. These changes are discussed in Sections 14.3, 14.4, 14.5, and 14.6. In addition, there are many ways that the lexicon can be affected by external change, which is covered in Section 14.7.

Check your understanding

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14.3: Phonological change

Many of the phonological changes we find diachronically are the same phonological processes that we find synchronically (see Section 4.9 for spoken languages and Section 4.10 for signed languages). A few additional types are discussed in the section.

Sporadic phonological change

One type of sporadic phonological change is **metathesis**, in which parts of the pronunciation swap positions with each other. For example, the ASL sign for $DEAF_1$ touches near the ear first and then near the mouth, but there is a metathesized version $DEAF_2$ that swaps the locations, touching near the mouth first and then near the ear.

$DEAF_1$: https://www.signingsavvy.com/media2/mp4-ld/23/23017.mp4
$DEAF_2$: https://www.signingsavvy.com/media2/mp4-ld/23/23016.mp4

Other signs can have metathesis in ASL, such as HEAD and RESTAURANT, but since this is a sporadic change, it only affects a few signs, so there are many more signs that do not normally have metathesis, such as CHILDREN and THING (Liddell and Johnson 1989):

$HEAD_1$: https://www.signingsavvy.com/media2/mp4-ld/30/30884.mp4
$HEAD_2$: https://www.signingsavvy.com/media2/mp4-ld/30/30885.mp4
$RESTAURANT_1$: https://www.signingsavvy.com/media2/mp4-ld/22/22673.mp4
$RESTAURANT_2$: https://www.signingsavvy.com/media2/mp4-ld/22/22674.mp4
CHILDREN: https://www.signingsavvy.com/media2/mp4-ld/21/21593.mp4
THING: https://www.signingsavvy.com/media2/mp4-ld/29/29617.mp4

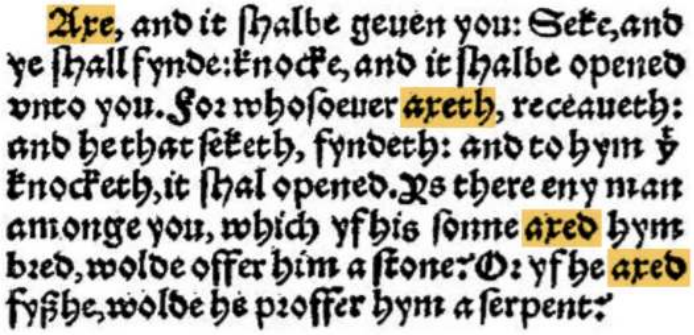
Metathesis also happens in spoken languages, where it affects the position of phones. For example, the English word *ask* has undergone metathesis multiple times in its history. In Old English, we find it first attested as *ascian* with [sk], but we soon find evidence of a metathesized form *axian* or *acsian* with [ks]. Both versions persisted in various regions, but *axian* was dominant enough throughout Old English that it resisted a different Old English sound change, [sk] > [ʃ], which we see evidence for in words like the following:

- *bishop* < *bisceop*
- *fish* < *fisc*
- *shine* < *scīnan*
- *wash* < *wascan*

If the original *ascian* had been stable through Old English, it should now be pronounced like *ash* in Modern English due to the [sk] > [ʃ] sound change. Any word now with [sk] must have gotten its [sk] by avoiding this sound change somehow. In the case of words like *skip* and *whisk*, they were borrowed later in Old English, after the [sk] > [ʃ] change was complete. In the case of *ask*, the *axian* variant was dominant while [sk] was changing, so *axian* was unaffected, like many other [ks] words:

- *axle* < *eaxl*
- *axe* < *æx*
- *vixen* < *fyxen*

The [ks] variant stayed dominant through Middle English and into Early Modern English. For example, it can be found multiple times in in the Coverdale Bible, the first complete version in English, published in 1535. See Figure 14.4 for sample text from Matthew 7:7–10 with four instances of the [ks] variant.



Axe, and it shalbe geuen you: Seke, and ye shall fynde: knocke, and it shalbe opened vnto you. For whosoeuer axeth, receaueth: and he that seketh, fyndeth: and to hym yt knocketh, it shal opened. Ys there eny man amonge you, which yf his sonne axed hym bred, wolde offer him a stone? Or yf he axed fysshe, wolde he proffer hym a serpent?

7 Ask, and it shall be given to you; seek, and you shall find; knock, and it shall be opened unto you.
8 For whosoever asks, receives, and he that seeks, finds; and to him that knocks, it shall be opened.
9 Is there any man among you, which if his son asked him (for) bread, would offer him a stone?
10 Or if he asked (for) fish, would he proffer him a serpent?

Figure 14.4. Scan of Matthew 7:7–10 from the Coverdale Bible (top left, adapted from The Internet Archive), the same text transcribed (top right), and a more modern equivalent (bottom), with different forms of **axe** and **ask** highlighted in each.

Some time later, metathesis happened again, and we now have [æsk] for many English users today. However, [æks] has persisted in many dialects due to its long history in English. In many cases of such long-standing variation, we often accept the difference: many Canadians say [əˈlumənɱ] *aluminum* and [ˈvaɪtəmɲ] *vitamin*, while many Brits say [ˌæljəˈmɪniɱ] *aluminium* and [ˈvɪtəmɲ]; many Canadians say [ˈædḷt] *adult*, while many Americans say [əˈdʌlt]; etc. These differences are usually no more than points of curiosity and polite joking.

But with [æsk] versus [æks], we find intense dislike and outright vitriol. People who use [æks] are often ridiculed as unintelligent, uneducated, and unworthy of respect. A key factor is that [æks] is popularly associated with African American English (although it is used in many other dialects), so expressing disdain for the people who use [æks] is a way to covertly express racial prejudice through linguistic prejudice.

But the linguistic prejudice is just a convenient mask. No one expresses as much hate towards metathesis in general; everyone ignores *wasp* and *bird*, which are metathesized from Old English *wæpse* and *bridd*. No one expresses as much hate for similarly small differences between dialects, such as *alumin(i)um* or *adult*. However, because this particular metathesized word happens to be associated with African American English, the hatred more readily comes out. Given the issues of language and power that we have touched on throughout this book, especially in Chapter 2, this unfortunate outcome is unsurprising.

Sporadic sound change

A language change that affects the phonology of a spoken language specifically is known as a **sound change**. One type of sporadic sound change is a **spelling pronunciation**, which is where the pronunciation of a word shifts to better match its spelling. This happens in English because the connection between spelling and pronunciation is often inconsistent (see Section 3.6), so a spelling pronunciation can help reduce this inconsistency.

For example, the English word *Arctic* was originally borrowed into Late Middle English from Middle French *artique*, which itself is derived from Latin *arcticus*. The spelling was changed a few hundred years later, with a <c> added based on the Latin spelling, which eventually caused the pronunciation to shift to [ɑrktɪk]. Other examples of spelling pronunciation in English include the following:

- the [l] in *falcon* (borrowed from Old French *faucon*, then respelled to match Latin *falcōnem*)
- the [h] in *hectic* (Old French *etique*, Latin *hecticus*)
- the [k] in *perfect* (Old French *parfit*, Latin *perfectus*)

Interestingly, many people today still pronounce *Arctic* as [ɑrtɪk], closer to the original Middle English pronunciation, though this pronunciation is often stigmatized and is frequently found on lists of “commonly mispronounced words”. However, this attitude directly contradicts a common belief among language pedants that language change “ruins” language. If change itself is

stigmatized, then older forms should always be more prestigious. However, with *Arctic*, it is the newer pronunciation [ɑrktɪk] that is prestigious, because of its spelling.

Of course, spelling pronunciations are not always prestigious either. Pronouncing the [h] in *honest* would likely be ridiculed, not prestigious. So neither history not spelling are reliable guides to a prestigious pronunciation. In fact, there is no consistent linguistic factor that correlates to prestige. Some prestigious forms are older, some are newer; some are pronounced to match their spelling, some are not. What is consistent across prestigious forms is that they are used by those who hold social power (see Chapter 2 for more discussion).

A different type of sporadic sound change involves stereotypes about the pronunciation of words in other languages, and using those stereotypes rather than the original pronunciation. This is known as **hyperforeignism**. There are many examples of hyperforeignism in English, such as the following:

- The capital of China is called *Beijing* in English, which is borrowed from Chinese *北京 (Běijīng)*. The Mandarin pronunciation is [pèɪ.t͡ɕíŋ], which is very similar to a possible English pronunciation [bed͡ʒɪŋ]. However, many English speakers use the hyperforeignism [beʒɪŋ] instead, because [ʒ] is relatively rare in English but does occur in many borrowings (*azure*, *Dijon*, *genre*, etc.), so it reinforces the foreignness of Beijing as a city in another country.
- The word *lingerie* was borrowed from French, where the final vowel is pronounced [i]. However, many French borrowings have a final [e] sound (*ballet*, *chez*, *fiancé*, etc.), so the pronunciation of *lingerie* was changed in English to match this stereotype by replacing final [i] with hyperforeign [e].
- Another stereotype about French is that where English might have a final [s], French does not. We see this in many borrowings from French into English, where the word looks like it should be pronounced with final [s]: *chassis*, *foie gras*, *rendezvous*, etc. However, French does allow final [s], as in the expression *coup de grâce* [ku də ɡʁɑs], but in the borrowed form in English, we drop the final [s] so that it seems more French-like, resulting in the hyperforeignism [ku də ɡrɑ].

There are many other types of sporadic sound changes, too many to go into detail here. Here a three more types, with brief summaries and examples:

- **dissimilation**: when a phone shifts to avoid being to similar to a nearby phone; for example, despite the spelling, *governor* is often pronounced [ɡʌvənɚ], so that the first <r> is not pronounced in order to dissimilate from the second, leaving only one [r] in the word (note that the first [r] is still pronounced in the base verb *govern*)
- **analogy**: when a word shifts to match a pattern found in other words, especially from a rare pattern to a more common pattern; for example, *nuclear* has a very rare [-kliɚ] sequence that many people pronounce by analogy as the more common sequence [-kjəlɚ], as in *binocular*, *circular*, *molecular*, *muscular*, *particular*, etc. (see more discussion and examples in Section 14.4)
- **immediate model**: a special type of analogy where a word shifts by analogy to match another word that it is frequently used together with, especially in an established sequence; for example, *February* is normally pronounced [fɛb**jə**wɛri] rather than [fɛb**ru**ɛri], by immediate model with [d͡ʒæn**jə**wɛri] *January*, since the two words are often said together in sequence

Regular phonological change

So far, we have looked mostly at sporadic changes, which affect only a limited number of words. However, a phonological change can be **regular** instead, which means that it applies uniformly in a consistent environment across every word possible, similar to how synchronic phonological rules apply. For example, if the [sk] > [ks] metathesis had been regular in Old English rather than sporadic, then every word with [sk] would have changed, not just *ascian*.

Modality seems to affect the potential for regularity in phonological change. Spoken languages can have both regular and sporadic sound changes, while signed languages seem to undergo only sporadic phonological changes. This is likely for the same reasons that signed languages do not seem to have productive phonological rules, but it could instead be due to our lack of understanding of the phonology of signed languages (see Section 4.10 for discussion). Thus, we focus on regular sound changes here.

The idea of that sound change could be regular was theorized in the late 1800s. Prior to that, historical linguists primarily focused on describing observed changes in the written record of known languages. However, a group of German linguists known as the **Neogrammarians** proposed that all sound changes were regular, not sporadic. So if a change existed, it had to affect every word it could; exceptions must be due to borrowing or some other separate process. This proposal is known as the **regularity principle** or the **Neogrammarian hypothesis**.

We now know that the regularity principle is not fully true. As discussed earlier in this section, many sound changes are sporadic. But even for those that are regular, they may spread slowly through the lexicon, word by word or morpheme by morpheme, typically affecting higher frequency words first, through a process called **lexical diffusion** (Wang 1969, Chen 1972, Chen and Wang 1975; see also Schuchardt 1885 for early recognition of this phenomenon). This means at any given moment, we may see only a partial effect of a sound change, affecting some words but not others.

For example, in Philadelphia, words like *bad*, *glad*, and *mad* have a tense [æ̝] due to a sound change affecting /æ/ before /d/. However, there are lots of other words in the lexicon, such as *dad* and *sad*, that still have lax [æ] because the sound change has not diffused to them yet (Labov 1981).

However, despite the flaws of the regularity principle, it was crucial for the development of the field of historical linguistics, as it turned from pure description to a predictive science (see Appendix 2.3 for discussion). The regularity principle is the core tool used in Sections 14.8–14.11 for helping us understand and make reasonable hypotheses about the linguistic past.

Conditioning of regular sound change

Like synchronic phonological rules, a regular sound change may be **conditioned**, which means that it only happens in a specific set of environments, such as at the end of the word or between vowels. For example, by Middle English, [sw] clusters were pronounced as [s], but only before back vowels. So *sword* and *answer* (from Old English *andswaru*) now have [s] because of the following back vowel, while *sweet*, *swift*, and *swell* all retained their original [sw] because the following front vowel blocked this change from applying.

We can notate such conditioned sound changes similarly to how we notated phonological rules in Section 4.7, using the symbols / and _ to specify the environment, but using > instead of → to represent that this is a diachronic sound change rather than a synchronic phonological rule. The conditioned change of [sw] to [s] change could thus be represented as follows:

- [sw] > [s] / _ back vowel

Some regular sound changes are instead **unconditioned**, which means they occur everywhere, regardless of the environment. For example, Old English had a high front round vowel [y] that changed to [i] everywhere in Middle English, as in *brycg* > *bridge* and *cyssen* > *kiss* (compare the German cognates *Brücke* and *küssen*, which still have a high front round vowel). This unconditioned change would be notated as [y] > [i], with no environment.

Phonemic effects of regular sound change

Sound changes can also be classified by whether they affect the number of phonemes in a language. If a regular sound change decreases the number of phonemes in a language, it is called a **phonemic merger** or simply **merger**. The [y] > [i] change was a merger, since /y/ and /i/ were separate phonemes before the merger. We can highlight the phonemic nature of this change by using slashes instead of square brackets: /y/ > /i/. In addition, mergers are sometimes notated with both of the older phonemes on one side, as in /i, y/ > /i/, to highlight that this was a merger.

When we acquire a language, we do not acquire its history, so once two phonemes have merged, there is no longer any way to reliably distinguish them. Thus, when a child acquires *kiss* and *miss* now, they cannot know that 1000 years ago, *kiss* used to be pronounced with [y] and *miss* with [i]. The merger has caused these two words to be perfect rhymes in Modern English, even though they used to be pronounced with different vowels in Old English (*cyssen* with [y] and *missan* with [i]).

Other changes can increase the number of phonemes. This is called a **phonemic split** or just **split**. An example of a split is the emergence of voiced fricatives as phonemes during Middle English. Old English only had voiceless fricatives as phonemes, but these already had voiced allophones between vowels. For example, *cnif* 'knife' was pronounced [kniːf], but its plural *cnifas* was pronounced [kniːvas], and we still have the [v] in the plural in Modern English *knives*. But [f] and [v] were allophones of a single phoneme /f/, until English borrowed a lot of Old French words that had [v] in a position where it was in contrast with [f], as with *fine* and *wine*. As discussed in Chapter 4, once there is contrastive distribution and the potential for minimal pairs, the phones belong to separate phonemes, which meant a new phoneme /v/ came into existence in Middle English.

A sound change may also keep the number of phonemes constant, only changing their pronunciation. This is known as **non-phonemic shift** or just **shift**. There have been a number of such shifts in the vowel system throughout the history of English. In particular, Late Middle English had four short vowels, [i], [e], [o], and [u], that shifted in pronunciation into Early Modern English

by becoming lax, plus an fifth short vowel [a] that did not change (see Figure 14.5). Since there were no pre-existing lax vowels, these shifts resulted in no mergers, so there was no change in the number of vowels.

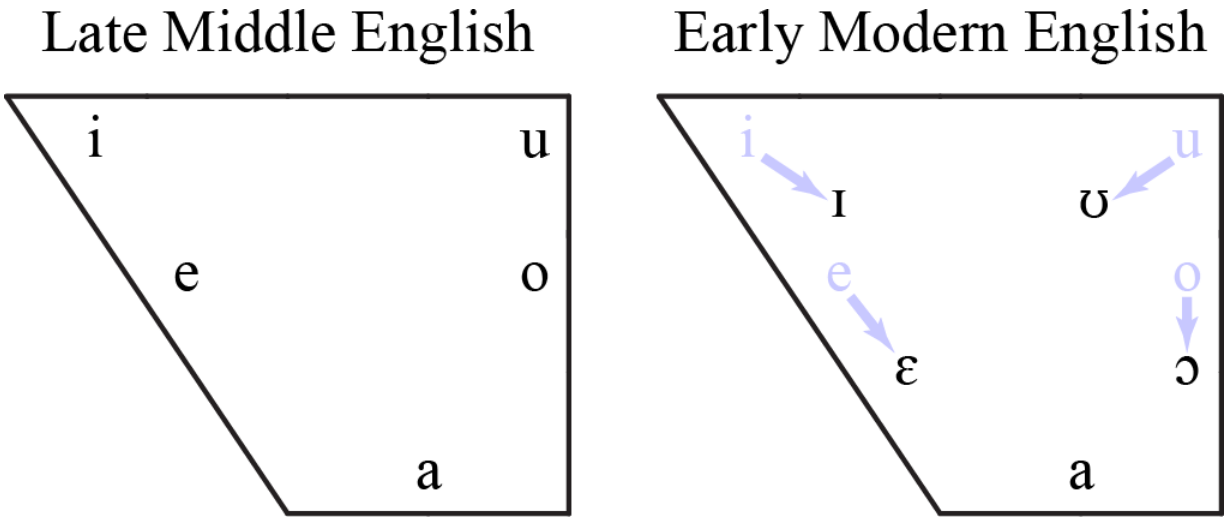


Figure 14.5. Shifts in the short vowels from Late Middle English to Early Modern English.

In this case, the different shifts did not interact with each other, but it is possible for shifts to overlap. This happened with the Middle English long vowels in a shift known as the **Great Vowel Shift**, which is one of the major features marking the transition from Middle English to Modern English (see Section 14.1).

