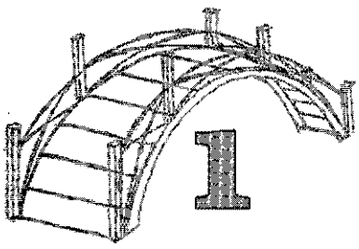


1

Basic Linguistics: How to Describe Language Use and Language Knowledge

1A. INTRODUCTION, PHONETICS, AND PHONOLOGY

1.0 Terminology: Strategy for Learning About Language

As adults, we usually take our first language for granted, and the effort of describing it in detail seems like a waste of time. If you already know how to speak English, what's the good in worrying about whether *on* is a preposition or an adverb, or whether *hot dog* (the sausage) is one word or two?

On the other hand, if you've had some experience with language problems like the ones discussed in the Introduction—for example, if you've tried to explain to someone who is not a native speaker of English why you say *on the 20th of February* but *on 20th Street* (rather than *on **the** 20th Street*), or if you've tried to help an elderly friend who has had a stroke find a needed word—you might feel that language is so hopelessly complicated that it's not possible to learn a useful amount about how it works in a reasonable amount of time. And if you've taken an ordinary linguistics course, it might have seemed very far removed from what you would need for language teaching, international Web page design, or speech-language therapy.

The terminology may have been a barrier, too. In this book, I will keep linking the materials on linguistics and psycholinguistics to examples of real-world language problems that they can help us understand. Our basic strategy for dealing with technical terms is to define terms as we need them for describing real or realistic examples of language problems: normal slips of the tongue, children's errors, second language learners' errors, aphasic errors, and so on. We'll start by introducing basic linguistic terms in this chapter because they are key tools for describing language as it is produced by skilled as well as unskilled or disabled speakers and hearers. (Most of the ideas here are also applicable to signed languages.) The terms that are presented in **BOLDFACE SMALL CAPITALS** are also defined in the Glossary. If you run into any technical term that you're not sure of, check the Glossary or the Index.

1.1 Divide and (More or Less) Conquer: Levels of Spoken Language

The usual way to organize language for study is by the size of the various kinds of pieces it can be divided into, from small to large; the small units are the low-level ones. The small units that we'll start with are the sounds that make up spoken words, or the letters that make up written ones. Then we'll go on to bigger units: **WORDS**, **PHRASES**, **SENTENCES**, and **PARAGRAPHS** (for written language) or **CONVERSATIONAL TURNS** (for spoken language).

As you've just noticed, some of these terms (word, phrase, sentence) are used for both written and spoken language, but others can only be used for describing writing, or only for describing speaking. In particular, people don't speak in "letters," so we will talk about people speaking in *sounds*, not letters. One reason for doing this is that the letters of the English alphabet are a poor tool for describing any kind of speech, so it's important to start thinking in terms of sounds (and to stop thinking in terms of letters) as soon as possible; section 1.2.1 will get you started in that direction. Another reason is that speech sounds are related to each other like nodes in a network; they aren't just items in a list. Understanding these relationships among speech sounds is the key to understanding, for example, why people have foreign accents and why children make characteristic errors in learning to speak and to read. More about that soon, in section 1.2.4.

Our list of levels of language above skipped some important items. **SYLLABLES** in spoken language, **SYLLABARY** symbols in Japanese and several other written languages, and **CHARACTERS** in written Chinese and Japanese are some that you may have thought of. Another important level for language teaching and error analysis is one that doesn't have a common name; it's the one involved in errors like *I was get inning the car*. Here, it looks like the speaker has treated the construction *get in* as if it were the verb, right? The whole phrase *get in* seems to have slipped into a **SLOT** where just the verb *get* should have gone, just before the *-ing* ending. We'll get to these errors in Chapter 4.

1.2 The Level of Speech Sounds: The Sounds of Spoken Words

People who are interested in language rarely start out with an interest in the level of **SPEECH SOUNDS**, also called the **PHONETIC** level, because it seems both so mechanical and so detailed. But it's "where the rubber

meets the road": if someone's speech articulation is poor, or if they can't distinguish the sounds of speech reliably, it doesn't matter how brilliant they are; they are cut out of full participation in spoken conversation. Speech is our basic tool for connecting with friends and family, except in Deaf communities that use a signed language fluently. Because social isolation is deadly for mental and even physical health, the quality of speech matters.

