6

What Is Language?

When we study human language, we are approaching what some might call the "human essence," the distinctive qualities of mind that are, so far as we know, unique to man.

NOAM CHOMSKY, *Language and Mind*, 1968

Whatever else people do when they come together—whether they play, fight, make love, or make automobiles—they talk. We live in a world of language. We talk to our friends, our associates, our wives and husbands, our lovers, our teachers, our parents, our rivals, and even our enemies. We talk to bus drivers and total strangers. We talk face-to-face and over the telephone, and everyone responds with more talk. Television and radio further swell this torrent of words. Hardly a moment of our waking lives is free from words, and even in our dreams we talk and are talked to. We also talk when there is no one to answer. Some of us talk aloud in our sleep. We talk to our pets and sometimes to ourselves.

The possession of language, perhaps more than any other attribute, distinguishes humans from other animals. To understand our humanity, one must understand the nature of language that makes us human. According to the philosophy expressed in the myths and religions of many peoples, language is the source of human life and power. To some people of Africa, a newborn child is a *kintu*, a "thing," not yet a *muntu*, a "person." Only by the act of learning language does the child become a human being. According to this tradition, we all become "human" because we all know at least one language. But what does it mean to "know" a language?

Linguistic Knowledge

Do we know only what we see, or do we see what we somehow already know?

CYNTHIA OZICK, "What Helen Keller Saw," *New Yorker*, June 16 & 23, 2003

When you know a language, you can speak and be understood by others who know that language. This means you have the capacity to produce sounds that signify certain meanings and to understand or interpret the sounds produced by others. But language is much more than speech. Deaf people produce and understand sign languages just as hearing persons produce and understand spoken languages. The languages of the deaf communities throughout the world are equivalent to spoken languages, differing only in their modality of expression.

Most everyone knows at least one language. Five-year-old children are nearly as proficient at speaking and understanding as their parents. Yet the ability to carry out the simplest conversation requires profound knowledge that most speakers are unaware of. This is true for speakers of all languages, from Albanian to Zulu. A speaker of English can produce a sentence having two relative clauses without knowing what a relative clause is, such as

> My goddaughter who was born in Sweden and who now lives in Iowa is named Disa, after a Viking queen.

In a parallel fashion, a child can walk without understanding or being able to explain the principles of balance and support or the neurophysiological control mechanisms that permit one to do so. The fact that we may know something unconsciously is not unique to language.

What, then, do speakers of English or Quechua or French or Mohawk or Arabic know?

Knowledge of the Sound System

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Part of knowing a language means knowing what sounds (or signs[1]) are in that language and what sounds are not. One way this unconscious knowledge is revealed is by the way speakers of one language pronounce words from another

[1]The sign languages of the deaf will be discussed throughout the book. A reference to "language," then, unless speech sounds or spoken languages are specifically mentioned, includes both spoken and signed languages.

language. If you speak only English, for example, you may substitute an English sound for a non-English sound when pronouncing "foreign" words like French *ménage à trois*. If you pronounce it as the French do you are using sounds outside the English sound system.

French people speaking English often pronounce words like *this* and *that* as if they were spelled *zis* and *zat*. The English sound represented by the initial letters *th* in these words is not part of the French sound system, and the French mispronunciation reveals the speaker's unconscious knowledge of this fact.

Knowing the sound system of a language includes more than knowing the inventory of sounds. It means also knowing which sounds may start a word, end a word, and follow each other. The name of a former president of Ghana was *Nkrumah*, pronounced with an initial sound like the sound ending the English word *sink*. While this is an English sound, no word in English begins with the *nk* sound. Speakers of English who have occasion to pronounce this name often mispronounce it (by Ghanaian standards) by inserting a short vowel sound, like *Nekrumah* or *Enkrumah*. Children who learn English recognize that *nk* cannot begin a word, just as Ghanaian children learn that words in their language can and do begin with the *nk* sound.

We will learn more about sounds and sound systems in chapters 4 and 5.

Knowledge of Words

Knowing the sounds and sound patterns in our language constitutes only one part of our linguistic knowledge. Knowing a language means also knowing that certain sequences of sounds signify certain concepts or **meanings**. Speakers of English know what *boy* means, and that it means something different from *toy* or *girl* or *pterodactyl*. You also know that *toy* and *boy* are words, but *moy* is not. When you know a language, you know words in that language, that is, which sequences of sounds are related to specific meanings and which are not.

Arbitrary Relation of Form and Meaning

> The minute I set eyes on an animal I know what it is. I don't have to reflect a moment; the right name comes out instantly. I seem to know just by the shape of the creature and the way it acts what animal it is. When the dodo came along he [Adam] thought it was a wildcat. But I saved him. I just spoke up in a quite natural way and said, "Well, I do declare if there isn't the dodo!"
>
> **MARK TWAIN,** *Eve's Diary*, 1906

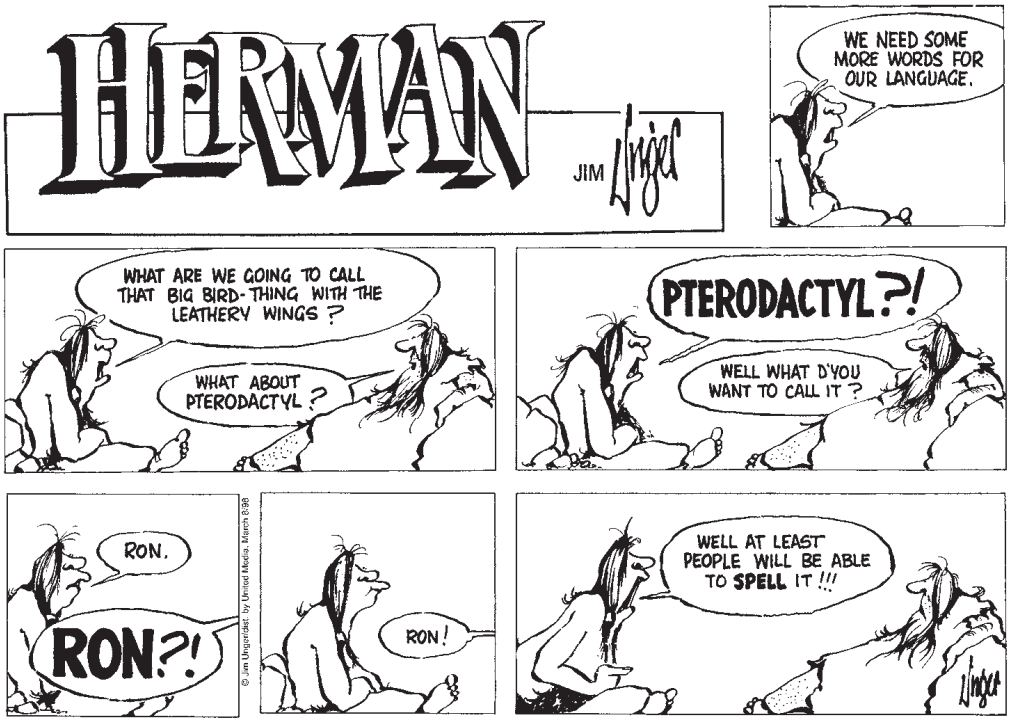
If you do not know a language, the words (and sentences) of that language will be mainly incomprehensible, because the relationship between speech sounds and the meanings they represent is, for the most part, an **arbitrary** one. When you are acquiring a language you have to learn that the sounds represented by the letters *house* signify the concept  ; if you know French, this same meaning is represented by *maison*; if you know Russian, by *dom*; if you know Spanish, by *casa*. Similarly,  is represented by *hand* in English, *main* in French, *nsa* in Twi, and *ruka* in Russian.

The following are words in some different languages. How many of them can you understand?

a. kyinii
b. doakam
c. odun
d. asa
e. toowq
f. bolna
g. wartawan
h. inaminatu
i. yawwa

People who know the languages from which these words are taken understand that they have the following meanings:

a. a large parasol (in Twi, a Ghanaian language)
b. living creature (in Tohono O'odham, an American Indian language)
c. wood (in Turkish)
d. morning (in Japanese)
e. is seeing (in Luiseño, a California Indian language)
f. to speak (in Hindi-Urdu); aching (in Russian)
g. reporter (in Indonesian)
h. teacher (in Warao, a Venezuelan Indian language)
i. right on! (in Hausa, a Nigerian language)



These examples show that the words of a particular language have the meanings they do only by convention. Despite what Eve says in Mark Twain's satire *Eve's Diary*, a pterodactyl could have been called *ron*, *blick*, or *kerplunkity*.

As Juliet says in Shakespeare's *Romeo and Juliet*:

> What's in a name? That which we call a rose
> By any other name would smell as sweet.

This **conventional** and arbitrary relationship between the **form** (sounds) and **meaning** (concept) of a word is also true in sign languages. If you see someone using a sign language you do not know, it is doubtful that you will understand the message from the signs alone. A person who knows Chinese Sign Language (CSL) would find it difficult to understand American Sign Language (ASL), and vice versa, as illustrated in Figure 6.1.

Many signs were originally like miming, where the relationship between form and meaning is not arbitrary. Bringing the hand to the mouth to mean "eating," as in miming, would be nonarbitrary as a sign. Over time these signs may change, just as the pronunciation of words changes, and the miming effect is lost. These signs become conventional, so that knowing the shape or movement of the hands does not reveal the meaning of the gestures in sign languages, as also shown in Figure 6.1.

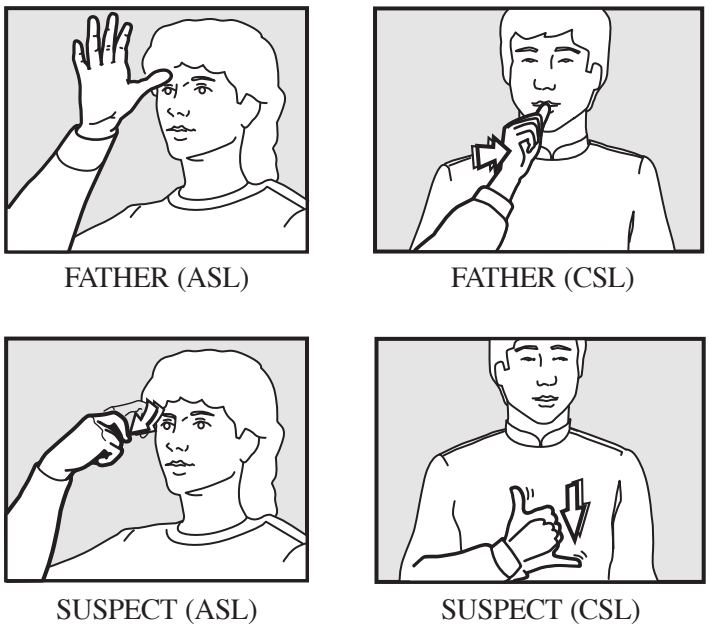


FIGURE 6.1 | Arbitrary relation between gestures and meanings of the signs for *father* and *suspect* in ASL and CSL.[2]

[2]From Poizner, Howard, Edward Klima, and Ursula Bellugi. "What the Hands Reveal about the Brain" figure: "Arbitrary relationship between gestures and meanings in ASL and CSL,"

There is some **sound symbolism** in language—that is, words whose pronunciation suggests the meaning. Most languages contain **onomatopoeic** words like *buzz* or *murmur* that imitate the sounds associated with the objects or actions they refer to. But even here, the sounds differ from language to language, reflecting the particular sound system of the language. In English *cock-a-doodle-doo* is an onomatopoeic word whose meaning is the crow of a rooster, whereas in Finnish the rooster's crow is *kukkokiekuu*. Forget *gobble gobble* when you're in Istanbul; a turkey in Turkey goes *glu-glu*.

Sometimes particular sound sequences seem to relate to a particular concept. In English many words beginning with *gl* relate to sight, such as *glare*, *glint*, *gleam*, *glitter*, *glossy*, *glaze*, *glance*, *glimmer*, *glimpse*, and *glisten*. However, *gl* words and their like are a very small part of any language, and *gl* may have nothing to do with "sight" in another language, or even in other words in English, such as *gladiator*, *glucose*, *glory*, *glutton*, *globe*, and so on.

English speakers know the *gl* words that relate to sight and those that do not; they know the onomatopoeic words and all the words in the basic vocabulary of the language. No speaker of English knows all 472,000 entries in *Webster's Third New International Dictionary*. And even if someone did know all the words in *Webster's*, that person would still not know English. Imagine trying to learn a foreign language by buying a dictionary and memorizing words. No matter how many words you learned, you would not be able to form the simplest phrases or sentences in the language, or understand a native speaker. No one speaks in isolated words. Of course, you could search in your traveler's dictionary for individual words to find out how to say something like "car—gas—where?" After many tries, a native might understand this question and then point in the direction of a gas station. If he answered you with a sentence, however, you probably would not understand what was said or be able to look it up, because you would not know where one word ended and another began. Chapter 2 will discuss how words are put together to form phrases and sentences, and chapter 3 will explore word and sentence meanings.

The Creativity of Linguistic Knowledge

> ALBERT: So are you saying that you were the best friend of the woman who was married to the man who represented your husband in divorce?
>
> ANDRÉ: In the history of speech, that sentence has never been uttered before.
>
> **NEIL SIMON,** *The Dinner Party*, 2000

Knowledge of a language enables you to combine sounds to form words, words to form phrases, and phrases to form sentences. You cannot buy a dictionary or phrase book of any language with all the sentences of the language. No dictionary can list all the possible sentences, because the number of sentences in a language is infinite. Knowing a language means being able to produce new sentences never spoken before and to understand sentences never heard before. The linguist Noam Chomsky, one of the people most responsible for the modern revolution in language and cognitive science, refers to this ability as part of the **creative aspect** of language use. Not every speaker of a language can create

great literature, but everybody who knows a language can and does create new sentences when speaking and understands new sentences created by others, a fact expressed more than 400 years ago by Huarte de San Juan (1530–1592): "Normal human minds are such that . . . without the help of anybody, they will produce 1,000 (sentences) they never heard spoke of . . . inventing and saying such things as they never heard from their masters, nor any mouth."

In pointing out the creative aspect of language, Chomsky made a powerful argument against the behaviorist view of language that prevailed in the first half of the twentieth century, which held that language is a set of learned responses to stimuli. While it is true that if someone steps on your toes you may automatically respond with a scream or a grunt, these sounds are not part of language. They are involuntary reactions to stimuli. After we reflexively cry out, we can then go on to say: "Thank you very much for stepping on my toe, because I was afraid I had elephantiasis and now that I can feel the pain I know I don't," or any one of an infinite number of sentences, because the particular sentences we produce are not controlled by any stimulus.

Even some involuntary cries like "ouch" are constrained by our own language system, as are the filled pauses that are sprinkled through conversational speech, such as *er*, *uh*, and *you know* in English. They contain only the sounds found in the language. French speakers, for example, often fill their pauses with the vowel sound that starts their word for egg—*oeuf*—a sound that does not occur in English.

Our creative ability is reflected not only in what we say but also includes our understanding of new or novel sentences. Consider the following sentence: "Daniel Boone decided to become a pioneer because he dreamed of pigeon-toed giraffes and cross-eyed elephants dancing in pink skirts and green berets on the wind-swept plains of the Midwest." You may not believe the sentence; you may question its logic; but you can understand it, although you have probably never heard or read it before now.

Knowledge of a language, then, makes it possible to understand and produce new sentences. If you counted the number of sentences in this book that you have seen or heard before, the number would be small. Next time you write an essay or a letter, see how many of your sentences are new. Few sentences are stored in your brain, to be pulled out to fit some situation or matched with some sentence that you hear. Novel sentences never spoken or heard before cannot be stored in your memory.

Simple memorization of all the possible sentences in a language is impossible in principle. If for every sentence in the language a longer sentence can be formed, then there is no limit to the number of sentences. In English you can say:

This is the house.

or

This is the house that Jack built.

or

This is the malt that lay in the house that Jack built.

or

> This is the dog that worried the cat that killed the rat that ate the malt that lay in the house that Jack built.

And you need not stop there. How long, then, is the longest sentence? A speaker of English can say:

> The old man came.

or

> The old, old, old, old, old man came.

How many "olds" are too many? Seven? Twenty-three?

It is true that the longer these sentences become, the less likely we would be to hear or to say them. A sentence with 276 occurrences of "old" would be highly unusual in either speech or writing, even to describe Methuselah. But such a sentence is theoretically possible. If you know English, you have the knowledge to add any number of adjectives as modifiers to a noun and to form sentences with an indefinite number of clauses, as in "the house that Jack built."

All human languages permit their speakers to increase the length and complexity of sentences in these ways; creativity is a universal property of human language.

Knowledge of Sentences and Nonsentences

To memorize and store an infinite set of sentences would require an infinite storage capacity. However, the brain is finite, and even if it were not, we could not store novel sentences, which are, well, novel. When you learn a language you must learn something finite—your vocabulary is finite (however large it may be)—and that can be stored. If sentences were formed simply by placing one word after another in any order, then a language could be defined simply as a set of words. But you can see that knowledge of words is not enough by examining the following strings of words:

1. **a.** John kissed the little old lady who owned the shaggy dog.
   b. Who owned the shaggy dog John kissed the little old lady.
   c. John is difficult to love.
   d. It is difficult to love John.
   e. John is anxious to go.
   f. It is anxious to go John.
   g. John, who was a student, flunked his exams.
   h. Exams his flunked student a was who John.

If you were asked to put an asterisk or star before the examples that seemed ill formed or ungrammatical or "no good" to you, which ones would you mark? Our intuitive knowledge about what is or is not an allowable sentence in English convinces us to star *b*, *f*, and *h*. Which ones did you star?

Would you agree with the following judgments?

2. **a.** What he did was climb a tree.
   b. *What he thought was want a sports car.[3]
   c. Drink your beer and go home!
   d. *What are drinking and go home?
   e. I expect them to arrive a week from next Thursday.
   f. *I expect a week from next Thursday to arrive them.
   g. Linus lost his security blanket.
   h. *Lost Linus security blanket his.

If you find the starred sentences unacceptable, as we do, you see that not every string of words constitutes a well-formed sentence in a language. Our knowledge of a language determines which strings of words are well-formed sentences and which are not. Therefore, in addition to knowing the words of the language, linguistic knowledge includes *rules* for forming sentences and making the kinds of judgments you made about the examples in (1) and (2). These rules must be finite in length and finite in number so that they can be stored in our finite brains. Yet, they must permit us to form and understand an infinite set of new sentences. They are not rules determined by a judge or a legislature, or even rules taught in a grammar class. They are unconscious rules that we acquire as young children as we develop language.

A language, then, consists of all the sounds, words, and infinitely many possible sentences. When you know a language, you know the sounds, the words, and the rules for their combination.

Linguistic Knowledge and Performance

> "What's one and one and one and one and one and one and one and one and one and one?" "I don't know," said Alice. "I lost count." "She can't do Addition," the Red Queen interrupted.
>
> **LEWIS CARROLL,** *Through the Looking-Glass*, 1871

Our linguistic knowledge permits us to form longer and longer sentences by joining sentences and phrases together or adding modifiers to a noun. Whether we stop at three, five, or eighteen adjectives, it is impossible to limit the number we could add if desired. Very long sentences are theoretically possible, but they are highly improbable. Evidently, there is a difference between having the knowledge necessary to produce sentences of a language and applying this knowledge. It is a difference between what we know, which is our **linguistic competence**, and how we use this knowledge in actual speech production and comprehension, which is our **linguistic performance**.

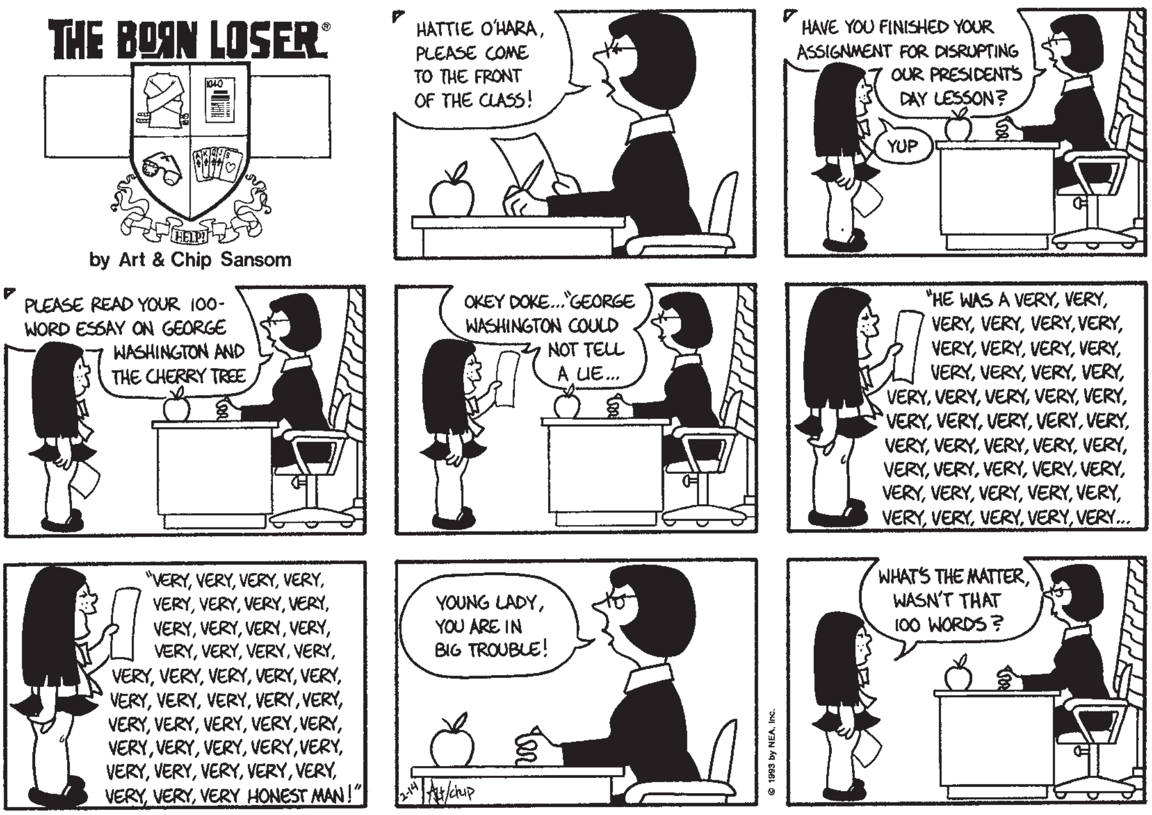
Speakers of all languages have the knowledge to understand or produce sentences of any length. Here is an example from the ruling of a federal judge:

[3]The asterisk is used before examples that speakers find ungrammatical. This notation will be used throughout the book.

> We invalidate the challenged lifetime ban because we hold as a matter of federal constitutional law that a state initiative measure cannot impose a severe limitation on the people's fundamental rights when the issue of whether to impose such a limitation on these rights is put to the voters in a measure that is ambiguous on its face and that fails to mention in its text, the proponent's ballot argument, or the state's official description, the severe limitation to be imposed.

However, there are physiological and psychological reasons that limit the number of adjectives, adverbs, clauses, and so on that we actually produce and understand. Speakers may run out of breath, lose track of what they have said, or die of old age before they are finished. Listeners may become confused, tired, bored, or disgusted.

When we speak, we usually wish to convey some message. At some stage in the act of producing speech, we must organize our thoughts into strings of words. Sometimes the message is garbled. We may stammer, or pause, or produce **slips of the tongue**. We may even sound like Hattie in the cartoon, who illustrates the difference between linguistic knowledge and the way we use that knowledge in performance.



For the most part, linguistic knowledge is unconscious knowledge. The linguistic system—the sounds, structures, meanings, words, and rules for putting them all together—is acquired with no conscious awareness. Just as we may not be conscious of the principles that allow us to stand or walk, we are unaware of the rules of language. Our ability to speak, to understand, and to make judgments about the grammaticality of sentences reveals our knowledge of the rules of our language. This knowledge represents a complex cognitive system. The nature of this system is what this book is all about.

What Is Grammar?

> We use the term "grammar" with a systematic ambiguity. On the one hand, the term refers to the explicit theory constructed by the linguist and proposed as a description of the speaker's competence. On the other hand, it refers to this competence itself.
>
> **NOAM CHOMSKY AND MORRIS HALLE,** *The Sound Pattern of English*, 1968

Descriptive Grammars

> There are no primitive languages. The great and abstract ideas of Christianity can be discussed even by the wretched Greenlanders.
>
> **JOHANN PETER SUESSMILCH,** in a paper delivered before the Prussian Academy, 1756

The way we are using the word *grammar* differs from most common usages. In our sense, the grammar is the knowledge speakers have about the units and rules of their language—rules for combining sounds into words (called phonology), rules of word formation (called morphology), rules for combining words into phrases and phrases into sentences (called syntax), as well as the rules for assigning meaning (called semantics). The grammar, together with a mental dictionary (called a lexicon) that lists the words of the language, represents our linguistic competence. To understand the nature of language we must understand the nature of grammar.