The Great Vowel Shift in English

In addition to the five short vowels discussed earlier, Late Middle English also five long vowels that matched the short vowels in vowel quality, [iː], [eː], [aː], [oː], and [uː], plus two other long vowels that did not have a matching short vowel, [ɛː] and [ɔː]. During the Great Vowel Shift, the long vowels changed in pronunciation separately from the short vowels, so that the long-short pairs ended up differing in both length and vowel quality.

In addition, the long vowels shifted in such a way that their shifts overlapped with each other. For example, [aː] shifted to [ɛː], while [ɛː] shifted to [eː]. Crucially, there was no merger: [aː] and [ɛː] each shifted separately by one step. This kind of overlapping series of non-merging shifts is a called a **chain shift**. In a chain shift, there are at least two changes, with the newer form of one change being the older form of some other separate change. In this case, the "link" in the chain is [ɛː], which is the newer form of the [aː] > [ɛː] change and the older form of the [ɛː] > [eː] change.

This chain was actually longer, because of two additional changes: [eː] > [iː] and [iː] > [ai]. The back vowels had a similar chain shift, with [ɔː] > [oː], [oː] > [uː], and [uː] > [au]. Thus, the Great Vowel Shift consisted of two chain shifts, one involving four vowels and one involving three vowels (Figure 14.6).

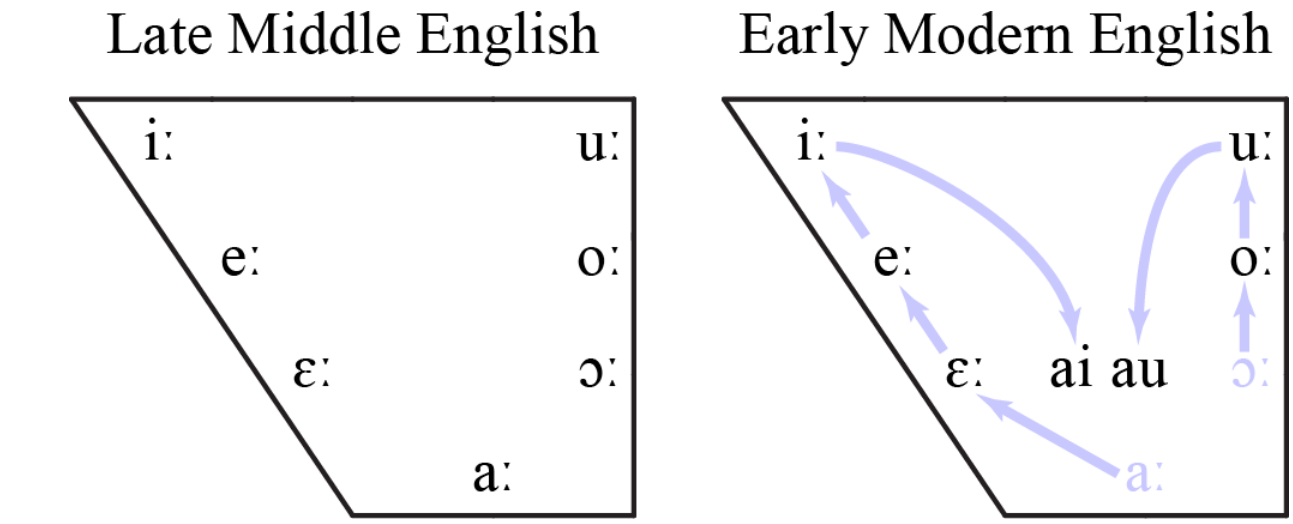


Figure 14.6. Shifts in the long vowels from Late Middle English to Early Modern English, known as the Great Vowel Shift.

There are a few ways that a chain shift could happen, depending on when the individual shifts occurred in time with respect to each other. This ordering of separate changes is called their **relative chronology**. One option is that all the shifts happened more or less simultaneously, so that [aː] shifted up at the same time that [ɛː] did, which was the same time that [eː] did, and so on.

However, it is more likely that some shifts happened a bit earlier than others. If the high vowels became diphthongs first, this would have left a gap in the vowel space. In general, languages tend to have their vowels evenly distributed throughout the vowel space, so this gap would pull the lower vowels up to keep the spacing more even. This is called a **pull chain**.

Instead, the lower vowels at the other end of the chain might have started shifting first, with [aː] and [ɔː] raising toward [ɛː] and [oː]. This would crowd that part of the vowel space vowels, and to avoid a merger, [ɛː] and [oː] would shift higher as well. This would create a chain reaction of each vowel pushing the next vowel up and out of the way, until the high vowels have nowhere to go, so they become diphthongs. This is called a **push chain**.

Based on written evidence, it seems like the Great Vowel Shift may have in fact been a bit of a mixture of push and pull chains, with the tense high vowels [eː] and [oː] shifting first. This would push the high vowels [iː] and [uː] while also pulling the lower mid vowels [ɛː] and [ɔː] to fill the gap. All three possibilities are visualized in Figure 14.7.

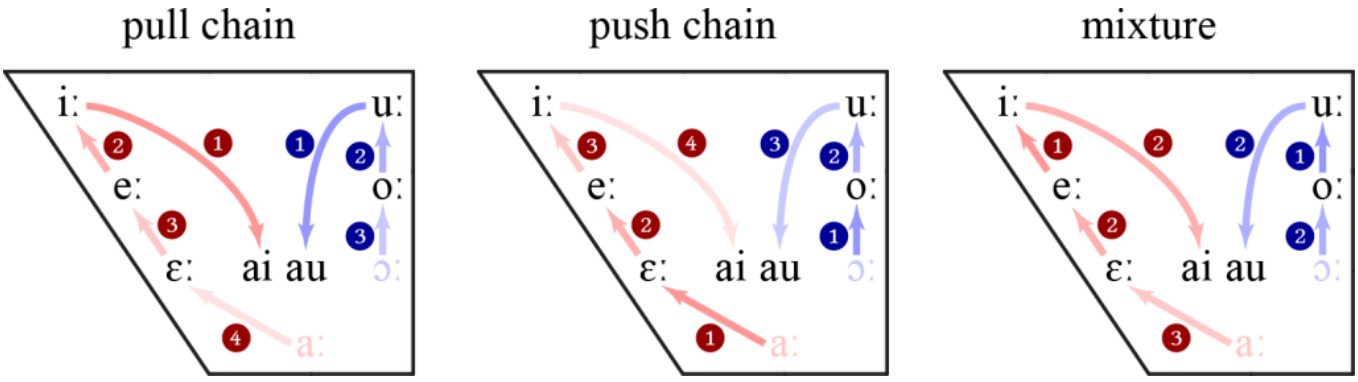


Figure 14.7. Three different possibilities for the Great Vowel Shift: pull chains starting with [iː] > [ai] and [uː] > [au] (left), push chains starting with [aː] > [ɛː] and [ɔː] > [oː] (centre), and a mixture of both types starting with [eː] > [iː] and [oː] > [uː] (right).

There were some further changes that affected most of these vowels later in Modern English to give us the vowels we have today (for example, [ɛː] and [eː] merged to [e]), but the changes for the long vowels discussed above are the essence of the Great Vowel Shift.

Interestingly, German underwent a similar vowel shift, but it did so much earlier than English, before there was widespread printing to standardize the spelling. We can see this in cognates like German *bei* 'by' and English *by*, which are both now pronounced [baɪ] but originally had [iː] prior to their vowel shifts. German shifted [iː] to a diphthong very early, and then sometime later, printing came along, which helped standardize spelling in both languages to match the pronunciation at the time. For German, this was

<bei>, while English retained <by>, because this word still had [iː]. Finally, after the spelling had been settled, the Great Vowel Shift occurred in English, and the pronunciation of *by* changed in the same way it had for German *bei*, but the English spelling was not updated to reflect to new pronunciation.

We see further evidence of the Great Vowel Shift in the morphology of English. In Middle English, allomorphs could differ in length in predictable ways, so that one allomorph of a morpheme had a long vowel in some environments, while another had a short vowel in other environments. Since the two types of vowels shifted differently due to the Great Vowel Shift, the pronunciation of the relevant allomorphs shifted differently as well. We can see remnants of this older long-short pattern preserved in word pairs like the following:

- *div**i**ne–div**i**nity*, *h**i**de-h**i**d*, etc., with [aɪ]-[ɪ] < [iː]-[i]
- *ser**e**ne-ser**e**nity*, *th**ie**f-th**e**ft*, etc., with [i]-[ɛ] < [eː]-[e]
- *gr**a**ze-gr**a**ss*, *s**a**ne-s**a**nity*, etc., with [e]-[æ] < [aː]-[a]
- *g**oo**se-g**o**sling*, *sch**oo**l-sch**o**larly*, etc. with [u]-[ɒ] < [oː]-[o]
- *h**ou**se-h**u**sband*, *pron**ou**nce-pron**u**nciation*, etc. with [aʊ]-[ʌ] < [uː]-[u]

The result is a lot of seemingly arbitrary complexity in the phonology and morphology of English. As discussed in Section 14.4, there are ways that languages change that can help reduce this complexity.

Check your understanding

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14.4: Morphological change

Paradigm change

In many languages, root morphemes may combine with different inflectional affixes (see Section 5.2 for discussion of root morphemes and Section 5.7 for discussion of inflectional affixes). The resulting set of words is called the root's **inflectional paradigm** or just **paradigm** for short. Verb paradigms are sometimes called **conjugations**, while noun and adjective paradigms are sometimes called **declensions**, especially in language learning courses. An example paradigm is given in Table 14.1 for the English verb *move*.

Table 14.1. Inflectional paradigm for *move* in English

move	present tense, except for third-person singular (*I move*)
moves	third-person singular present (*she moves*)
moved	past tense and past participle (*I moved*, *I have moved*)
moving	present participle (*I am moving*)

Many other English verbs (*check*, *end*, *sign*, etc.) have this same basic pattern in their paradigms, so it can also be useful to talk about that pattern as a kind of paradigm itself, separate from specific verb roots. This basic verb paradigm in English is given in Table 14.2.

Table 14.2. Basic verb paradigm in English

ROOT	present tense, except for third-person singular
ROOT-*s*	third-person singular present
ROOT-*ed*	past tense and past participle
ROOT-*ing*	present participle

There are other verb paradigms in English with different patterns. Some verbs have different past tense and past participle forms, such as *show*, which has the paradigm in Table 14.3.

Table 14.3. Paradigm for *show* in English

show	present tense except for third-person singular (*I show*)
shows	third-person singular present (*she shows*)
showed	past tense (*I showed*)
shown	past participle (*I have shown*)
showing	present participle (*I am showing*)

In addition, many verbs undergo changes in pronunciation in some parts of the paradigm, such as **internal change** (changing one or more phones in the root) or even **suppletion** (changing the entire root); see Section 5.3 for discussion. Some examples of paradigms with internal changes and suppletion are given in Table 14.4, with internal changes highlighted in blue and suppletion highlighted in orange. Note that *gone* has an internal change, with the vowel of the root changing from [o] to [ɒ], though this is not apparent from the spelling.

Table 14.4. Paradigms for *ring* and *show* in English

internal change	suppletion	
ring	*go*	present tense except for third-person singular
rings	*goes*	third-person singular present
*r**a**ng*	***went***	past tense
*r**u**ng*	*g**o**ne*	past participle
ringing	*going*	present participle

English has many different verb paradigms, mostly with internal change. In addition to the *ring-rang-rung* pattern, there are patterns like *fly-flew-flown*, *ride-rode-ridden*, *speed-sped-sped*, *speak-spoke-spoken*, and *think-thought-thought*. There are even degenerate patterns like *hit-hit-hit*, *put-put-put*, and *quit-quit-quit*, which have only a single form where many other verbs have three different forms.

Differences between paradigms can be a source of language change. Languages often shift to make their paradigms more consistent, either within a single paradigm or across multiple paradigms. They may copy existing patterns from elsewhere in the same paradigm or from a completely different paradigm. This kind of copying of paradigm patterns is part of a general type of language change called **analogy**. Analogy was introduced in Section 14.3 for sound change, but it is also a significant driving force in morphological change.

Recall from Section 14.3 the following sound change from Old English to Middle English that explains why words like *sword* are pronounced with [s] rather than [sw]:

- [sw] > [s] / _ back vowel

For the verb *swear*, the root and most other forms have a front vowel, so these forms did not change [sw], which still remains in Modern English: *swear*, *swear*, and *swearing*. However, *swear* had the same paradigm as *speak*, so it had a back vowel in the past tense and past participle forms: *swore* and *sworn*, just like *spoke* and *spoken*. If the [sw] > [s] change had affected *swore* and *sworn* as expected, then we would now pronounce them with [s], just like we do for *sword*. However, by analogy with the rest of the *swear* paradigm, the [sw] in all of *swear*'s forms was retained, blocking the sound change from applying to *swore* and *sworn*, which keeps the paradigm more consistent.

Analogy commonly results in a reduction in the total number of allomorphs a root has in its paradigm (see Section 5.4 for discussion of allomorphy). This type of analogy that reduces the number of allomorphs is called **analogical levelling**. Many verbs in English have undergone analogical levelling by changing from a paradigm with multiple root allomorphs to just one allomorph. For example *help* used to have three root allomorphs in Middle English *(help*, *halp*, *holp)*, but these underwent analogical levelling in Modern English so that there is now only one root allomorph (*help*), by analogy with many other verbs, like *float* and *hope*, as shown in Table 14.5.

Table 14.5. Analogical levelling in the paradigm for *help* in English

Middle English	Modern English		
help	*help*	*float*	*hope*
halp	*helped*	*floated*	*hoped*
holpen	*helped*	*floated*	*hoped*

More rarely, analogy can result in increasing the number of root allomorphs by **analogical extension** of some other paradigm. For example, the Old English verb *hring* 'ring' had a paradigm with only one root allomorph (*hring*), but it shifted throughout Middle English and into Modern English to have three root allomorphs (*ring*, *rang*, *rung*), following the paradigm of verbs like *begin* and *sing*, as shown in Table 14.6.

Table 14.6. Analogical extension in the paradigm for *ring* in English

Old English	Modern English		
hringe	*ring*	*begin*	*sing*
hringde	*rang*	*began*	*sang*
hringed	*rung*	*begun*	*sung*

Analogy can change the inflectional affixes in a paradigm instead of the root morpheme. For example, some nouns in Middle English could form their plural by adding *–n*. This *–n* is still retained in a few modern words like *oxen* and *children*, but it was replaced in Modern English with *–s* for nearly all other nouns: *eyen* > *eyes*, *schon* > *shoes*, *treen* > *trees*, etc. This change was due to analogy with the plural pattern with *–s* that other Middle English nouns followed: *cloudes* 'clouds', *foxes*, *heedes* 'heads', etc.

Structural change

The morphological structure of individual words or expressions can also undergo change. One type of change to morphological structure is **reanalysis** or **rebracketing**, where an existing morphological boundary shifts across one or more phones. The result is that the word or expression still contains the same morphemes, but some of the phones have shifted from one morpheme to another.

This happened in the history of the English word *apron*. Middle English *naperon* was borrowed from Old French *naperon* 'tablecloth', and it continued as *napron* into Early Middle English. Like many nouns, *napron* was frequently used with the indefinite article, as in *a napron*. However, the definite article *a* has a second form *an* which is used before words that begin with a vowel, as in *an apple*. By reanalysis, the boundary between the article and the noun was shifted. This caused the [n] to be treated as part of the article rather than the noun, that is, *a napron* was reanalyzed as *an apron*. As a result, when the noun was used by itself, it become *apron*. Interestingly, the reverse boundary shift happened for *newt*, which was originally *ewte*, and by reanalysis, *an ewte* changed to *a newte*. See Figure 14.8 for a diagram of how reanalysis affected both *napron* and *ewte*.

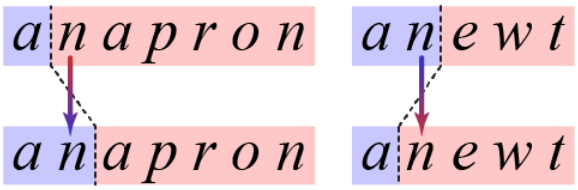


Figure 14.8. Reanalysis of **(n)apron** and **(n)ewt**.

We still see the original [n] in *(n)apron* in related words like *napkin* and *nape*, which did not undergo reanalysis. Similarly, we see the original lack of [n] in *(n)ewt* in the related word *eft*, which is used in the term *red eft*, the name for a juvenile eastern newt (*Notophthalmus viridescens*).

Another way that the morphological structure of a word or expression can change is if new morphemes or a new structure is imposed upon it that it did not have before. This is called **folk etymology** or sometimes **corruption**, in which users of a language treat a word as having an etymology that it does not actually have, and this changes how they interpret its morphological structure. They may even invent completely new morphemes to build the folk etymology, and these morphemes could end up being used to create new words later. The folk etymology normally has some combination of matching phonology and semantics to the original word, though sometimes only the phonology matches.

Folk etymology can be seen in the development of the English word *woodchuck*, which was a late 1600s borrowing from an Algonquian language. The exact source is not known, but a likely candidate is the word [ʊˈt͡ʃeːk] ᐅᐁᐧ *(ochek)* 'fisher (*Pekania pennanti*)' from Cree, which is a dialect continuum in the Algonquian family, spoken in Canada and the United States.