Every human being who speaks a language knows its grammar. When linguists wish to describe a language, they make explicit the rules of the grammar of the language that exist in the minds of its speakers. There will be some differences among speakers, but there must be shared knowledge too. The shared knowledge—the common parts of the grammar—makes it possible to communicate through language. To the extent that the linguist's description is a true model of the speakers' linguistic capacity, it is a successful description of the grammar and of the language itself. Such a model is called a **descriptive grammar**. It does not tell you how you *should* speak; it describes your basic linguistic knowledge. It explains how it is possible for you to speak and understand and make judgments about well-formedness, and it tells what you know about the sounds, words, phrases, and sentences of your language.

When we say in later chapters that a sentence is **grammatical** we mean that it conforms to the rules of the mental grammar (as described by the linguist);

when we say that it is **ungrammatical**, we mean it deviates from the rules in some way. If, however, we posit a rule for English that does not agree with your intuitions as a speaker, then the grammar we are describing differs in some way from the mental grammar that represents your linguistic competence; that is, your language is not the one described. No language or variety of a language (called a **dialect**) is superior to any other in a linguistic sense. Every grammar is equally complex, logical, and capable of producing an infinite set of sentences to express any thought. If something can be expressed in one language or one dialect, it can be expressed in any other language or dialect. It might involve different means and different words, but it can be expressed. We will have more to say about dialects in chapter 9. This is true as well for languages of technologically underdeveloped cultures. The grammars of these languages are not primitive or ill formed in any way. They have all the richness and complexity of the grammars of languages spoken in technologically advanced cultures.

Prescriptive Grammars

> It is certainly the business of a grammarian to find out, and not to make, the laws of a language.
>
> **JOHN FELL,** *Essay towards an English Grammar*, 1784

> Just read the sentence aloud, Amanda, and listen to how it sounds. If the sentence sounds OK, go with it. If not, rearrange the pieces. Then throw out the rule books and go to bed.
>
> **JAMES KILPATRICK,** "Writer's Art" (syndicated newspaper column), 1998

> Any fool can make a rule
> And every fool will mind it
>
> **HENRY DAVID THOREAU,** journal entry, 1860

Not all grammarians, past or present, share the view that all grammars are equal. Language "purists" of all ages believe that some versions of a language are better than others, that there are certain "correct" forms that all educated people should use in speaking and writing, and that language change is corruption. The Greek Alexandrians in the first century, the Arabic scholars at Basra in the eighth century, and numerous English grammarians of the eighteenth and nineteenth centuries held this view. They wished to *prescribe* rather than *describe* the rules of grammar, which gave rise to the writing of **prescriptive grammars**.

In the Renaissance a new middle class emerged who wanted their children to speak the dialect of the "upper" classes. This desire led to the publication of many prescriptive grammars. In 1762 Bishop Robert Lowth wrote *A Short Introduction to English Grammar with Critical Notes*. Lowth prescribed a number of new rules for English, many of them influenced by his personal taste. Before the publication of his grammar, practically everyone—upper-class, middle-class, and lower-class—said *I don't have none* and *You was wrong about that*. Lowth,

however, decided that "two negatives make a positive" and therefore one should say *I don't have any*; and that even when *you* is singular it should be followed by the plural *were*. Many of these prescriptive rules were based on Latin grammar and made little sense for English. Because Lowth was influential and because the rising new class wanted to speak "properly," many of these new rules were legislated into English grammar, at least for the **prestige dialect**—that variety of the language spoken by people in positions of power.

The view that dialects that regularly use double negatives are inferior cannot be justified if one looks at the standard dialects of other languages in the world. Romance languages, for example, use double negatives, as the following examples from French and Italian show:

French:	Je	ne	veux	parler	avec	personne.
	I	not	want	speak	with	no-one.
Italian:	Non	voglio		parlare	con	nessuno.
	not	I-want		speak	with	no-one.

English translation: "I don't want to speak with anyone."

Prescriptive grammars such as Lowth's are different from the descriptive grammars we have been discussing. Their goal is not to describe the rules people know, but to tell them what rules they should follow. The great British Prime Minister Winston Churchill is credited with this response to the "rule" against ending a sentence with a preposition: "This is the sort of nonsense up with which I will not put."

Today our bookstores are populated with books by language purists attempting to "save the English language." They criticize those who use *enormity* to mean "enormous" instead of "monstrously evil." But languages change in the course of time and words change meaning. Language change is a natural process, as we discuss in chapter 10. Over time *enormity* was used more and more in the media to mean "enormous," and we predict that now that President Barack Obama has used it that way (in his victory speech of November 4, 2008), that usage will gain acceptance. Still, the "saviors" of the English language will never disappear. They will continue to blame television, the schools, and even the National Council of Teachers of English for failing to preserve the standard language, and are likely to continue to dis (oops, we mean disparage) anyone who suggests that African American English (AAE)[4] and other dialects are viable, complete languages.

In truth, human languages are without exception fully expressive, complete, and logical, as much as they were two hundred or two thousand years ago. Hopefully (another frowned-upon usage), this book will convince you that all languages and dialects are rule-governed, whether spoken by rich or poor, powerful or weak, learned or illiterate. Grammars and usages of particular groups

[4]AAE is also called African American Vernacular English (AAVE), Ebonics, and Black English (BE). It is spoken by some (but by no means all) African Americans. It is discussed in chapter 9.

in society may be dominant for social and political reasons, but from a linguistic (scientific) perspective they are neither superior nor inferior to the grammars and usages of less prestigious members of society.

Having said all this, it is undeniable that the **standard** dialect (defined in chapter 9) may indeed be a better dialect for someone wishing to obtain a particular job or achieve a position of social prestige. In a society where "linguistic profiling" is used to discriminate against speakers of a minority dialect, it may behoove those speakers to learn the prestige dialect rather than wait for social change. But linguistically, prestige and standard dialects do not have superior grammars.

Finally, all of the preceding remarks apply to *spoken* language. Writing (see chapter 11) is not acquired naturally through simple exposure to others speaking the language (see chapter 7), but must be taught. Writing follows certain prescriptive rules of grammar, usage, and style that the spoken language does not, and is subject to little, if any, dialectal variation.

Teaching Grammars

> I don't want to talk grammar. I want to talk like a lady.
>
> **G. B. SHAW,** *Pygmalion*, 1912

The descriptive grammar of a language attempts to describe the rules internalized by a speaker of that language. It is different from a **teaching grammar**, which is used to learn another language or dialect. Teaching grammars can be helpful to people who do not speak the standard or prestige dialect, but find it would be advantageous socially and economically to do so. They are used in schools in foreign language classes. This kind of grammar gives the words and their pronunciations, and explicitly states the rules of the language, especially where they differ from the language of instruction.

It is often difficult for adults to learn a second language without formal instruction, even when they have lived for an extended period in a country where the language is spoken. (Second language acquisition is discussed in more detail in chapter 7.) Teaching grammars assume that the student already knows one language and compares the grammar of the target language with the grammar of the native language. The meaning of a word is provided by a **gloss**—the parallel word in the student's native language, such as *maison*, "house" in French. It is assumed that the student knows the meaning of the gloss "house," and so also the meaning of the word *maison*.

Sounds of the target language that do not occur in the native language are often described by reference to known sounds. Thus the student might be aided in producing the French sound *u* in the word *tu* by instructions such as "Round your lips while producing the vowel sound in *tea*."

The rules on how to put words together to form grammatical sentences also refer to the learner's knowledge of their native language. For example, the teaching grammar *Learn Zulu* by Sibusiso Nyembezi states that "The difference between singular and plural is not at the end of the word but at the beginning of it," and warns that "Zulu does not have the indefinite and definite articles

'a' and 'the.'" Such statements assume students know the rules of their own grammar, in this case English. Although such grammars might be considered prescriptive in the sense that they attempt to teach the student what is or is not a grammatical construction in the new language, their aim is different from grammars that attempt to change the rules or usage of a language that is already known by the speaker.

This book is not primarily concerned with either prescriptive or teaching grammars. However, these kinds of grammars are considered in chapter 9 in the discussion of standard and nonstandard dialects.

Language Universals

> In a grammar there are parts that pertain to all languages; these components form what is called the general grammar. In addition to these general (universal) parts, there are those that belong only to one particular language; and these constitute the particular grammars of each language.
>
> **CÉSAR CHESNEAU DU MARSAIS,** c. 1750

There are rules of particular languages, such as English, Swahili, and Zulu, that form part of the individual grammars of these languages, and then there are rules that hold in all languages. Those rules representing the universal properties that all languages share constitute a universal grammar. The linguist attempts to uncover the "laws" of particular languages, and also the laws that pertain to all languages. The universal laws are of particular interest because they give us a window into the workings of the human mind in this cognitive domain.

In about 1630, the German philosopher Johann Heinrich Alsted first used the term *general grammar* as distinct from *special grammar*. He believed that the function of a general grammar was to reveal those features "which relate to the method and etiology of grammatical concepts. They are common to all languages." Pointing out that "general grammar is the pattern 'norma' of every particular grammar whatsoever," he implored "eminent linguists to employ their insight in this matter." Three and a half centuries before Alsted, the scholar Robert Kilwardby held that linguists should be concerned with discovering the nature of language in general. So concerned was Kilwardby with Universal Grammar that he excluded considerations of the characteristics of particular languages, which he believed to be as "irrelevant to a science of grammar as the material of the measuring rod or the physical characteristics of objects were to geometry." Kilwardby was perhaps too much of a universalist. The particular properties of individual languages are relevant to the discovery of language universals, and they are of interest for their own sake.

People attempting to study Latin, Greek, French, or Swahili as a second language are so focused on learning those aspects of the second language that are different from their native language that they may be skeptical of assertions that there are universal laws of language. Yet the more we investigate this question, the more evidence accumulates to support Chomsky's view that there is a **Universal Grammar** (**UG**) that is part of the biologically endowed human

language faculty. We can think of UG as the basic blueprint that all languages follow. It specifies the different components of the grammar and their relations, how the different rules of these components are constructed, how they interact, and so on. It is a major aim of **linguistic theory** to discover the nature of UG. The linguist's goal is to reveal the "laws of human language" as the physicist's goal is to reveal the "laws of the physical universe." The complexity of language, a product of the human brain, undoubtedly means this goal will never be fully achieved. All scientific theories are incomplete, and new hypotheses must be proposed to account for new data. Theories are continually changing as new discoveries are made. Just as physics was enlarged by Einstein's theories of relativity, so grows the linguistic theory of UG as new discoveries shed new light on the nature of human language. The comparative study of many different languages is of central importance to this enterprise.

The Development of Grammar

> How comes it that human beings, whose contacts with the world are brief and personal and limited, are nevertheless able to know as much as they do know?
>
> **BERTRAND RUSSELL,** *Human Knowledge: Its Scope and Limits*, 1948

Linguistic theory is concerned not only with describing the knowledge that an adult speaker has of his or her language, but also with explaining how that knowledge is acquired. All normal children acquire (at least one) language in a relatively short period with apparent ease. They do this despite the fact that parents and other caregivers do not provide them with any specific language instruction. Indeed, it is often remarked that children seem to "pick up" language just from hearing it spoken around them. Children are language learning virtuosos—whether a child is male or female, from a rich family or a disadvantaged one, grows up on a farm or in the city, attends day care or has home care—none of these factors fundamentally affects the way language develops. Children can acquire any language they are exposed to with comparable ease—English, Dutch, French, Swahili, Japanese—and even though each of these languages has its own peculiar characteristics, children learn them all in very much the same way. For example, all children go through a babbling stage; their babbles gradually give way to words, which then combine into simple sentences. When children first begin to produce sentences, certain elements may be missing. For example, the English-speaking two-year-old might say *Cathy build house* instead of *Cathy is building the house*. On the other side of the world, a Swahili-speaking child will say *mbuzi kula majani*, which translates as "goat eat grass," and which also lacks many required elements. They pass through other linguistic stages on their way to adultlike competence, and by about age five children speak a language that is almost indistinguishable from the language of the adults around them.

In just a few short years, without the benefit of explicit guidance and regardless of personal circumstances, the young child—who may be unable to tie her shoes or do even the simplest arithmetic computation—masters the complex grammatical structures of her language and acquires a substantial lexicon. Just

how children accomplish this remarkable cognitive feat is a topic of intense interest to linguists. The child's inexorable path to adult linguistic knowledge and the uniformity of the acquisition process point to a substantial innate component to language development. Chomsky, following the lead of the early rationalist philosophers, proposed that human beings are born with an innate "blueprint" for language, what we referred to earlier as Universal Grammar. Children acquire language as quickly and effortlessly as they do because they do not have to figure out all the grammatical rules, only those that are specific to their particular language. The universal properties—the laws of language—are part of their biological endowment. Linguistic theory aims to uncover those principles that characterize all human languages and to reveal the innate component of language that makes language acquisition possible. In chapter 7 we will discuss language acquisition in more detail.

Sign Languages: Evidence for the Innateness of Language

> It is not the want of organs that [prevents animals from making] . . . known their thoughts . . . for it is evident that magpies and parrots are able to utter words just like ourselves, and yet they cannot speak as we do, that is, so as to give evidence that they think of what they say. On the other hand, men who, being born deaf and mute . . . are destitute of the organs which serve the others for talking, are in the habit of themselves inventing certain signs by which they make themselves understood.
>
> **RENÉ DESCARTES,** *Discourse on Method*, 1637

The sign languages of deaf communities provide some of the best evidence to support the notion that humans are born with the ability to acquire language, and that all languages are governed by the same universal properties.

Because deaf children are unable to hear speech, they do not acquire spoken languages as hearing children do. However, deaf children who are exposed to sign languages acquire them just as hearing children acquire spoken languages. Sign languages do not use sounds to express meanings. Instead, they are visual-gestural systems that use hand, body, and facial gestures as the forms used to represent words and grammatical rules. Sign languages are fully developed languages, and signers create and comprehend unlimited numbers of new sentences, just as speakers of spoken languages do. Current research on sign languages has been crucial to understanding the biological underpinnings of human language acquisition and use.

About one in a thousand babies is born deaf or with a severe hearing deficiency. Deaf children have difficulty learning a spoken language because normal speech depends largely on auditory feedback. To learn to speak, a deaf child requires extensive training in special schools or programs designed especially for deaf people.

Although deaf people can be taught to speak a language intelligibly, they can never understand speech as well as a hearing person. Seventy-five percent of spoken English words cannot be read on the lips accurately. The ability of many deaf individuals to comprehend spoken language is therefore remarkable; they

combine lip reading with knowledge of the structure of language, the meaning redundancies that language has, and context.

If, however, human language is a biologically based ability and all human beings have the innate ability (or as Darwin suggested, instinct) to acquire a language, it is not surprising that nonspoken languages have developed among nonhearing individuals. The more we learn about the human linguistic knowledge, the clearer it becomes that language acquisition and use are not dependent on the ability to produce and hear sounds, but on a far more abstract cognitive capacity that accounts for the similarities between spoken and sign languages.

American Sign Language

The major language of the deaf community in the United States is **American Sign Language** (**ASL**). ASL is an outgrowth of the sign language used in France and brought to the United States in 1817 by the great educator Thomas Hopkins Gallaudet.

Like all languages, ASL has its own grammar with phonological, morphological, syntactic, and semantic rules, and a mental lexicon of signs, all of which is encoded through a system of gestures, and is otherwise equivalent to spoken languages.

Signers communicate ideas at a rate comparable to spoken communication. Moreover, language arts are not lost to the deaf community. Poetry is composed in sign language, and stage plays such as Richard Brinsley Sheridan's *The Critic* have been translated into sign language and acted by the National Theatre of the Deaf.

Deaf children acquire sign language much in the way that hearing children acquire a spoken language, going through the same linguistic stages including the babbling stage. Deaf children babble with their hands, just as hearing children babble with their vocal tract. Deaf children often sign themselves to sleep just as hearing children talk themselves to sleep. Deaf children report that they dream in sign language as French-speaking children dream in French and Hopi-speaking children dream in Hopi. Deaf children sign to their dolls and stuffed animals. Slips of the hand occur similar to slips of the tongue; finger fumblers amuse signers as tongue twisters amuse speakers. Sign languages resemble spoken languages in all major aspects, showing that there truly are universals of language despite differences in the modality in which the language is performed. This universality is predictable because regardless of the modality in which it is expressed, language is a biologically based ability.

In the United States there are several signing systems that educators have created in an attempt to represent spoken and/or written English. Unlike ASL, these languages are artificial, consisting essentially in the replacement of each spoken English word (and grammatical elements such as the *-s* ending for plurals and the *-ed* ending for past tense) by a sign. So the syntax and semantics of these manual codes for English are approximately the same as those of spoken English. The result is unnatural—similar to trying to speak French by translating every English word or ending into its French counterpart. Difficulties arise because there are not always corresponding forms in the two languages. The problem is even greater with sign languages because they use multidimensional space while spoken languages are sequential.

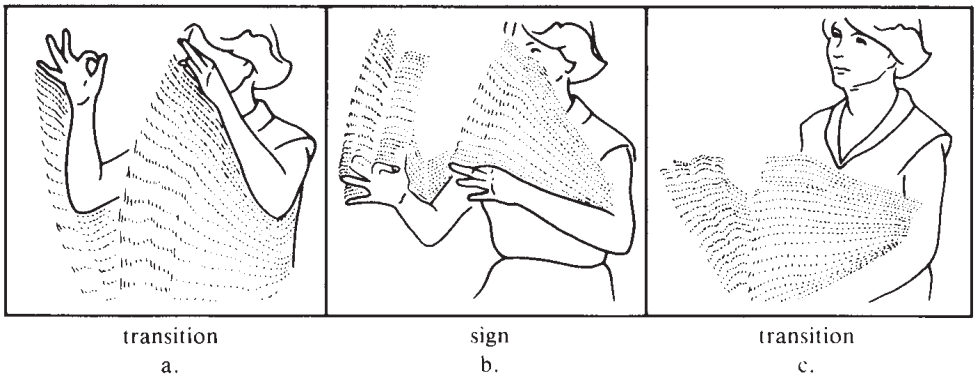


FIGURE 6.2 | The ASL sign DECIDE: (a) and (c) show transitions from the sign; (b) illustrates the single downward movement of the sign.

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There are occasions when signers need to represent a word or concept for which there is no sign. New coinages, foreign words, acronyms, certain proper nouns, technical vocabulary, or obsolete words as might be found in a signed interpretation of a play by Shakespeare are among some of these. For such cases ASL provides a series of hand shapes and movements that represent the letters of the English alphabet, permitting all such words and concepts to be expressed through finger spelling.

Signs, however, are produced differently from finger-spelled words. As Klima and Bellugi observe, "The sign DECIDE cannot be analyzed as a sequence of distinct, separable configurations of the hand. Like all other lexical signs in ASL, but unlike the individual finger-spelled letters in D-E-C-I-D-E taken separately, the ASL sign DECIDE does have an essential movement but the hand shape occurs simultaneously with the movement. In appearance, the sign is a continuous whole."[5] This sign is shown in Figure 6.2.

Animal "Languages"

> A dog cannot relate his autobiography; however eloquently he may bark, he cannot tell you that his parents were honest though poor.
>
> **BERTRAND RUSSELL,** *Human Knowledge: Its Scope and Limits*, 1948

Is language the exclusive property of the human species? The idea of talking animals is as old and as widespread among human societies as language itself. All cultures have legends in which some animal plays a speaking role. All over West Africa, children listen to folktales in which a "spider-man" is the hero. "Coyote" is a favorite figure in many Native American tales, and many an animal takes

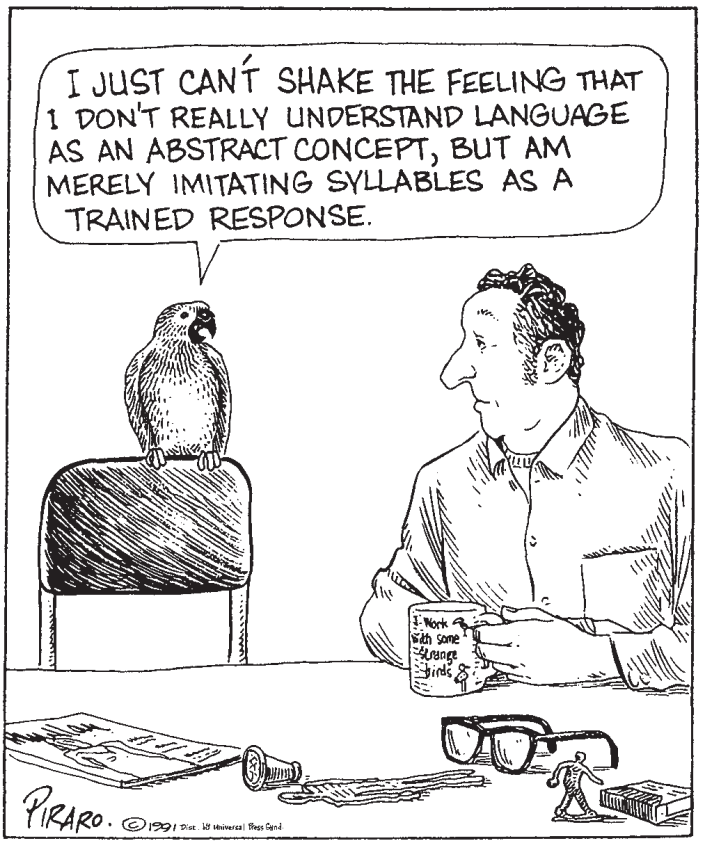
[5]Klima, E. S., and U. Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.

the stage in Aesop's famous fables. The fictional Doctor Doolittle's forte was communicating with all manner of animals, from giant snails to tiny sparrows.

If language is viewed only as a system of communication, then many species communicate. Humans also use systems other than language to relate to each other and to send and receive "messages," like so-called body language. The question is whether the communication systems used by other species are at all like human linguistic knowledge, which is acquired by children with no instruction, and which is used creatively rather than in response to internal or external stimuli.

"Talking" Parrots

> Words learned by rote a parrot may rehearse; but talking is not always to converse.
>
> **WILLIAM COWPER,** *Poems by William Cowper, of the Inner Temple, Esq.*, 1782



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Most humans who acquire language use speech sounds to express meanings, but such sounds are not a necessary aspect of language, as evidenced by the sign languages. The use of speech sounds is therefore not a basic part of what we have

been calling language. The chirping of birds, the squeaking of dolphins, and the dancing of bees may potentially represent systems similar to human languages. If animal communication systems are not like human language, it is not because of a lack of speech.

Conversely, when animals vocally imitate human utterances, it does not mean they possess language. Language is a system that relates sounds or gestures to meanings. Talking birds such as parrots and mynahs are capable of faithfully reproducing words and phrases of human language that they have heard, but their utterances carry no meaning. They are speaking neither English nor their own language when they sound like us.

Talking birds do not dissect the sounds of their imitations into discrete units. *Polly* and *Molly* do not rhyme for a parrot. They are as different as *hello* and *good-bye*. One property of all human languages (which will be discussed further in chapter 4) is the discreteness of the speech or gestural units, which are ordered and reordered, combined and split apart. Generally, a parrot says what it is taught, or what it hears, and no more. If Polly learns "Polly wants a cracker" and "Polly wants a doughnut" and also learns to imitate the single words *whiskey* and *bagel*, she will not spontaneously produce, as children do, "Polly wants whiskey" or "Polly wants a bagel" or "Polly wants whiskey and a bagel." If she learns *cat* and *cats*, and *dog* and *dogs*, and then learns the word *parrot*, she will not be able to form the plural *parrots* as children do by the age of three; nor can a parrot form an unlimited set of utterances from a finite set of units, or understand utterances never heard before. Reports of an African gray parrot named Alex suggest that new methods of training animals may result in more learning than was previously believed possible. When the trainer uses words in context, Alex seems to relate some sounds with their meanings. This is more than simple imitation, but it is not how children acquire the complexities of the grammar of any language. It is more like a dog learning to associate certain sounds with meanings, such as *heel*, *sit*, *fetch*, and so on. Indeed, a recent study in Germany reports on a nine-year-old border collie named Rico who has acquired a 200-word vocabulary (containing both German and English words). Rico did not require intensive training but was able to learn many of these words quite quickly.

However impressive these feats, the ability of a parrot to produce sounds similar to those used in human language, even if meanings are related to these sounds, and Rico's ability to understand sequences of sounds that correspond to specific objects, cannot be equated with the child's ability to acquire the complex grammar of a human language.

The Birds and the Bees

> The birds and animals are all friendly to each other, and there are no disputes about anything. They all talk, and they all talk to me, but it must be a foreign language for I cannot make out a word they say.
>
> **MARK TWAIN,** *Eve's Diary*, 1906

Most animals possess some kind of "signaling" communication system. Among certain species of spiders there is a complex system for courtship. The male spider, before he approaches his ladylove, goes through an elaborate series of gestures to inform her that he is indeed a spider and a suitable mate, and not a crumb or a fly to be eaten. These gestures are invariant. One never finds a creative spider changing or adding to the courtship ritual of his species.

A similar kind of gestural language is found among the fiddler crabs. There are forty species, and each uses its own claw-waving movement to signal to another member of its "clan." The timing, movement, and posture of the body never change from one time to another or from one crab to another within the particular variety. Whatever the signal means, it is fixed. Only one meaning can be conveyed.

The imitative sounds of talking birds have little in common with human language, but the natural calls and songs of many species of birds do have a communicative function. They also resemble human languages in that there are "regional dialects" within the same species, and as with humans, these dialects are transmitted from parents to offspring. Indeed, researchers have noted that dialect differences may be better preserved in songbirds than in humans because there is no homogenization of regional accents due to radio or TV.

Birdcalls (consisting of one or more short notes) convey messages associated with the immediate environment, such as danger, feeding, nesting, flocking, and so on. **Bird songs** (more complex patterns of notes) are used to stake out territory and to attract mates. There is no evidence of any internal structure to these songs, nor can they be segmented into independently meaningful parts as words of human language can be. In a study of the territorial song of the European robin, it was discovered that the rival robins paid attention only to the alternation between high-pitched and low-pitched notes, and which came first did not matter. The message varies only to the extent of how strongly the robin feels about his possession and to what extent he is prepared to defend it and start a family in that territory. The different alternations therefore express intensity and nothing more. The robin is creative in his ability to sing the same thing in many ways, but not creative in his ability to use the same units of the system to express many different messages with different meanings.

As we discussed in the introduction, some species of birds can only acquire their song during a specific period of development. In this respect bird songs are similar to human language, for which there is also a critical period for acquisition. Although this is an important aspect of both bird song and human language, birdcalls and songs are fundamentally different kinds of communicative systems. The kinds of messages that birds can convey are limited, and messages are stimulus controlled.

This distinction is also true of the system of communication used by honeybees. A forager bee is able to return to the hive and communicate to other bees where a source of food is located. It does so by performing a dance on a wall of the hive that reveals the location and quality of the food source. For one species of Italian honeybee, the dancing behavior may assume one of three possible patterns: *round* (which indicates locations near the hive, within 20 feet or so); *sickle* (which indicates locations at 20 to 60 feet from the hive); and *tail-wagging* (for

distances that exceed 60 feet). The number of repetitions per minute of the basic pattern in the tail-wagging dance indicates the precise distance; the slower the repetition rate, the longer the distance.

The bees' dance is an effective system of communication for bees. It is capable, in principle, of infinitely many different messages, like human language; but unlike human language, the system is confined to a single subject—food source. An experimenter who forced a bee to walk to the food source showed the inflexibility. When the bee returned to the hive, it indicated a distance twenty-five times farther away than the food source actually was. The bee had no way of communicating the special circumstances in its message. This absence of creativity makes the bee's dance qualitatively different from human language.

In the seventeenth century, the philosopher and mathematician René Descartes pointed out that the communication systems of animals are qualitatively different from the language used by humans:

> It is a very remarkable fact that there are none so depraved and stupid, without even excepting idiots, that they cannot arrange different words together, forming of them a statement by which they make known their thoughts; while, on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same.

Descartes goes on to state that one of the major differences between humans and animals is that human use of language is not just a response to external, or even internal, stimuli, as are the sounds and gestures of animals. He warns against confusing human use of language with "natural movements which betray passions and may be . . . manifested by animals."

To hold that animals communicate by systems qualitatively different from human language systems is not to claim human superiority. Humans are not inferior to the one-celled amoeba because they cannot reproduce by splitting in two; they are just different sexually. They are not inferior to hunting dogs, whose sense of smell is far better than that of human animals. As we will discuss in the next chapter, the human language ability is rooted in the human brain, just as the communication systems of other species are determined by their biological structure. All the studies of animal communication systems, including those of primates, provide evidence for Descartes' distinction between other animal communication systems and the linguistic creative ability possessed by the human animal.

Can Chimps Learn Human Language?

> It is a great baboon, but so much like man in most things. . . . I do believe it already understands much English; and I am of the mind it might be taught to speak or make signs.
>
> **ENTRY IN SAMUEL PEPYS'S DIARY,** 1661

In their natural habitat, chimpanzees, gorillas, and other nonhuman primates communicate with each other through visual, auditory, olfactory, and tactile

signals. Many of these signals seem to have meanings associated with the animals' immediate environment or emotional state. They can signal danger and can communicate aggressiveness and subordination. However, the natural sounds and gestures produced by all nonhuman primates are highly stereotyped and limited in the type and number of messages they convey, consisting mainly of emotional responses to particular situations. They have no way of expressing the anger they felt yesterday or the anticipation of tomorrow.

Even though the natural communication systems of these animals are quite limited, many people have been interested in the question of whether they have the latent capacity to acquire complex linguistic systems similar to human language. Throughout the second half of the twentieth century, there were a number of studies designed to test whether nonhuman primates could learn human language.

In early experiments researchers raised chimpanzees in their own homes alongside their children, in order to recreate the natural environment in which human children acquire language. The chimps were unable to vocalize words despite the efforts of their caretakers, though they did achieve the ability to understand a number of individual words.

One disadvantage suffered by primates is that their vocal tracts do not permit them to pronounce many different sounds. Because of their manual dexterity, primates might better be taught sign language as a test of their cognitive linguistic ability. Starting with a chimpanzee named Washoe, and continuing over the years with a gorilla named Koko and another chimp ironically named Nim Chimpsky (after Noam Chomsky), efforts were made to teach them American Sign Language. Though the primates achieved small successes such as the ability to string two signs together, and to occasionally show flashes of creativity, none achieved the qualitative linguistic ability of a human child.

Similar results were obtained in attempting to teach primates artificial languages designed to resemble human languages in some respects. Sarah, Lana, Sherman, Austin, and other chimpanzees were taught languages whose "words" were plastic chips, or keys on a keyboard, that could be arranged into "sentences." The researchers were particularly interested in the ability of primates to communicate using such abstract symbols.

These experiments also came under scrutiny. Questions arose over what kind of knowledge Sarah and Lana were showing with their symbol manipulations. The conclusion was that the creative ability that is so much a part of human language was not evidenced by the chimps' use of the artificial languages.

More recently, psychologists Patricia Greenfield and Sue Savage-Rumbaugh studied a different species of chimp, a male bonobo (or pygmy chimpanzee) named Kanzi. They used the same plastic symbols and computer keyboard that were used with Lana. They claimed that Kanzi not only learned, but also invented, grammatical rules. One rule they described is the use of a symbol designating an object such as "dog" followed by a symbol meaning "go." After combining these symbols, Kanzi would then go to an area where dogs were located to play with them. Greenfield and Savage-Rumbaugh claimed that this "ordering" rule was not an imitation of his caretakers' utterances, who they said used an opposite ordering, in which "go" was followed by "dogs."

Kanzi's acquisition of grammatical skills was slower than that of children, taking about three years (starting when he was five and a half years old). Most of Kanzi's "sentences" are fixed formulas with little if any internal structure. Kanzi has not yet exhibited the linguistic knowledge of a human three-year-old, whose complexity level includes knowledge of sentence structure. Moreover, unlike Kanzi's use of a different word order from his caretakers, children rapidly adopt the correct word order of the surrounding language.

As often happens in science, the search for the answers to one kind of question leads to answers to other questions. The linguistic experiments with primates have led to many advances in our understanding of primate cognitive ability. Researchers have gone on to investigate other capacities of the chimp mind, such as causality; Savage-Rumbaugh and Greenfield are continuing to study the ability of chimpanzees to use symbols. These studies also point out how remarkable it is that human children, by the ages of three and four, without explicit teaching or overt reinforcement, create new and complex sentences never spoken and never heard before.

In the Beginning: The Origin of Language

> Nothing, no doubt, would be more interesting than to know from historical documents the exact process by which the first man began to lisp his first words, and thus to be rid forever of all the theories on the origin of speech.
>
> **MAX MÜLLER,** *Lectures on the Science of Language*, 1874

All religions and mythologies contain stories of language origin. Philosophers through the ages have argued the question. Scholarly works have been written on the subject. Prizes have been awarded for the "best answer" to this eternally perplexing problem. Theories of divine origin, language as a human invention, and evolutionary development have all been put forward.

Linguistic history suggests that spoken languages of the kind that exist today have been around for tens of thousands of years at the very least, but the earliest deciphered written records are barely six thousand years old. (The origin of writing is discussed in chapter 11.) These records appear so late in the history of the development of language that they provide no clue to its origin.

Despite the difficulty of finding scientific evidence, speculations on language origin have provided valuable insights into the nature and development of language, which prompted the great Danish linguist Otto Jespersen to state that "linguistic science cannot refrain forever from asking about the whence (and about the whither) of linguistic evolution." A brief look at some of these speculative notions will reveal this point.

Divine Gift

> And out of the ground the Lord God formed every beast of the field, and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof.
>
> **GENESIS 2:19,** *The Bible*, King James Version

According to Judeo-Christian beliefs, the one deity gave Adam the power to name all things. Similar beliefs are found throughout the world. According to the Egyptians, the creator of speech was the god Thoth. Babylonians believed that the language giver was the god Nabu, and the Hindus attributed our unique language ability to a female god: Brahma was the creator of the universe, but his wife Sarasvati gave language to us. Plato held that at some ancient time, a "legislator" gave the correct, natural name to everything, and that words echoed the essence of their meanings.

Belief in the divine origin of language is intertwined with the supernatural properties that have been associated with the spoken word. In many religions only special languages may be used in prayers and rituals, such as Latin in the Catholic Church for many centuries. The Hindu priests of the fifth century B.C.E. believed that the original pronunciation of Vedic Sanskrit was sacred and must be preserved. This led to important linguistic study because their language had already changed greatly since the hymns of the Vedas had been written. The first linguist known to us is Panini, who wrote a descriptive grammar of Sanskrit in the fourth century B.C.E. that revealed the earlier pronunciation, which could then be used in religious worship. Even today Panini's deep insights into the workings of language are highly revered by linguists.

Although myths, customs, and superstitions do not tell us very much about language origin, they do tell us about the importance ascribed to language. There is no way to prove or disprove the divine origin of language, just as one cannot argue scientifically for or against the existence of deities.

The First Language

> Imagine the Lord talking French! Aside from a few odd words in Hebrew, I took it completely for granted that God had never spoken anything but the most dignified English.
>
> **CLARENCE DAY,** *Life with Father*, 1935

For millennia, "scientific" experiments have reportedly been devised to verify particular theories of the first language. The Egyptian pharaoh Psammetichus (664–610 B.C.E.) sought to determine the most primitive language by isolating two infants in a mountain hut, to be cared for by a mute servant, in the belief that their first words would be in the original language. They weren't! History is replete with similar stories, but as we saw in the introduction, all such "experimentation" on children is unspeakably cruel and utterly worthless.

Nearly all "theories" of language origin, however silly and superstitious, contain the implicit belief that all languages originated from a single source—the **monogenetic theory of language origin**. Opposing this is the proposition that language arose in several places, or at several times, in the course of history. Which of these is true is still debated by linguists.

Human Invention or the Cries of Nature?

> Language was born in the courting days of mankind; the first utterances of speech I fancy to myself like something between the nightly love lyrics of puss upon the tiles and the melodious love songs of the nightingale.
>
> **OTTO JESPERSEN,** *Language, Its Nature, Development, and Origin*, 1922

Despite all evidence to the contrary, the idea that the earliest form of language was imitative, or echoic, was proposed up to the twentieth century. A parallel view states that language at first consisted of emotional ejaculations of pain, fear, surprise, pleasure, anger, and so on. French philosopher Jean-Jacques Rousseau proposed that the earliest manifestations of language were "cries of nature."

Other hypotheses suggested that language arose out of the rhythmical grunts of men and women working together, or more charming, that language originated from song as an expressive rather than a communicative need. Just as with the beliefs in a divine origin of language, these proposed origins are not verifiable by scientific means.

Language most likely evolved with the human species, possibly in stages, possibly in one giant leap. Research by linguists, evolutionary biologists, and neurologists support this view and the view that from the outset the human animal was genetically equipped to learn language. Further discussion of this topic can be found in the introduction.

Language and Thought

> It was intended that when Newspeak had been adopted once and for all and Oldspeak forgotten, a heretical thought—that is, a thought diverging from the principles of IngSoc—should be literally unthinkable, at least so far as thought is dependent on words.
>
> **GEORGE ORWELL,** appendix to *1984*, 1949

Many people are fascinated by the question of how language relates to thought. It is natural to imagine that something as powerful and fundamental to human nature as language would influence how we think about or perceive the world around us. This is clearly reflected in the appendix of George Orwell's masterpiece *1984*, quoted above. Over the years there have been many claims made regarding the relationship between language and thought. The claim that the structure of a language influences how its speakers perceive the world around

them is most closely associated with the linguist Edward Sapir and his student Benjamin Whorf, and is therefore referred to as the **Sapir-Whorf hypothesis**. In 1929 Sapir wrote:

> Human beings do not live in the objective world alone, nor in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society . . . we see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation.[6]

Whorf made even stronger claims:

> The background linguistic system (in other words, the grammar) of each language is not merely the reproducing instrument for voicing ideas but rather is itself the shaper of ideas, the program and guide for the individual's mental activity, for his analysis of impressions, for his synthesis of his mental stock in trade . . . We dissect nature along lines laid down by our native languages.[7]

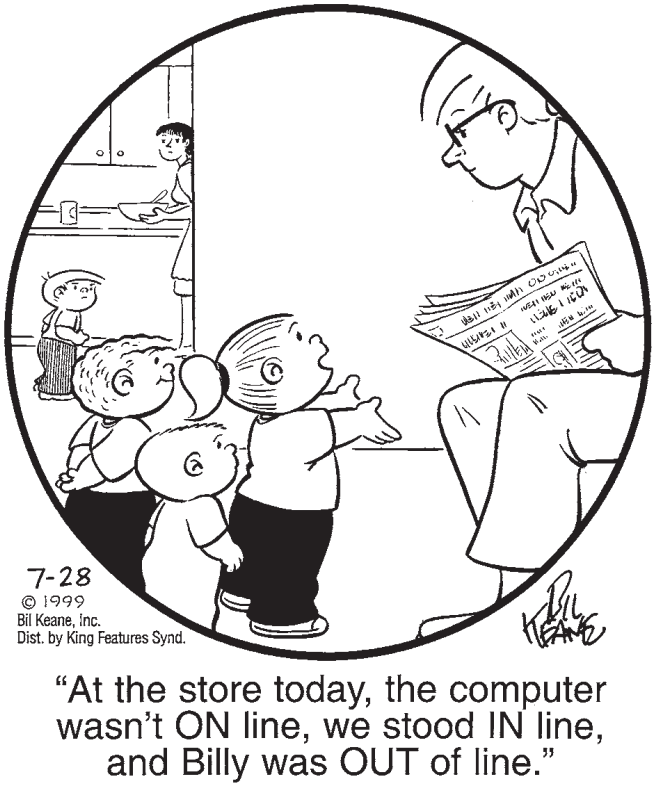
The strongest form of the Sapir-Whorf hypothesis is called **linguistic determinism** because it holds that the language we speak *determines* how we perceive and think about the world. On this view language acts like a filter on reality. One of Whorf's best-known claims in support of linguistic determinism was that the Hopi Indians do not perceive time in the same way as speakers of European languages because the Hopi language does not make the grammatical distinctions of tense that, for example, English does with words and word endings such as *did*, *will*, *shall*, *-s*, *-ed*, and *-ing*.

A weaker form of the hypothesis is **linguistic relativism**, which says that different languages encode different categories and that speakers of different languages therefore think about the world in different ways. For example, languages break up the color spectrum at different points. In Navaho, blue and green are one word. Russian has different words for dark blue (*siniy*) and light blue (*goluboy*), while in English we need to use the additional words *dark* and *light* to express the difference. The American Indian language Zuni does not distinguish between the colors yellow and orange. Languages also differ in how they express locations. For example, in Italian you ride "in" a bicycle and you go "in" a country while in English you ride "on" a bicycle and you go "to" a country. In English we say that a ring is placed "on" a finger and a finger is placed "in" the ring. Korean, on the other hand, has one word for both situations, *kitta*, which expresses the idea of a tight-fitting relation between the two objects. Spanish has two different words for the inside of a corner (*esquina*) and the outside of a corner (*rincon*). The Whorfian claim that is perhaps most familiar is that the

[6]Sapir, E. 1929. *Language*. New York: Harcourt, Brace & World, p. 207.

[7]Whorf, B. L., and J. B. Carroll. 1956. *Language, thought, and reality: Selected writings*. Cambridge, MA: MIT Press.

Eskimo language Inuit has many more words than English for snow and that this affects the world view of the Inuit people.



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That languages show linguistic distinctions in their lexicons and grammar is certain, and we will see many examples of this in later chapters. The question is to what extent—if at all—such distinctions determine or influence the thoughts and perceptions of speakers. The Sapir-Whorf hypothesis is controversial, but it is clear that the strong form of this hypothesis is false. Peoples' thoughts and perceptions are not determined by the words and structures of their language. We are not prisoners of our linguistic systems. If speakers were unable to think about something for which their language had no specific word, translations would be impossible, as would learning a second language. English may not have a special word for the inside of a corner as opposed to the outside of a corner, but we are perfectly able to express these concepts using more than one word. In fact, we just did. If we could not think about something for which we do not have words, how would infants ever learn their first word, much less a language?

Many of the specific claims of linguistic determinism have been shown to be wrong. For example, the Hopi language may not have words and word endings

for specific tenses, but the language has other expressions for time, including words for the days of the week, parts of the day, yesterday and tomorrow, lunar phases, seasons, etc. The Hopi people use various kinds of calendars and various devices for time-keeping based on the sundial. Clearly, they have a sophisticated concept of time despite the lack of a tense system in the language. The Munduruku, an indigenous people of the Brazilian Amazon, have no words in their language for triangle, square, rectangle, or other geometric concepts, except circle. The only terms to indicate direction are words for upstream, downstream, sunrise, and sunset. Yet Munduruku children understand many principles of geometry as well as American children, whose language is rich in geometric and spatial words.

Similarly, though languages differ in their color words, speakers can readily perceive colors that are not named in their language. Grand Valley Dani is a language spoken in New Guinea with only two color words, black and white (dark and light). In experimental studies, however, speakers of the language showed recognition of the color red, and they did better with fire-engine red than off-red. This would not be possible if their color perceptions were fixed by their language. Our perception of color is determined by the structure of the human eye, not by the structure of language. A source of dazzling linguistic creativity is to be found at the local paint store where literally thousands of colors are given names like *soft pumpkin*, *Durango dust*, and *lavender lipstick*.

Anthropologists have shown that Inuit has no more words for snow than English does: around a dozen, including *sleet*, *blizzard*, *slush*, and *flurry*. But even if it did, this would not show that language conditions the Inuits' experience of the world, but rather that experience with a particular world creates the need for certain words. In this respect the Inuit speaker is no different from the computer programmer, who has a technical vocabulary for Internet protocols, or the linguist, who has many specialized words regarding language. In this book we will introduce you to many new words and linguistic concepts, and surely you will learn them! This would be impossible if your thoughts about language were determined by the linguistic vocabulary you now have.

These studies show that our perceptions and thoughts are not determined by the words or word endings of our language. But what about the linguistic structures we are accustomed to using? Could these be a strong determinant? In a recent study, psychologist Susan Goldin-Meadow and colleagues asked whether the word order of a particular language influences the way its speakers describe an event nonverbally, either with gestures or with pictures. Languages differ in how they encode events, such as a person twisting a knob. Speakers of languages like English, Chinese, and Spanish typically use the word order *actor—action—object* (person—twist—knob), whereas speakers of languages like Turkish and Japanese use the order *actor—object—action* (person—knob—twist). Word order is one of the earliest aspects of language structure that children acquire and it is a fundamental aspect of our linguistic knowledge. Therefore if language structure strongly influences how we interpret events, then these ordering patterns might show up in the way we describe events even when we are not talking. Goldin-Meadow and colleagues asked adult speakers of English, Turkish, and Chinese (Mandarin) to describe vignettes shown on a computer screen using only their hands, and also using a set of pictures. Their results showed that all

the speakers—irrespective of their language—used the same order in the nonverbal tasks. The predominant gesture order was *actor—action—object*, and the same results were found in the picture-ordering task. Goldin-Meadow and colleagues suggest that there is a universal, natural order in which people cognitively represent events, and that this is not affected by the language they happen to speak.

Similar results have been observed between English and Greek speakers. These languages differ in how their verbs encode motion. When describing movement, English speakers will commonly use verbs that focus on the *manner* of motion such as *slide*, *skip*, and *walk*. Greek speakers, on the other hand, use verbs that focus on the *direction* of the motion, as in *approach* and *ascend*. Measurements of eye movements of these speakers as they verbally describe an event show that they focus on the aspect of the event encoded by their language. However, when freely observing an event but not describing it verbally, they attend to the event in the same ways regardless of what language they speak. These results show that speakers' attention to events is not affected by their language except as they are preparing to speak.

In our understanding of the world we are certainly not "at the mercy of whatever language we speak," as Sapir suggested. However, we may ask whether the language we speak *influences* our cognition in some way. In the domain of color categorization, for example, it has been shown that if a language lacks a word for *red*, say, then it's harder for speakers to reidentify red objects. In other words, having a label seems to make it easier to store or access information in memory. Similarly, experiments show that Russian speakers are better at discriminating light blue (*goluboy*) and dark blue (*siniy*) objects than English speakers, whose language does not make a lexical distinction between these categories. These results show that words can influence simple perceptual tasks in the domain of color discrimination. Upon reflection, this may not be a surprising finding. Colors exist on a continuum, and the way we segment into "different" colors happens at arbitrary points along this spectrum. Because there is no physical motivation for these divisions, this may be the kind of situation where language could show an effect.

The question has also been raised regarding the possible influence of grammatical gender on how people think about objects. Many languages, such as Spanish and German, classify nouns as masculine or feminine; Spanish "key" is *la llave* (feminine) and "bridge" is *el puente* (masculine). Some psychologists have suggested that speakers of gender-marking languages think about objects as having gender, much like people or animals have. In one study, speakers of German and Spanish were asked to describe various objects using English adjectives (the speakers were proficient in English). In general, they used more masculine adjectives—independently rated as such—to describe objects that are grammatically masculine in their language. For example, Spanish speakers described bridges (el puente) as *big*, *dangerous*, *long*, *strong*, and *sturdy*. In German the word for bridge is feminine (die Brücke) and German speakers used more feminine adjectives such as *beautiful*, *elegant*, *fragile*, *peaceful*, *pretty*, and *slender*. Interestingly, it has been noted that English speakers, too, make consistent judgments about the gender of objects (ships are "she") even though English has no grammatical gender on common nouns. It may be, then, that regardless of the

language spoken, humans have a tendency to anthropomorphize objects and this tendency is somehow enhanced if the language itself has grammatical gender. Though it is too early to come to any firm conclusions, the results of these and similar studies seem to support a weak version of linguistic relativism.

Politicians and marketers certainly believe that language can influence our thoughts and values. One political party may refer to an inheritance tax as the "estate tax," while an opposing party refers to it as the "death tax." One politician may refer to "tax breaks for the wealthy" while another refers to "tax relief." In the abortion debate, some refer to the "right to choose" and others to the "right to life." The terminology reflects different ideologies, but the choice of expression is primarily intended to sway public opinion. Politically correct (PC) language also reflects the idea that language can influence thought. Many people believe that by changing the way we talk, we can change the way we think; that if we eliminate racist and sexist terms from our language, we will become a less racist and sexist society. As we will discuss in chapter 9, language itself is not sexist or racist, but people can be, and because of this particular words take on negative meanings. In his book *The Language Instinct*, Steven Pinker uses the expression *euphemism treadmill* to describe how the euphemistic terms that are created to replace negative words often take on the negative associations of the words they were coined to replace. For example, *handicapped* was once a euphemism for the offensive term *crippled*, and when *handicapped* became politically incorrect it was replaced by the euphemism *disabled*. And as we write, *disabled* is falling into disrepute and is often replaced by yet another euphemism, *challenged*. Nonetheless, in all such cases, changing language has not resulted in a new world view of the speakers.

Prescient as Orwell was with respect to how language could be used for social control, he was more circumspect with regard to the relation between language and thought. He was careful to qualify his notions with the phrase "at least so far as thought is dependent on words." Current research shows that language does not determine how we think about and perceive the world. Future research should show the extent to which language influences other aspects of cognition such as memory and categorization.

What We Know about Human Language

Much is unknown about the nature of human languages, their grammars and use. The science of linguistics is concerned with these questions. Investigations of linguists and the analyses of spoken languages date back at least to 1600 B.C.E. in Mesopotamia. We have learned a great deal since that time. A number of facts pertaining to all languages can be stated.

1. Wherever humans exist, language exists.
2. There are no "primitive" languages—all languages are equally complex and equally capable of expressing any idea. The vocabulary of any language can be expanded to include new words for new concepts.