Since [ʊˈt͡ʃeːk] contains phones used in Enlgish, it could have just been straightforwardly adapted into English with little change. However, its lack of transparent morphology lead to it being reinterpreted as a compound of *wood* and *chuck* 'throw', giving a possible etymology (an animal that throws wood around, perhaps) with a similar pronunciation: ['wʊdˌt͡ʃʌk] versus [ʊˈt͡ʃeːk]. Real woodchucks do not in fact do anything special with wood, let alone throw it, but the phonological similarity and vague semantics were enough to reinforce this folk etymology. Other examples of folk etymology in English include the following:

- Old English *angnægl* ‘hangnail’ was originally a compound of *ange* ‘tight; painful’ and *nægl* ‘nail’, but it was eventually reanalyzed through folk etymology as *hangnail*, through influence from both phonological and semantic similarity to *hang*, since hangnails are pieces of torn flesh that “hang” next to the nail
- Spanish *cucaracha* ‘cockroach’ was borrowed into English and reanalyzed as *cockroach*, a folk etymology influenced by phonological similarity to the existing words *cock* ‘rooster; male chicken’ and *roach* ‘fish in the genera *Hesperoleucus* or *Rutilus’*, which also refer to animals, though very different, so there is only weak semantic similarity; *cockroach* is now often clipped to just *roach*
- Old French *meisseron* ‘mushroom’ was borrowed into Middle English and reanalyzed as *mushroom*, a folk etymology influenced by phonological similarity to the existing words *mush* and *room*, with no notable semantic influence

Folk etymology likely begins at an individual level, often due to a misperception of the real word, when it is sometimes called an **eggcorn** (Liberman 2003). The term *eggcorn* itself is also an eggcorn, in this case, a misinterpretation of *acorn*. Examples of eggcorns include the following, some of which are more commonly used and accepted than others:

- *chomping at the bit* < *champing at the bit*
- *cold slaw* < *coleslaw*
- *for all intensive purposes* < *for all intents and purposes*
- *hone in* < *home in*
- *wet your appetite* < *whet your appetite*

Many eggcorns are only obvious in spelling, because the replacement is pronounced the same as the original, as in the following:

- *deep-seeded* < *deep-seated*
- *free reign* < *free reign*
- *of* < *-’ve* (as in *could of*, *should of*, etc.)
- *peak my interest* < *pique my interest*
- *tow the line* < *toe the line*

Importantly, folk etymology and eggcorns are fundamentally the same process, just with different levels of acceptance: eggcorns are used by individuals, folk etymology are used by an entire language community. A person is not less intelligent or less competent at English for using *cold slaw* or *could of* instead of *coleslaw* and *could’ve*. Indeed, they are demonstrating the same creative insight into English that speakers used centuries ago for words like *woodchuck* and *hangnail*. As with any case of variation, their version of the language may be mocked now, but some day, it could eventually become the accepted version used by everyone, transitioning from an eggcorn into a folk etymology.

A similar concept is a **mondegreen** (Wright 1954), which is like an eggcorn in that it is also an idiosyncratic misperception by individual language users. The difference between an eggcorn and a mondegreen is their different effects on the meaning. With an eggcorn, the fundamental meaning is still the same: *eggcorn* still refers to an acorn, *cold slaw* still refers to coleslaw, etc. But with a mondegreen, the semantics change, too.

The original example of a mondegreen (and the name of the phenomenon) comes from a 1954 article by Sylvia Wright. In her article, Wright discusses her own childhood misunderstanding of the lyrics of “The Bonny Earl of Murray” (a.k.a. “The Bonnie Earl O’ Moray”), an old Scottish ballad from a collection of songs, poems, and ballads published by Thomas Percy in 1765. The first stanza of the original as published by Percy (1765: 211) is on the left in Table 14.7, with a modernized version on the right:

Table 14.7. First stanza of “The Bonny Earl of Murray”

Ye highlands, and ye lawlands, Oh ! whair hae ye been ? They hae slaine the Earl of Murray, And hae layd him on the green.	You highlands, and you lowlands, Oh, where have you been? They have slain the Earl of Murray, And have laid him on the green.

Wright misheard the final line as *and Lady Mondegreen*, imaging that Lady Mondegreen was perhaps the Earl of Murray’s wife, and both had been killed. This changes not only the pronunciation and morphology, but also the meaning. Wright’s mondegreen includes someone who did not even exist in the original!

Mondegreens are often the result of mishearing lyrics from a song or poem. Perhaps one of the most famous mondegreens is *scuse me while I kiss this guy* as a mishearing of *scuse me while I kiss the sky* from the 1967 song "Purple Haze" by the Jimi Hendrix Experience. Jimi Hendrix singing the relevant lyric can be heard starting at 0:45 in the video linked here: https://youtu.be/WGoDaYjdfSg?t=45. Note that the mondegreen changes the meaning of the lyric to something that is more physically plausible (kissing a guy versus kissing the sky), which is why it so easily arises.

Just as an eggcorn may become frequent enough for everyone to adopt it as part of the language as a folk etymology (as happened with *woodchuck*), a mondegreen may become so common that the standard version of the song changes to match the new misheard lyrics. For example, in the first published version of "The Twelve Days of Christmas" (in a children's book of unknown authorship from around 1780), the fourth present given to the singer was *four colly birds*, where *colly* is an older word for 'black' related to *coal*. However, by the 1909 version arranged by Frederic Austin, *colly* had become an obsolete word, and the lyric had shifted to the mondegreen *four calling birds*, no longer referencing their colour at all. Unlike with an eggcorn becoming a folk etymology, there is no special name for a mondegreen like this that becomes standardized.

Folk etymology can also result in **back formation**, which is a special type of neologism that creates a new morpheme from the false morphological structure, in which the new morpheme is used beyond the original word it was created for. The new morpheme could be a free morpheme or a bound morpheme, depending on the situation.

For example, English borrowed the word *emotion* from French, but because there are many English nouns having the structure of verb plus the suffix *–(t)ion*, *emotion* was incorrectly analyzed as having the same structure: *emote–ion*. This resulted in the creation of the new free morpheme *emote* in English. Many other verbs were created in English the same way: *donate*, *resurrect*, *secrete*, etc.

Back formation can also create new bound morphemes, like the English suffix *–holic* (or *–oholic* or *–aholic*), which is back-formed by treating the word *alcoholic* as if it had the structure *alco-holic* or *alc-oholic*, even though it has no such structure (it is actually structured as the Arabic loanword *alcohol* plus the adjective suffix *-ic*). This invented morpheme *-holic* is treated as meaning 'addict', and it can be used fairly productively to create new words, like *chocoholic* 'chocolate addict', *shopaholic* 'shopping addict', *sugarholic*, 'sugar addict', *workaholic* 'work addict', etc.

A word that uses a back-formed bound morpheme like *–holic* looks a lot like a blend; that is, we might think of *shopaholic* as being a blend of *shop* and *alcoholic*, rather than being *shop* plus the back-formed suffix *–holic*. However, blending usually results in only a single neologism, while a morpheme created through back formation could be used to create many new words. Language is flexible though, and it could be difficult in some cases to draw a clear boundary between blending and back formation.

Other examples of back formation in English include the following:

- some verbs like *babysit* and *edit* were back-formed from nouns (*babysitter* and *editor*) which are similar to other nouns that are built from a verb plus the suffix *–er* or *–or*, like *baker* and *sailor*
- some singular nouns like *bicep* and *pea* were back-formed from nouns (*biceps* and *pease*) which were originally already singular, but they seemed like regular plurals ending in *–s*, so they were misinterpreted as plurals, requiring new singulars to be created
- the prefix *cyber–* was back-formed from the word *cybernetics* and can now be used quite productively to derive new words having to do online activities, like *cyberbullying*, *cybercafe*, *cyberspace*, etc.

Morphosyntactic change

Morphology and syntax are intimately related, especially in the realm of grammatical functions, like verb tense and noun case (see Section 5.7 for many others). Some languages may express a particular grammatical function **synthetically** (as a bound morpheme within the same word as the root), while others may express it **analytically** (that is, as a free morpheme separate from the root). Some languages can even differ within themselves, expressing some grammatical functions synthetically and some analytically.

For example, in English, the past tense is ordinarily formed synthetically with a suffix, while the future tense is formed analytically with a separate word. Contrast this with Malagasy (a Greater Barito language of the Austronesian family, spoken in Madagascar), in which both the past and future tenses are synthetic (with the tense morphemes being prefixes), and with Māori (a Tahitic language of the Austronesian family, spoken in New Zealand), in which both tenses are analytic (with the tense words preceding

the verb). The different patterns for these three languages are demonstrated in Table 14.8, with data adapted from Richardson 1885 (for Malagasy) and from Williams 1917 (for Māori).

Table 14.8. Comparison of tense in English, Malagasy, and Māori

language	past tense	future tense	type
English	[pl**ɛd**]	[**wɪl** ple]	**synthetic** / **analytic**
Malagasy	[**ni**lalao]	[**hi**lalao]	**synthetic**
Māori	[**i** taːkaro]	[**ka** taːkaro]	**analytic**
	‘played’	‘will play’	

Over time, languages can change from synthetic to analytic and vice versa, because of the connection between morphology and syntax. Morphology and syntax essentially behave as two aspects of the same underlying concept, called **morphosyntax**. Diachronic changes to the morphosyntax of a language, as well as changes to just the syntax, are discussed in Section 14.5.

Check your understanding

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CHAPTER OVERVIEW

Chapter 15: PSRs and Flat Tree Structures

This appendix is provided as an alternative to the second half of the syntax chapter (Sections 6.14-6.21), teaching flat tree structures instead of x-bar. It is written to follow Section 6.13. It is recommended to use this alternative for one-semester introductory courses, as well as any introductory courses that have two weeks or fewer to cover syntax.

15.1: Phrase Structure Rules

15.2: Phrase Structure Rules in Other Languages

15.3: Properties of PSR Trees

15.4: Structural Ambiguity

15.5: Head movement in yes-no questions

15.6: Phrasal movement in wh-questions

15.7: Draw a Tree Step-by-Step

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15.1: Phrase Structure Rules

As we saw in the last section, **Phrase structure rules** (or PSRs) are the rules we use to build tree diagrams. They are a way to describe and record which kind of phrases can occur inside and modify which other kinds of phrases. They are also hypotheses, so if we find a sentence that doesn't fit with our rules, we should not panic! Instead, we should double-check that we've actually analyzed the sentence properly, and if we have, we should keep calm and revise our hypothesis. The final form of the phrase structure rules we will be using in this textbook are as follows. They will look very similar to the PSRs we developed in Section 6.13, but they have a few small additions.

(1)	a.	S → (AdvP) NP/CP (Aux) (Neg) VP (AdvP)
	b.	CP → (Comp) S
	c.	NP → (Det) (Num) (AdjP+) N (PP+)
	d.	VP → (AdvP+) V (NP) (NP/CP) (AdvP+) (PP+) (AdvP+)
	e.	PP → (Deg) P (NP)
	f.	AdvP → (AdvP) Adv
	g.	AdjP → (AdvP) Adj (PP)

Phrase structure rules try to answer these three questions.

- What rules are there about what is allowed to modify what?
- Are there any patterns?
- If so, how can we represent these patterns?

Phrase structure rules are a formal hypothesis for representing constituency using rules. They indicate what each type of constituent must contain and what they may optionally contain.

They take the following form:

(2)	XP → (YP) X (ZP+)

In this kind of template, X, Y, and Z are variables representing any category such as nouns, verbs, adjectives, prepositions, determiners, etc. The first part, before the arrow, is the name of the constituent. The arrow itself can be read as *consists of*. After the arrow, there is a list of the elements that are inside of the constituent, in order from left to right. Elements without parentheses are obligatory. Elements in parentheses are optional. A plus sign means you can have as many of that type of constituent as you need; there can be multiple of that kind of constituent.

Embedded Clauses

You might notice that the PSR in (1b) is completely new, it wasn't in Section 6.13! This is the rule that introduces embedded clauses (see Section 6.6 for a refresher on embedded clauses). C (or Comp) stands for **complementizer** and includes words like *that*, *for*, *if*, and *whether*.

Embedded clauses can appear in a number of positions, but the most common one is in **object** position, appearing instead of the NP object inside of the VP (or instead of the second object, in the case of ditransitives). For example, in (3a) and (4a) we have the NP object *some syntax*. In (3b) and (4b), these are replaced with the embedded clause *that syntax is fun*.

(3)	a.	I know [some syntax].
	b.	I know [that syntax is fun].
(4)	a.	I taught my students [some syntax].
	b.	I taught my students [that syntax is fun].

This is why the VP rule in (1d) has NP/CP in the second object position; the second object can be an NP or a Complementizer Phrase (but not both).

Another place you might see a clause in this textbook is in **subject** position, as shown in (5).

(5)	a.	[It] is obvious.
	b.	[That cake is delicious] is obvious.

A subject embedded clause is inserted with the PSR in (1a); this PSR has NP/CP in the subject position, meaning that the subject can be an NP or a CP (but not both).

One common mistake that students make when drawing embedded clauses is to miss a layer in the structure, since the complementizer can be silent in English, as shown in (6).

(6)	a.	I know [that syntax is fun].
	b.	I know [syntax is fun].

However, our PSRs don't allow you to put an S *directly* into the VP. You can only put a CP into the VP. Our PSR rules also don't allow you to put an NP and a VP *directly* into the CP; they need an S layer. So an embedded clause must always have a CP layer *and* an S layer.

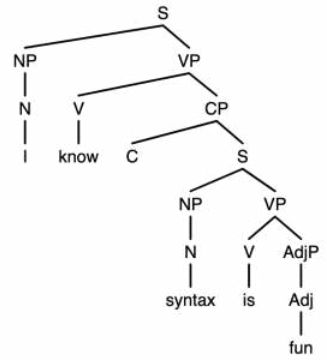


Figure A1.1: Example tree of (6b)

Similar Structures

One thing to watch out for is that two sentences or phrases that appear very similar might have very different structures, so you actually need to think about what a sentence means when you're drawing a tree diagram. You can't just draw it robotically. If you do, you'll probably make mistakes.

For example, one common mistake is to mix up the constituency in adjective and adverb phrases. Consider the phrases in (7).

(7)	a.	the big yellow balloon
	b.	the very yellow balloon

These two phrases look very similar, but they have different structures. In (7a), does *big* describe *yellow* or *balloon*? Can yellow be big? Not really. The *big* describes the balloon, so you need to have two separate adjective phrases, one for *big* and one for *yellow*. Both are attached directly to the NP because *big* modifies *balloon* and *yellow* also modifies *balloon*.

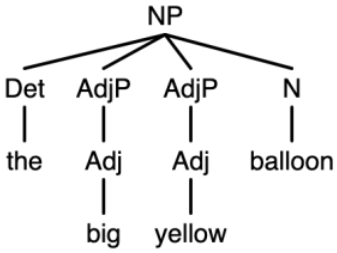


Figure A1.2: tree of (7a)

However, (7b) is different. Think about it. Does *very* describe *yellow* or *balloon*? *Very* describes *yellow* because a balloon can't be very. So even though these phrases look very, very similar, they have different structures. In (7b), *very* is an adverb phrase that modifies the adjective and then that entire adjective phrase *very yellow* modifies the noun.

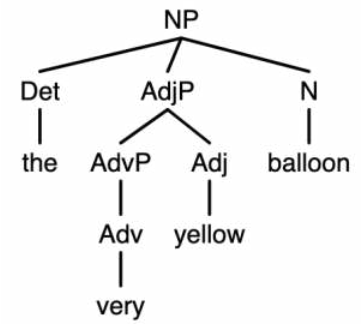


Figure A1.3: tree of (7b)

For a fun comic illustrating sentences that are similar but have distinct structures, check out this comic on the *Speculative Grammarian* (a satirical journal of linguistics).

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15.2: Phrase Structure Rules in Other Languages

One thing that linguists often do is look at languages that they don't know much about and look for the word order patterns in that language. They can then describe the patterns with phrase structure rules.

The first step in figuring out the phrase structure rules for another language is to determine the constituency in your data. You can use the meaning in the English translation to determine what modifies what in the other language.

Let's look at some examples together. The following examples are from Turkish. Remember that in examples from other languages, the first line is written naturally in the other language. The second line tells you what each word in the other language means. The third line tells you what the sentence means in English.

The abbreviations used in these examples are listed in the table below.

Abbreviation	**Meaning**
1	First person (I/me)
3	Third person (it/she/he)
OBJ	Object case marker
PASS	Passive voice marker
POSS	Possessive marker
PST	Past tense
SG	Singular number

Table A1.x: Turkish glossing abbreviations

Step 1: Identify the order of subject, object, and verb

The first constituents you should look for are the subject and the verb phrase. The subject will typically be the NP that performs the action, while the VP will include the verb and the object NP. The object NP is the NP at which the action is directed.

The VP *always* includes the verb and the object (if there is an object). It *never* includes the subject.

In sentence (1), the word order is roughly *Toprak Deniz see*, as we can see from the second line. But how do we know whether Toprak saw Deniz or Deniz saw Toprak? Well, we look at the English translation in the third line. The sentence means that Toprak is the one doing the seeing, not Deniz, so Toprak is the subject. Likewise, Deniz is the one being seen, so Deniz is the object.

(1)	Toprak	Deniz'-i	gör-dü.
	Toprak	Deniz-OBJ	see–PST
	'Toprak saw Deniz.'		

From this, we can hypothesize that Turkish is an SOV language, which means that sentences in Turkish follow a subject – object – verb word order by default.

Turkish also has object case markers which can help us find the object (see Section 5.7 for a refresher on what case is). Not all languages use case markers, and sometimes case markers are used in unexpected ways, so we cannot always depend on case markers to help us determine which NP is the subject or the object. However, it can be a useful piece of secondary evidence!

You can draw boxes around the constituents you identify so you don't get confused! In example (1) we might draw a box around Deniz'i gördü 'saw Deniz' to remind ourselves that this is a constituent, the VP

How to be a linguist: Working Hypotheses

This approach works on the assumption that the English translation in the third line has an equivalent structure as the original language, which is not always the case. Linguists will try to translate the sentence as close as possible, but sometimes the language will have a structure that does not have an equivalent in English.

For example, here is what a passive sentence looks like in Turkish, although, unlike in English, it is unusual (but still possible!) to include the subject in a passive like we did here. (For a refresher on what a passive is, see Section 6.11).

(2)	Deniz	Toprak	taraf-ın-dan	gör-ül-dü.	
	Deniz	Toprak	side-3SG-POSS	see-PASS-PST	
	‘Deniz was seen by Toprak.’ Or literally, ‘Deniz was seen from Toprak’s side.’				

Because it’s passive, the one doing the seeing is not in subject position, and the one being seen is not in object position.

It is important to keep in mind the difference between the structural subject and the thematic subject. The structural subject is the NP that appears in the subject position of the clause (the daughter of S). The thematic subject is the NP with the agent theta role (see Section 6.10). In most sentences, both of these pick out the same NP, the subject. However, sometimes they aren’t the same, such as in passive sentences.

When you’re working on an unfamiliar language, you won’t always know if there’s something happening that is adding extra complication to your data, like if it’s a passive sentence. But we have to start somewhere! So what we do is we make a hypothesis based on the data we have. We try to make it the simplest hypothesis possible. After that, we collect more data to check our first hypothesis.

If the passive sentence was the only sentence of Turkish we had, we might conclude that Turkish has OSV word order instead of SOV (depending on how seriously we took the structure of the English translation). However, once we collected more data, we’d probably notice that the passive sentence has a different word order than the others. We might also notice that the passive sentence has morphological differences. For example, it has the passive marker on the verb but it doesn’t have the object case marker on the object. We would use these clues to help us revise our initial hypothesis and conclude that sentence (2) has a change in argument structure and that Turkish really is SOV.