3. All languages change through time.
4. The relationships between the sounds and meanings of spoken languages and between the gestures and meanings of sign languages are for the most part arbitrary.
5. All human languages use a finite set of discrete sounds or gestures that are combined to form meaningful elements or words, which themselves may be combined to form an infinite set of possible sentences.
6. All grammars contain rules of a similar kind for the formation of words and sentences.
7. Every spoken language includes discrete sound segments, like *p*, *n*, or *a*, that can all be defined by a finite set of sound properties or features. Every spoken language has both vowel sounds and consonant sounds.
8. Similar grammatical categories (for example, noun, verb) are found in all languages.
9. There are universal semantic properties like *entailment* (one sentence inferring the truth of another) found in every language in the world.
10. Every language has a way of negating, forming questions, issuing commands, referring to past or future time, and so on.
11. All languages permit abstractions like *goodness*, *spherical*, and *skillful*.
12. All languages have slang, epithets, taboo words, and euphemisms for them, such as *john* for "toilet."
13. All languages have hypothetical, counterfactual, conditional, unreal, and fictional utterances; e.g., "If I won the lottery, I would buy a Ferrari," or "Harry Potter battled Voldemort with his wand by Hogwarts castle."
14. All languages exhibit freedom from stimulus; a person can choose to say anything at any time under any circumstances, or can choose to say nothing at all.
15. Speakers of all languages are capable of producing and comprehending an infinite set of sentences. Syntactic universals reveal that every language has a way of forming sentences such as:

    Linguistics is an interesting subject.
    I know that linguistics is an interesting subject.
    You know that I know that linguistics is an interesting subject.
    Cecelia knows that you know that I know that linguistics is an interesting subject.
    Is it a fact that Cecelia knows that you know that I know that linguistics is an interesting subject?

16. The ability of human beings to acquire, know, and use language is a biologically based ability rooted in the structure of the human brain, and expressed in different modalities (spoken or signed).
17. Any normal child, born anywhere in the world, of any racial, geographical, social, or economic heritage, is capable of learning any language to which he or she is exposed. The differences among languages are not due to biological reasons.

It seems that the universalists from all ages were not spinning idle thoughts. We all possess human language.

Summary

We are all intimately familiar with at least one language, our own. Yet few of us ever stop to consider what we know when we know a language. No book contains, or could possibly contain, the English or Russian or Zulu language. The words of a language can be listed in a dictionary, but not all the sentences can be; and a language consists of these sentences as well as words. Speakers use a finite set of rules to produce and understand an infinite set of possible sentences.

These rules are part of the **grammar** of a language, which develops when you acquire the language and includes the sound system (the **phonology**), the structure and properties of words (the **morphology** and **lexicon**), how words may be combined into phrases and sentences (the **syntax**), and the ways in which sounds and meanings are related (the **semantics**). The sounds and meanings of individual words are related in an **arbitrary** fashion. If you had never heard the word *syntax* you would not know what it meant by its sounds. The gestures used by signers are also arbitrarily related to their meanings. Language, then, is a system that relates sounds (or hand and body gestures) with meanings. When you know a language, you know this system.

This knowledge (**linguistic competence**) is different from behavior (**linguistic performance**). If you woke up one morning and decided to stop talking (as the Trappist monks did after they took a vow of silence), you would still have knowledge of your language. This ability or competence underlies linguistic behavior. If you do not know the language, you cannot speak it; but if you know the language, you may choose not to speak.

There are different kinds of "grammars." The **descriptive grammar** of a language represents the unconscious linguistic knowledge or capacity of its speakers. Such a grammar is a model of the **mental grammar** every speaker of the language knows. It does not teach the rules of the language; it describes the rules that are already known. A grammar that attempts to legislate what your grammar should be is called a **prescriptive grammar**. It prescribes. It does not describe, except incidentally. **Teaching grammars** are written to help people learn a foreign language or a dialect of their own language.

The more that linguists investigate the thousands of languages of the world and describe the ways in which they differ from each other, the more they discover that these differences are limited. There are linguistic universals that pertain to each of the parts of grammars, the ways in which these parts are related, and the forms of rules. These principles compose **Universal Grammar**, which provides a blueprint for the grammars of all possible human languages. Universal Grammar constitutes the innate component of the human language faculty that makes normal language development possible.

Strong evidence for Universal Grammar is found in the way children acquire language. Children learn language by exposure. They need not be deliberately taught, though parents may enjoy "teaching" their children to speak or sign. Children will learn any human language to which they are exposed, and they learn it in definable stages, beginning at a very early age. By four or five years of age, children have acquired nearly the entire adult grammar. This suggests that children are born with a genetically endowed faculty to learn and use human language, which is part of the Universal Grammar.

The fact that deaf children learn **sign language** shows that the ability to hear or produce sounds is not a prerequisite for language learning. All the sign languages in the world, which differ as spoken languages do, are visual-gestural systems that are as fully developed and as structurally complex as spoken languages. The major sign language used in the United States is **American Sign Language** (**ASL**).

If language is defined merely as a system of communication, or the ability to produce speech sounds, then language is not unique to humans. There are, however, certain characteristics of human language not found in the communication systems of any other species. A basic property of human language is its **creativity**—a speaker's ability to combine the basic linguistic units to form an infinite set of "well-formed" grammatical sentences, most of which are novel, never before produced or heard.

For many years researchers were interested in the question of whether language is unique to the human species. There have been many attempts to teach nonhuman primates communication systems that are supposed to resemble human language in certain respects. Overall, results have been disappointing: Chimpanzees like Sarah and Lana learned to manipulate symbols for rewards, and others, like Washoe and Nim Chimpsky, learned a number of ASL signs. But a careful examination of their multisign utterances reveals that unlike in children, the language of the chimps shows little spontaneity, is highly imitative (echoic), and has little syntactic structure. It has been suggested that the pygmy chimp Kanzi shows grammatical ability greater than the other chimps studied, but he still does not have the ability of even a three-year-old child.

At present we do not know if there was a single original language—the **monogenetic** hypothesis—or whether language arose independently in several places, or at several times, in human history. Myths of language origin abound; divine origin and various modes of human invention are the source of these myths. Language most likely evolved with the human species, possibly in stages, possibly in one giant leap.

The **Sapir-Whorf hypothesis** holds that the particular language we speak determines or influences our thoughts and perceptions of the world. Much of the early evidence in support of this hypothesis has not stood the test of time. More recent experimental studies suggest that the words and grammar of a language may affect aspects of cognition, such as memory and categorization.

References for Further Reading

Anderson, S. R. 2008. The logical structure of linguistic theory. *Language* (December): 795–814.

Bickerton, D. 1990. *Language and species*. Chicago: Chicago University Press.

Chomsky, N. 1986. *Knowledge of language: Its nature, origin, and use*. New York and London: Praeger.

_____. 1975. *Reflections on language*. New York: Pantheon Books.

_____. 1972. *Language and mind*. Enlarged ed. New York: Harcourt Brace Jovanovich.

Gentner, D., and S. Goldin-Meadow. 2003. *Language in mind*. Cambridge, MA: MIT Press.

Hall, R. A. 1950. *Leave your language alone*. Ithaca, NY: Linguistica.
Jackendoff, R. 1997. *The architecture of the language faculty*. Cambridge, MA: MIT Press.
_____. 1994. *Patterns in the mind: Language and human nature*. New York: Basic Books.
Klima, E. S., and U. Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.
Lane, H. 1989. *When the mind hears: A history of the deaf*. New York: Vintage Books (Random House).
Milroy, J., and L. Milroy. 1998. *Authority in language: Investigating standard English*, 3rd edn. New York: Routledge.
Napoli, D. J. 2003. *Language matters: A guide to everyday thinking about language*. New York: Oxford University Press.
Pinker, S. 1999. *Words and rules: The ingredients of language*. New York: HarperCollins.
_____. 1994. *The language instinct*. New York: William Morrow.
Premack, A. J., and D. Premack. 1972. Teaching language to an ape. *Scientific American* (October): 92–99.
Terrace, H. S. 1979. *Nim: A chimpanzee who learned sign language*. New York: Knopf.
Stam, J. 1976. *Inquiries into the origin of language: The fate of a question*. New York: Harper & Row.
Stokoe, W. 1960. *Sign language structure: An outline of the visual communication system of the American deaf*. Silver Spring, MD: Linstok Press.

Exercises

1. An English speaker's knowledge includes the sound sequences of the language. When new products are put on the market, the manufacturers have to think up new names for them that conform to the allowable sound patterns. Suppose you were hired by a manufacturer of soap products to name five new products. What names might you come up with? List them.

We are interested in how the names are pronounced. Therefore, describe in any way you can how to say the words you list. Suppose, for example, you named one detergent *Blick*. You could describe the sounds in any of the following ways:

bl as in *blood*, *i* as in *pit*, *ck* as in *stick*
bli as in *bliss*, *ck* as in *tick*
b as in *boy*, *lick* as in *lick*

2. Consider the following sentences. Put a star (*) after those that do not seem to conform to the rules of your grammar, that are ungrammatical for you. State, if you can, why you think the sentence is ungrammatical.

a. Robin forced the sheriff go.
b. Napoleon forced Josephine to go.
c. The devil made Faust go.
d. He passed by a large pile of money.
e. He came by a large sum of money.
f. He came a large sum of money by.

g. Did in a corner little Jack Horner sit?
h. Elizabeth is resembled by Charles.
i. Nancy is eager to please.
j. It is easy to frighten Emily.
k. It is eager to love a kitten.
l. That birds can fly amazes.
m. The fact that you are late to class is surprising.
n. Has the nurse slept the baby yet?
o. I was surprised for you to get married.
p. I wonder who and Mary went swimming.
q. Myself bit John.
r. What did Alice eat the toadstool with?
s. What did Alice eat the toadstool and?

3. It was pointed out in this chapter that a small set of words in languages may be onomatopoeic; that is, their sounds "imitate" what they refer to. *Ding-dong*, *tick-tock*, *bang*, *zing*, *swish*, and *plop* are such words in English. Construct a list of ten new onomatopoeic words. Test them on at least five friends to see if they are truly nonarbitrary as to sound and meaning.

4. Although sounds and meanings of most words in all languages are arbitrarily related, there are some communication systems in which the "signs" unambiguously reveal their "meaning."

a. Describe (or draw) five different signs that directly show what they mean. *Example*: a road sign indicating an S curve.
b. Describe any other communication system that, like language, consists of arbitrary symbols. *Example*: traffic signals, where red means stop and green means go.

5. Consider these two statements: I learned a new word today. I learned a new sentence today. Do you think the two statements are equally probable, and if not, why not?

6. What do the barking of dogs, the meowing of cats, and the singing of birds have in common with human language? What are some of the basic differences?

7. A wolf is able to express subtle gradations of emotion by different positions of the ears, the lips, and the tail. There are eleven postures of the tail that express such emotions as self-confidence, confident threat, lack of tension, uncertain threat, depression, defensiveness, active submission, and complete submission. This system seems to be complex. Suppose that there were a thousand different emotions that the wolf could express in this way. Would you then say a wolf had a language similar to a human's? If not, why not?

8. Suppose you taught a dog to *heel*, *sit up*, *roll over*, *play dead*, *stay*, *jump*, and *bark* on command, using the italicized words as cues. Would you be teaching it language? Why or why not?

9. State some rule of grammar that you have learned is the correct way to say something, but that you do not generally use in speaking. For example, you may have heard that *It's me* is incorrect and that the correct form is *It's I*. Nevertheless, you always use *me* in such sentences; your friends do also, and in fact *It's I* sounds odd to you.

Write a short essay presenting arguments against someone who tells you that you are wrong. Discuss how this disagreement demonstrates the difference between descriptive and prescriptive grammars.

10. Noam Chomsky has been quoted as saying:

> It's about as likely that an ape will prove to have a language ability as that there is an island somewhere with a species of flightless birds waiting for human beings to teach them to fly.

In the light of evidence presented in this chapter, comment on Chomsky's remark. Do you agree or disagree, or do you think the evidence is inconclusive?

11. Think of song titles that are "bad" grammar, but that, if corrected, would lack effect. For example, the 1929 "Fats" Waller classic "Ain't Misbehavin'" is clearly superior to the bland "I am not misbehaving." Try to come up with five or ten such titles.

12. Linguists who attempt to write a descriptive grammar of linguistic competence are faced with a difficult task. They must understand a deep and complex system based on a set of sparse and often inaccurate data. (Children learning language face the same difficulty.) Albert Einstein and Leopold Infeld captured the essence of the difficulty in their book *The Evolution of Physics*, written in 1938:

> In our endeavor to understand reality we are somewhat like a man trying to understand the mechanism of a closed watch. He sees the face and the moving hands, even hears its ticking, but he has no way of opening the case. If he is ingenious he may form some picture of a mechanism which could be responsible for all the things he observes, but he may never be quite sure his picture is the only one which could explain his observations. He will never be able to compare his picture with the real mechanism and he cannot even imagine the possibility of the meaning of such a comparison.

Write a short essay that speculates on how a linguist might go about understanding the reality of a person's grammar (the closed watch) by observing what that person says and doesn't say (the face and moving hands). For example, a person might never say *the sixth sheik's sixth sheep is sick as a dog*, but the grammar should specify that it is a well-formed sentence, just as it should somehow indicate that *Came the messenger on time* is ill-formed.

13. View the motion picture *My Fair Lady* (drawn from the play *Pygmalion* by George Bernard Shaw). Write down every attempt to teach grammar (pro-

nunciation, word choice, and syntax) to the character of Eliza Doolittle. This is an illustration of a "teaching grammar."

14. Many people are bilingual or multilingual, speaking two or more languages with very different structures.
    a. What implications does bilingualism have for the debate about language and thought?
    b. Many readers of this textbook have some knowledge of a second language. Think of a linguistic structure or word in one language that does not exist in the second language and discuss how this does or does not affect your thinking when you speak the two languages. (If you know only one language, ask this question of a bilingual person you know.)
    c. Can you find an example of an untranslatable word or structure in one of the languages you speak?

15. The South American indigenous language Pirahã is said to lack numbers beyond two and distinct words for colors. Research this language—Google would be a good start—with regard to whether Pirahã supports or fails to support linguistic determinism and/or linguistic relativism.

16. English (especially British English) has many words for woods and woodlands. Here are some:

    woodlot, carr, fen, firth, grove, heath, holt, lea, moor, shaw, weald, wold, coppice, scrub, spinney, copse, brush, bush, bosquet, bosky, stand, forest, timberland, thicket

    a. How many of these words do you recognize?
    b. Look up several of these words in the dictionary and discuss the differences in meaning. Many of these words are obsolete, so if your dictionary doesn't have them, try the Internet.
    c. Do you think that English speakers have a richer concept of woodlands than speakers whose language has fewer words? Why or why not?

17. English words containing *dge* in their spelling (*trudge*, *edgy*) are said mostly to have an unfavorable or negative connotation. Research this notion by accumulating as many *dge* words as you can and classifying them as unfavorable (*sludge*) or neutral (*bridge*). What do you do about *budget*? Unfavorable or not? Are there other questionable words?

18. With regard to the "euphemism treadmill": Identify three other situations in which a euphemism evolved to be as offensive as the word it replaced, requiring yet another euphemism. *Hint*: Sex, race, and bodily functions are good places to start.

19. **Research project**: Read the Cratylus Dialogue—it's online. In it is a discussion (or "dialogue") of whether names are "conventional" (i.e., what we have called *arbitrary*) or "natural." Do you find Socrates' point of view sufficiently well argued to support the thesis in this chapter that the rela-

tionship between form and meaning is indeed arbitrary? Argue your case in either direction in a short (or long, if you wish) essay.

20. **Research project:** (Cf. exercise 15) It is claimed that Pirahã—an indigenous language of Brazil—violates some of the universal principles hypothesized by linguists. Which principles are in question? Is the evidence persuasive? Conclusive? Speculative? (*Hint*: Use the journal *Language*, Volume 85, Number 2, June 2009.)

7

Language Acquisition

> [The acquisition of language] is doubtless the greatest intellectual feat any one of us is ever required to perform.
>
> **LEONARD BLOOMFIELD,** *Language*, 1933

> The capacity to learn language is deeply ingrained in us as a species, just as the capacity to walk, to grasp objects, to recognize faces. We don't find any serious differences in children growing up in congested urban slums, in isolated mountain villages, or in privileged suburban villas.
>
> **DAN SLOBIN,** *The Human Language Series program 2*, 1994

Language is extremely complex. Yet very young children—before the age of five—already know most of the intricate system that is the grammar of a language. Before they can add 2 + 2, children are conjoining sentences, asking questions, using appropriate pronouns, negating sentences, forming relative clauses, and inflecting verbs and nouns and in general have the creative capacity to produce and understand a limitless number of sentences.

It is obvious that children do not learn a language simply by memorizing the sentences of the language. Rather, they acquire a system of grammatical rules of the sort we have discussed in the preceding chapters. No one teaches children the rules of the grammar. Their parents are no more aware of the phonological, morphological, syntactic, and semantic rules than are the children. Even if you remember your early years, do you remember anyone telling you to form a sentence by adding a verb phrase to a noun phrase, or to add [s] or [z] to form plurals? No one told you "This is a grammatical utterance and that is not." Yet somehow you were able, as all children are, to quickly and effortlessly extract the intricate system of rules from the language you heard around you

and thereby "reinvent" the grammar of your parents. How the child accomplishes this phenomenal task is the subject of this chapter.

Mechanisms of Language Acquisition

There have been various proposals concerning the psychological mechanisms involved in acquiring a language. Early theories of language acquisition were heavily influenced by behaviorism, a school of psychology prevalent in the 1950s. As the name implies, behaviorism focused on people's behaviors, which are directly observable, rather than on the mental systems underlying these behaviors. Language was viewed as a kind of verbal behavior, and it was proposed that children learn language through imitation, reinforcement, analogy, and similar processes. B. F. Skinner, one of the founders of behaviorist psychology, proposed a model of language acquisition in his book *Verbal Behavior* (1957). Two years later, in a devastating reply to Skinner entitled *Review of Verbal Behavior* (1959), Noam Chomsky showed that language is a complex cognitive system that could not be acquired by behaviorist principles.

Do Children Learn through Imitation?

CHILD: My teacher holded the baby rabbits and we patted them.
ADULT: Did you say your teacher held the baby rabbits?
CHILD: Yes.
ADULT: What did you say she did?
CHILD: She holded the baby rabbits and we patted them.
ADULT: Did you say she held them tightly?
CHILD: No, she holded them loosely.

ANONYMOUS ADULT AND CHILD

At first glance the question of how children acquire language doesn't seem difficult to answer. Don't children just listen to what is said around them and imitate the speech they hear? Imitation is involved to some extent. An American child may hear *milk* and a Mexican child *leche* and each attempts to reproduce what is heard. But the early words and sentences that children produce show that they are not simply imitating adult speech. Many times the words are barely recognizable to an adult and the meanings are also not always like the adult's, as we will discuss below.

Children do not hear words like *holded* or *tooths* or sentences such as *Cat stand up table* or many of the other utterances they produce between the ages of two and three, such as the following:[1]

[1]Many of the examples of child language in this chapter are taken from CHILDES (Child Language Data Exchange System), a computerized database of the spontaneous speech of children acquiring English and many other languages. MacWhinney, B., and C. Snow. 1985. The child language data exchange system. *Journal of Child Language* 12:271–96.

a my pencil
two foot
what the boy hit?
other one pants
Mommy get it my ladder
cowboy did fighting me

Even when children are trying to imitate what they hear, they are unable to produce sentences outside of the rules of their developing grammar. The following are a child's attempt to imitate what the adult has said:

ADULT:	He's going out.	CHILD:	He go out.
ADULT:	That's an old-time train.	CHILD:	Old-time train.
ADULT:	Adam, say what I say. Where can I put them?	CHILD:	Where I can put them?

Imitation also fails to account for the fact that children who are unable to speak for neurological or physiological reasons are able to learn the language spoken to them and understand it. When they overcome their speech impairment, they immediately use the language for speaking.

Do Children Learn through Correction and Reinforcement?

CHILD: Nobody don't like me.
MOTHER: No, say "Nobody likes me."
CHILD: Nobody don't like me.
(dialogue repeated eight times)
MOTHER: Now, listen carefully; say "Nobody likes me."
CHILD: Oh, nobody don't likes me.

ANONYMOUS MOTHER AND CHILD

Another proposal, in the behaviorist tradition, is that children learn to produce correct (grammatical) sentences because they are positively reinforced when they say something grammatical and negatively reinforced (corrected) when they say something ungrammatical. Roger Brown and his colleagues at Harvard University studied parent–child interactions. They report that correction seldom occurs, and when it does, it is usually for mispronunciations or incorrect reporting of facts and not for "bad grammar." They note, for example, that the ungrammatical sentence "Her curl my hair" was not corrected because the child's mother was in fact curling her hair. However, when the child uttered the grammatical sentence "Walt Disney comes on Tuesday," she was corrected because the television program was shown on Wednesday. Brown concludes that it is "truth value rather than syntactic well-formedness that chiefly governs explicit verbal reinforcement by parents—which renders mildly paradoxical the fact that the usual product of such a training schedule is an adult whose speech is highly grammatical but not notably truthful."

Adults will sometimes **recast** children's utterances into an adultlike form, as in the following examples:

Child	Mother
It fall.	It fell?
Where is them?	They're at home.
It doing dancing.	It's dancing, yes.

In these examples, the mother provides the correct model without actually correcting the child. Although recasts are potentially helpful to the child, they are not used in a consistent way. One study of forty mothers of children two to four years old showed that only about 25 percent of children's ungrammatical sentences are recast and that overall, grammatical sentences were recast as often as bad sentences. Parents tend to focus on the correctness of content more than on grammaticality. So parents allow many ungrammatical utterances to "slip by" and change many grammatical utterances. A child who relied on recasts to learn grammar would be mightily confused.

Even if adults did correct children's syntax more often than they do, it would still not explain how or what children learn from such adult responses, or how children discover and construct the correct rules. Children do not know what they are doing wrong and are unable to make corrections even when they are pointed out, as shown by the preceding example and the following one:

CHILD: Want other one spoon, Daddy.
FATHER: You mean, you want *the other spoon*.
CHILD: Yes, I want other one spoon, please, Daddy.
FATHER: Can you say "the other spoon"?
CHILD: Other . . . one . . . spoon.
FATHER: Say . . . "other."
CHILD: Other.
FATHER: Spoon.
CHILD: Spoon.
FATHER: Other . . . spoon.
CHILD: Other . . . spoon. Now give me other one spoon?

Such conversations between parents and children do not occur often; this conversation was between a linguist studying child language and his child. Mothers and fathers are usually delighted that their young children are talking and consider every utterance a gem. The "mistakes" children make are cute and repeated endlessly to anyone who will listen.

Do Children Learn Language through Analogy?

It has also been suggested that children put words together to form phrases and sentences by **analogy**, by hearing a sentence and using it as a model to form other sentences. But this is also problematic, as Lila Gleitman, an expert on developmental psycholinguistics, points out:

> [S]uppose the child has heard the sentence "I painted a red barn." So now, by analogy, the child can say "I painted a blue barn." That's exactly the

> kind of theory that we want. You hear a sample and you extend it to all of the new cases by similarity. . . . In addition to "I painted a red barn" you might also hear the sentence "I painted a barn red." So it looks as if you take those last two words and switch their order. . . . So now you want to extend this to the case of seeing, because you want to look at barns instead of paint them. So you have heard, "I saw a red barn." Now you try (by analogy) a . . . new sentence—"I saw a barn red." Something's gone wrong. This is an analogy, but the analogy didn't work. It's not a sentence of English.[2]

This kind of problem arises constantly. Consider another example. The child hears the following pair of sentences:

The boy was sleeping. Was the boy sleeping?

Based on pairs of sentences like this, he formulates a rule for forming questions: "Move the auxiliary to the position preceding the subject." He then acquires the more complex relative clause construction:

The boy who is sleeping is dreaming about a new car.

He now wants to form a question. What does he do? If he forms a question on analogy to the simple yes-no question, he will move the first auxiliary *is* as follows:

*Is the boy who sleeping is dreaming about a new car?

Studies of spontaneous speech, as well as experiments, show that children never make mistakes of this sort. As discussed in chapter 2, syntactic rules, such as the rule that moves the auxiliary, are sensitive to the structure of the sentence and not to the linear order of words. The available evidence shows that children know about the structure dependency of rules at a very early age.

In recent years, a computer model of language representation and acquisition called **connectionism** has been proposed that relies in part on behaviorist learning principles such as analogy and reinforcement. In the connectionist model, no grammatical rules are stored anywhere. Linguistic knowledge, such as knowledge of the past tense, is represented by a set of neuron-like connections between different phonological forms (e.g., between *play* and *played*, *dance* and *danced*, *drink* and *drank*). Repeated exposure to particular verb pairs in the input reinforces the connection between them, mimicking rule-like behavior. Based on similarities between words, the model can produce a past-tense form that it was not previously exposed to. On analogy to *dance-danced*, it will convert *prance* to *pranced*; on analogy to *drink-drank* it will convert *sink* to *sank*.