Step 2: Adding the modifiers to the constituents

After we identify the order between subject, object, and verb, we can start to fill out some of the other constituents, by identifying what the modifiers are modifying.

For example, in sentence (3), we have the adjective *siyah* ‘black’ occurring between two nouns. Some languages (like English) put adjectives on the left of the noun it modifies, while others (such as French) put adjectives on the right. How do we know, then, whether Turkish is like English, and this sentence is about a black table, or whether Turkish is like French, and this sentence is about a black book?

(3)	Kitap	siyah	masa-ya	dokun-du.
	book	black	table-OBJ	touch-PST
	‘The book touched the black table.’			

Again, we can tell by looking at the English translation in the third line. In the translation, black modifies table, so we can know that *siyah* modifies *masaya*, and therefore that *siyah masaya* forms a constituent.

You may want to put a box around this constituent too, so we remember what we figured out.

Turkish has a phonological assimilation rule called vowel harmony which can change the pronunciation of vowels to match the backness feature of other vowels in the word. This is why the past tense marker is sometimes *–dü* and sometimes *–du*. This difference doesn’t affect the syntax, so you don’t need to worry about that difference here.

Step 3: Looking for patterns

After you've identified the constituents, you need to go through each constituent one by one and identify what goes into that constituent. At this step, the sort of questions you should ask are:

- What is optional in this kind of constituent?
- What is obligatory in this kind of constituent?
- Which elements can be repeated, so that they need a plus sign?
- What is the relative order of the elements inside a constituent?

You can identify that something is optional in a given constituent by noticing that it isn't there each time that kind of constituent appears in your data.

For example, the S rule will show the order between the subject NP and the VP. However, in some languages, including Turkish, the subject is optional in some contexts. This is shown in sentences (4) and (5). In sentence (4), there is a subject pronoun *ben* 'I'. But in sentence (5), which has the exact same meaning, there is no subject pronoun! You can still tell who the subject is, but only because of the agreement marker on the verb.

(4)	Ben	Deniz'i	gör-dü-m
	I	Deniz-OBJ	see-PST-1SG
	'I saw Deniz.'		

(5)	Deniz'i	gör-dü-m
	Deniz-OBJ	see-PST-1SG
	'I saw Deniz.'	

Because of this, when we write the S rule for Turkish, we will put the subject NP in brackets to show that it is optional.

(6)	S → (NP) VP

When we're working with a small data set, like you will be doing on most of your homework in this class, you won't usually be able to tell for sure whether something is obligatory. However, if it appears in all of the relevant places in your data set, you should assume it is obligatory until you find evidence to the contrary. So, for example, all of the sentences we've looked at in this section are transitive, and have an object. So we would not put the object NP in parentheses. (Turkish does have intransitive verbs, though, so if our data set was a bit bigger, this would be different.) Remember, we are writing our PSRs as a model that describes the data we have, not the data we expect to exist. Once we gather that further data, we can revise our hypotheses.

When you are listing the members of a constituent in your PSRs, be careful that you list the constituents of just the next layer of structure.

For example, let's look at sentence (3) again.

(7)	Kitap	siyah	masa-ya	dokun-du.
	book	black	table-OBJ	touch-PST
	'The book touched the black table.'			

In this sentence, the VP is *siyah masaya dokundu* 'touched the black table.' Many students will look at this sentence and conclude that the VP rule for Turkish is an AdjP (for *siyah*), followed by an NP (for *masaya*), followed by a V (for *dokundu*), as shown in (8). But this isn't quite right!

(8)	*Incorrect rules*
	VP → (AdjP) NP V
	NP → (AdjP) N

Earlier we decided that *siyah masaya* 'black table' was a constituent. The adjective doesn't belong directly in the VP; instead it belongs inside of the NP meaning black table, and the whole NP is inside the VP, as shown in the tree in Figure A1.4.

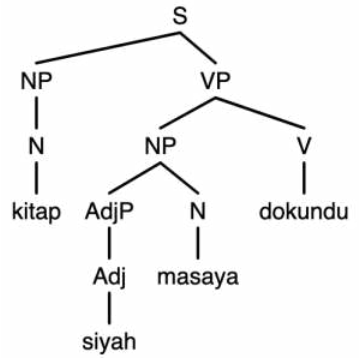


Figure A1.4: Tree of example (7)

The incorrect rules in (8) put the same AdjP in two different places—both inside the VP and inside the NP. Instead, it should only belong to the NP, as in (9). *Siyah* does not modify the verb. It only modifies the noun, so it belongs to the NP.

(9)	*Correct rules*
	VP → NP V
	NP → (AdjP) N

Step 4: Putting it all together

In your last step, you should collect all of your PSRs in one list and then double check them. Here is the list of PSRs for the Turkish data from this section.

(10)	*Turkish PSRs*
	S → (NP) VP
	VP → NP V
	NP → (AdjP) N
	AdjP → Adj

The first thing you should do to double check your answers is to compare all of the data in your data set to the final version of your rules. Sometimes when you revise a rule, you accidentally make it inconsistent with some data you looked at earlier in your process.

I also recommend you draw a tree of one or more sentences in your data using your PSRs, to check to see if following your PSRs strictly makes the word order come out right with no pieces missing. If you only draw one sentence, choose the most complicated one. That is the one that is most likely to have a mistake! If you have to draw something that isn't listed in your rules, then either you've drawn it incorrectly or there's a mistake in your rules.

Special thanks to Çağrı Bilgin for coming up with the Turkish data in this section.

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15.3: Properties of PSR Trees

Headedness

One thing that we can notice about the phrase structure rules is that most phrases must have a **head**. Recall from Section 6.3 that a head is the word in a phrase that determines the properties of the entire phrase.

In our PSRs, repeated below in (1), the **label** of the phrase is *usually* named after the head of the phrase. The only exception is S in (1a).

(1)	a.	S → (AdvP) NP/CP (Aux) (Neg) VP (AdvP)
	b.	CP → (Comp) S
	c.	NP → (Det) (Num) (AdjP+) N (PP+)
	d.	VP → (AdvP+) V (NP) (NP/CP) (AdvP+) (PP+) (AdvP+)
	e.	PP → (Deg) P (NP)
	f.	AdvP → (AdvP) Adv
	g.	AdjP → (AdvP) Adj (PP)

Another property of heads in PSRs is that the head is the only part of the PSR that is not a phrase (an XP). So in the VP rule in (1d), for example, the AdvPs, the NPs, the CP, and the PPs all have that P at the end to indicate it is a phrase. The only member of the VP rule that is not a phrase is the verb. The only exceptions to this are Aux and Neg in the S rule (1a) and Det and Num in the NP rule (1c). S in (1b) looks like an exception because it doesn't have a P, but it really is a phrase (it includes more than one word); it just has an unusual label.

The final property of heads is that they are usually the only part of the phrase that is obligatory. The exceptions to this are the subject and VP in the S rule in (1a), and both the Comp and the S in the CP rule in (1b). In the CP, the head is optional while the non-head S is obligatory!

If the exceptions to the properties of heads in these rules are bothering you, you're in good company! If you take some more advanced syntax courses, you will probably learn about some explanations about these exceptions.

These properties of heads can also help us identify a head in a tree diagram, such as in Figures A1.5 and A1.6.

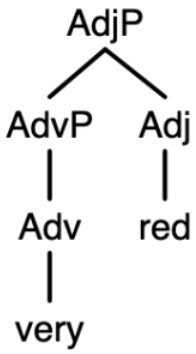


Figure A1.5: Tree diagram of '*very red*'

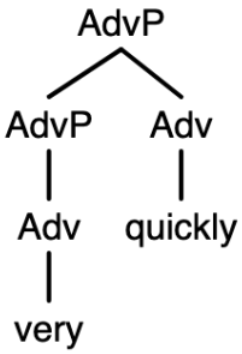
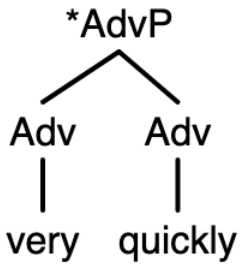


Figure A1.6: Tree diagram of '*very quickly*'

The adverb phrase *very red* in Figure A1.5, for example, has the adjective head *quickly*. It is modified by the AdvP *very*, which only has a single word which is also the head, *very.* You can tell that *red* is the head of the main AdvP, and not *very*, because the category of *red* matches the category of the phrase (adjective) and because there is an extra AdvP layer above *very*.

On the other hand, in *very quickly* in Figure A1.6, we have an adverb modifying another adverb. The head of the main adverb phrase is *quickly*, with another AdvP *very* modifies it. This has the same structure as *very red* in Figure A1.5, except that *quickly* is an adverb, instead of an adjective like *red*, so we cannot use the category label to determine which one is the head. But we can still use the number of layers to figure it out. *Quickly* is the head of the main AdvP and it is modified by *very*, which appears in its own AdvP.

Watch out that you never draw something like in Figure A1.7. A phrase will *never* have two heads like this. (Note the asterisk to indicate that this is an ungrammatical structure).



A1.7: An ill-formed AdvP structure with two heads

Every phrase must have a head and one head (except the S rule, which doesn't have a head at all).

We can describe this pattern with the **Principle of Modification** in (2).

(2)	*Principle of Modification*
	If an XP modifies a head Y, then XP must be Y's sister, or, in other words, XP must be the daughter of YP

According to the Principle of Modification, if an XP modifies some head, then XP must be Y's sister. According to the way the principle of modification is written, all modifiers must be phrases. Modifiers are always attached inside the phrase they modify.

Another common mistake is to mix up the head and the modifier in a tree diagram. Modifiers are attached inside the phrase they modify, not the other way around. For example, the phrase *very quickly* must be drawn as in Figure A1.6 and not as in Figure A1.8.

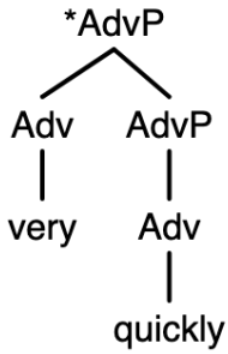


Figure A1.8: An ill-formed AdvP structure with '*very*' as the head instead of '*quickly*'

Recursion and the Power of PSRs

We saw in Section 6.6 that sentences could be placed inside of another sentence. You can also put other kinds of phrases inside of each other. For example, you can put an NP inside of an NP, as in (3).

(3)	a.	the yard
	b.	the tree in [the yard]
	c.	the branch on [the tree in [the yard]]
	d.	the leaf on [the branch on [the tree in [the yard]]]
		and so on…

Putting something inside of itself is called recursion, and it is what allows language to be infinite.

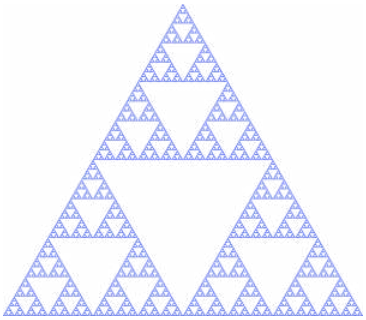


Figure A1.9: The Sierpiński triangle is an example of a visual recursive structure. The triangle pattern repeats inside of each triangle. Image by Beojan Stanislaus is licenced under CC BY-SA 3.0.

Recursion is built into our phrase structure rules. For example, the NP rule consists of an N and an optional PP, and the PP rule consists of a P and usually an NP, as shown in the simplified PSRs in (4)

(4)	a.	NP → (Det) N (PP+)
	b.	PP → P (NP)

Because the NP rule has a PP after the arrow, and because the PP rule has an NP after the arrow, you could repeat these two rules forever.

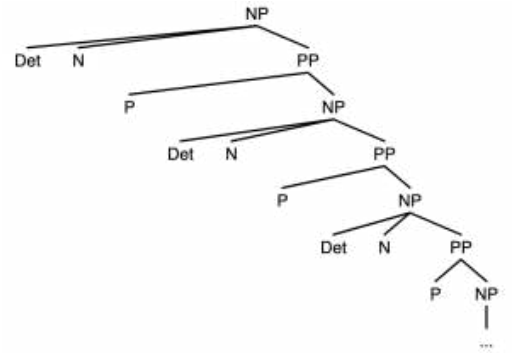


Figure A1.10: Tree of recursive NPs and PPs

Any pair of rules that contain each other's phrases work the same. Because of this, recursion is built into our PSRs.

The properties of language, including recursion, constituency, and hierarchical structure, are captured by phrase structure rules. Phrase structure rules also captured the fact that language is recursive and therefore infinite. Phrase structure rules have a lot of power!

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15.4: Structural Ambiguity

Note: This is adapted from Section 6.17

When we talked about morphology, we saw a first example of structural ambiguity in Section 5.9: cases where the same string of morphemes can have more than one structure, with each structure corresponding to a different interpretation.

The same thing is found in syntax. Consider the following example:

(1)		I saw someone with a telescope.

This has two possible interpretations:

1. I was using a telescope, and I saw someone. (PP modifies VP)
2. I saw someone, and that person had a telescope. (PP modifies NP)

When a sentence is restated with a new wording, it is called a **paraphrase.** You may be asked to provide paraphrases of the two meanings of an ambiguous sentence and draw the trees that represent the two meanings an a linguistics assignment or test. If you are asked to do this, make sure your paraphrases aren't also ambiguous, and make sure you draw a tree of the original sentence, not your paraphrase.

In the first interpretation, the prepositional phrase [$_{PP}$ with a telescope] modifies the verb phrase headed by *saw*. In the second interpretation, the same prepositional phrase modifies the noun phrase *someone*. These two structures are illustrated below:

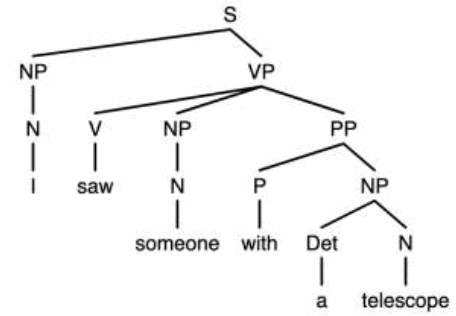


Figure A1.11: Tree diagram showing [PP with a telescope] as a modifier of the verb, meaning "I used a telescope to see someone".

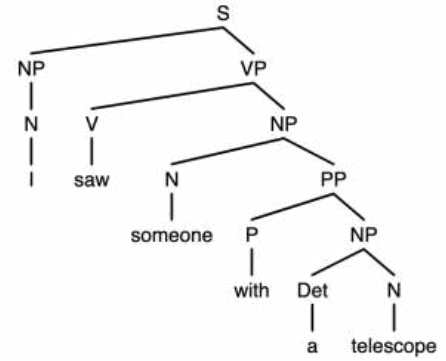


Figure A1.12: Tree diagram showing [PP with a telescope] as a modifier of the NP object, meaning "I saw a person and that person had a telescope"

The same will be true for other cases of structural ambiguity—each meaning will correspond to a different potential tree structure.

We can use the **principle of modification,** repeated in (2), to decide how to draw structurally ambiguous sentences.

(2)	*Principle of Modification*
	If an XP modifies a head Y, then XP must be Y's sister, or, in other words, XP must be the daughter of YP

If we apply this to the sentence in (1), we may notice that *with a telescope* can modify either the verb *saw* or the noun *someone*. If it modifies the verb *saw*, it will have the meaning that the act of seeing was done using a telescope and the PP will be sister to the verb, as shown in Figure A1.11. On the other hand, if the PP modifies the noun *someone*, it will have the meaning that the someone has the telescope and the PP will be sister to the noun, as shown in Figure A1.12.

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15.5: Head movement in yes-no questions

Note: *This is adapted from Section 6.19.*

Recall from Section 6.7 that *yes-no* questions are questions that can be answered with *yes* or *no*, and are formed by swapping the positions of the subject and the auxiliary, which is called **subject-auxiliary inversion**, as shown in (1)-(3). In these examples, the subject is in bold and the auxiliary is underlined.

(1)	a.	**They** have left.
	b.	Have **they** left?
(2)	a.	**Iryna** is eating cake.
	b.	Is **Iryna** eating cake?
(3)	a.	**The man with the long beard and the plaid shirt** is waving at you.
	b.	Is **the man with the long beard and the plaid shirt** waving at you?

If there is no auxiliary, the auxiliary word DO is inserted, and then the auxiliary DO inverts.

(4)	a.	**Hari** plays the viola.
	b.	**Hari** does play the viola.
	c.	Does **Hari** play the viola?

Subject-Aux Inversion as Head Movement

Subject-auxiliary inversion reverses the order of the subject and the auxiliary. Thinking not in terms of the linear order of the subject and the auxiliary, but instead in terms of tree structure, could we state this transformation more precisely?

The tree for *They have left*, an ordinary declarative clause, will be as in Figure A1.13, according to our PSRs.

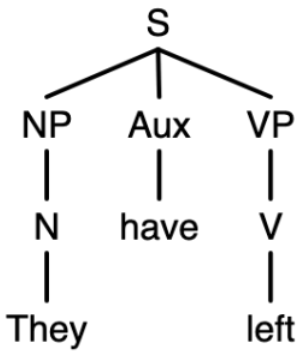


Figure A1.13: The tree for “They have left.”

The structural relations in this tree encode the grammatical relations between the subject, the clause as a whole, and the predicate. Those relations should not be fundamentally different in a question. We just want to add a difference in the order of constituents, in order to mark that this is a question.

The simplest way to change the order of the subject and the auxiliary is to **move** one of them. We could either move the auxiliary up and to the left, or move the subject down and to the right.

If we think about *embedded* questions, these have a question complementizer above the S, *if* or *whether*.

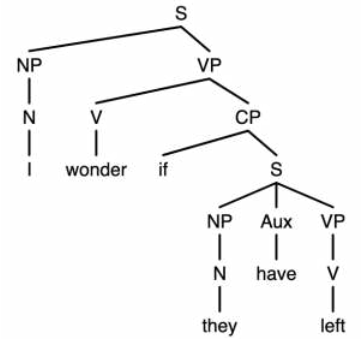


Figure A1.14: Tree of “I wonder if they have left.”

This complementizer is in the same position that the auxiliary appears in in main clause questions: right before the subject. This gives us a way to understand subject-auxiliary inversion as movement of the auxiliary from S up and to the left, to land in C. This is illustrated in Figure A1.16.