As a model of language acquisition, connectionism faces some serious challenges. The model assumes that the language of the child's environment has very specific properties. However, investigation of the input that children actually receive shows that it is not consistent with those assumptions. Another problem

[2]Gleitman, L. R., and E. Wanner. 1982. *Language acquisition: The state of the art*. Cambridge, UK: Cambridge University Press.

is that rules such as formation of past tense cannot be based on phonological form alone but must also be sensitive to information in the lexicon. For example, the past tense of a verb derived from a noun is always regular even if an irregular form exists. When a fly ball is caught in a baseball game, we say the batter *flied out*, not *flew out*. Similarly, when an irregular plural is part of a larger noun, it may be regularized. When we see several images of Walt Disney's famous rodent, we describe them as Mickey Mouses, not Mickey Mice.

Do Children Learn through Structured Input?

Yet another suggestion is that children are able to learn language because adults speak to them in a special "simplified" language sometimes called **motherese**, or **child-directed speech** (CDS) (or more informally, **baby talk**). This hypothesis places a lot of emphasis on the role of the environment in facilitating language acquisition.

In our culture adults do typically talk to young children in a special way. We tend to speak more slowly and more clearly, we may speak in a higher pitch and exaggerate our intonation, and sentences are generally grammatical. However, motherese is not syntactically simpler. It contains a range of sentence types, including syntactically complex sentences such as questions (*Do you want your juice now?*); embedded sentences (*Mommy thinks you should sleep now*); imperatives (*Pat the dog gently!*); and negatives with tag questions (*We don't want to hurt him, do we?*). And adults do not simplify their language by dropping inflections from verbs and nouns or by omitting function words such as determiners and auxiliaries, though children do this all the time. It is probably a good thing that motherese is not syntactically restricted. If it were, children might not have sufficient information to extract the rules of their language.

Although infants prefer to listen to motherese over normal adult speech, studies show that using motherese does not significantly affect the child's language development. In many cultures, adults do not use a special style of language with children, and there are even communities in which adults hardly talk to babies at all. Nevertheless, children around the world acquire language in much the same way, irrespective of these varying circumstances. Adults seem to be the followers rather than the leaders in this enterprise. The child does not develop linguistically because he is exposed to ever more adultlike language. Rather, the adult adjusts his language to the child's increasing linguistic sophistication. The exaggerated intonation and other properties of motherese may be useful for getting a child's attention and for reassuring the child, but it is not a driving force behind language development.

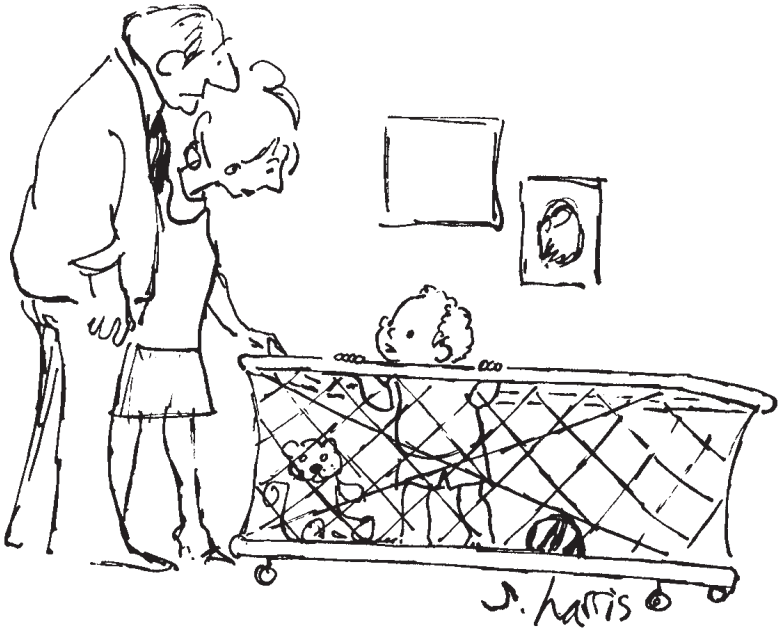
Analogy, imitation, and reinforcement cannot account for language development because they are based on the (implicit or explicit) assumption that what the child acquires is a set of sentences or forms rather than a set of grammatical rules. Theories that assume that acquisition depends on a specially structured input also place too much emphasis on the environment rather than on the grammar-making abilities of the child. These proposals do not explain the creativity that children show in acquiring language, why they go through stages, or why they make some kinds of "errors" but not others, for example, "Give me other one spoon" but not "Is the boy who sleeping is dreaming about a new car?"

Children Construct Grammars

> We are designed to walk. . . . That we are taught to walk is impossible. And pretty much the same is true of language. Nobody is taught language. In fact you can't prevent the child from learning it.
>
> **NOAM CHOMSKY,** *The Human Language Series* program 2, 1994

Language acquisition is a creative process. Children are not given explicit information about the rules, by either instruction or correction. They extract the rules of the grammar from the language they hear around them, and their linguistic environment does not need to be special in any way for them to do this. Observations of children acquiring different languages under different cultural and social circumstances reveal that the developmental stages are similar, possibly universal. Even deaf children of deaf signing parents go through stages in their signing development that parallel those of children acquiring spoken languages. These factors lead many linguists to believe that children are equipped with an innate template or blueprint for language—which we have referred to as Universal Grammar (UG)—and that this blueprint aids the child in the task of constructing a grammar for her language. This is referred to as the **innateness hypothesis.**

The Innateness Hypothesis



"WHAT'S THE BIG SURPRISE? ALL THE LATEST THEORIES OF LINGUISTICS SAY WE'RE BORN WITH THE INNATE CAPACITY FOR GENERATING SENTENCES."

The innateness hypothesis receives its strongest support from the observation that the grammar a person ends up with is vastly underdetermined by his linguistic experience. In other words, we end up knowing far more about language than is exemplified in the language we hear around us. This argument for the innateness of UG is called the **poverty of the stimulus**.

Although children hear many utterances, the language they hear is incomplete, noisy, and unstructured. We said earlier that child-directed speech is largely well formed, but children are also exposed to adult–adult interactions. These utterances include slips of the tongue, false starts, ungrammatical and incomplete sentences, and no consistent information as to which utterances are well formed and which are not. But most important is the fact that children come to know aspects of the grammar about which they receive *no* information. In this sense, the data they are exposed to is **impoverished**. It is less than what is necessary to account for the richness and complexity of the grammar they attain.

For example, we noted that the rules children construct are **structure dependent**. Children do not produce questions by moving the first auxiliary as in (1) below. Instead, they correctly invert the auxiliary of the main clause, as in (2). (We use ___ to mark the position from which a constituent moves.)

1. *Is the boy who ___ sleeping is dreaming of a new car?
2. Is the boy who is sleeping ___ dreaming of a new car?

To come up with a rule that moves the auxiliary of the main clause rather than the first auxiliary, the child must know something about the structure of the sentence. Children are not told about structure dependency. They are not told about constituent structure. Indeed, adults who have not studied linguistics do not explicitly know about structure dependency, constituent structure, and other abstract properties of grammar and so could not instruct their children even if they were so inclined. This knowledge is tacit or implicit. The input children get is a sequence of sounds, not a set of phrase structure trees. No amount of imitation, reinforcement, analogy, or structured input will lead the child to formulate a phrase structure tree, much less a principle of structure dependency. Yet, children do create phrase structures, and the rules they acquire are sensitive to this structure.

The child must also learn many aspects of grammar from her specific linguistic environment. English-speaking children learn that the subject comes first and that the verb precedes the object inside the VP, that is, that English is an SVO language. Japanese children acquire an SOV language. They learn that the object precedes the verb.

English-speaking children must learn that yes-no questions are formed by moving the auxiliary to the beginning of the sentence, as follows:

You will come home. → Will you ___ come home?

Japanese children learn that to form a yes-no question, the morpheme *-ka* is suffixed to a verb stem.

Tanaka ga sushi o tabete iru	"Tanaka is eating sushi."
Tanaka ga sushi o tabete iru**ka**	"Is Tanaka eating sushi?"

In Japanese questions, sentence constituents are not rearranged.

According to the innateness hypothesis, the child extracts from the linguistic environment those rules of grammar that are language specific, such as word order and movement rules. But he does not need to learn universal principles like structure dependency, or general principles of sentence formation such as the fact that heads of categories can take complements. All these principles are part of the innate blueprint for language that children use to construct the grammar of their language.

The innateness hypothesis provides an answer to *the logical problem of language acquisition* posed by Chomsky: What accounts for the ease, rapidity, and uniformity of language acquisition in the face of impoverished data? The answer is that children acquire a complex grammar quickly and easily without any particular help beyond exposure to the language because they do not start from scratch. UG provides them with a significant head start. It helps them to extract the rules of their language and to avoid many grammatical errors. Because the child constructs his grammar according to an innate blueprint, all children proceed through similar developmental stages, as we will discuss in the next section.

The innateness hypothesis also predicts that all languages will conform to the principles of UG. We are still far from understanding the full nature of the principles of UG. Research on more languages provides a way to test any principles that linguists propose. If we investigate a language in which a posited UG principle is absent, we will have to correct our theory and substitute other principles, as scientists must do in any field. But there is little doubt that human languages conform to abstract universal principles and that the human brain is specially equipped for acquisition of human language grammars.

Stages in Language Acquisition

> . . . for I was no longer a speechless infant; but a speaking boy. This I remember; and have since observed how I learned to speak. It was not that my elders taught me words . . . in any set method; but I . . . did myself . . . practice the sounds in my memory. . . . And thus by constantly hearing words, as they occurred in various sentences . . . I thereby gave utterance to my will.
>
> **ST. AUGUSTINE,** *Confessions*, 398 C.E.

Children do not wake up one fine morning with a fully formed grammar in their heads. Relative to the complexity of the adult grammar that they eventually attain, the process of language acquisition is fast, but it is not instantaneous. From first words to virtual adult competence takes three to five years, during which time children pass through linguistic stages. They begin by babbling, they then acquire their first words, and in just a few months they begin to put words together into sentences.

Observations of children acquiring different languages reveal that the stages are similar, possibly universal. The earliest studies of child language acquisition come from diaries kept by parents. More recent studies include the use of tape recordings, videotapes, and controlled experiments. Linguists record the

spontaneous utterances of children and purposefully elicit other utterances to study the child's production and comprehension. Researchers have also invented ingenious techniques for investigating the linguistic abilities of infants, who are not yet speaking.

Children's early utterances may not look exactly like adult sentences, but child language is not just a degenerate form of adult language. The words and sentences that the child produces at each stage of development conform to the set of grammatical rules he has developed to that point. Although child grammars and adult grammars differ in certain respects, they also share many formal properties. Like adults, children have grammatical categories such as NP and VP, rules for building phrase structures and for moving constituents, as well as phonological, morphological, and semantic rules, and they adhere to universal principles such as structure dependency.

From the perspective of the adult grammar, sentences such as *Nobody don't like me* and *Want other one spoon, Daddy* contain grammatical errors, but such "errors" often reflect the child's current stage of grammatical competence and therefore provide researchers with a window into their grammar.

The Perception and Production of Speech Sounds

An infant crying in the night:
An infant crying for the light:
And with no language but a cry.

ALFRED LORD TENNYSON, *In Memoriam A.H.H.*, 1849

The notion that a person is born with a mind like a blank slate is belied by a wealth of evidence that newborns are reactive to some subtle distinctions in their environment and not to others. That is, the mind appears to be attuned at birth to receive certain kinds of information. Infants will respond to visual depth and distance distinctions, to differences between rigid and flexible physical properties of objects, and to human faces rather than to other visual stimuli.

Infants also show a very early response to different properties of language. Experiments demonstrate that infants will increase their sucking rate—measured by ingeniously designed pacifiers—when stimuli (visual or auditory) presented to them are varied, but will decrease the sucking rate when the same stimuli are presented repeatedly. Early in acquisition when tested with a preferential listening technique, they will also turn their heads toward and listen longer to sounds, stress patterns, and words that are familiar to them. These instinctive responses can be used to measure a baby's ability to discriminate and recognize different linguistic stimuli.

A newborn will respond to phonetic contrasts found in human languages even when these differences are not phonemic in the language spoken in the baby's home. A baby hearing a human voice over a loudspeaker saying [pa] [pa] [pa] will slowly decrease her rate of sucking. If the sound changes to [ba] or even [p^ha], the sucking rate increases dramatically. Controlled experiments show that adults find it difficult to differentiate between the allophones of one phoneme, but for infants it comes naturally. Japanese infants can distinguish between [r] and [l] whereas their parents cannot; babies can hear the difference between

aspirated and unaspirated stops even if students in an introductory linguistics course cannot. Babies can discriminate between sounds that are phonemic in other languages and nonexistent in the language of their parents. For example, in Hindi, there is a phonemic contrast between a retroflex "t" [ʈ] (made with the tongue curled back) and the alveolar [t]. To English-speaking adults, these may sound the same; to their infants, they do not.

Infants can perceive voicing contrasts such as [pa] versus [ba], contrasts in place of articulation such as [da] versus [ga], and contrasts in manner of articulation such as [ra] versus [la], or [ra] versus [wa], among many others. Babies will not react, however, to distinctions that never correspond to phonemic contrasts in any human language, such as sounds spoken more or less loudly or sounds that lie between two phonemes. Furthermore, a vowel that we perceive as [i], for example, is a different physical sound when produced by a male, female, or child, but babies ignore the nonlinguistic aspects of the speech signal just as adults do.

Infants appear to be born with the ability to perceive just those sounds that are phonemic in some language. It is therefore possible for children to learn any human language they are exposed to. During the first year of life, the infant's job is to uncover the sounds of the ambient language. From around six months, he begins to lose the ability to discriminate between sounds that are not phonemic in his own language. His linguistic environment molds the infant's initial perceptions. Japanese infants can no longer hear the difference between [r] and [l], which do not contrast in Japanese, whereas babies in English-speaking homes retain this perception. They have begun to learn the sounds of the language of their parents. Before that, they appear to know the sounds of human language in general.

Babbling

"Hi & Lois" © King Features Syndicate

The shaping by the linguistic environment that we see in perception also occurs in the speech the infant is producing. At around six months, the infant begins to babble. The sounds produced in this period include many sounds that do not occur in the language of the household. However, **babbling** is not linguistic chaos. The twelve most frequent consonants in the world's languages make up

95 percent of the consonants infants use in their babbling. There are linguistic constraints even during this very early stage. The early babbles consist mainly of repeated consonant-vowel sequences, like *mama*, *gaga*, and *dada*. Later babbles are more varied.

By the end of the first year the child's babbles come to include only those sounds and sound combinations that occur in the target language. Babbles begin to sound like words, although they may not have any specific meaning attached to them. At this point adults can distinguish the babbles of an English-babbling infant from those of an infant babbling in Cantonese or Arabic. During the first year of life, the infant's perceptions and productions are being fine-tuned to the surrounding language(s).

Deaf infants produce babbling sounds that are different from those of hearing children. Babbling is related to auditory input and is linguistic in nature. Studies of vocal babbling of hearing children and manual babbling of deaf children support the view that babbling is a linguistic ability related to the kind of language input the child receives. These studies show that four- to seven-month-old hearing infants exposed to spoken language produce a restricted set of phonetic forms. At the same age, deaf children exposed to sign language produce a restricted set of signs. In each case the forms are drawn from the set of possible sounds or possible gestures found in spoken and signed languages.

Babbling illustrates the readiness of the human mind to respond to linguistic input from a very early stage. During the babbling stage, the intonation contours produced by hearing infants begin to resemble the intonation contours of sentences spoken by adults. The different intonation contours are among the first linguistic contrasts that children perceive and produce. During this same period, the vocalizations produced by deaf babies are random and nonrepetitive. Similarly, the manual gestures produced by hearing babies differ greatly from those produced by deaf infants exposed to sign language. The hearing babies move their fingers and clench their fists randomly with little or no repetition of gestures. The deaf infants, however, use more than a dozen different hand motions repetitively, all of which are elements of American Sign Language or the sign languages used in deaf communities of other countries.

The generally accepted view is that humans are born with a predisposition to discover the units that serve to express linguistic meanings, and that at a genetically specified stage in neural development, the infant will begin to produce these units—sounds or gestures—depending on the language input the baby receives. This suggests that babbling is the earliest stage in language acquisition, in opposition to an earlier view that babbling was prelinguistic and merely neuromuscular in origin. The "babbling as language acquisition" hypothesis is supported by recent neurological studies that link babbling to the language centers of the left hemisphere, also providing further evidence that the brain specializes for language functions at a very early age, as discussed in the introduction.

First Words

> From this golden egg a man, Prajapati, was born. . . . A year having passed, he wanted to speak. He said "bhur" and the earth was created. He said "bhuvar" and the space of the air was created. He said "suvar" and the sky was created. That is why a child wants to speak

after a year. . . . When Prajapati spoke for the first time, he uttered one or two syllables. That is why a child utters one or two syllables when he speaks for the first time.

HINDU MYTH

Some time after the age of one, the child begins to repeatedly use the same string of sounds to mean the same thing. At this stage children realize that sounds are related to meanings. They have produced their first true words. The age of the child when this occurs varies and has nothing to do with the child's intelligence. (It is reported that Einstein did not start to speak until he was three or four years old.)

The child's first utterances differ from adult language. The following words of one child, J. P., at the age of sixteen months, illustrate the point:

[ʔaʊ]	"not," "no," "don't"	[sː]	"aerosol spray"
[bʌʔ]/[mʌʔ]	"up"	[sʲuː]	"shoe"
[da]	"dog"	[haɪ]	"hi"
[iʔo]/[siʔo]	"Cheerios"	[sr]	"shirt," "sweater"
[sa]	"sock"	[sæː]/[əsæː]	"what's that?"/"hey, look!"
[aɪ]/[ʌɪ]	"light"	[ma]	"mommy"
[baʊ]/[daʊ]	"down"	[dæ]	"daddy"

Most children go through a stage in which their utterances consist of only one word. This is called the **holophrastic** or "whole phrase" stage because these one-word utterances seem to convey a more complex message. For example, when J. P. says "down" he may be making a request to be put down, or he may be commenting on a toy that has fallen down from the shelf. When he says "cheerios" he may simply be naming the box of cereal in front of him, or he may be asking for some Cheerios. This suggests that children have a more complex mental representation than their language allows them to express. Comprehension experiments confirm the hypothesis that children's productive abilities do not fully reflect their underlying grammatical competence.

It has been claimed that deaf babies develop their first signs earlier than hearing children speak their first words. This has led to the development of Baby Sign, a technique in which hearing parents learn and model for their babies various "signs," such as a sign for "milk," "hurt," and "mother." The idea is that the baby can communicate his needs manually even before he is able to articulate spoken words. Promoters of Baby Sign (and many parents) say that this leads to less frustration and less crying. The claim that signs appear earlier than words is controversial. Some linguists argue that what occurs earlier in both deaf and hearing babies are pre-linguistic gestures that lack the systematic meaning of true signs. Baby Sign may perhaps be exploiting this earlier manual dexterity, and not a precocious linguistic development. More research is needed.

Segmenting the Speech Stream

I scream, you scream, we all scream for ice cream.

TRANSCRIBED FROM VOCALS BY TOM STACKS, performing with Harry Reser's Six Jumping Jacks, January 14, 1928

The acquisition of first words is an amazing feat. How do infants discover where one word begins and another leaves off? Speech is a continuous stream broken only by breath pauses. Children are in the same fix that you might be in if you tuned in a foreign-language radio station. You wouldn't have the foggiest idea of what was being said or what the words were. Intonation breaks that do exist do not necessarily correspond to word, phrase, or sentence boundaries. The adult speaker with knowledge of the lexicon and grammar of a language imposes structure on the speech he hears, but a person without such knowledge cannot. How then do babies, who have not yet learned the lexicon or rules of grammar, extract the words from the speech they hear around them? The ability to segment the continuous speech stream into discrete units—words—is one of the remarkable feats of language acquisition.

Studies show that infants are remarkably good at extracting information from continuous speech. They seem to know what kind of cues to look for in the input that will help them to isolate words. One of the cues that English-speaking children attend to that helps them figure out word boundaries is stress.

As noted in chapter 5, every content word in English has a stressed syllable. (Function words such as *the*, *a*, *am*, *can*, etc. are ordinarily unstressed.) If the content word is monosyllabic, then that syllable is stressed as in *dóg* or *hám*. Bisyllabic content words can be **trochaic**, which means that stress is on the first syllable, as in *páper* or *dóctor*, or **iambic**, which means stress is on the second syllable, as in *giráffe* or *devíce*. The vast majority of English words have trochaic stress. In controlled experiments adult speakers are quicker to recognize words with trochaic stress than words with iambic stress. This can be explained if English-speaking adults follow a strategy of taking a stressed syllable to mark the onset of a new word.

But what about children? Could they avail themselves of the same strategy? Stress is very salient to infants, and they are quick to acquire the rhythmic structure of their language. Using the preferential listening technique mentioned earlier, researchers have shown that at just a few months old infants are able to discriminate native and non-native stress patterns. Before the end of the first year their babbling takes on the rhythmic pattern of the ambient language. At about nine months old, English-speaking children prefer to listen to bisyllabic words with initial rather than final stress. And most notably, studies show that infants acquiring English can indeed use stress cues to segment words in fluent speech. In a series of experiments, infants who were seven and a half months old listened to passages with repeated instances of a trochaic word such as *púppy*, and passages with iambic words such as *guitár*. They were then played lists of words, some of which had occurred in the previous passage and others that had not. Experimenters measured the length of time that they listened to the familiar versus unfamiliar words. The results showed that children listened significantly longer (indicated by turning their head in the direction of the loudspeaker) to words that they had heard in the passage, but only when the words had the trochaic pattern (*púppy*). For words with the iambic pattern (*guitár*), the children responded only to the stressed syllable (tár), though the monosyllabic word *tar* had not appeared in the passage. These results suggest that the infants—like adults—are taking the stressed syllable to mark the onset of a new word. Following such a strategy will sometimes lead to errors (for iambic words

and unstressed function words), but it provides the child with a way of getting started. This is sometimes referred to as **prosodic bootstrapping**. Infants can use the stress pattern of the language as a start to word learning.

Infants are also sensitive to phonotactic constraints and to the distribution of allophones in the target language. For example, we noted in chapter 5 that in English aspiration typically occurs at the beginning of a stressed syllable—[pʰɪt] versus [spɪt]—and that certain combinations of sounds are more likely to occur at the end of a word rather than at the beginning, for example [rt]. Studies show that nine-month-olds can use this information to help segment speech into words in English.

Languages differ in their stress patterns as well as in their allophonic variation and phonotactics. Wouldn't the infant then need some way to first figure out what stress pattern he is dealing with, or what the allophones and possible sound combinations are, before he could use this information to extract the words of his language from fluent speech? This seems to be a classic chicken and egg problem—he has to know the language to learn the language. A way out of this conundrum is provided by the finding that infants may also rely on statistical properties of the input to segment words, such as the frequency with which particular sequences of sounds occur.

In one study, eight-month-old infants listened to two minutes of speech formed from four nonsense words, *pabiku*, *tutibu*, *golabu*, *babupu*. The words were produced by a speech synthesizer and strung together in three different orders, analogous to three different sentences, without any pauses or other phonetic cues to the word boundaries. Here is an example of what the children heard:

golabupabikututibubabupugolabubabupututibu. . . . .

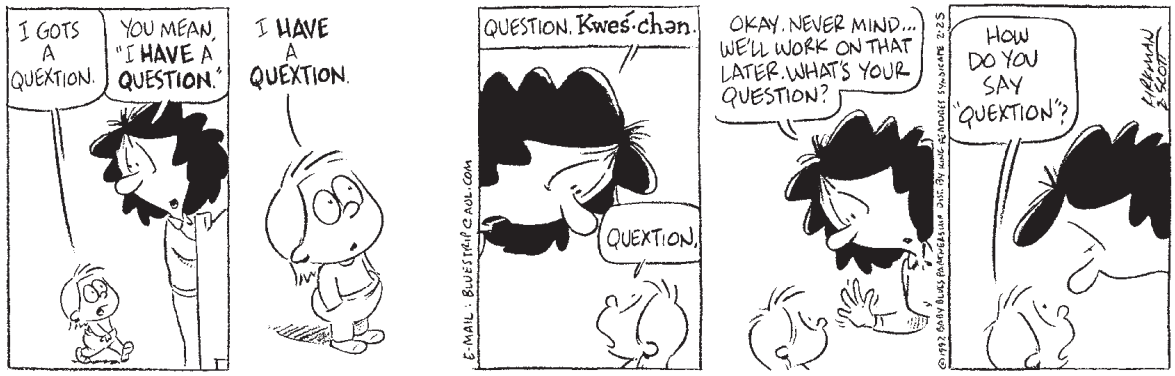
After listening to the strings the infants were tested to see if they could distinguish the "words" of the language, for example *pabiku* (which, recall, they had never heard in isolation before), from sequences of syllables that spanned word boundaries, such as *bubabu* (also in the input). Despite the very brief exposure and the lack of boundary cues, the infants were able to distinguish the words from the nonwords. The authors of the study conclude that the children do this by tracking the frequency with which the different sequences of syllables occur: the sequences inside the words (e.g., pa-bi-ku) remain the same whatever order the words are presented in, but the sequences of syllables that cross word boundaries will change in the different presentations and hence these sequences will occur much less frequently. Though it is still unclear how much such statistical procedures can accomplish with real language input, which is vastly larger and more varied, this experiment and others like it suggest that babies are sensitive to statistical information as well as to linguistic structure to extract words from the input. It is possible that they first rely on statistical properties to isolate some words, and then, based on these words, they are able to detect the rhythmic, allophonic, and phonotactic properties of the language, and with this further knowledge they can do further segmentation. Studies that measure infants' reliance on statistics versus stress for segmenting words support this two stage model: younger infants (seven-and-a-half months old) respond to frequency

while older infants (nine months old) attend to stress, allophonic, and phonotactic information.

The Development of Grammar

Children are biologically equipped to acquire all aspects of grammar. In this section we will look at development in each of the components of language, and we will illustrate the role that Universal Grammar and other factors play in this development.

The Acquisition of Phonology



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In terms of his phonology, J. P. is like most children at the one-word stage. The first words are generally monosyllabic with a CV (consonant-vowel) form. The vowel part may be a diphthong, depending on the language being acquired. The phonemic inventory is much smaller than is found in the adult language. It appears that children first acquire the small set of sounds common to all languages regardless of the ambient language(s), and in later stages acquire the less common sounds of their own language. For example, most languages have the sounds [p] and [s], but [θ] is a rare sound. J. P.'s sound system followed this pattern. His phonological inventory at an early stage included the consonants [b,m,d,k], which are frequently occurring sounds in the world's languages.

In general, the order of acquisition of classes of sounds begins with vowels and then goes by *manner* of articulation for consonants: nasals are acquired first, then glides, stops, liquids, fricatives, and affricates. Natural classes characterized by *place* of articulation features also appear in children's utterances according to a more or less ordered series: labials, velars, alveolars, and palatals. It is not surprising that *mama* is an early word for many children.

The distribution and frequency of sounds in a language can also influence the acquisition of certain segments. Sounds that are expected to be acquired late may appear earlier in children's language when they are frequently occurring. For example, the fricative [v] is a very late acquisition in English but it is an early phoneme in Estonian, Bulgarian, and Swedish, languages that have several [v]-initial words that are common in the vocabularies of young children.

If the first year is devoted to figuring out the sounds of the target language, the second year involves learning how these sounds are used in the phonology of

the language, especially which contrasts are phonemic. When children first begin to contrast one pair of a set (e.g., when they learn that /p/ and /b/ are distinct phonemes due to a voicing difference), they also begin to distinguish between other similar pairs (e.g., /t/ and /d/, /s/ and /z/, and all the other voiceless–voiced phonemic pairs). As we would expect, the generalizations refer to natural classes of speech sounds.

Controlled experiments show that children at this stage can perceive or comprehend many more phonological contrasts than they can produce. The same child who says [wæbɪt] instead of "rabbit," and who does not seem to distinguish [w] and [r], will not make mistakes on a picture identification task in which she must point to either a ring or a wing. In addition, children sometimes produce two different sounds in a way that makes them indiscernible to adult observers. Acoustic analyses of children's utterances show that although a child's pronunciation of *wing* and *ring* may seem the same to the adult ear, they are physically different sounds. As a further example, a spectrographic analysis of *ephant*, "elephant," produced by a three-year-old child, clearly showed an [l] in the representation of the word, even though the adult experimenter could not hear it.

Many anecdotal reports also show the disparity between the child's production and perception at this stage. An example is the exchange between the linguist Neil Smith and his two-year-old son Amahl. At this age Amahl's pronunciation of "mouth" is [maʊs].

NS: What does [maʊs] mean?
A: Like a cat.
NS: Yes, what else?
A: Nothing else.
NS: It's part of your head.
A: (*fascinated*)
NS: (*touching A's mouth*) What's this?
A: [*maʊs*]

According to Smith, it took Amahl a few seconds to realize his word for "mouse" and his word for "mouth" were the same. It is not that Amahl and other children do not hear the correct adult pronunciation. They do, but they are unable in these early years to produce it themselves. Another linguist's child (yes, linguists love to experiment on their own children) pronounced the word *light* as *yight* [jaɪt] but would become very angry if someone said to him, "Oh, you want me to turn on the yight." "No no," he would reply, "not yight—yight!"

Therefore, even at this stage, it is not possible to determine the extent of the grammar of the child—in this case, the phonology—simply by observing speech production. It is sometimes necessary to use various experimental and instrumental techniques to tap the child's competence.

A child's first words show many substitutions of one feature for another or one phoneme for another. In the preceding examples, *mouth* [maʊθ] is pronounced *mouse* [maʊs], with the alveolar fricative [s] replacing the less common interdental fricative [θ]; *light* [laɪt] is pronounced *yight* [jaɪt], with the glide [j] replacing the liquid [l]; and *rabbit* is pronounced *wabbit*, with the glide [w] replacing the liquid [r]. Glides are acquired earlier than liquids, and hence substitute for them.

These substitutions are simplifications of the adult pronunciation. They make articulation easier until the child achieves greater articulatory control.

Children's early pronunciations are not haphazard, however. The phonological substitutions are rule governed. The following is an abridged lexicon for another child, Michael, between the ages of eighteen and twenty-one months:

[pun]	"spoon"	[maɪtl]	"Michael"
[peɪn]	"plane"	[daɪtər]	"diaper"
[tɪs]	"kiss"	[pati]	"Papi"
[taʊ]	"cow"	[mani]	"Mommy"
[tin]	"clean"	[bərt]	"Bert"
[polər]	"stroller"	[bərt]	"(Big) Bird"

Michael systematically substituted the alveolar stop [t] for the velar stop [k] as in his words for "cow," "clean," "kiss," and his own name. He also replaced labial [p] with [t] when it occurred in the middle of a word, as in his words for "Papi" and "diaper." He reduced consonant clusters in "spoon," "plane," and "stroller," and he devoiced final stops as in "Big Bird." In devoicing the final [d] in "bird," he created an ambiguous form [bərt] referring both to Bert and Big Bird. No wonder only parents understand their children's first words!

Michael's substitutions are typical of the phonological rules that operate in the very early stages of acquisition. Other common rules are reduplication—"bottle" becomes [baba], "water" becomes [wawa]; and the dropping of a final consonants—"bed" becomes [be], "cake" becomes [ke]. These two rules show that the child prefers a simple CV syllable.

Of the many phonological rules that children create, no child will necessarily use all rules. Early phonological rules generally reflect natural phonological processes that also occur in adult languages. For example, various adult languages have a rule of syllable-final consonant devoicing (German does—/bʊnd/ is pronounced [bʊnt]—English doesn't). Children do not create bizarre or whimsical rules. Their rules conform to the possibilities made available by Universal Grammar.

The Acquisition of Word Meaning

> Suddenly I felt a misty consciousness as of something forgotten—a thrill of returning thought; and somehow the mystery of language was revealed to me. . . . Everything had a name, and each name gave birth to a new thought.
>
> **HELEN KELLER,** *The Story of My Life*, 1903

In addition to what it tells us about phonological regularities, the child's early vocabulary also provides insight into how children use words and construct word meaning. For J. P. the word *up* was originally used only to mean "Get me up!" when he was either on the floor or in his high chair, but later he used it to mean "Get up!" to his mother as well. J. P. used his word for *sock* not only for socks but also for other undergarments that are put on over the feet, such

as undershorts. This illustrates how a child may extend the meaning of a word from a particular referent to encompass a larger class.

When J. P. began to use words, the object had to be physically present, but that requirement did not last very long. He first used "dog" only when pointing to a real dog, but later he used the word for pictures of dogs in various books. A new word that entered J. P.'s vocabulary at seventeen months was "uh-oh," which he would say after he had an accident like spilling juice, or when he deliberately poured his yogurt over the side of his high chair. His use of this word shows his developing use of language for social purposes. At this time he added two new words meaning "no," [do:] and [no], which he used when anyone attempted to take something from him that he wanted, or tried to make him do something he did not want to do. He used them either with the imperative meaning of "Don't do that!" or with the assertive meaning of "I don't want to do that." Even at this early stage, J. P. was using words to convey a variety of ideas and feelings, as well as his social awareness.

But how do children learn the meanings of words? Most people do not see this aspect of acquisition as posing a great problem. The intuitive view is that children look at an object, the mother says a word, and the child connects the sounds with the object. However, this is not as easy as it seems:

> A child who observes a cat sitting on a mat also observes . . . a mat supporting a cat, a mat under a cat, a floor supporting a mat and a cat, and so on. If the adult now says "The cat is on the mat" even while pointing to the cat on the mat, how is the child to choose among these interpretations of the situation?

Even if the mother simply says "cat," and the child accidentally associates the word with the animal on the mat, the child may interpret cat as "Cat," the name of a particular animal, or of an entire species. In other words, to learn a word for a class of objects such as "cat" or "dog," children have to figure out exactly what the word refers to. Upon hearing the word *dog* in the presence of a dog, how does the child know that "dog" can refer to any four-legged, hairy, barking creature? Should it include poodles, tiny Yorkshire terriers, bulldogs, and Great Danes, all of which look rather different from one another? What about cows, lambs, and other four-legged mammals? Why are they not "dogs"? The important and very difficult question is: What relevant features define the class of objects we call *dog*, and how does a child acquire knowledge of them? Even if a child succeeds in associating a word with an object, nobody provides explicit information about how to extend the use of that word to all the other objects to which that word refers.

It is not surprising, therefore, that children often **overextend** a word's meaning, as J. P. did with the word *sock*. A child may learn a word such as *papa* or *daddy*, which she first uses only for her own father, and then extend its meaning to apply to all men, just as she may use the word *dog* to mean any four-legged creature. After the child has acquired her first seventy-five to one hundred words, the overextended meanings start to narrow until they correspond to those of the other speakers of the language. How this occurs is still not entirely understood.

On the other hand, early language learning may involve **underextension**, in which a lexical item is used in an overly restrictive way. It is common for children

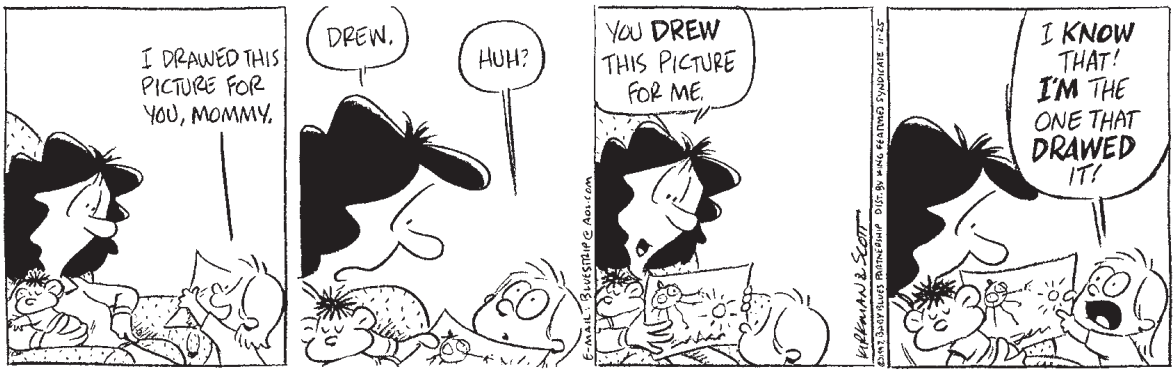
to first apply a word like *bird* only to the family's pet canary without making a connection to birds in the tree outside, as if the word were a proper noun. And just as overextended meanings narrow in on the adult language, underextended meanings broaden their scope until they match the target language.

The mystery surrounding the acquisition of word meanings has intrigued philosophers and psychologists as well as linguists. We know that all children view the world in a similar fashion and apply the same general principles to help them determine a word's meaning. For example, overextensions are usually based on physical attributes such as size, shape, and texture. *Ball* may refer to all round things, *bunny* to all furry things, and so on. However, children will not make overextensions based on color. In experiments, children will group objects by shape and give them a name, but they will not assign a name to a group of red objects.

If an experimenter points to an object and uses a nonsense word like *blick*, saying *that's a blick*, the child will interpret the word to refer to the whole object, not one of its parts or attributes. Given the poverty of stimulus for word learning, principles like the "form over color principle" and the "whole object principle" help the child organize his experience in ways that facilitate word learning. Without such principles, it is doubtful that children could learn words as quickly as they do. Children learn approximately fourteen words a day for the first six years of their lives. That averages to about 5,000 words per year. How many students know 10,000 words of a foreign language after two years of study?

There is also experimental evidence that children can learn the meaning of one class of words—verbs—based on the syntactic environment in which they occur. If you were to hear a sentence such as *John blipped Mary the gloon*, you would not know exactly what John did, but you would likely understand that the sentence is describing a transfer of something from John to Mary. Similarly, if you heard *John gonked that Mary. . . .*, you would conclude that the verb *gonk* was a verb of communication like *say* or a mental verb like *think*. The complement types that a verb selects can provide clues to its meaning and thereby help the child. This learning of word meaning based on syntax is referred to as **syntactic bootstrapping**.

The Acquisition of Morphology



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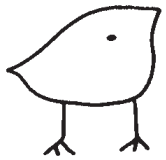
The child's acquisition of morphology provides the clearest evidence of rule learning. Children's errors in morphology reveal that the child acquires the regular rules of the grammar and then overgeneralizes them. This **overgeneralization** occurs when children treat irregular verbs and nouns as if they were regular. We have probably all heard children say *bringed*, *goed*, *drawed*, and *runned*, or *foots*, *mouses*, *and sheeps*.

These mistakes tell us much about how children learn language because such forms could not arise through imitation; children use them in families in which the parents never speak "bad English." In fact, children generally go through three phases in the acquisition of an irregular form:

Phase 1	Phase 2	Phase 3
broke	breaked	broke
brought	bringed	brought

In phase 1 the child uses the correct term such as *brought* or *broke*. At this point the child's grammar does not relate the form *brought* to *bring*, or *broke* to *break*. The words are treated as separate lexical entries. Phase 2 is crucial. This is when the child constructs a rule for forming the past tense and attaches the regular past-tense morpheme to all verbs—*play*, *hug*, *help*, as well as *break* and *bring*. Children look for general patterns. What they do not know at phase 2 is that there are exceptions to the rule. Now their language is more regular than the adult language. During phase 3 the child learns that there are exceptions to the rule, and then once again uses *brought* and *broke*, with the difference being that these irregular forms will be related to the root forms.

The child's morphological rules emerge quite early. In a classic study, preschool children and children in the first, second, and third grades were shown a drawing of a nonsense animal like the funny creature shown in the following picture. Each "animal" was given a nonsense name. The experimenter would then say to the child, pointing to the picture, "This is a wug."



Then the experimenter would show the child a picture of two of the animals and say, "Now here is another one. There are two of them. There are two ___."

The child's task was to give the plural form, "wugs" [wʌgz]. Another little make-believe animal was called a "bik," and when the child was shown two biks, he or she again was to say the plural form [bɪks]. The children applied regular plural formation to words they had never heard, showing that they had acquired the plural rule. Their ability to add [z] when the animal's name ended with a voiced sound, and [s] when there was a final voiceless consonant, showed that the children were also using rules based on an understanding of natural classes of phonological segments, and not simply imitating words they had previously heard.

More recently, studies of children acquiring languages with richer inflectional morphologies than English reveal that they learn agreement at a very early age. For example, Italian verbs must be inflected for number and person to agree with the subject. This is similar to the English agreement rule "add *s* to the verb" for third-person, singular subjects—*He giggles a lot* but *We giggle a lot*—except that in Italian more verb forms must be acquired. Italian-speaking children between the ages of 1;10 (one year, ten months) and 2;4 correctly inflect the verb, as the following utterances of Italian children show:

Tu legg**i** il libro.	"You (second person singular) read the book."
Io vad**o** fuori.	"I go (first person singular) outside."
Dorm**e** miao dorme.	"Sleeps (third person singular) cat sleeps."
Legg**iamo** il libro.	"(We) read (first person plural) the book."

Children acquiring other richly inflected languages such as Spanish, German, Catalan, and Swahili quickly acquire agreement morphology. It is rare for them to make agreement errors, just as it is rare for an English-speaking child to say "I goes."

In these languages there is also gender and number agreement between the head noun and the article and adjectives inside the noun phrase. Children as young as two years old respect these agreement requirements when producing NPs, as shown by the following Italian examples:

E mi**a** gonn**a**.	"(It) is my (feminine singular) skirt."
Quest**o** mi**o** bimb**o**.	"This my (masculine singular) baby."
Guarda **la** mel**a** piccolin**a**.	"Look at the little (feminine singular) apple."
Guarda **il** top**o** piccolin**o**.	"Look at the little (masculine singular) mouse."

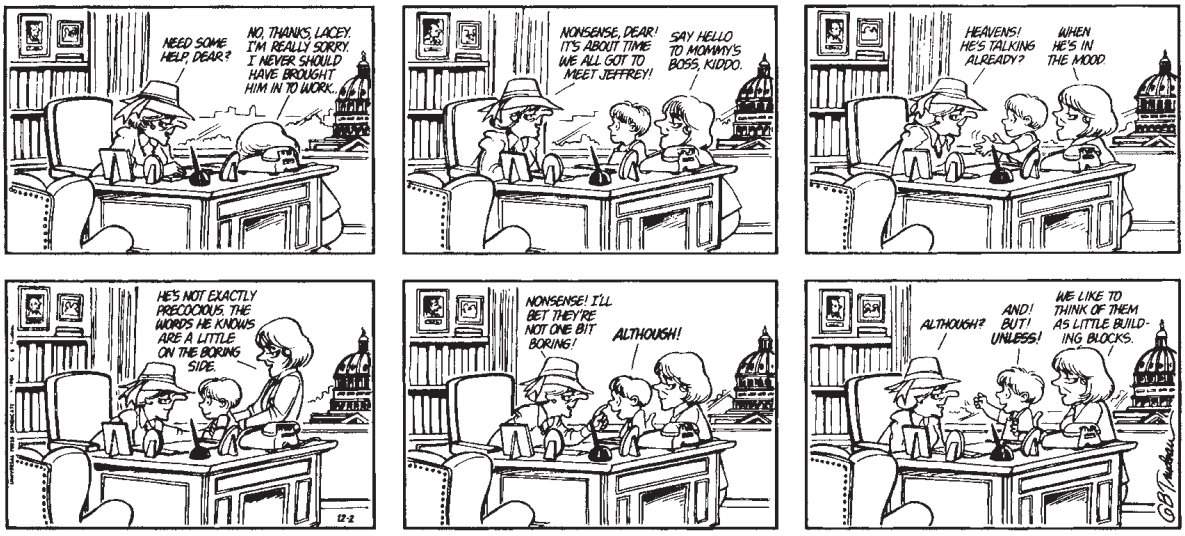
Experimental studies with twenty-five-month-old French-speaking children also show that they use gender information on determiners to help identify the subsequent noun, for example, *le ballon* (the-masc. balloon) versus *la banane* (the-fem. banana).

Children also show knowledge of the derivational rules of their language and use these rules to create novel words. In English, for example, we can derive verbs from nouns. From the noun *microwave* we now have a verb *to microwave*; from the noun *e(lectronic) mail* we derived the verb *to e-mail*. Children acquire this derivational rule early and use it often because there are lots of gaps in their verb vocabulary.

Child Utterance	**Adult Translation**
You have to scale it.	"You have to weigh it."
I broomed it up.	"I swept it up."
He's keying the door.	"He's opening the door (with a key)."

These novel forms provide further evidence that language acquisition is a creative process and that children's utterances reflect their internal grammars, which include both derivational and inflectional rules.

The Acquisition of Syntax



When children are still in the holophrastic stage, adults listening to the one-word utterances often feel that the child is trying to convey a more complex message. Experimental techniques show that at that stage (and even earlier), children have knowledge of some syntactic rules. In these experiments the infant sits on his mother's lap and hears a sentence over a speaker while seeing two video displays depicting different actions, one of which corresponds to the sentence. Infants tend to look longer at the video that matches the sentence they hear. This methodology allows researchers to tap the linguistic knowledge of children who are using only single words or who are not talking at all. Results show that children as young as seventeen months can understand the difference between sentences such as "Ernie is tickling Bert" and "Bert is tickling Ernie." Because these sentences have all the same words, the child cannot be relying on the words alone to understand the meanings. He must also understand the word-order rules and how they determine the grammatical relations of subject and object. This same preferential looking technique has shown that eighteen-month-olds can distinguish between subject and object *wh* questions, such as *What is the apple hitting?* and *What hit the apple?* These results and many others strongly suggest that children's syntactic competence is ahead of their productive abilities, which is also how their phonology develops.

Around the time of their second birthday, children begin to put words together. At first these utterances appear to be strings of two of the child's earlier holophrastic utterances, each word with its own single-pitch contour. Soon, they begin to form actual two-word sentences with clear syntactic and semantic relations. The intonation contour of the two words extends over the whole utterance rather than being separated by a pause between the two words. The

following utterances illustrate the kinds of patterns that are found in children's utterances at this stage:

allgone sock	hi Mommy
bye bye boat	allgone sticky
more wet	it ball
Katherine sock	dirty sock

These early utterances can express a variety of semantic and syntactic relations. For example, noun + noun sentences such as *Mommy sock* can express a subject + object relation in the situation when the mother is putting the sock on the child, or a possessive relation when the child is pointing to Mommy's sock. Two nouns can also be used to show a subject-locative relation, as in *sweater chair* to mean "The sweater is on the chair," or to show attribution as in *dirty sock*. Children often have a variety of modifiers such as *allgone*, *more*, and *bye bye*.

Because children mature at different rates and the age at which children start to produce words and put words together varies, chronological age is not a good measure of a child's language development. Instead, researchers use the child's **mean length of utterances** (MLU) to measure progress. MLU is the average length of the utterances the child is producing at a particular point. MLU can be measured in terms of morphemes, so words like *boys*, *danced*, and *crying* each have a value of two (morphemes). MLU can also be measured in term of words, which is a more revealing measure when comparing children acquiring languages with different morphological systems. Children with the same MLU are likely to have similar grammars even though they are different ages.

In their earliest multiword utterances, children are inconsistent in their use of function words (grammatical morphemes) such as *a* and *the*, subject pronouns, auxiliary verbs such as *can* and *is*, and verbal inflection. Many (though not all) utterances consist only of open-class or content words, while some or all of the function words, auxiliaries, and verbal inflection may be missing. During this stage children often sound as if they are sending an e-message or reading an old-fashioned telegram (containing only the required words for basic understanding), which is why such utterances are sometimes called "telegraphic speech," and we call this the **telegraphic stage** of the child's language development.

Cat stand up table.
What that?
He play little tune.
Andrew want that.
Cathy build house.
No sit there.
Ride truck.
Show Mommy that.

J. P.'s early sentences were similar (the words in parentheses are missing from J. P.'s sentences):

Age in Months		
25	[danʔ ɪʔ tsɪʔ]	"Don't eat (the) chip."
	[bʷaʔ tat]	"Block (is on) top."
26	[mamis tu hæs]	"Mommy's two hands."
	[mo bʌs go]	"Where bus go?"
	[dædi go]	"(Where) Daddy go?"
27	[ʔaɪ gat tu dʲus]	"I got two (glasses of) juice."
	[do baɪʔ mi]	"Don't bite (kiss) me."
	[kʌder sʌni ber]	"Sonny color(ed a) bear."
28	[ʔaɪ gat pwe dɪs]	"I('m) play(ing with) this."
	[mamis tak mɛns]	"Mommy talk(ed to the) men."