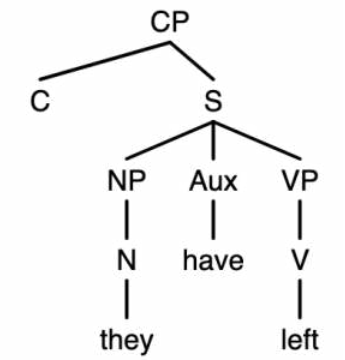


Figure A1.15: Tree of “Have they left?” before movement.

[CP have [S [NP they] <have [VP left]]]" class="wp-image-3736" height="391" width="287" src="/@api/deki/files/131258/have-they-left-220x300.png">

Figure A1.16: Tree of “Have they left?” after movement.

The movement in Figure A1.16 is an example of **Head Movement**, which changes a tree by moving a head to the next head above it.

(5)	**Head Movement**
	Movement of a head (X) into the next higher head position.

We can now restate the generalization about how *Yes-No* Questions are formed in English main clauses. To name an instance of head movement, you can identify the start and end points. So the movement we see in English main clause questions is called **Aux-to-C movement.**

(6)	**Yes -No Question Formation in English**
	Yes-No Questions are formed by **moving the auxiliary in S to C.**

This is a **derivational** way of representing the relationship between a fronted auxiliary and the position it occupies in statements: we start with one tree structure and make a change to it in order to arrive at the final structure. There are other ways to represent this dependency, some of which are pursued in non-derivational approaches to syntax.

Notation for Head Movement

In the history of generative linguistics, there have been several different notations used for movement. In this class, we will put angle brackets around the thing that moved like so: <thing that moved>, and draw an arrow to the position it moves to.

There are other ways of indicating movement, which you might encounter online or in other resources. These include *trace notation*, where the original position of the moved element has a "trace" (written *t*) left in it. This can be thought of as a variable, or as the empty space left behind by the thing that moved. Trace notation won't be used in this class, but we mention it so that you won't be confused if you see it elsewhere.

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15.6: Phrasal movement in wh-questions

Note: This is adapted from Section 6.19.

Alongside *yes-no* questions, there are also *wh*-questions, also known as content questions. Content questions in English usually have a *wh*-word at the beginning (*who*, *what*, *which*, *when*, *where*, *why*, or *how*). The answer to a *wh*-word question will be a phrase, not *yes* or *no*.

Wh-questions also have subject-auxiliary inversion. The auxiliaries are in bold in the examples below. In (1b), *did* appears before the subject *Bruno*; in (2b), *is* appears before the subject *Kenzie*; in (3b), *is* appears before the subject *Radu*. We can analyze subject-auxiliary inversion as Aux-to-C movement in *wh*-questions, just like we did for *yes-no* questions.

(1)	a.	**Bruno** ate the cookie.
	b.	*What* did **Bruno** eat? The cookie.
(2)	a.	**Kenzie** is taking syntax classes at the university.
	b.	*Where* is **Kenzie** taking syntax classes? At the university.
(3)	a.	**Radu** is commuting by train.
	b.	*How* is **Radu** commuting? By train.

However, there is also something else going on in *wh*-questions. You may notice that the *wh*-word (italicized) appears in front of the auxiliary. In addition, part of the sentence disappears: *the cookie* in (1b), *at the university* in (2b), and *by train* in (3b). Plus, the part of the sentence that disappears happens to be exactly the same as the answer to the question. We explain this by saying that the *wh*-words actually replace a phrase, similar to a pronoun.

- *Who* replaces animate NPs.
- *What* replaces inanimate NPs and determiners.
- *When* replaces NPs, AdvPs, and PPs that describe time.
- *Where* replaces NPs, AdvPs, and PPs that describe location.
- *Why* replaces CPs that describe reasons.
- *How* replaces AdvPs, PPs, and CPs that describe manner.
- *Which* replaces determiners.

The *wh*-words replace phrases (except for Det, which we will return to later) and then they are moved to the front of the sentence.

Wh-phrases might, by coincidence, consist only of one word, but but we know that they are phrases because they can sometimes contain more than one word. In examples (1)-(3), you can see that what they replace can be more than one word, but what moves can also be more than one word.

(4)	a.	**Jagmeet** is taking salsa classes.
	b.	*What kind of dance class* is **Jagmeet** taking? Salsa classes.
(5)	a.	**Kenzie's class** is in the South building.
	b.	*Where at the university* is **Kenzie's class**? In the South building.

Which is special because it doesn't replace a phrase; instead it is a determiner. In (6), *which* replaces *that*; in (7), *which* replaces *a*. In both cases, the entire NP that contains the determiner *which* undergoes *wh*-movement to the front of the sentence, and so even

though *which* doesn't replace a phrase, it is still an entire phrase that moves. The *wh*-word *what* can also be a determiner sometimes. For example, in (4b), it is a determiner, but not in (1b).

(6)	a.	***Katoka** likes that spaghetti sauce.*
	b.	*Which spaghetti sauce* does **Katoka** like?
(7)	a.	**Zahra** has written a book about whales.
	b.	*Which book about whales* has **Zahra** written?

The *wh*-phrases can also start out anywhere in the sentence, not just the end. The phrases that are being replaced by the *wh*-phrase is in square brackets.

(8)	a.	**Kenzie** is taking [syntax classes] at the university.
	b.	*What* is **Kenzie** taking at the university? Syntax classes.
(9)	a.	**Jagmeet** is [happily] dancing.
	b.	*How* is **Jagmeet** dancing? Happily.

To figure out where it starts out, you can answer the question as a full sentence and see where the answer goes (such as in all of the (a) examples above), or you can act surprised and ask an **echo question**, as in (10).

(10)	a.	Bruno ate WHAT?	from example (1)
	b.	Jagmeet is taking WHAT kind of dance class?	from example (4)
	c.	Kenzie is taking syntax classes WHERE?	from example (5)
	d.	Zahra has written WHICH book about whales?	from example (7)
	e.	Kenzie is taking WHAT at the university?	from example (8)

Question word fronting as Phrasal Movement

Because *wh*-phrases are entire phrases, not heads, we can't describe their movement in terms of head movement. Instead, we're going to introduce a second (and final) type of movement: **Phrasal Movement**.

Recall that *wh*-questions all involve subject-auxiliary inversion, which we analyzed earlier as **Aux-to-C movement** when looking at main clause *Yes-No* questions. We can tell this has applied because the auxiliary is **before** the subject in all of the *wh*-questions in (1)-(9). But we can't use Aux-to-C movement to analyze how the content question word gets to the front of the sentence for two reasons:

1. The auxiliary is already in C. We can't put two words in one head, so we need to put the *wh*-word somewhere else—and somewhere further to the left.
2. The thing that moves to the front of the sentence in a *wh*-question isn't just a head, it's a whole phrase, like we saw in examples (4)-(7). In all of those examples, we have larger NPs moving to the front of the question, instead of the single word *what* or *where*—though these larger NPs still contain *wh*-words.

So we know that the content question phrase isn't pronounced in the C head in content questions. Instead it is pronounced before C. We can simply add an extra branch in CP, to the left of the C head, in order to contain the *wh*-phrase.

Let's work through an example, *What has the squirrel hidden?* The statement version of this question is *The squirrel has hidden nuts*. A labeled bracketed diagram is shown in (11). The subject NP is *the squirrel*, the auxiliary is *has*, the verb is *hidden* and the object is *nuts*.

(11)	[S [NP The squirrel] [Aux has] [VP hidden nuts]]

In the content question, what changes is that we have *what* as the object of *hidden*, instead of *nuts*. We also have a +Q C head above S, because that's where the auxiliary in T moves. We can schematize the structure before we do any movement as in Figure A1.17. (The tree before any movement occurs is called **Deep Structure** in some theories of syntax, though we won't focus on that terminology here.)

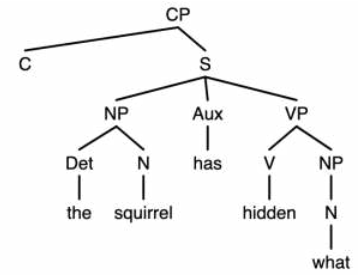


Figure 1.17: Tree for "What has the squirrel hidden?" before movement.

Now we need to transform this clause so that the question phrase appears in initial position, at the beginning of the sentence. This isn't head movement, it's **Phrasal Movement**, also referred to as **XP Movement**. A phrase can't go in a head position, but we can add an extra branch to the CP.

(12)	**Phrasal Movement**
	Movement of a phrase (XP) into a higher phrase.

This type of Phrasal Movement is known as *wh*-movement; Phrasal Movement is usually named for the type of phrase that moves.

(13)	***Wh*-movement**
	Move a *wh*-phrase from its original position into the CP.

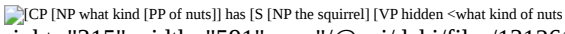
Figure A1.18 shows what the tree structure will look like after both Aux-to-C Movement and *wh*-movement have applied.



]]]]" class="size-medium wp-image-3762" height="236" width="300" src="/@api/deki/files/131260/what-has-the-squirrel-hidden-300x236.png">

Figure A1.18: Tree diagram for the question "What has the squirrel hidden?" after both Aux-to-C and wh-movement

What does it look like when we have a **complex NP** moving to Spec,CP? Basically the same, as shown in Figure A1.19.



]]]" class="wp-image-3785" height="315" width="591" src="/@api/deki/files/131261/what-kind-of-nuts-300x160.png">

Figure A1.19: Tree diagram for the question "What kind of nuts has the squirrel hidden?" after both Aux-to-C and wh-movement.

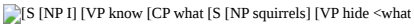
Embedded content questions

Embedded content questions have very similar tree structures. They are **like** main clause content questions in putting the *wh*-phrase at the front of the CP, but **unlike** main clause content phrases in that they don't do subject-auxiliary inversion (Aux-to-C movement).

What would this look like in a tree? Consider this embedded content question:

(14)	I know [CP what squirrels hide].

The tree for this sentence would be as in Figure A1.20.



]]]]]" class="wp-image-3740" height="412" width="383" src="/@api/deki/files/131262/i-know-what-squirrels-hide-279x300.png">

Figure A1.20: Tree diagram for the embedded content question “I know what squirrels hide.”

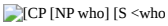
Notice that the embedded C is empty! In many varieties of English, when you have a *wh*-phrase in an embedded Spec,CP, it’s impossible to also have an overt complementizer. So sentences like (13) are always ungrammatical, even though *if* is a +Q complementizer. This is a property of **embedded *wh*-questions in English.**

(15)	*I know [CP what if squirrels hide].

This isn’t true in all languages! In many languages *wh*-movement is totally compatible with an overt complementizer; we saw this for Japanese content questions in Section 6.8.

Main clause subject questions

Subject questions—when the *wh*-word replaces the subject—are special because they also don’t appear to undergo subject-auxiliary inversion, even in main clauses. We normally wouldn’t be able to tell—after the subject *wh*-word moves to the front of the question, both the auxiliary and the C head appear in between the *wh*-word and the rest of the sentence, as you can see in Figure A1.21. The auxiliary could be in either head, and the sentence would look the same!



is [VP eating [NP the cookie]]]]" class="wp-image-3786" height="271" width="347" src="/@api/deki/files/131263/who-is-eating-the-cookie-300x234.png">

Figure A1.21: Tree diagram for the sentence “Who is eating the cookie?”

But there is one clue that it does not move. When there is no auxiliary, *do*-insertion doesn’t have to happen.

(16)	a.	**Bruno** ate the cookie.
	b.	*Who* ate the cookie? Bruno.

Linguists disagree about *why* subject-auxiliary inversion doesn’t happen in subject questions. It’s an interesting little unsolved puzzle!

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15.7: Draw a Tree Step-by-Step

Here are some step-by-step instructions on how to analyze sentences and then draw a tree of them. Notice that *before* you start drawing, you should analyze the structure of the sentence! You are much more likely to draw it correctly that way.

Step One: Identify the main verb.

Don't get distracted by auxiliary verbs! In the sentences in (1), the main verbs are bolded. Notice that in (1a), *have* is a main verb, while in (1d), (1e), and (1f), it is an auxiliary verb.

(1)	a.	I **have** a green spaceship.
	b.	I **think** that aliens **exist.**
	c.	That aliens **exist surprised** my sister.
	d.	You have **seen** an alien with a telescope.
	e.	Have you **seen** an alien?
	f.	What have you **seen**?

Step two. Find the subject of each verb.

The subject will usually be right before the verb in English (or the auxiliary verb), it will trigger subject-verb agreement, and it is often the one *doing* the action (but not always). You can stick a question word (*who* or *what*) before the verb, and the answer to the question will be the subject. For example, *who has a green spaceship? I do*. Or *What surprised my sister? That aliens exist.*

(2)	a.	I **have** a green spaceship.	The subject of *have* is *I.*
	b.	I **think** that aliens **exist.**	The subject of *think* is *I*, and the subject of *exist* is *aliens*.
	c.	That aliens **exist surprised** my sister.	The subject of *exist* is *aliens*, and the subject of *surprised* is *that aliens exist*.
	d.	You have **seen** an alien with a telescope.	The subject of *(have) seen* is *you*.
	e.	Have you **seen** an alien?	The subject of *(have) seen* is *you*.
	f.	What have you **seen**?	The subject of *(have) seen* is *you*.

Step three. Identify the clauses of the sentence.

There will be one clause for each main verb (but not auxiliary!). I have put brackets around each clause in (3). Notice that main clauses *include* the embedded clauses. Embedded clauses can be the object of the verb, as in (3b), or the subject of the verb, as in (3c).

(3)	a.	[I **have** a green spaceship].
	b.	[I **think** [[that aliens exist].
	c.	[[That aliens **exist**] **surprised** my sister].
	d.	[You have **seen** an alien with a telescope].
	e.	[Have you **seen** an alien]?
	f.	[What have you **seen**]?

Step four. Classify each clause.

For each clause, identify whether it is question or a statement. If it is question, identify whether it is a yes-no question or a content question. If it is a content question, figure out where the question word started before movement.

You can figure out where the question word started out by saying the echo question: *You have seen WHAT?* or by answering the question and looking at where the answer goes: *What have you seen? I have seen* ***an alien.***

(4)	a.	[I **have** a green spaceship].	This is a statement.
	b.	[I **think** [[that aliens exist].	The main clause is a statement and the embedded object clause is a statement.
	c.	[[That aliens **exist**] **surprised** my sister].	The main clause is a statement and the embedded subject clause is a statement
	d.	[You have **seen** an alien with a telescope].	This is a statement.
	e.	[Have you **seen** an alien]?	This is a yes-no question.
	f.	[What have you **seen**]?	This is a content question. The *wh*-phrase started in object position.

Step five. Identify the modifiers.

Identify the modifiers, such as adjectives and prepositional phrases. Figure out what they modify. Watch for ambiguity! Maybe it is possible that they can attach to more than one thing.

In our set of six sentences, there are two modifiers, *green* in the (a) sentence and *with a telescope* in the (d) sentence. *Green* modifies *spaceship*. But *with a telescope* is ambiguous! It can modify *an alien* or *seen*. You can use constituency tests to see the two different meanings. For example, in (5), the two different meanings are illustrated with the movement test.

(5)	a.	It is [an alien with a telescope] that you have seen.
	b.	It is [an alien] that you have seen [with a telescope].

In (5a), *an alien with a telescope* is a constituent. This means that *with a telescope* modifies *alien* and is sister to *alien* (according to the Principle of Modification). This constituency structure derives the meaning that the alien has the telescope.

In (5b), *an alien* is a constituent that does not include *with a telescope*. This means that *with a telescope* does not modify *alien*; instead it modifies the verb and is sister to the verb. This constituency structure derives the meanings that the telescope was used for the act of seeing.

Step six. Draw the *spine* of the clause.

Start at the top of the page with an S. Draw two to four branches down from the S—one for the subject, one each for the auxiliary or negation if they are there, and one for the VP. Now draw one or two branches down from the VP—one for the V head and a second one for the object if there is an object.

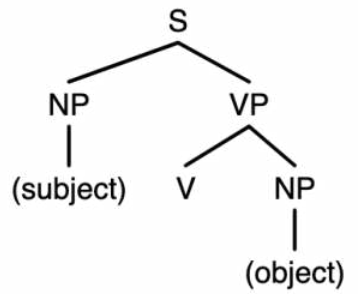


Figure A1.22: The spine for a declarative main clause

If it is a question, also put a CP on top of the TP.

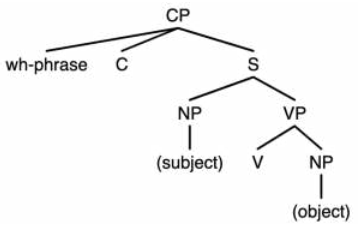


Figure A1.23: The spine for a main clause question

If there is an embedded clause in your sentence, check again if it is a subject clause or an object clause. If it is a subject clause, put it under the far left branch under the S, instead of a subject NP. If it is an object clause, put it under the right branch under VP, instead of an object. Draw the spine of the embedded clause, starting at CP, with the C head on the left as either *that* or null. Under the CP, draw an S that contains an NP and a VP, just like you did with the main clause.

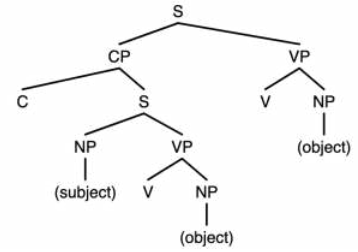


Figure A1.24: The spine for a sentence with an embedded subject clause

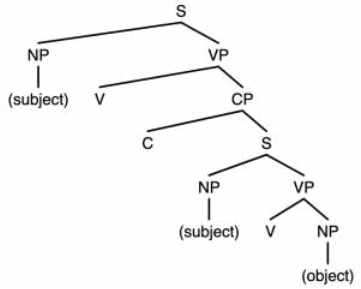


Figure A1.25: The spine for a sentence with an embedded object clause

Step seven. Fill in the subjects, objects, and modifiers.

Draw the subject and object NPs in the subject and object positions. If there are no modifiers, an NP will usually be two branches, one for the determiner and one for the head noun. If there are modifiers, add as many extra branches as you need.

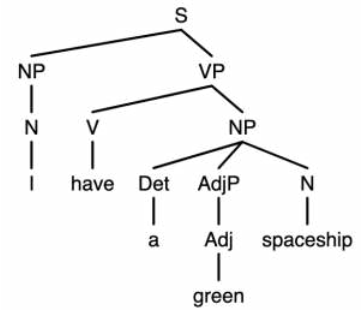


Figure A1.26: Tree diagram of "I have a green spaceship"

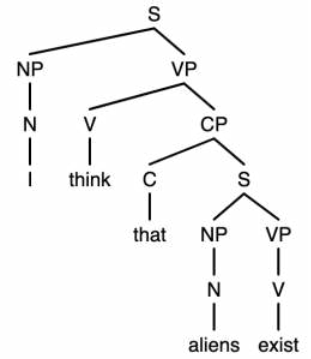


Figure A1.27: Tree diagram of "I think that aliens exist"

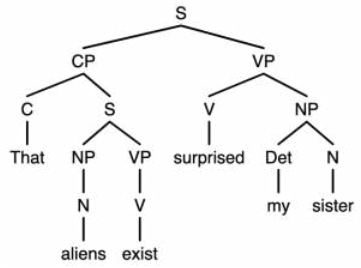


Figure A1.28: Tree diagram of "That aliens exist surprised my sister."

If there are any modifiers for the verb (such as a PP or an adverb), add branches to the VP as needed. In English, adverbs can go to the left or right of the verb head, but PPs always go to the right.

Remember again to watch out for ambiguity! Watch out especially for constituents at the end of the sentence. They might attach to the VP or they might attach to the object. If there are two clauses, they might also attach to either the main clause or the embedded

clause! Use your constituency tests to figure it out or use the meaning to determine which part of the sentence it modifies.

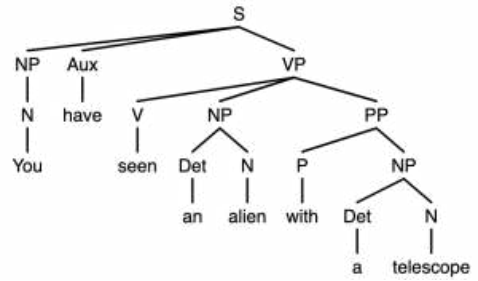


Figure A1.29: Tree diagram of “You have seen an alien with a telescope” where “with a telescope” modifies the verb. This structure means that you used the telescope to see the alien.

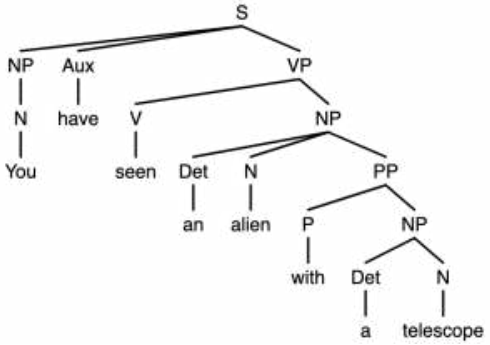


Figure A1.30: Tree diagram of “You have seen an alien with a telescope” where “with a telescope” modifies “alien.” This structure means that the alien has a telescope.

If one of the NPs or PPs is particularly complex, like in (6), break it down into smaller pieces, and do one piece at a time.

(6)	The outlandish lady with the purple purse from Wal-Mart on her elegant arm

First, identify the head. Is this NP as a whole identifying a lady, a purse or an arm? It is identifying a lady, so *lady* is the head of the phrase. Which adjectives and PPs modify *lady*? The adjective *outlandish* and the PP *with the purple purse from Wal-Mart on her elegant arm* both modify *lady*. So we can draw an NP with four branches: one for the determiner *the*, one for the adjective *outlandish*, one for the head N *lady*, and one for the very long PP.

Next you can repeat the steps with the PP. The PP *with the purple purse from Wal-Mart on her elegant arm* begins with the P *with* and contains an NP headed by *purse*. So under the PP, you can draw two lines, one for the P *with* and one for the long NP. Next, ask what modifies *purse*? Keep repeating these steps until you have identified all of the constituents and what each one modifies.

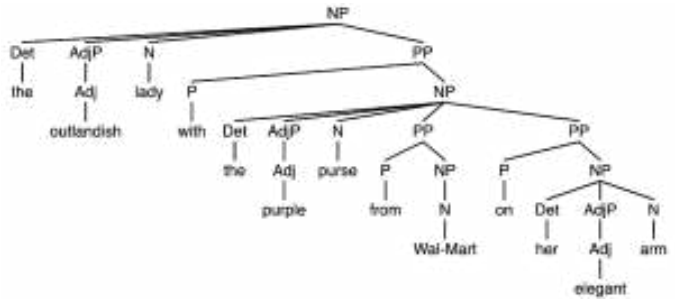
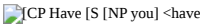


Figure A1.31: The tree diagram for example (6).

Step eight. If it’s a question, add the movement.

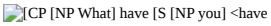
If there’s subject-auxiliary inversion, put angle brackets around the auxiliary under S, and re-write the auxiliary under the C head. Then draw an arrow from the Aux under S to the C head.



[VP seen [NP an alien]]]]" class="size-medium wp-image-3737" height="274" width="300" src="/@api/deki/files/131274/have-you-seen-an-alien-300x274.png">

Figure A1.32: Tree diagram of “Have you seen an alien?”

If there’s *wh*-movement, put the *wh*-phrase where it started out in the sentence, as you determined in Step 4, with angle brackets around it. Then add an extra branch to the left under the CP, rewrite the label of the *wh*-phrase, and draw the internal structure of the *wh*-phrase underneath. Then draw an arrow from where the *wh*-phrase started to where it ended up.



[VP seen

]]]" class="size-medium wp-image-3763" height="287" width="300" src="/@api/deki/files/131275/what-have-you-seen-300x287.png">

Figure A1.33: Tree diagram of “What have you seen?”

Step nine. Double check your answer!

Here are some things you should check:

- Does every phrase have a head? Does every head (except Det) have a phrase?
- If you read the ends of the branches from left to right, do all the words come out in the right order?
- Do any branches cross? (They shouldn’t!)
- Are your subject clauses in subject position and your object clauses in object position?
- Are your subjects under TP, your objects under VP, and your modifiers sister to what they modify?
- Are all your words labeled for part of speech?
- Is movement clearly indicated with an arrow? Is it clear from your diagram where the movement started *and* where it ended?

Sometimes you will see trees with triangles in them. For example, there is a triangle in Figure A1.19 of Section A1.6 or in Figure A1.34 below.

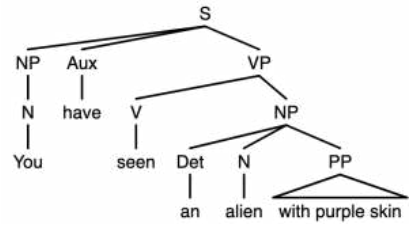


Figure A1.34 Example of a tree with a triangle

Triangles are a way to abbreviate the structure. Instead of drawing all the pieces of a constituent, you can write the entire constituent underneath a triangle (instead of branches). They are usually used in papers if part of the structure is not relevant. In your homework and tests, if you are asked to draw a tree and you use a triangle, you might not get full marks for the part of the tree inside the triangle–check with the grading scheme for your course to see if triangles are permitted and how they will be graded! That being said, if you are feeling very overwhelmed, you could use a triangle and you may at least get part marks. Or, even better, you can use a triangle in your rough work to help you break up the sentence into smaller, more manageable parts. Just remember to come back and finish drawing the bits you placed in triangles.

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CHAPTER OVERVIEW

Chapter 16: A history of linguistics

16.1: Check Yourself Questions

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16.1: Check Yourself Questions

This is a printable version of the interactive *Check Yourself* questions and answers from the end of each subsection.

Chapter 1: Human Language and Language Science

1.1 What even is language?

Questions

Question 1.1-1. The sentence, "*Sam bumped the passenger with the rolling suitcase*," has at least two different meanings. It could mean that Sam had the suitcase and bumped the passenger, or that the passenger had the suitcase and Sam bumped them.

Which part of the grammar leads to these two different meanings?

- Syntax
- Phonology
- Phonetics
- Morphology
- Semantics

Question 1.1-2. Newfoundland English has some characteristics that are different from the varieties of English that are more common in the rest of Canada. The following sentences are grammatical in Newfoundland English:

I eats toast for breakfast every day.

You knows the answer to that question.

In these examples, what part of the grammar is different from that of standardized Canadian English?

- Syntax
- Phonology
- Phonetics
- Morphology
- Semantics

Question 1.1-3. Which of the following are examples of **implicit** knowledge?

- How to recognize your sister's voice on the phone.
- How to calculate the area of a circle.
- How to make your grandmother's famous chocolate babka.
- How to blink when you get dust in your eye.

Answers

Question 1.1-1. Syntax and semantics.

Question 1.1-2. Morphology.

Question 1.1-3. How to recognize your sister's voice on the phone and how to blink when you get dust in your eye.

1.2. What grammars are and aren't

Question

Question 1.2-1. Given what you've learned in the first couple of sections of this book, which of the following do you predict you're going to learn in linguistics class?

- Why verbs come at the end of a sentence in Japanese but at the beginning of a sentence in Welsh.
- The true meaning of the word *literally*.
- Why podcasters should stop using vocal fry.

- Why all English students should study Latin.
- What Mandarin, ASL, and English all have in common.
- Why kids sometimes produce words differently from adults.
- How to use the word *whom* correctly.

Answer

Question 1.2-1.

- Why verbs come at the end of a sentence in Japanese but at the beginning of a sentence in Welsh.
- What Mandarin, ASL, and English all have in common.
- Why kids sometimes produce words differently from adults.

1.3 Studying language scientifically

Question

Question 1.3-1. All of the following are statements people make about language. Check off all the ones that are descriptive statements and leave the prescriptive statements unchecked.

- In addition to singular and plural forms, some languages (for example, Inuktitut and Arabic) also have dual forms that refer to exactly two of something.
- English words that are derived from Latin should have Latin plural forms.
- A sentence like, “You ain’t going nowhere,” really has a positive meaning because two negatives make a positive.
- The English speech sound made with the tongue between the teeth, usually spelled ‘th’, is quite rare across the world’s languages.
- American Sign Language (ASL) and British Sign Language (BSL) are two distinct languages.
- It’s annoying when podcasters use so much vocal fry.
- Spending too much time texting destroys your writing skills.

Answer

Question 1.3-1.

- In addition to singular and plural forms, some languages (for example, Inuktitut and Arabic) also have dual forms that refer to exactly two of something.
- The English speech sound made with the tongue between the teeth, usually spelled ‘th’, is quite rare across the world’s languages.
- American Sign Language (ASL) and British Sign Language (BSL) are two distinct languages.

1.4 Doing harm with language science

Questions

Question 1.4-1. This section describes some ways that language science has done harm to minoritized groups of people. Think about what you know about other social sciences (such as anthropology, sociology, psychology), life sciences (physiology, biology, neuroscience, etc.) or physical sciences (geology, physics, chemistry, etc.).

What are some ways that these sciences have done harm to humans, either inadvertently or deliberately?

What are some steps scientists in these fields could take to lessen or even repair these harms?

Question 1.4-2. These sites attempt to show the languages and language families that were Indigenous to various regions before colonization.

Native Land Digital: https://native-land.ca

Whose Land: https://www.whose.land/en/

Choose a region from one of these maps to learn about the language groups and/or treaties of that area. You might choose the region where you are right now, or a region where you have relatives, or just a region that interests you.

What name is currently used for the region you chose?

What languages are Indigenous to the region you've chosen?

Answers

Answers will vary.

1.5 Doing good with language science

Questions

Question 1.5-1. Have you ever had trouble getting your phone or other voice assistant to recognize your speech? What might have been missing in the programming of that device that prevented it from understanding you?

Question 1.5-2. Imagine you're trying to come up with a name for a new product you've invented. What factors would you consider in deciding whether the name works for your product or not?

Question 1.5-3. What drew you to studying linguistics? What problem(s) do you hope to be able to solve with language science?

Answers

Answers will vary.

Chapter 2: Language, Power and Privilege

2.1 How are power and privilege connected to language?

Questions

Question 2.1. Think of a time when someone corrected or judged your language use. What role did power have in this interaction? What was your social status relative to the person correcting you? What kind of social status was the person enacting towards you? What was the effect of their correction or judgment?

Answers

Answers will vary.

2.2 Language change and gender identity

Questions

Question 2.2-1. How recently has *they* been used as a singular pronoun in English?

- *They* has been used as a generic singular for centuries and now it's changing to also be used as a specific singular.
- *They* started being used as a singular around 2015.
- Never; *they* is always plural.

Question 2.2-2. How can people stop language from deteriorating?

- Teach correct grammar in schools.
- No one can stop language from changing!
- Correct people every time they make a mistake.
- Publish extensive dictionaries and make them widely available.

Answers

Question 2.2-1. *They* has been used as a generic singular for centuries and now it's changing to also be used as a specific.

Question 2.2-2. No one can stop language from changing!.

2.3 Linguistic discrimination

Questions

Question 2.3-1. In a study published in a marketing journal, researchers reported an experiment that asked Americans to consider buying a product that was offered with a set sales script. The script was spoken in English by a salesperson with either a standardized American accent or a Greek accent. Which is true of this study?

- The product is the stimulus and the accent is the guise.
- The product being sold is the stimulus and the sales script is the guise.
- The script is the stimulus and the accent is the guise.
- The accent is the stimulus and the product is the guise.

Question 2.3-2. A Canadian study sent résumés to thousands of hiring managers in Montreal, Toronto, and Vancouver. The résumés all listed the same job experience and skills, but varied in whether the job-seeker's name was an English name, an Indian name, or a Chinese name. The researchers measured how many résumés led to a job interview. Which is true of this study?

- The job interview is the guise and the job-seeker's name is the stimulus
- The job-seeker's name is the guise and the résumé is the stimulus.
- The hiring manager is the guise and the résumé is the stimulus.
- The résumé is the guise and the job interview is the stimulus.

Question 2.3-3. Imagine you want to make friends with your new neighbour who recently moved to Canada and has been learning English for about a year. Which technique(s) would a linguist recommend to make it easier for you to understand your neighbour when she speaks?

- Watch some videos or listen to podcasts by other people who are L2 English speakers
- Correct your neighbour whenever she makes a mistake.
- Have lots of conversations with your neighbour so you get lots of opportunity to listen to her speak.
- Encourage your neighbour to speak more slowly.

Answers

Question 2.3-1. The script is the stimulus and the accent is the guise.

Question 2.3-2. The job-seeker's name is the guise and the résumé is the stimulus.

Question 2.3-3.

- Watch some videos or listen to podcasts by other people who are L2 English speakers
- Have lots of conversations with your neighbour so you get lots of opportunity to listen to her speak.

Chapter 3: Phonetics

3.1 Modality

Questions

Question 3.1-1. Which of the following is the modality of signed languages?

- manual-auditory
- vocal-visual
- vocal-auditory
- manual-visual

Question 3.1-2. What kind of languages can be studied in phonetics?

- spoken languages only
- both signed and spoken languages
- signed languages only

Question 3.1-2. Which of the following subfields of phonetics are studied for both signed and spoken languages? Select all correct answers.

- articulatory phonetics
- perceptual phonetics
- acoustic phonetics

Answers

Question 3.1-1. Manual-visual

Question 3.1-2. Both signed and spoken languages. Other types of languages can be studied in phonetics, too! Phonetics is the study of modality, and every language has a modality.

Question 3.1-3. Articulatory phonetics and perceptual phonetics.

3.2 Speech articulators

Questions

Question 3.2-1. Which of the following parts of the body is not considered part of the vocal tract, because it is not normally used for phones in spoken languages?

- pharynx
- oral cavity
- esophagus
- nasal cavity
- trachea

Question 3.2-2. Which of the following ways of producing sound with the body are known to be used to create phones in some spoken languages?

- clapping
- burping
- snapping
- clicking

Answers

Question 3.2-1. The esophagus. It connects the vocal tract to the stomach, but spoken languages do not ordinarily use airflow into or out of the stomach.

Question 3.2-2. Clicking. Although many languages do not have clicks as phones, some languages do, such as Hadza and isiZulu.

3.3 Describing consonants: Place and phonation

Questions

Question 3.3-1. Which of the following are including in the tongue front? There are two answers. Select both.

- back
- hard palate
- root
- velum
- blade
- tip

Question 3.3-2. Which of the following are passive articulators in the vocal tract? Select all that apply.

- pharynx
- hard palate

- alveolar ridge
- glottis
- lower lip
- uvula

Question 3.3-3. How is a consonant's place of articulation ordinarily defined?

- a constriction in the oral cavity
- a combination of any two articulators
- a combination of an active and passive articulator
- a combination of a part of the tongue and a part of the roof of the mouth

Question 3.3-4. Which somewhat odd place of articulation uses the same articulators needed for phonation?

- palatal
- labiopharyngeal
- pharyngeal
- glottal
- bilabial

Question 3.3-5. What is another name for vocal fold vibration?

- articulation
- glottis
- voicing
- phonation

Answers

Question 3.3-1. Blade and tip.

Question 3.3-2. The hard palate, the alveolar ridge, and the uvula.

Question 3.3-3. A combination of an active and passive articulator.

Question 3.3-4. Glottal.

Question 3.3-5. Voicing.

3.4 Describing consonants: Manner

Questions

Question 3.4-1. Which of the following manners of articulation have the widest opening in the oral cavity?

- approximant
- oral stop
- fricative
- nasal stop

Question 3.4-2. Which of the following manners of articulation are included in the class of obstruents? Select all that apply.

- fricative
- affricate
- nasal stop
- oral stop
- approximant

Question 3.4-3. Which of the following manners of articulation are included in the class of continuants? Select all that apply.

- nasal stop
- approximant

- oral stop
- affricate
- fricative

Question 3.4-4. Passive articulators do not normally move, though the upper lip is an exception. Which other passive articulator is also an exception, because its position determines whether a stop is oral or nasal?

- velum
- tongue back
- hard palate
- upper teeth
- alveolar ridge

Answers

Question 3.4-1. Approximant.

Question 3.4-2. Fricative, affricate, nasal stop, and oral stop.

Question 3.4-3. Approximant and fricative.

Question 3.4-4. Velum.

3.5 Describing vowels

Questions

Question 3.5-1. Which aspect of vowel quality is determined by the vertical position of the tongue within the oral cavity?