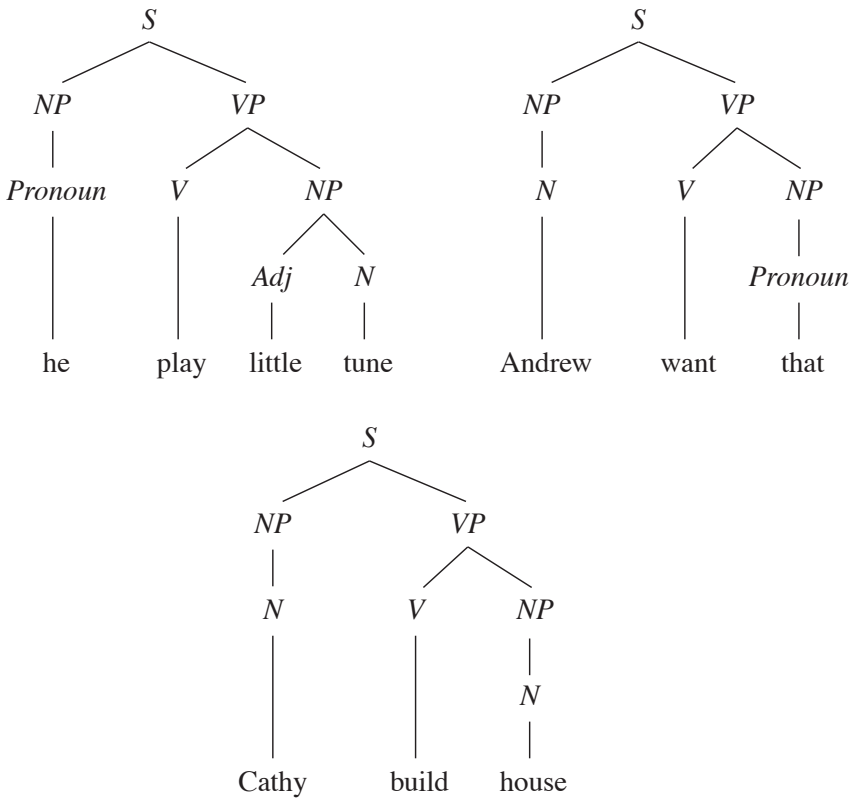
It can take many months before children use all the grammatical morphemes and auxiliary verbs consistently. However, the child does not deliberately leave out function words as would an adult sending a twitter. The sentences reflect the child's linguistic capacity at that particular stage of language development.

There is a great deal of debate among linguists about how to characterize telegraphic speech: Do children omit function morphemes because of limitations in their ability to produce longer, more complex sentences, or do they omit these morphemes because their grammar permits such elements to be unexpressed? On the first account, telegraphic speech is due to performance limitations: Since there is an upper limit on the length of utterance a child can produce, and function morphemes are prosodically and semantically weak, they are omitted. On the second view, telegraphic speech is an early grammatical stage similar to languages like Italian or Spanish that allow subject pronouns to be dropped, as in *Hablo ingles* "(I) speak English," or Chinese, which lacks many types of determiners.

Although these sentences may lack certain morphemes, they nevertheless appear to have hierarchical constituent structures and syntactic rules similar to those in the adult grammar. For example, children almost never violate the word-order rules of their language. In languages with relatively fixed word order such as English and Japanese, children use the required order (SVO in English, SOV in Japanese) from the earliest stage. In languages with freer word order, like Turkish and Russian, grammatical relations such as subject and object are generally marked by inflectional morphology, such as case markers. Children acquiring these languages quickly learn the morphological case markers. For example, Russian- and German-speaking children mark subjects with nominative case and objects with accusative case with very few errors.

Telegraphic speech is also very good evidence against the hypothesis that children learn sentences by imitation. Adults—even when speaking motherese—do not drop function words when they talk to children.

The correct use of word order, case marking, and agreement rules shows that even though children may often omit function morphemes, they are aware of constituent structure and syntactic rules. Their utterances are not simply words randomly strung together. From a very early stage onward, children have a grasp of the principles of phrase and sentence formation and of the kinds of structure dependencies mentioned in chapter 2, as revealed by these constituent structure trees:



In order to apply morphological and syntactic rules the child must know what syntactic categories the words in his language belong to. But how exactly does the child come to know that *play* and *want* are verbs and *tune* and *house* are nouns? One suggestion is that children first use the meaning of the word to figure out its category. This is called **semantic bootstrapping**. The child may have rules such as "if a word refers to a physical object, it's a noun" or "if a word refers to an action, it's a verb," and so on. However, the rules that link certain meanings to specific categories are not foolproof. For example, the word *action* denotes an action but it is not a verb, *know* is not an action but is a verb, and *justice* is a noun though it is not a physical object. But the rules that drive semantic bootstrapping might be helpful for the kind of words children learn early on which tend to refer to objects and actions.

Word frames may also help the child to determine when words belong to the same category. Studies of the language used to children show that there are certain frames that occur frequently enough to be reliable for categorization, for example, "you __ it" and "the __ one." Most typically, verbs such as *see*, *do*, *did*, *win*, *fix*, *turned*, and *get* occur in the first frame, while adjectives like *red*, *big*, *wrong*, and *light* occur in the second. If a child knows that *see* is a verb, then he could also deduce that all the other words appearing in the same frame are also verbs. Like semantic bootstrapping, the distributional evidence is not foolproof. For example, "it __ the" can frame a verb, *it **hit** the ball*, but also a preposition, *I hit it **across** the street*. And also like semantic bootstrapping, this evidence may

well be reliable enough to give the child a head start into the complex task of learning the syntactic categories of words.

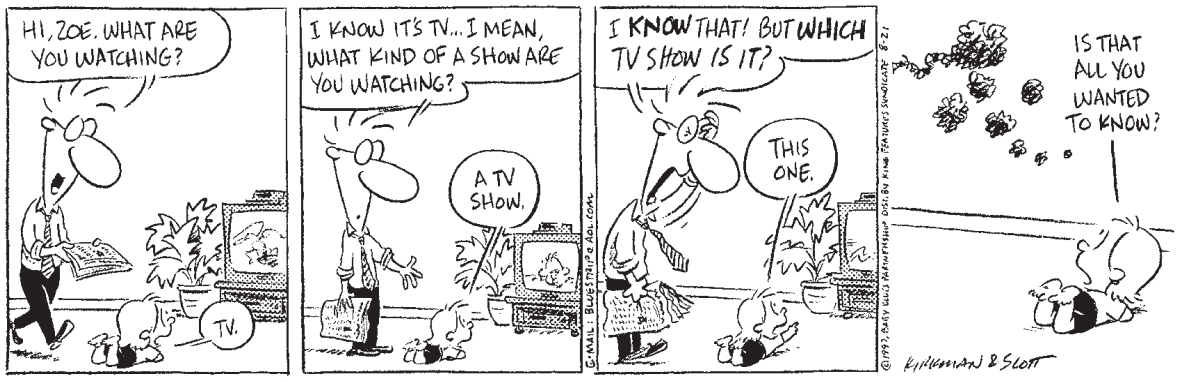
The most frequent frames typically consist of function words, determiners such as *the* or *a* or pronouns like *it* or *one*. This suggests that children can learn from function morphemes in the input even though they omit these elements in their own speech. Indeed, comprehension studies show that children pay attention to function words. Two-year-olds respond more appropriately to grammatical commands such as *Find the bird* than to commands with an ungrammatically positioned function word as in *Find was bird*. Other studies suggest that function morphemes such as determiners help children in word segmentation and categorization.

Sometime between the ages of 2;6 and 3;6, a virtual language explosion occurs. At this point it is difficult to identify distinct stages because the child is undergoing so much development so rapidly. By the age of 3;0, most children are consistent in their use of function morphemes. Moreover, they have begun to produce and understand complex structures, including coordinated sentences and embedded sentences of various kinds, such as the following:

He was stuck and I got him out.
I want this doll because she's big.
I know what to do.
I like to play with something else.
I think she's sick.
Look at the train Ursula bought.
I gon' make it like a rocket to blast off with.
It's too early for us to eat.

Past the age of 3;6 children can generally form grammatical *wh* questions with the proper Aux inversion such as *What can I do tomorrow?* They can produce and understand relative clauses such as *This is the lion that chased the giraffe*, as well as other embedded clauses such as *I know that Mommy is home.* They can use reflexive pronouns correctly such as *I saw myself in the camera.* Somewhat beyond 4;0, depending on the individual, much of the adult grammar has been acquired.

The Acquisition of Pragmatics



"Baby Blues" © Baby Blues Partnership. Reprinted with permission of King Features Syndicate.

In addition to acquiring the rules of grammar, children must learn the appropriate use of language in context, or pragmatics. The cartoon is funny because of the inappropriateness of the interaction, showing that Zoe hasn't completely acquired the pragmatic "maxims of conversation" discussed in chapter 3.

Context is needed to determine the reference of pronouns. A sentence such as "Amazingly, he loves her anyway" is uninterpretable unless both speaker and hearer understand who the pronouns *he* and *her* refer to. If the sentence were preceded by "I saw John and Mary kissing in the park," then the referents of the pronouns would be clear. Children are not always sensitive to the needs of their interlocutors, and they may fail to establish the referents for pronouns. It is not unusual for a three- or four-year-old (or even older children) to use pronouns out of the blue, like the child who cries to her mother "He hit me" when mom has no idea who did the deed.

The speaker and listener form part of the context of an utterance. The meaning of *I* and *you* depends on who is talking and who is listening, which changes from situation to situation. Younger children (around age two) have difficulty with the "shifting reference" of these pronouns. A typical error that children make at this age is to refer to themselves as "you," for example, saying "You want to take a walk" when they mean "I want to take a walk."

Children also show a lack of pragmatic awareness in the way they sometimes use articles. Like pronouns, the interpretation of articles depends on context. The definite article *the*, as in "the boy," can be used felicitously only when it is clear to speaker and hearer what boy is being discussed. In a discourse the indefinite article *a/an* must be used for the first mention of a new referent, but the definite article (or pronoun) may be used in subsequent mentions, as illustrated following:

A boy walked into the class.
He was in the wrong room.
The teacher directed the boy to the right classroom.

Children do not always respect the pragmatic rules for articles. In experimental studies, three-year-olds may use the definite article for introducing a new referent. In other words, the child tends to assume that his listener knows who he is talking about without having established this in a linguistically appropriate way.

It may take a child several months or years to master those aspects of pragmatics that involve establishing the reference for function morphemes such as determiners and pronouns. Other aspects of pragmatics are acquired very early. Children in the holophrastic stage use their one-word utterances with different illocutionary force (see page 176). The utterance "up" spoken by J. P. at sixteen months might be a simple statement such as "The teddy is up on the shelf," or a request: "Pick me up."

The Development of Auxiliaries: A Case Study

We have seen in this chapter that language acquisition involves development in various components—the lexicon, phonology, morphology, and syntax, as well as pragmatics. These different modules interact in complex ways to chart an overall course of language development.

As an example, let us take the case of the English auxiliaries. As noted earlier, children in the telegraphic stage do not typically use auxiliaries such as *can*, *will*, or *do*, and they often omit *be* and *have* from their utterances. Several syntactic constructions in English depend on the presence of an auxiliary, the most central of which are questions and negative sentences. To negate a main verb requires an auxiliary verb (or *do* if there isn't one) as in the following examples:

I don't like this book.
I won't read this book.

An adult does not say "I not like this book."

Similarly, as discussed in chapter 2, English yes-no and *wh* questions are formed by moving an auxiliary to precede the subject, as in the following examples:

Can I leave now?
Do you love me?
Where should John put the book?

Although the two-year-old does not have productive control of auxiliaries, she is able to form negative sentences and questions. During the telegraphic stage, the child produces questions of the following sort:

Yes-No Questions
I ride train?
Mommy eggnog?
Have some?

These utterances have a rising intonation pattern typical of yes-no questions in English, but because there are no auxiliaries, there can be no auxiliary movement. In *wh* questions there is also no auxiliary, but there is generally a *wh* phrase that has moved to the beginning of the sentence. English-speaking children do not produce sentences such as "Cowboy doing what?" in which the *wh* phrase remains in its deep structure position.

The two-year-old has an insufficient lexicon. The lack of auxiliaries means that she cannot use a particular syntactic device associated with question formation in English—auxiliary movement. However, she has the pragmatic knowledge to make a request or ask for information, and she has the appropriate prosody, which depends on knowledge of phonology and the syntactic structure of the question. She also knows the grammatical rule that requires *wh* phrases to be in a fronted position. Many components of language must be in place to form an adultlike question.

In languages that do not require auxiliaries to form a question, children appear more adultlike. For example, in Dutch and Italian, the main verb moves. Because many main verbs are acquired before auxiliaries, Dutch and Italian children in the telegraphic stage produce questions that follow the adult rule:

Dutch

En wat doen ze daar?	and what do they there	"And what are they doing there?"
Wordt mama boos?	becomes mama angry	"Is mommy angry?"
Weet je n kerk?	know you a church	"Do you know a church?"

Italian

Cosa fanno questi bambini?	what do these children	"What are these babies doing?"
Chando vene a mama?	when comes the mommy	"When is Mommy coming?"
Vola cici?	flies birdie	"Is the birdie flying?"

The Dutch and Italian children show us there is nothing intrinsically difficult about syntactic movement rules. The delay that English-speaking children show in producing adultlike questions may simply be because auxiliaries are acquired later than main verbs and because English is idiosyncratic in forming questions by moving only auxiliaries.

The lack of auxiliaries during the telegraphic stage also affects the formation of negative sentences. During this stage the English-speaking child's negative sentences look like the following:

He no bite you.
Wayne not eating it.
Kathryn not go over there.
You no bring choo-choo train.
That no fish school.

Because of the absence of auxiliaries, these utterances do not look very adultlike. However, children at this stage understand the pragmatic force of negation. The child who says "No!" when asked to take a nap knows exactly what he means.

As children acquire the auxiliaries, they generally use them correctly; that is, the auxiliary usually appears before the subject in yes-no questions, but not always.

Yes-No Questions
Does the kitty stand up?
Can I have a piece of paper?
Will you help me?
We can go now?
***Wh* Questions**
Which way they should go?
What can we ride in?
What will we eat?

The introduction of auxiliaries into the child's grammar also affects negative sentences. We now find correctly negated auxiliaries, though *be* is still missing in many cases.

Paul can't have one.
Donna won't let go.
I don't want cover on it.
I am not a doctor.
It's not cold.
Paul not tired.
I not crying.

The child always places the negation in the correct position in relation to the auxiliary or *be*. Main verbs follow negation and *be* precedes negation. Children never produce errors such as "Mommy dances not" or "I not am going."

In languages such as French and German, which are like Italian and Dutch in having a rule that moves inflected verbs, the verb shows up before the negative marker. French and German children respect this rule, as follows. (In the German examples *nich* is the baby form of *nicht*.)

French

Veux pas lolo.	want not water	"I don't want water."
Marche pas.	walks not	"She doesn't walk."
Ça tourne pas.	that turns not	"That doesn't turn."

German

Macht nich aua.	makes not ouch	"It doesn't hurt."
Brauche nich lala.	need not pacifier	"I don't need a pacifier."
Schmeckt auch nich.	tastes also not	"It doesn't taste good either."

Though the stages of language development are universal, they are shaped by the grammar of the particular adult language the child is acquiring. During the telegraphic stage, German, French, Italian, and English-speaking children omit auxiliaries, but they form negative sentences and questions in different ways because the rules of question and negative formation are different in the respective adult languages. This tells us something essential about language acquisition: Children are sensitive to the rules of the adult language at the earliest stages of development. Just as their phonology is quickly fine-tuned to the ambient language(s), so is their syntactic system.

The ability of children to form complex rules and construct grammars of the languages around them in a relatively short time is phenomenal. That all children go through similar stages regardless of language shows that they are equipped with special abilities to know what generalizations to look for and what to ignore, and how to discover the regularities of language.

Setting Parameters

Children acquire some aspects of syntax very early, even while they are still in the telegraphic stage. Most of these early developments correspond to what we referred to as the parameters of UG in chapter 2. One such parameter determines whether the head of a phrase comes before or after its complements, for

example, whether the order of the VP is verb-object (VO) as in English or OV as in Japanese. Children produce the correct word order of their language in their earliest multiword utterances, and they understand word order even when they are in the one-word stage of production. According to the parameter model of UG, the child does not actually have to formulate a word-order rule. Rather, he must choose between two already specified values: head first or head last. He determines the correct value based on the language he hears around him. The English-speaking child can quickly figure out that the head comes before its complements; a Japanese-speaking child can equally well determine that his language is head final.

Other parameters of UG involve the verb movement rules. In some languages the verb can move out of the VP to higher positions in the phrase structure tree. We saw this in the Dutch and Italian questions discussed in the last section. In other languages, such as English, verbs do not move (only auxiliaries do). The verb movement parameters provide the child with an option: my language does/does not allow verb movement. As we saw, Dutch- and Italian-speaking children quickly set the verb movement parameters to the "does allow" value, and so they form questions by moving the verb. English-speaking children never make the mistake of moving the verb, even when they don't yet have auxiliaries. In both cases, the children have set the parameter at the correct value for their language. Even after English-speaking children acquire the auxiliaries and the Aux movement rule, they never overgeneralize this movement to include verbs. This supports the hypothesis that the parameter is set early in development and cannot be undone. In this case as well, the child does not have to formulate a rule of verb movement; he does not have to learn when the verb moves and where it moves to. This is all given by UG. He simply has to decide whether verb movement is possible in his language.

The parameters of UG limit the grammatical options to a small well-defined set—is my language head first or head last, does my language have verb movement, and so on. Parameters greatly reduce the acquisition burden on the child and contribute to explaining the ease and rapidity of language acquisition.

The Acquisition of Signed Languages

Deaf children who are born to deaf signing parents are naturally exposed to sign language just as hearing children are naturally exposed to spoken language. Given the universal aspects of sign and spoken languages, it is not surprising that language development in these deaf children parallels the stages of spoken language acquisition. Deaf children babble, they then progress to single signs similar to the single words in the holophrastic stage, and finally they begin to combine signs. There is also a telegraphic stage in which the function signs may be omitted. Use of function signs becomes consistent at around the same age for deaf children as function words in spoken languages. The ages at which signing children go through each of these stages are comparable to the ages of children acquiring a spoken language.

Both spoken and signed language acquisition adhere to a set of universal principles, overlaid by language-particular components. We saw earlier that English-speaking children easily acquire *wh* movement, which is governed by universal principles, but they show some delay in their use of Aux movement, which is

specific to English. In *wh* questions in ASL, the *wh* word can move or it can be left in its original position. Both of the following sentences are grammatical:

_____whq
WHO BILL SEE YESTERDAY?

_____ whq
BILL SAW WHO YESTERDAY?

(*Note*: We follow the convention of writing the glosses for signs in uppercase letters.)

There is no Aux movement in ASL, but a question is accompanied by a facial expression with furrowed brows and the head tilted back. This is represented by the "whq" above the ASL glosses. This *non-manual marker* is part of the grammar of ASL. It is like the rising intonation we use when we ask questions in English and other spoken languages.

In the acquisition of *wh* questions in ASL, signing children easily learned the rules associated with the *wh* phrase. The children sometimes move the *wh* phrase and sometimes leave it in place, as adult signers do. But they often omit the non-manual marker, an omission that is not grammatical in the adult language.

Sometimes the parallels between the acquisition of signed and spoken languages are striking. For example, some of the grammatical morphemes in ASL are semantically transparent or **iconic**, that is, they look like what they mean; for example, the sign for the pronoun "I" involves the speaker pointing to his chest. The sign for the pronoun "you" is a point to the chest of the addressee. As noted earlier, at around age two, children acquiring spoken languages often reverse the pronouns "I" and "you." Interestingly, at this same age signing children make this same error. They will point to themselves when they mean "you" and point to the addressee when they mean "I." Children acquiring ASL make this error despite the transparency or iconicity of these particular signs, because signing children (like signing adults) treat these pronouns as linguistic symbols and not simply as pointing gestures. As part of the language, the shifting reference of these pronouns presents the same problem for signing children that it does for speaking children.

Hearing children of deaf parents acquire both sign language and spoken language when exposed to both. Studies show that Canadian bilingual children who acquire Langues des Signes Quebecoise (LSQ), or Quebec Sign Language, develop the two languages exactly as bilingual children acquiring two spoken languages. The LSQ–French bilinguals reached linguistic milestones in each of their languages in parallel with Canadian children acquiring French and English. They produced their first words, as well as their first word combinations, at the same time in each language. In reaching these milestones, neither group showed any delay compared to monolingual children.

Deaf children of hearing parents who are not exposed to sign language from birth suffer a great handicap in acquiring language. It may be many years before these children are able to use a spoken language or before they encounter a conventional sign language. Yet the instinct to acquire language is so strong in humans that these deaf children begin to develop their own manual gestures to

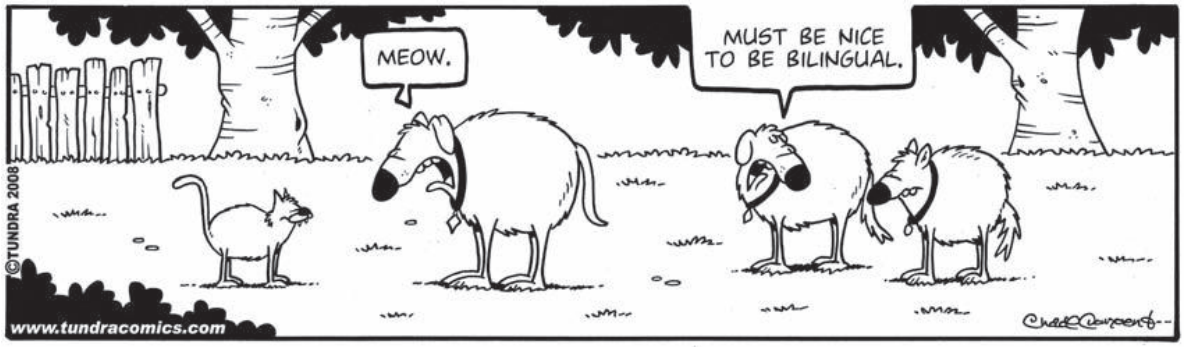
express their thoughts and desires. A study of six such children revealed that they not only developed individual signs but joined pairs and formed sentences with definite syntactic order and systematic constraints. Although these "home signs," as they are called, are not fully developed languages like ASL or LSQ, they have a linguistic complexity and systematicity that could not have come from the input, because there was no input. Cases such as these demonstrate not only the strong drive that humans have to communicate through language, but also the innate basis of language structure.

Knowing More Than One Language

> He that understands grammar in one language, understands it in another as far as the essential properties of Grammar are concerned. The fact that he can't speak, nor comprehend, another language is due to the diversity of words and their various forms, but these are the accidental properties of grammar.
>
> **ROGER BACON** (1214–1294)

People can acquire a second language under many different circumstances. You may have learned a second language when you began middle school, or high school, or college. Moving to a new country often means acquiring a new language. Other people live in communities or homes in which more than one language is spoken and may acquire two (or more) languages simultaneously. The term **second language acquisition**, or **L2 acquisition**, generally refers to the acquisition of a second language by someone (adult or child) who has already acquired a first language. This is also referred to as **sequential bilingualism**. **Bilingual language acquisition** refers to the (more or less) simultaneous acquisition of two languages beginning in infancy (or before the age of three years), also referred to as **simultaneous bilingualism**.

Childhood Bilingualism



Approximately half of the people in the world are native speakers of more than one language. This means that as children they had regular and continued

exposure to those languages. In many parts of the world, especially in Africa and Asia, bilingualism (even multilingualism) is the norm. In contrast, many Western countries (though by no means all of them) view themselves as monolingual, even though they may be home to speakers of many languages. In the United States and many European countries, bilingualism is often viewed as a transitory phenomenon associated with immigration.

Bilingualism is an intriguing topic. People wonder how it's possible for a child to acquire two (or more) languages at the same time. There are many questions, such as: Doesn't the child confuse the two languages? Does bilingual language development take longer than monolingual development? Are bilingual children brighter, or does acquiring two languages negatively affect the child's cognitive development in some way? How much exposure to each language is necessary for a child to become bilingual?

Much of the early research into bilingualism focused on the fact that bilingual children sometimes mix the two languages in the same sentences, as the following examples from French-English bilingual children illustrate. In the first example, a French word appears in an otherwise English sentence. In the other two examples, all of the words are English but the syntax is French.

His nose is perdu.	"His nose is lost."
A house pink	"A pink house"
That's to me.	"That's mine."

In early studies of bilingualism, this kind of language mixing was viewed negatively. It was taken as an indication that the child was confused or having difficulty with the two languages. In fact, many parents, sometimes on the advice of educators or psychologists, would stop raising their children bilingually when faced with this issue. However, it now seems clear that some amount of language mixing is a normal part of the early bilingual acquisition process and not necessarily an indication of any language problem.

Theories of Bilingual Development

These mixed utterances raise an interesting question about the grammars of bilingual children. Does the bilingual child start out with only one grammar that is eventually differentiated, or does she construct a separate grammar for each language right from the start? The **unitary system hypothesis** says that the child initially constructs only one lexicon and one grammar. The presence of mixed utterances such as the ones just given is often taken as support for this hypothesis. In addition, at the early stages, bilingual children often have words for particular objects in only one language. For example, a Spanish-English bilingual child may know the Spanish word for milk, *leche*, but not the English word, or she may have the word *water* but not *agua*. This kind of complementarity has also been taken as support for the idea that the child has only one lexicon.

However, careful examination of the vocabularies of bilingual children reveals that although they may not have exactly the same words in both languages, there is enough overlap to make the single lexicon idea implausible. The reason children may not have the same set of words in both languages is that they use their two languages in different circumstances and acquire the vocabulary

appropriate to each situation. For example, the bilingual English-Spanish child may hear only Spanish during mealtime, and so he will first learn the Spanish words for foods. Also, bilingual children have smaller vocabularies in each of their languages than the monolingual child has in her one language. This makes sense because a child can only learn so many words a day, and the bilingual child has two lexicons to build. For these reasons the bilingual child may have more lexical gaps than the monolingual child at a comparable stage of development, and those gaps may be different for each language.