- tenseness
- height
- length
- nasality
- rounding
- backness

Question 3.5-2. Because of how the human jaw moves, there is a relationship between vowel height and vowel backness. Which of the following best expresses that relationship?

- High front vowels tend to be backer than low front vowels.
- High back vowels tend to be fronter than low back vowels.
- Low front vowels tend to be backer than high front vowels.
- Low back vowels tend to be fronter than high back vowels.

Question 3.5-3. What articulation distinguishes an oral vowel from a nasal vowel?

- Oral vowels have a lowered velum, while nasal vowels have a raised velum.
- Oral vowels have a raised velum, while nasal vowels have a lowered velum.
- Oral vowels have a lowered nasal cavity, while nasal vowels have a raised nasal cavity.
- Oral vowels have a raised nasal cavity, while nasal vowels have a lowered nasal cavity.

Answers

Question 3.5-1. Height.

Question 3.5-2. Low front vowels tend to be backer than high front vowels.

Question 3.5-3. Oral vowels have a raised velum, while nasal vowels have a lowered velum.

3.6 The International Phonetic Alphabet

Questions

Question 3.6-1. What is the IPA symbol for a voiceless velar plosive?

- [x]
- [t]
- [ɡ]
- [k]

Question 3.6-2. Which of the following IPA symbols represents a consonant with the same place of articulation as the consonant represented by [n]? Select all that apply.

- [m]
- [ʒ]
- [d]
- [s]
- [u]

Question 3.6-3. What articulatory properties do [θ] and [ʃ] have in common? Select all that apply.

- phonation
- place of articulation
- manner of articulation

Question 3.6-4. What is the IPA symbol for a mid front unrounded lax vowel?

- [ɪ]
- [ɛ]
- [æ]
- [e]
- [ɔ]

Question 3.6-5. Which of the following IPA symbols represents a vowel with the same height as the vowel represented by [u]? Select all that apply. Consider only a three-way height distinction (high, mid, low).

- [ɑ]
- [i]
- [ɔ]
- [ʊ]

Answers

Question 3.6-1. [k].

Question 3.6-2. [d] and [s].

Question 3.6-3. Phonation and manner of articulation. They are both voiceless fricatives.

Question 3.6-4. [ɛ].

Question 3.6-4. [i] and [ʊ].

3.7–3.12 Coming soon!

Chapter 4: Phonology

Coming soon!

Chapter 5: Morphology

Coming soon!

Chapter 6: Syntax

Coming soon!

Chapter 7: Semantics

7.1 Linguistic meaning

Question

Question 7.1-1. Which of these sentences describe **non-linguistic** meaning? Select all that apply.

- When my toddler is this quiet, it usually means trouble.
- I saw a double rainbow; what does it mean?!
- Giving you this gift means that I'm sorry.
- What does *swill* even mean?

Answer

Question 7.1-1.

- When my toddler is this quiet, it usually means trouble.
  - This one designates a relationship between the state of the toddler being quiet and some sort of outcome. This is not linguistic.
- I saw a double rainbow; what does it mean?!
  - This one designates a relationship between the double rainbow (the actual thing in the real world) and some sort of interpretation of the world. This is not linguistic.
- Giving you this gift means that I'm sorry.
  - This one designates a relationship between the act of giving the gift and some sort of sentiment. This is not linguistic.
- What does *swill* even mean?
  - Note that *swill* is italicized; this question can be interpreted as 'What is the sense of the word *swill?*'. This is linguistic meaning.

7.2 Compositionality: Why not just syntax?

Questions

Question 7.2-1. What does the principle of compositionality predict? Select all that apply.

- That since there are two possible structures for the sentence *The raccoon thought about the food in that trashcan*, there should be two possible meanings for it.
- That language users have to memorize the meaning of most sentences and store them as wholes in their head.
- That in the word *unluckily*, the meaning of *un-*, the meaning of *luck*, the meaning of *-y*, and the meaning of *-ly* should be present.

Question 7.2-2. True or false: All DPs are referential in their meaning.

Answers

Question 7.2-1.

- That since there are two possible structures for the sentence *The raccoon thought about the food in that trashcan*, there should be two possible meanings for it.

- This one is true. Compositionality cares about *how* words combine in a sentence too, not just *which* words were put together. Structural ambiguity like this highlights the "how they combine" part of compositionality.

- That language users have to memorize the meaning of most sentences and store them as wholes in their head.
  - This is not predicted by compositionality. If you know the meaning of the subparts of the sentence (e.g., the meaning of the morphemes), then you shouldn't have to store sentences as wholes; you can just store the meaning of morphemes in your head. In fact, it would be impossible to store "all of the sentences in a language" in your head, because language can produce an infinite number of sentences. Exceptions include idioms (e.g., *raining cats and dogs*), which are not compositional, and thus must be stored as a whole unit.
- That in the word *unluckily*, the meaning of *un-*, the meaning of *luck*, the meaning of *-y*, and the meaning of *-ly* should be present.
  - This one is true. Compositionality says that the meaning of a complex linguistic unit results from what pieces got put together, and how they got put together. This statement highlights the "what got put together" part of compositionality.

Question 7.2-2. False.

7.3 What does this sentence "mean"? Entailments vs. implicatures

Questions

Question 7.3-1. Is (2) a regular entailment, a presupposition, or an implicature of (1)?

(1) The professor petted a cat again.

(2) The professor has previously petted a cat.

Question 7.3-2. Is (2) a regular entailment, a presupposition, or an implicature of (1)?

(1) The professor petted a cat.

(2) The professor likes cats.

Question 7.3-3. Is (2) a regular entailment, a presupposition, or an implicature of (1)?

(1) The professor adopted a brown cat.

(2) The professor adopted a cat.

Answers

Question 7.3-1. Presupposition.

Question 7.3-2. Implicature.

Question 7.3-3. Regular entailment.

7.4 The mental lexicon

Questions

Question 7.4-1. Determine if the bracketed portion of the sentence has compositional meaning or non-compositional meaning.

You need to [prebake] the pie crust.

Question 7.4-2. Determine if the bracketed portion of the sentence has compositional meaning or non-compositional meaning.

Do you [brush] your cat daily?

Question 7.4-3. Determine if the bracketed portion of the sentence has compositional meaning or non-compositional meaning.

When Chenchen was talking about her plans for the new year, she [let the cat out of the bag]: she let it slip that she was quitting her current job.

Question 7.4-4. Determine if the bracketed portion of the sentence has compositional meaning or non-compositional meaning.

The [beige notebook on the table] belongs to me.

Answers

Question 7.4-1. Compositional meaning.

Question 7.4-2. Non-compositional meaning.

Question 7.4-3. Non-compositional meaning. Based on the context, this is most likely the idiomatic use of “let the cat out of the bag”, not a literal one — it’s an idiom in English that means ‘to reveal a secret’.

Question 7.4-4. Compositional meaning.

7.5 The nature of lexical meaning

Questions

Question 7.5-1. For *chair*, “the purpose of it is to seat one person” is listed as a part of the necessary and sufficient conditions. Why do you think we need to specify it’s for one person? What might be miscategorized as a chair if we do not specify “for one person”?

Question 7.5-2. What does the “cup or bowl” type of experiment say about the nature of categorization?

Answers

Question 7.5-1. We need to specify “for one person” if we want to exclude *benches*! But are benches a type of chair? Something to think about.

Question 7.5-2. It shows that category boundaries are not so sharp, and that they can be fuzzy. The concepts attached to a word seems to be much more than just “necessary and sufficient” conditions.

7.6 Events and thematic roles

Question

Question 7.6-1. Using event semantics in the style of (15), give the lexical meaning of the verb *frighten*, as in the following sentence.

The sound will frighten the child.

Answer

Question 7.6-1.

There is an event e &

e is a FRIGHTEN event &

x is the EXPERIENCER of e &

y is the CAUSER of e.

7.7 Countability

Questions

Question 7.7-1. In the following sentence, is the bolded word used as a count noun or mass noun?

Cracking your egg against the coutner is risky; if you hit it too hard, you’ll get ***egg*** *everywhere.*

Question 7.7-2. In the following sentence, is the bolded word used as a count noun or mass noun?

If you have a lot of ***idea****s, make sure you write them down somewhere.*

Answers

Question 7.71. Mass noun.

Question 7.72. Count noun.

7.8 Individual- vs. stage-level predicates

Questions

Question 7.8-1. We said that some adjectives in Spanish are ambivalent, meaning they can take on a stage-level or individual-level interpretation depending on context. Given what you have learned about Spanish copulas, what might be a better paraphrase of what the following Spanish sentence means in English?

Tu hermano es inquieto.
your brother is restless.
'Your brother is restless.'

- 'Your brother is a restless person (i.e., he's generally restless all the time).
- 'Your brother is being restless (e.g., right now, in this particular situation)'

Question 7.8-2. We said that some adjectives in Spanish are ambivalent, meaning they can take on a stage-level or individual-level interpretation depending on context. Given what you have learned about Spanish copulas, what might be a better paraphrase of what the following Spanish sentence means in English?

Tu hermano está *inquieto.*
your brother is restless.
'Your brother is restless.'

- 'Your brother is a restless person (i.e., he's generally restless all the time).
- 'Your brother is being restless (e.g., right now, in this particular situation)'

Answers

Question 7.8-1. 'Your brother is a restless person (i.e., he's generally restless all the time).

Question 7.8-2. 'Your brother is being restless (e.g., right now, in this particular situation).

7.9 Degrees

Questions

Question 7.9-1. Based on what you learned about degrees and scales, what might be the reason why (1) is a valid comparison in English, while (2) is a bit more strange?

(1) This shelf is **taller** than this table is **wide**.

(2) ?This shelf is **taller** than this music is **loud**.

Question 7.9-2. We saw that some languages like Washo have no overt comparative morphemes like *-er* or *more*. In these languages, 'x is taller than y' can be expressed as 'x is tall, y is not tall'. "Degreeless" languages like this also lack superlative morphemes like *-est* and *most* as well. Make an educated guess as to how people might express 'x is the tallest in this class' in a language like Washo.

Answers

Question 7.9-1. In (1), tallness can be compared to width, because both *tall* and width use the same kind of scale: some sort of length scale. Both the degree of tallness and the degree of width can lie on the same scale. In (2), tallness cannot be compared to loudness, because *tall* and *loud* use different kinds of scales: length and intensity of sound, respectively. The degrees that you are trying to compare would lie on different scales.

Question 7.9-2. In Washo, if you wanted to express 'x is the tallest in the class', you can say literally 'x is tall, everyone else (in the class) is not tall'! (Source: Bochnak 2015)

7.10 Why not the dictionary?

Questions

Question 7.10-1. True or false: If a word that is used by a language community is not in the Oxford English Dictionary, then it isn't a real word.

Question 7.10-2. True or false: Dictionaries do not necessarily list all meanings/uses of a word.

Answers

Question 7.10-1. It is false. A dictionary does not decide what is a "real" word or not. If people use that word, then it is a word!

Question 7.10-2. It is true. Most words have so many different uses, it's impossible for lexicographers to list every single use of every single word in a dictionary! They only list enough information so that you get a general idea of how the word is used.

7.11 Denotation

Questions

Question 7.11-1. What is the denotation of the word *purple* in the following sentence?

Josh's mug is purple.

- The set of all purple things in the actual world.
- T if Josh's mug is purple in the actual world, F otherwise.
- The individual Josh in the actual world.

Question 7.11-2. What is the denotation of the following sentence?

The CN Tower is in Toronto.

- The CN Tower in the actual world
- The city of Toronto in the actual world
- The set of things that are in Toronto in the actual world
- T
- F

Question 7.11-3. What is the denotation of the name *Sandra Oh* in the following sentence?

Sandra Oh is an actress.

Answers

Question 7.11-1. The set of all purple things in the actual world.

Question 7.11-2. T.

Question 7.11-3. The individual Sandra Oh in the actual world.

7.12 Introduction to set theory

Question

Question 7.12-1. Consider the following sets. Which of the following are true statements in set theory notation? Select all that apply.

A = { **a**, **b**, **c** }

B = { **a**, **b** }

C = { **c**, **d**, **e** }

D = { **c**, **d**, **e** }

- $C \subset D$
- $B \subseteq A$
- $C \subseteq D$

- $B \subset A$
- $\mathbf{e} \in D$
- $B \subseteq C$

Answer

Question 7.12-1.

- $B \subseteq A$
- $C \subseteq D$
- $B \subset A$
- $\mathbf{e} \in D$

7.13 Negative polarity items

Questions

Question 7.13-1. Consider the environment *Nobody* ___, as in *Nobody dressed up as a dinosaur*. Determine if this is a downward-entailing or an upward-entailing environment, following the steps that were described in this section. The first step has been given to you already.

Step 1: *Nobody dressed up as a dinosaur.* (**superset**)

Step 2:

Step 3:

Answer: Downward-entailing or upward-entailing?

Question 7.13-2. Consider the environment *I know that* ___, as in *I know that you own a broomstick*. Determine if this is a downward-entailing or an upward-entailing environment, following the steps that were described in this section. The first step has been given to you already.

Step 1: *I know that you own a broomstick.* (**superset**)

Step 2:

Step 3:

Answer: Downward-entailing or upward-entailing?

Question x.x2. Question

Answers

Question 7.13-1.

Step 1: *Nobody dressed up as a dinosaur.* (**superset**)

Step 2: *Nobody dressed up as a T-Rex.* (**subset**)

Step 3: The **superset** sentence entails the **subset** sentence, but not the other way around. (If nobody dressed up as a dinosaur, then it necessarily means that nobody dressed up as a T-Rex. But if nobody dressed up as a T-Rex, it doesn't necessarily mean that nobody dressed up as a dinosaur — perhaps someone dressed up as a pterodactyl!)

Answer: Downward-entailing.

Question 7.13-2.

Step 1: *I know that you own a broomstick.* (**superset**)

Step 2: *I know that you own a wooden broomstick.* (**subset**)

Step 3: The sentence with the **subset** entails the sentence with the **superset**, but not the other way around. (If I know that you own a wooden broomstick, then I necessarily know that you own a broomstick. But if I know that you own a broomstick, I don't necessarily know that you own a *wooden* broomstick — maybe it's plastic.)

Answer: Upward entailing.

Chapter 8: Pragmatics

8.1 At-issue vs. non-at-issue meaning

Question

Question 8.1-1. Consider the following meanings that the italicized sentence produces in this context. Which of these are non-asserted meaning? Select all that apply.

(Context: Leela usually touches her hair frequently when she is stressed.)

Leela is touching her hair again.

- 'There is an event in which Leela is touching her hair.'
- 'Leela is stressed.'
- 'Leela has touched her hair before.'

Answer

Question 8.1-1.

- 'Leela is stressed.' This is an implicature, which is non-asserted.
- 'Leela has touched her hair before.' This is a presupposition, which is non-asserted.

Chapter 9: Reclaiming Indigenous Languages

Coming soon!

Chapter 10: Language Variation and Change

Coming soon!

Chapter 11: Child Language Acquisition

11.1 Tiny, powerful language learners

Questions

Question 11.1-1. Which of the following is good evidence for the importance of the language environment to children's language acquisition?

- A child who is adopted at birth acquires the language of their adoptive parents.
- Deaf children naturally learn to sign because they don't have access to spoken language.
- A newborn can tell the difference between a child's voice and an adult's voice.
- Children who get a lot of screen time have slower language development.

Question 11.1-2.

In the child language literature, what is the conventional way of representing the age of a child who is two-and-a-half years old?

- 0;30
- 2;6
- 2.5
- 2:6
- 2, 1/2

Answers

Question 11.1-1. A child who is adopted at birth acquires the language of their adoptive parents.

Question 11.1-2. 2;6

11.2 When does language learning start?

Questions

Question 11.2-1. In the high-amplitude sucking paradigm, what observation do researchers interpret to mean that a baby has noticed a difference between stimuli?

- The infant sucks at a high rate.
- The infant's sucking rate declines after being high.
- The infant's sucking rate increases after declining.

Question 11.2-2. Suppose a pregnant parent is bilingual in two languages that have similar prosodic rhythm patterns. Is it likely or unlikely that this parent's newborn infant will notice the difference between the two languages?

Answers

Question 11.2-1. The infant's sucking rate increases after declining.

Question 11.2-2. Unlikely

11.3 Phonemic contrast

Questions

Question 11.3-1. The phonology of Thai contains a three-way contrast between voiced /b/, voiceless /p/, and aspirated /p^h/. Is it very likely or very unlikely that a six-month-old baby growing up in an English-speaking household would be able to hear the difference between Thai [p] and [p^h]?

Question 11.3-2. Arabic phonology includes a contrast between uvular and pharyngeal fricatives. Is it very likely or very unlikely that a two-year-old growing up in an English-speaking household would be able to hear the difference between these two places of articulation?

Question 11.3-3. In the various dialects of Chinese, there is no phonemic contrast between tense and lax vowels. Is it very likely or very unlikely that a four-month-old baby growing up in a Mandarin Chinese-speaking household would be able to hear the contrast between English [e] and [ɛ]?

Answers

Question 11.3-1. Very likely.

Question 11-3.2. Very unlikely.

Question 11.3-3. Very likely.

11.4 Early language production

Questions

Question 11.4-1. Around age 0;6 both deaf and hearing babies produce vocal babbling. By age 0;10 hearing babies continue to babble vocally but deaf babies' vocal babbles are less frequent. What's the likeliest explanation for this difference??

- Deaf babies have less control of the articulators for speech.
- Deaf babies have signed language in their environment.
- Deaf babies don't have access to vocal language to shape their babbles.

Question 11.4-2. A child whose father has a bear refers to anyone with a beard as "Dada". Is that child's meaning for the word *dada (daddy)* overextended or underextended?

Question 11.4-3. A young child in a stroller heard a noisy motorcycle drive past and uttered [ætoʊ], his word for *vacuum*. Is his meaning for the word *vacuum* overextended or underextended?

Answers

Question 11.4-1. Deaf babies don't have access to vocal language to shape their babbles.

Question 11-4.2. Overextended.

Question 11.4-3. Overextended.

11.5 The language environment and the so-called word gap

Questions

Question 11.5. Each of the following describes a metric that a researcher might choose for recording a child's language use. All metrics have biases. Of the ones presented here, some are biased towards overestimating a child's grammatical competence, and some are biased towards underestimating it. Rank these metrics in order from most generous to least generous.