The **separate systems hypothesis** says that the bilingual child builds a distinct lexicon and grammar for each language. To test the separate systems hypothesis, it is necessary to look at how the child acquires those pieces of grammar that are different in his two languages. For example, if both languages have SVO word order, this would not be a good place to test this hypothesis. Several studies have shown that where the two languages diverge, children acquire the different rules of each language. Spanish-English and French-German bilingual children have been shown to use the word orders appropriate to each language, as well as the correct agreement morphemes for each language. Other studies have found that children set up two distinct sets of phonemes and phonological rules for their languages.

The separate systems hypothesis also receives support from the study of the LSQ-French bilinguals discussed earlier. These children have semantically equivalent words in the two languages, just as bilinguals acquiring two spoken languages do. In addition, these children, like all bilingual children, were able to adjust their language choice to the language of their addressees, showing that they differentiated the two languages. Like most bilingual children, the LSQ-French bilinguals produced mixed utterances that had words from both languages. What is especially interesting is that these children showed simultaneous language mixing. They would produce an LSQ sign and a French word at the same time, something that is only possible if one language is spoken and the other signed. However, this finding has implications for bilingual language acquisition in general. It shows that the language mixing of bilingual children is not caused by confusion, but is rather the result of two grammars operating simultaneously.

If bilingual children have two grammars and two lexicons, what explains the mixed utterances? Various explanations have been offered. One suggestion is that children mix because they have lexical gaps; if the French-English bilingual child does not know the English word *lost*, she will use the word she does know, *perdu*—the "any port in a storm" strategy. Another possibility is that the mixing in child language is similar to **codeswitching** used by many adult bilinguals (discussed in chapter 9). In specific social situations, bilingual adults may switch back and forth between their two languages in the same sentence, for example, "I put the forks en las mesas" (I put the forks on the tables). Codeswitching reflects the grammars of both languages working simultaneously; it is not "bad grammar" or "broken English." Adult bilinguals codeswitch only when speaking to other bilingual speakers. It has been suggested that the mixed utterances of bilingual children are a form of codeswitching. In support of this proposal, various studies have shown that bilingual children as young as two make contextually appropriate language choices: In speaking to monolinguals the children use one language, and in speaking to bilinguals they mix the two languages.

Two Monolinguals in One Head

Although we must study many bilingual children to reach any firm conclusions, the evidence accumulated so far seems to support the idea that children construct multiple grammars from the outset. Moreover, it seems that bilingual children develop their grammars along the same lines as monolingual children. They go through a babbling stage, a holophrastic stage, a telegraphic stage, and so on. During the telegraphic stage they show the same characteristics in each of their languages as the monolingual children. For example, monolingual English-speaking children omit verb endings in sentences such as "Eve play there" and "Andrew want that," and German-speaking children use infinitives as in "S[ch]okolade holen" (chocolate get-infinitive). Spanish- and Italian-speaking monolinguals never omit verbal inflection or use infinitives in this way. Remarkably, two-year-old German-Italian bilinguals use infinitives when speaking German but not when they speak Italian. Young Spanish-English bilingual children drop the English verb endings but not the Spanish ones, and German-English bilinguals omit verbal inflection in English and use the infinitive in German. Results such as these have led some researchers to suggest that from a grammar-making point of view, the bilingual child is like "two monolinguals in one head."

The Role of Input

One issue that concerns researchers studying bilingualism, as well as parents of bilingual children, is the relationship between language input and proficiency. What role does input play in helping the child to separate the two languages? One input condition that is thought to promote bilingual development is *une personne–une langue* (one person, one language)—as in, Mom speaks only language A to the child and Dad speaks only language B. The idea is that keeping the two languages separate in the input will make it easier for the child to acquire each without influence from the other. Whether this method influences bilingual development in some important way has not been established. In practice this "ideal" input situation may be difficult to attain. It may also be unnecessary. We saw earlier that babies are attuned to various phonological properties of the input language such as prosody and phonotactics. Various studies suggest that this sensitivity provides a sufficient basis for the bilingual child to keep the two languages separate.

Another question is, how much input does a child need in each language to become "native" in both? The answer is not straightforward. It seems intuitively clear that if a child hears twelve hours of English a day and only two hours of Spanish, he will probably develop English much more quickly and completely than Spanish. In fact, under these conditions he may never achieve the kind of grammatical competence in Spanish that we associate with the normal monolingual Spanish speaker. In reality, bilingual children are raised in a variety of circumstances. Some may have more or less equal exposure to the two languages; some may hear one language more than the other but still have sufficient input in the two languages to become "native" in both; some may ultimately have one language that is dominant to a lesser or greater degree. Researchers simply do not know how much language exposure is necessary in the two languages to produce a balanced bilingual. For practical purposes, the rule of thumb is that

the child should receive roughly equal amounts of input in the two languages to achieve native proficiency in both.

Cognitive Effects of Bilingualism

Bilingual Hebrew-English-speaking child: "I speak Hebrew and English."
Monolingual English-speaking child: "What's English?"

SOURCE UNKNOWN

Another issue is the effect of bilingualism on intellectual or cognitive development. Does being bilingual make you more or less intelligent, more or less creative, and so on? Historically, research into this question has been fraught with methodological problems and has often been heavily influenced by the prevailing political and social climate. Many early studies (before the 1960s) showed that bilingual children did worse than monolingual children on IQ and other cognitive and educational tests. The results of more recent research indicate that bilingual children outperform monolinguals in certain kinds of problem solving. Also, bilingual children seem to have better **metalinguistic awareness**, which refers to a speaker's conscious awareness *about* language rather than *of* language. This is illustrated in the epigraph to this section. Moreover, bilingual children have an earlier understanding of the arbitrary relationship between an object and its name. Finally, they have sufficient metalinguistic awareness to speak the contextually appropriate language, as noted earlier.

Whether children enjoy some cognitive or educational benefit from being bilingual seems to depend in part on extralinguistic factors such as the social and economic position of the child's group or community, the educational situation, and the relative "prestige" of the two languages. Studies that show the most positive effects (e.g., better school performance) generally involve children reared in societies where both languages are valued and whose parents were interested and supportive of their bilingual development.

Second Language Acquisition

In contrast to the bilinguals just discussed, many people are introduced to a second language (L2) after they have achieved native competence in a first language (L1). If you have had the experience of trying to master a second language as an adult, no doubt you found it to be a challenge quite unlike your first language experience.

Is L2 Acquisition the Same as L1 Acquisition?

With some exceptions, adults do not simply pick up a second language. It usually requires conscious attention, if not intense study and memorization, to become proficient in a second language. Again, with the exception of some remarkable individuals, adult second-language learners (L2ers) do not often achieve native-like grammatical competence in the L2, especially with respect to pronunciation. They generally have an accent, and they may make syntactic or morphological errors that are unlike the errors of children acquiring their first language

(L1ers). For example, L2ers often make word order errors, especially early in their development, as well as morphological errors in grammatical gender and case. L2 errors may **fossilize** so that no amount of teaching or correction can undo them.

Unlike L1 acquisition, which is uniformly successful across children and languages, adults vary considerably in their ability to acquire an L2 completely. Some people are very talented language learners. Others are hopeless. Most people fall somewhere in the middle. Success may depend on a range of factors, including age, talent, motivation, and whether you are in the country where the language is spoken or sitting in a classroom five mornings a week with no further contact with native speakers. For all these reasons, many people, including many linguists who study L2 acquisition, believe that second language acquisition is something different from first language acquisition. This hypothesis is referred to as the **fundamental difference hypothesis** of L2 acquisition.

In certain important respects, however, L2 acquisition is like L1 acquisition. Like L1ers, L2ers do not acquire their second language overnight; they go through stages. Like L1ers, L2ers construct grammars. These grammars reflect their competence in the L2 at each stage, and so their language at any particular point, though not native-like, is rule-governed and not haphazard. The intermediate grammars that L2ers create on their way to the target have been called **interlanguage grammars**.

Consider word order in the interlanguage grammars of Romance (e.g., Italian, Spanish, and Portuguese) speakers acquiring German as a second language. The word order of the Romance languages is Subject-(Auxiliary)-Verb-Object (like English). German has two basic word orders depending on the presence of an auxiliary. Sentences with auxiliaries have Subject-Auxiliary-Object-Verb, as in (1). Sentences without auxiliaries have Subject-Verb-Object, as in (2). (Note that as with the child data above, these L2 sentences may contain various "errors" in addition to the word order facts we are considering.)

1. Hans hat ein Buch gekauft. "Hans has a book bought."
2. Hans kauft ein Buch. "Hans is buying a book."

Studies show that Romance speakers acquire German word order in pieces. During the first stage they use German words but the S-Aux-V-O word order of their native language, as follows:

Stage 1: Mein Vater hat gekauft ein Buch.
"My father has bought a book."

At the second stage, they acquired the VP word order Object-Verb.

Stage 2: Vor Personalrat auch meine helfen.
in the personnel office [a colleague] me helped
"A colleague in the personnel office helped me."

At the third stage they acquired the rule that places the verb or (auxiliary) in second position.

Stage 3: Jetzt kann sie mir eine Frage machen.
now can she me a question ask
"Now she can ask me a question."
I kenne nich die Welt.
I know not the world.
"I don't know the world."

These stages differ from those of children acquiring German as a first language. For example, German children know early on that the language has SOV word order.

Like L1ers, L2ers also attempt to uncover the grammar of the target language, but with varying success, and they often do not reach the target. Proponents of the *fundamental difference hypothesis* believe that L2ers construct grammars according to different principles than those used in L1 acquisition, principles that are not specifically designed for language acquisition, but for the problem-solving skills used for tasks like playing chess or learning math. According to this view, L2ers lack access to the specifically linguistic principles of UG that L1ers have to help them.

Opposing this view, others have argued that adults are superior to children in solving all sorts of nonlinguistic problems. If they were using these problem-solving skills to learn their L2, shouldn't they be uniformly more successful than they are? Also, linguistic savants such as Christopher, discussed in the introduction, argue against the view that L2 acquisition involves only nonlinguistic cognitive abilities. Christopher's IQ and problem-solving skills are minimal at best, yet he has become proficient in several languages.

Many L2 acquisition researchers do not believe that L2 acquisition is fundamentally different from L1 acquisition. They point to various studies that show that interlanguage grammars do not generally violate principles of UG, which makes the process seem more similar to L1 acquisition. In the German L2 examples above, the interlanguage rules may be wrong for German, or wrong for Romance, but they are not impossible rules. These researchers also note that although L2ers may fall short of L1ers in terms of their final grammar, they appear to acquire rules in the same way as L1ers.

Native Language Influence in L2 Acquisition

One respect in which L1 acquisition and L2 acquisition are clearly different is that adult L2ers already have a fully developed grammar of their first language. As discussed in chapter 6, linguistic competence is unconscious knowledge. We cannot suppress our ability to use the rules of our language. We cannot decide not to understand English. Similarly, L2ers—especially at the beginning stages of acquiring their L2—seem to rely on their L1 grammar to some extent. This is shown by the kinds of errors L2ers make, which often involve the **transfer** of grammatical rules from their L1. This is most obvious in phonology. L2ers generally speak with an accent because they may transfer the phonemes, phonological rules, or syllable structures of their first language to their second language. We see this in the Japanese speaker, who does not distinguish between *write* [raɪt] and *light* [laɪt] because the r/l distinction is not phonemic in Japanese; in the French speaker, who says "ze cat in ze hat" because French does not have [ð];

in the German speaker, who devoices final consonants, saying [hæf] for *have*; and in the Spanish speaker, who inserts a schwa before initial consonant clusters, as in [əskul] for *school* and [əsnab] for *snob*.

Similarly, English speakers may have difficulty with unfamiliar sounds in other languages. For example, in Italian long (or double) consonants are phonemic. Italian has minimal pairs such as the following:

ano	"anus"	anno	"year"
pala	"shovel"	palla	"ball"
dita	"fingers"	ditta	"company"

English-speaking L2 learners of Italian have difficulty in hearing and producing the contrast between long and short consonants. This can lead to very embarrassing situations, for example on New Year's Eve, when instead of wishing people *buon anno* (good year), you wish them *buon ano*.

Native language influence is also found in the syntax and morphology. Sometimes this influence shows up as a wholesale transfer of a particular piece of grammar. For example, a Spanish speaker acquiring English might drop subjects in nonimperative sentences because this is possible in Spanish, as illustrated by the following examples:

Hey, is not funny.
In here have the mouth.
Live in Colombia.

Or speakers may begin with the word order of their native language, as we saw in the Romance-German interlanguage examples.

Native language influence may show up in more subtle ways. For example, people whose L1 is German acquire English yes-no questions faster than Japanese speakers do. This is because German has a verb movement rule for forming yes-no questions that is very close to the English Aux movement rule, while in Japanese there is no syntactic movement in question formation.

The Creative Component of L2 Acquisition

It would be an oversimplification to think that L2 acquisition involves only the transfer of L1 properties to the L2 interlanguage. There is a strong creative component to L2 acquisition. Many language-particular parts of the L1 grammar do not transfer. Items that a speaker considers irregular, infrequent, or semantically difficult are not likely to transfer to the L2. For example, speakers will not typically transfer L1 idioms such as *He hit the roof* meaning "He got angry." They are more likely to transfer structures in which the semantic relations are transparent. For example, a structure such as (1) will transfer more readily than (2).

1. It is awkward to carry this suitcase.
2. This suitcase is awkward to carry.

In (1) the NP "this suitcase" is in its logical direct object position, while in (2) it has been moved to the subject position away from the verb that selects it.

Many of the "errors" that L2ers do make are not derived from their L1. For example, in one study Turkish speakers at a particular stage in their development of German used S-V-Adv (Subject-Verb-Adverb) word order in embedded clauses (the *wenn* clause in the following example) in their German interlanguage, even though both their native language and the target language have S-Adv-V order:

Wenn	ich	geh	zuruck	ich	arbeit elektriker	in der Türkei.
if	I	go	back,	I	work (as an) electrician	in Turkey

(Cf. *Wenn ich **zuruck geh** ich arbeit elektriker*, which is grammatically correct German.)

The embedded S-V-Adv order is most likely an overgeneralization of the verb-second requirement in German main clauses. As we noted earlier, overgeneralization is a clear indication that a rule has been acquired.

Why certain L1 rules transfer to the interlanguage grammar and others don't is not well understood. It is clear, however, that although construction of the L2 grammar is influenced by the L1 grammar, developmental principles—possibly universal—also operate in L2 acquisition. This is best illustrated by the fact that speakers with different L1s go through similar L2 stages. For example, Turkish, Serbo-Croatian, Italian, Greek, and Spanish speakers acquiring German as an L2 all drop articles to some extent. Because some of these L1s have articles, this cannot be caused by transfer but must involve some more general property of language acquisition.

Is There a Critical Period for L2 Acquisition?

> I don't know how you manage, Sir, amongst all the foreigners; you never know what they are saying. When the poor things first come here they gabble away like geese, although the children can soon speak well enough.
>
> **MARGARET ATWOOD,** *Alias Grace*, 1996

Age is a significant factor in L2 acquisition. The younger a person is when exposed to a second language, the more likely she is to achieve native-like competence.

In an important study of the effects of age on ultimate attainment in L2 acquisition, Jacqueline Johnson and Elissa Newport tested several groups of Chinese and Korean speakers who had acquired English as a second language. The subjects, all of whom had been in the United States for at least five years, were tested on their knowledge of specific aspects of English morphology and syntax. They were asked to judge the grammaticality of sentences such as:

The little boy is speak to a policeman.
The farmer bought two pig.
A bat flewed into our attic last night.

Johnson and Newport found that the test results depended heavily on the age at which the person had arrived in the United States. The people who arrived as children (between the age of three and eight) did as well on the test as American

native speakers. Those who arrived between the ages of eight and fifteen did not perform like native speakers. Moreover, every year seemed to make a difference for this group. The person who arrived at age nine did better than the one who arrived at age ten; those who arrived at age eleven did better than those who arrived at age twelve, and so on. The group that arrived between the ages of seventeen and thirty-one had the lowest scores.

Does this mean that there is a critical period for L2 acquisition, an age beyond which it is *impossible* to acquire the grammar of a new language? Most researchers would hesitate to make such a strong claim. Although age is an important factor in achieving native-like L2 competence, it is certainly possible to acquire a second language as an adult. Many teenage and adult L2 learners become proficient, and a few highly talented ones even manage to pass for native speakers. Also, the Newport and Johnson studies looked at the end state of L2 acquisition, after their subjects had been in an English-speaking environment for many years. It is possible that the ultimate attainment of adult L2ers falls short of native competence, but that the process of L2 acquisition is not fundamentally different from L1 acquisition.

It is more appropriate to say that L2 acquisition abilities gradually decline with age and that there are "sensitive periods" for the native-like mastery of certain aspects of the L2. The sensitive period for phonology is the shortest. To achieve native-like pronunciation of an L2 generally requires exposure during childhood. Other aspects of language, such as syntax, may have a larger window.

Recent research with learners of their "heritage language" (the ancestral language not learned as a child, such as Gaelic in Ireland) provides additional support for the notion of sensitive periods in L2 acquisition. This finding is based on studies into the acquisition of Spanish by college students who had overheard the language as children (and sometimes knew a few words), but who did not otherwise speak or understand Spanish. The *overhearers* were compared to people who had no exposure to Spanish before the age of fourteen. All of the students were native speakers of English studying their heritage language as a second language. These results showed that the overhearers acquired a more native-like accent than the other students did. However, the overhearers did not show any advantage in acquiring the grammatical morphemes of Spanish. Early exposure may leave an imprint that facilitates the late acquisition of certain aspects of language.

Recent research on the neurological effects of acquiring a second language shows that left hemisphere cortical density is increased in bilinguals relative to monolinguals and that this increase is more pronounced in early versus late second-language learners. The study also shows a positive relationship between brain density and second-language proficiency. The researchers conclude that the structure of the human brain is altered by the experience of acquiring a second language.

Summary

When children acquire a language, they acquire the grammar of that language—the phonological, morphological, syntactic, and semantic rules. They also acquire the pragmatic rules of the language as well as a lexicon. Children

are not taught language. Rather, they extract the rules (and much of the lexicon) from the language around them.

Several learning mechanisms have been suggested to explain the acquisition process. Imitations of adult speech, reinforcement, and analogy have all been proposed. None of these possible learning mechanisms account for the fact that children creatively form new sentences according to the rules of their language, or for the fact that children make certain kinds of errors but not others. Empirical studies of the motherese hypothesis show that grammar development does not depend on structured input. **Connectionist models** of acquisition also depend on the child having specially structured input.

The ease and rapidity of children's language acquisition and the uniformity of the stages of development for all children and all languages, despite the **poverty of the stimulus** they receive, suggest that the language faculty is innate and that the infant comes to the complex task already endowed with a Universal Grammar. UG is not a grammar like the grammar of English or Arabic, but represents the principles to which all human languages conform. Language acquisition is a creative process. Children create grammars based on the linguistic input and are guided by UG.

Language development proceeds in stages, which are universal. During the first year of life, children develop the sounds of their language. They begin by producing and perceiving many sounds that do not exist in their language input, the **babbling stage**. Gradually, their productions and perceptions are fine-tuned to the environment. Children's late babbling has all the phonological characteristics of the input language. Deaf children who are exposed at birth to sign languages also produce manual babbling, showing that babbling is a universal first stage in language acquisition that is dependent on the linguistic input received.

At the end of the first year, children utter their first words. During the second year, they learn many more words and they develop much of the phonological system of the language. Children's first utterances are one-word "sentences" (the **holophrastic** stage).

Many experimental studies show that children are sensitive to various linguistic properties such as stress and phonotactic constraints, and to statistical regularities of the input that enable them to segment the fluent speech that they hear into words. One method of segmenting speech is **prosodic bootstrapping**. Other bootstrapping methods can help the child to learn verb meaning based on syntactic context (**syntactic bootstrapping**), or syntactic categories based on word meaning (**semantic bootstrapping**) and distributional evidence such as word frames.

After a few months, the child puts two or more words together. These early sentences are not random combinations of words—the words have definite patterns and express both syntactic and semantic relationships. During the telegraphic stage, the child produces longer sentences that often lack function or grammatical morphemes. The child's early grammar still lacks many of the rules of the adult grammar, but is not qualitatively different from it. Children at this stage have correct word order and rules for agreement and case, which show their knowledge of structure.

Children make specific kinds of errors while acquiring their language. For example, they will **overgeneralize** morphology by saying *bringed* or *mans*. This

shows that they are acquiring rules of their particular language. Children never make errors that violate principles of Universal Grammar.

In acquiring the lexicon of the language children may **overextend** word meaning by using *dog* to mean any four-legged creature. As well, they may **underextend** word meaning and use dog only to denote the family pet and no other dogs, as if it were a proper noun. Despite these categorization "errors," children's word learning, like their grammatical development, is guided by general principles.

Deaf children exposed to **sign language** show the same stages of language acquisition as hearing children exposed to spoken languages. That all children go through similar stages regardless of language shows that they are equipped with special abilities to know what generalizations to look for and what to ignore, and how to discover the regularities of language, irrespective of the modality in which their language is expressed.

Children may acquire more than one language at a time. **Bilingual** children seem to go through the same stages as monolingual children except that they develop two grammars and two lexicons simultaneously. This is true for children acquiring two spoken languages as well as for children acquiring a spoken language and a sign language. Whether the child will be equally proficient in the two languages depends on the input he or she receives and the social conditions under which the languages are acquired.

In **second language acquisition, L2** learners construct grammars of the target language—called **interlanguage grammars**—that go through stages, like the grammars of first-language learners. Influence from the speaker's first language makes L2 acquisition appear different from L1 acquisition. Adults often do not achieve native-like competence in their L2, especially in pronunciation. The difficulties encountered in attempting to learn languages after puberty may be because there are sensitive periods for L2 acquisition. Some theories of second language acquisition suggest that the same principles operate that account for first language acquisition. A second view suggests that the acquisition of a second language in adulthood involves general learning mechanisms rather than the specifically linguistic principles used by the child.

The universality of the language acquisition process, the stages of development, and the relatively short period in which the child constructs a complex grammatical system without overt teaching suggest that the human species is innately endowed with special language acquisition abilities and that language is biologically and genetically part of the human neurological system.

All normal children learn whatever language or languages they are exposed to, from Afrikaans to Zuni. This ability is not dependent on race, social class, geography, or even intelligence (within a normal range). This ability is uniquely human.

References for Further Reading

Brown, R. 1973. *A first language: The early stages*. Cambridge, MA: Harvard University Press.

Clark, E. 2002. *First language acquisition*. New York: Cambridge University Press.

Guasti, M. T. 2002. *Language acquisition: The growth of grammar.* Cambridge, MA: MIT Press.

Hakuta, K. 1986. *Mirror of language: The debate on bilingualism*. New York: Basic Books.
Ingram, D. 1989. *First language acquisition: Method, description and explanation*. New York: Cambridge University Press.
Jakobson, R. 1971. *Studies on child language and aphasia*. The Hague: Mouton.
Klima, E. S., and U. Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.
O'Grady, W. 2005. *How children learn language*. Cambridge, UK: Cambridge University Press.
White, L. 2003. *Second language acquisition and Universal Grammar*. Cambridge, UK: Cambridge University Press.

Exercises

1. *Baby talk* is a term used to label the word forms that many adults use when speaking to children. Examples in English are *choo-choo* for "train" and *bow-wow* for "dog." Baby talk seems to exist in every language and culture. At least two things seem to be universal about baby talk: The words that have baby-talk forms fall into certain semantic categories (e.g., food and animals), and the words are phonetically simpler than the adult forms (e.g., "tummy" /tʌmi/ for "stomach" /stʌmɪk/). List all the baby-talk words you can think of in your native language; then (1) separate them into semantic categories, and (2) try to state general rules for the kinds of phonological reductions or simplifications that occur.

2. In this chapter we discussed the way children acquire rules of question formation. The following examples of children's early questions are from a stage that is later than those discussed in the chapter. Formulate a generalization to describe this stage.

Can I go?	Can I can't go?
Why do you have one tooth?	Why you don't have a tongue?
What do frogs eat?	What do you don't like?
Do you like chips?	Do you don't like bananas?

3. Find a child between two and four years old and play with the child for about thirty minutes. Keep a list of all words and/or "sentences" that are used inappropriately. Describe what the child's meanings for these words probably are. Describe the syntactic or morphological errors (including omissions). If the child is producing multiword sentences, write a grammar that could account for the data you have collected.

4. Roger Brown and his coworkers at Harvard University studied the language development of three children, referred to in the literature as Adam, Eve, and Sarah. The following are samples of their utterances during the "two-word stage."

see boy	push it
see sock	move it
pretty boat	mommy sleep