- An audio or video device records all the child's utterances for the same one-hour period every day for a week.
- A researcher visits the child's home for one-hour periods selected randomly over the course of a week. They transcribe all the child's utterances during those periods.
- An audio or video device records all the child's utterances for one-hour periods selected randomly over the course of a week.
- A researcher visits the child's home for one-hour periods selected randomly over the course of a week. They transcribe all the child's recognizable words during those periods.
- An audio or video device records every utterance the child makes over the course of an entire week, both at home and at school/daycare.

Answers

Question 11.5.

1. An audio or video device records every utterance the child makes over the course of an entire week, both at home and at school/daycare.
2. An audio or video device records all the child's utterances for one-hour periods selected randomly over the course of a week.
3. An audio or video device records all the child's utterances for the same one-hour period every day for a week.
4. A researcher visits the child's home for one-hour periods selected randomly over the course of a week. They transcribe all the child's utterances during those periods.
5. A researcher visits the child's home for one-hour periods selected randomly over the course of a week. They transcribe all the child's recognizable words during those periods.

11.6 Understanding word combinations

Questions

Image for Questions 11.6-1 and 11.6-2: A grid containing four vegetables: top left is an onion, top right is a summer squash, bottom left is a purple-polka-dotted onion, bottom right is an onion.

Question 11.6-1. If you showed this picture to a two-year-old and asked them to point to "the feppy one", which of the four pictures is the child likely to point to?

- top left (plain onion)
- top right (summer squash)
- bottom left (polka-dot onion)
- bottom right (plain onion)

Question 11.6-2. If you showed this picture to a two-year-old and asked them to point to "the fep", which of the four pictures is the child likely to point to?

- top left (plain onion)
- top right (summer squash)
- bottom left (polka-dot onion)
- bottom right (plain onion)

Answers

Question 11.6-1. Bottom left (polka-dot onion).

Question 11.6-2. Top right (summer squash).

11.7 Syntax in early utterances

Questions

Question 11.7. None of the following sentences is typical of adult English grammar (in other words, they might count as "errors"), but some of them are likely to be uttered by children and others are not. Which sentences are **unlikely** errors? Check all that apply.

- My cereal is very milk.
- I'm filling some sugar into the bowl.
- Open me the door.
- Can you lotion my hands?
- The want babies some milk.
- I don't want a sweater. It always sweats me.
- I hate you and I'm never going to unhate you.

Answers

Question 11.7. My cereal is very milk.; The want babies some milk.

11.8 Developing word meanings

Questions

Question 11.8-1. Researchers investigated whether young children could use the semantic restrictions of verbs to figure out the meanings of novel nouns. They presented a novel noun like blick in one of two contexts:

> Constrained context: The blick is **crying**.
> Unconstrained context: The blick is **right here**.

Notice that only animate things can cry, while any kind of object could be right here. The researchers used a preferential looking task with two images: one of a hedgehog and one of a bath sponge. If children can indeed use these semantic constraints, what results would we predict in response to the question, "Where is the blick?" in the constrained context?

- no difference in looks between the hedgehog and the sponge
- more looks to the sponge than to the hedgehog
- more looks to the hedgehog than to the sponge

Question 11.8-2. One of the earliest investigations of children's understanding of mass/count syntax in English showed children a bowl of noodles and described it with a sentence including a novel word. If children are sensitive to mass/count syntax, the sentence frame should affect their interpretation of the word. For each sentence, drag the answer that represents their interpretation.

- This is some corvel.
- This is a corvel.
- This is my corvel.
- bowl
- noodles
- no difference

Answers

Question 11.8-1. More looks to the hedgehog than to the sponge.

Question 11.8-2. some corvel: noodles / a corvel: bowl / my corvel: no difference

11.9 Growing up bilingual (or multilingual!)

Questions

Question 11.9-1. One task used in cognitive assessments is a sorting task. A bin contains coloured shapes: red circles, red squares, blue circles, and blue squares. In the first stage of the task, the child has to sort out the bin by colour, grouping all the reds together and all the blues together. Then in the second stage, they mix up all the shapes again and sort them by shape, grouping all the circles together and all the squares together. To successfully complete the second task, children have to ignore the sorting rule they learned on the first task. If bilingualism does indeed have a positive effect on executive function, what results would we predict for this task?

- No difference between monolingual and bilingual children on the second task.
- Monolingual children will complete the second task more quickly and accurately than bilingual children.
- Bilingual children will complete the second task more quickly and accurately than monolingual children.

Question 11.9-2. Parents of deaf children who are considering cochlear implants for their child are sometimes reluctant to provide access to signed language, because they worry that it will delay the child's acquisition of spoken language. Given what you now know about language acquisition, do you think their fear is realistic?

- Yes, because the signed modality will interfere with the spoken modality.
- Yes, because bilingual children are often delayed relative to monolingual children.
- No, because the cochlear implant provides such high-quality input that the child will learn spoken language easily after receiving the implant.
- No, because acquiring a grammar for signed language will facilitate the child's acquisition of spoken language after receiving the implant.

Answers

Question 11.9-1. Bilingual children will complete the second task more quickly and accurately than monolingual children.

Question 11.9-2. No, because acquiring a grammar for signed language will facilitate the child's acquisition of spoken language after receiving the implant.

Chapter 12: Adult Language Acquisition

Coming soon!

Chapter 13: Psycholinguistics and Neurolinguistics

Coming soon!

Appendix 1: PSRs and Flat Tree Structure

A1.1 Phrase Structure Rules

Questions

Question A1.1-1. Match the words to the correct blank.

What is the function of each part of the following PSR?

XP → WP X (YP+) ZP

The XP is _____ of the constituent.

The WP is _____ of the constituent.

The X is _____ of the constituent.

The YP is _____ of the constituent.

The ZP is _____ of the constituent.

words to match:

- the head
- an optional element that can be repeated
- the label
- an optional element that cannot be repeated
- an obligatory element

Question A1.1-2. Match the words to the correct blank.

The following sentence has _____ embedded clause.
“The very fast red racecar crossed the finished line first in the final competition.”
The following sentence has _____ embedded clause.
“That the red racecar won surprised the judges.”
The following sentence has _____ embedded clause.
“One of the judges thinks that the driver cheated.”

Words to match:

- no
- a subject
- an object

Question A1.1-3. Match the words to the correct blank.

Consider the following sentence.
“The extremely loud child was demanding a large unhealthy candy.”
The word “extremely” is an _____ that modifies the word _____, not _____. The word ‘large’ is an _____ that modifies the word _____, not _____.

Words to match:

- adverb
- adjective
- ‘child’
- ‘loud’
- ‘candy’
- ‘unhealty’

Answers

Question A1.1-1.

The XP is **the label** of the constituent.

The WP is **an obligatory element** of the constituent.

The X is **the head** of the constituent.

The YP is **an optional element that can be repeated** of the constituent.

The ZP is **an optional element that cannot be repeated** of the constituent.

Question A1.1-2.

The following sentence has **no** embedded clause.
“The very fast red racecar crossed the finished line first in the final competition.”

The following sentence has **a subject** embedded clause.
“That the red racecar won surprised the judges.”

The following sentence has **an object** embedded clause.
“One of the judges thinks that the driver cheated.”

Question A1.1-3.

The word “extremely” is an **adverb** that modifies the word **‘loud’**, not **‘child’**. The word ‘large’ is an **adjective** that modifies the word **‘candy’**, not **‘unhealthy’**.

A1.2 Phrase Structure Rules in Other Languages

Coming soon!

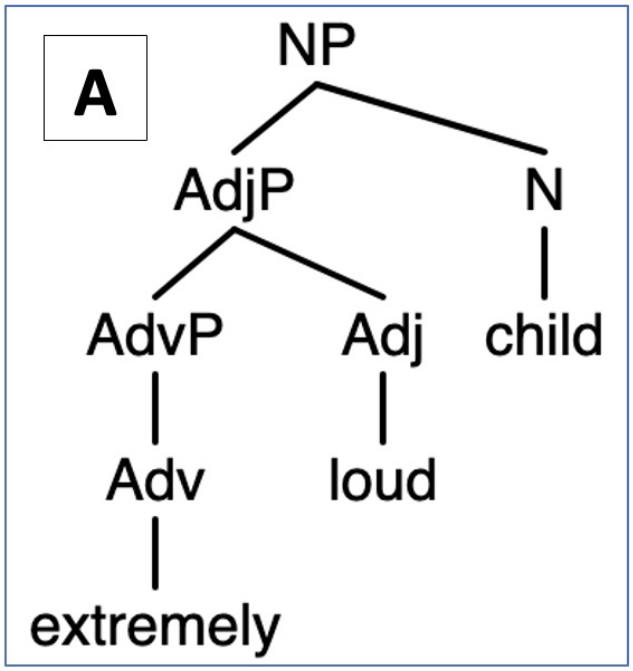
A1.3 Properties of PSR Trees

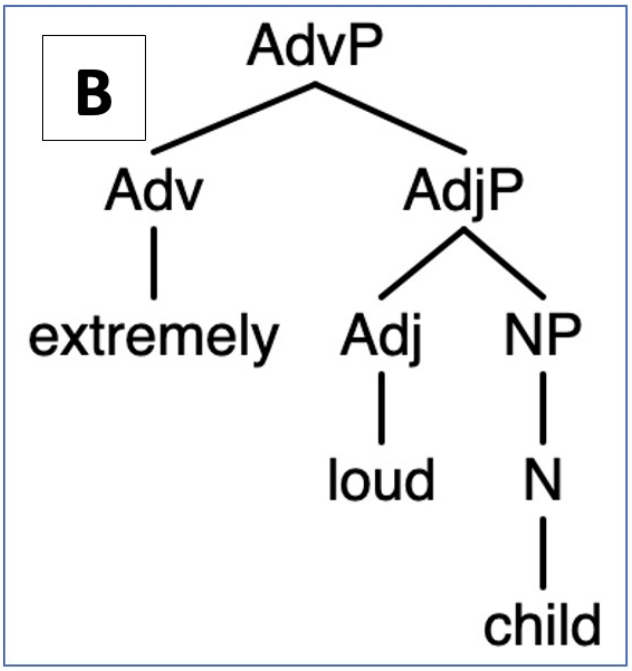
Questions

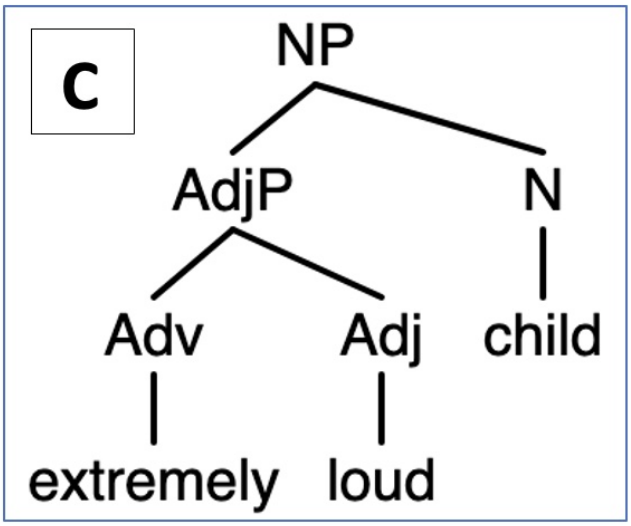
Question A1.3-1. Which of the following is NOT usually a property of heads?

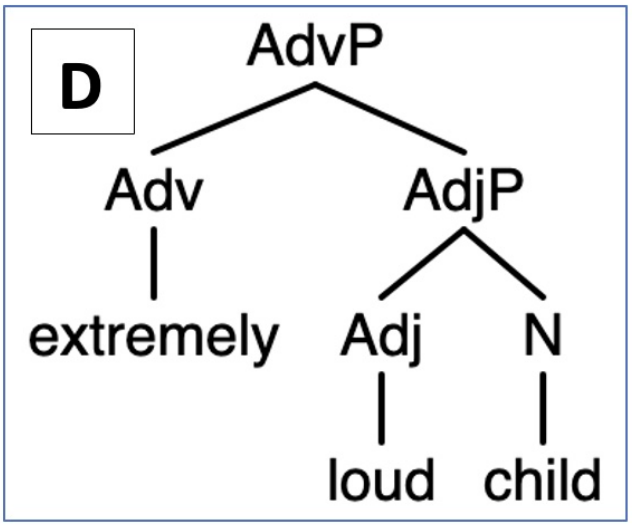
- There is only one head per phrase.
- The label of a phrase is usually named after its head.
- The head is usually a phrase.
- The head is usually obligatory.

Question A1.3-2.









Which of the tree diagrams in the image above correctly represent the heads of the phrase *extremely loud child*?

- tree A: [NP [AdjP [AdvP [Adv extremely]] [Adj loud]] [N child]]
- tree B: [AdvP [Adv extremely] [AdjP [Adj loud] [NP [N child]]]]
- tree C: [NP [AdjP [Adv extremely] [Adj loud]] [N child]]
- tree D: [AdvP [Adv extremely] [AdjP [Adj loud] [N child]]]

Question A1.3-3. Which **two** of the following groups of rules are recursive?

- AdvP → (AdvP) Adv
- S → NP VP // VP → V CP // CP → (Comp) S
- VP → V NP PP // PP → P NP
- S → NP VP // VP → V NP

Answers

Question A1.3-1. The head is usually a phrase.

The head is never a phrase! However, most other things inside a constituent are usually phrases.

Question A1.3-2. Tree A.

Question A1.3-3.

- AdvP → (AdvP) Adv
- S → NP VP // VP → V CP // CP → (Comp) S

A1.4 Structural Ambiguity

Coming soon!

A1.5 Head movement in yes-no questions

Coming soon!

A1.6 Phrasal movement in wh-questions

Coming soon!

A1.7 Draw a Tree Step-by-Step

Questions

Question A1.7-1. Select the **main verbs** in the following sentences. Remember, there can be more than one main verb if the sentence has an embedded clause!

1. My family had spaghetti for dinner last night.

2. What did you eat for dinner?

3. My baby sister spilled pasta sauce all over the floor.

4. I hope that the sauce doesn't stain the carpet.

5. It is being scrubbed right now.

6. Will we find out whether it left a mark?

7. It somehow hadn't been ruined already.

Question A1.7-2. For each clause, identify whether it is a statement, a content question, or a *yes-no* question. There are 3 statements, 3 content questions, and 2 yes-no questions.

1. [What did you eat for dinner]?
This clause is a _____.
2. [My baby sister spilled pasta sauce all over the floor].
This clause is a _____.3. [Who hopes [that the sauce doesn't stain the carpet]]?
The main clause is a _____ and the embedded clause is a _____.4. [Will we find out [whether it left a mark]]?
The main clause is a _____ and the embedded clause is a _____.5. I asked [how long should we soak it for].
The main clause is a _____ and the embedded clause is a _____.

Question A1.7-3. Select the word that the bolded phrase modifies.

Here is an example:

1. Let's throw out the **ruined** carpet.

In sentence one, *ruined* modifies *carpet*, so you would click on *carpet*.

2. My family had spaghetti **for dinner** last night.

3. My **baby** sister spilled pasta sauce all over the floor.

4. I ate my spaghetti **with a fork** .

5. I ate the spaghetti **with basil** .

6. For dessert, we had strawberries with **large** dollops of whipped cream.

7. For dessert, we had strawberries with large dollops of **whipped** cream.

8. For dessert, we had strawberries with large dollops **of whipped cream**.

9. For dessert, we had strawberries **with large dollops of whipped cream**.

Answers

Question A1.7-1.

1. My family **had** spaghetti for dinner last night.

2. What did you **eat** for dinner?

3. My baby sister **spilled** pasta sauce all over the floor.

4. I **hope** that the sauce doesn't **stain** the carpet.

5. It is being **scrubbed** right now.

6. Will we **find** out whether it **left** a mark?

7. It somehow hadn't been **ruined** already.

Question A1.7-2.

1. [What did you eat for dinner]?
This clause is a **content question**.

2. [My baby sister spilled pasta sauce all over the floor].
This clause is a **statement**.

3. [Who hopes [that the sauce doesn't stain the carpet]]?
The main clause is a **content question** and the embedded clause is a **statement**.

4. [Will we find out [whether it left a mark]]?
The main clause is a **yes-no question** and the embedded clause is a **yes-no question**.

5. I asked [how long should we soak it for].
The main clause is a **statement** and the embedded clause is a **content question**.

Question A1.7-3. The modified words are underlined.

2. My family had spaghetti **for dinner** last night.

3. My **baby** sister spilled pasta sauce all over the floor.

4. I ate my spaghetti **with a fork** .

5. I ate the spaghetti **with basil** .

6. For dessert, we had strawberries with **large** dollops of whipped cream.

7. For dessert, we had strawberries with large dollops of **whipped** cream.

8. For dessert, we had strawberries with large dollops **of whipped cream** .

9. For dessert, we had strawberries **with large dollops of whipped cream** .

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Accessibility Statement

This textbook conforms to the Accessibility requirements of eCampusOntario's Virtual Learning Strategy. In addition, the authors understand the importance of accessibility and strive to not only meet the minimum accessibility standards, but to research and develop accessibility standards particular to linguistic diagrams, formalisms, and notation.

Below we list several of the measures we have taken to increase accessibility.

- Pages are navigable by screenreader. (Note: Firefox does not seem to work well.)
- Alt-text is provided for all non-decorative images and diagrams. For syntax and morphology trees, the alt-text is currently formatted as a bracketed diagram, but we are exploring ways to communicate the hierarchal structure in a way that is easier to interpret in audio format.
- A definition file for special characters from the International Phonetic Alphabet is available for screenreaders. (Coming soon!)
- Graphs, charts, and maps are described in writing in the body of the text.
- Many parts of the text are provided in parallel video format. In these cases, the text functions as a transcript of the video. (More coming soon!)
- Glossed linguistic examples are formatted in tables that can be navigated by tabbing, and are tagged as non-English when applicable for screenreaders.
- High contrast colour is used.
- This ebook is available to export as PDF or EPUB. PDF versions can be printed. All interactive content is available in the backmatter of the text for exported copies.
- Pressbooks supports zooming the font size by 200% across all of its platforms.

We welcome feedback both in terms of what is working well and for issues that we overlooked or can be improved. We can be emailed at teaching.in.linguistics@gmail.com.

Note: As of "soft launch" on February 28th, 2022, not all of these accessibility features have been implemented. However, we plan to continue working on them throughout the rest of 2022. We still welcome feedback at this preliminary stage!

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