Phonetics is often seen as a difficult subject for two reasons: You are supposed to learn to make and hear unfamiliar speech sounds, and you have to learn a new writing system, the **INTERNATIONAL PHONETIC ALPHABET (IPA)**, in order to write down and discuss even the sounds of languages that you know. Learning the IPA is mostly a matter of practice. If you've ever studied a spoken language other than your native one and learned how to write and pronounce it more or less correctly, you have already done the same kind of thing: learning that, for example, in French, the letter combination *eau* is pronounced close to American *oh*, but without pulling your lips into a *w* at the end of it the way Americans do. Or learning that in Russian, the letter Я is pronounced *ya*. But learning to make and hear unfamiliar speech sounds correctly can indeed be a real challenge. Understanding why this is hard will lead us from linguistics to psycholinguistics, and also (in Chapter 7) to the study of how speech sound perception develops in young children.

1.2.1 What's wrong with letters for describing speech sounds?

1.2.1.1 Inconsistency of English spelling

As you know, the English spelling system is not user friendly. Here's an example to make this point, the first 10 lines of a comic poem called "The Chaos."

The Chaos, Lines 1–10

Gerard Nolst Trenité (Netherlands, 1870–1946)

1 Dearest creature in creation,
2 Study English pronunciation.
3 I will teach you in my verse
4 Sounds like corpse, corps, horse, and worse.
5 I will keep you, Suzy, busy,

6 Make your head with heat grow dizzy.

7 Tear in eye, your dress will tear.

8 So shall I! Oh hear my prayer.

9 Just compare heart, beard, and heard,

10 Dies and diet, lord and word,

Spelling is a nationally televised competitive sport in English because the same sound can be spelled by different letters. (Compare *busy* and *dizzy* in lines 5 and 6; *tear* meaning "rip" and *prayer* in lines 7 and 8.) Plus, one letter or combination of letters can spell different sounds. (Compare *tear* "teardrop" and *tear* "rip" in line 7; *horse* and *worse* in line 4.) A good first exercise in thinking phonetically is to compile all the examples of these two types of inconsistency in the 10 lines of the poem.

Because English letters are so bad at matching sounds, using letters as names for sounds constantly requires saying "i as in *smile*" or "long i." This is good enough for school, but it is too clumsy for professional language work. For example, if you need to organize sets of words by their length (in number of sounds) or by complexity of pronunciation, which is important for creating testing and teaching materials for oral language, it is nasty work when *Joe* looks just as long as *Zoe* (*zoh-ee*), and both of them look much shorter than *though* or *dough*. And if you (or your students) are going to teach reading to children or adults, you need to be able to think separately about the sounds and the letters in a word, so that you have a clearly organized mental picture of which words (or parts of words) new readers can safely be asked to sound out, and which ones they will have to learn with less help from PHONICS. If you don't have practice in thinking in terms of sounds, it is quite easy to let the letters in a word persuade you that you pronounce things the way they are written, even when you don't; for example, you may be fooled by the spelling into thinking that the first vowel in *pretty* is a "short e." (What is it? Does *pretty* rhyme with *Betty* or with *bitty*?) If your students are not native speakers of your language, or speak a very different dialect of your language, you also need to be able to think about how the words of your language sound to them (see Exercise 1.1, and Chapter 8, section 8.4.).

1.2.1.2 Coarticulation: Anticipating and continuing each speech sound

When we speak, we don't make sounds one at a time, the way we type or write letters of the alphabet. We give information about what the upcom-

ing sounds are going to be well before we actually get to them (the way prizefighters may "telegraph" their upcoming moves), and other information may linger well after we feel that a sound has been made. Lay your fingers lightly on your mouth; say first *steel* and then *stool*. You may be able to feel your lips spreading sideways toward the smiling shape needed for the *ee* as early as the beginning of the *s* in *steel*, and you will almost certainly feel them pushing outward toward the kissing shape needed for the *oo* of *stool* before you make the *t* sound. This kind of articulatory anticipation (and lingering; the L sounds in these two words are also made with different mouth shapes) is called **COARTICULATION**. Using just the right amount of coarticulation at the right time for each speech style and speaking rate in a native speaker's repertory is essential for normal-sounding fluent speech. Unsurprisingly, given the huge number of combinations of possible sound sequences, styles, and speech rates, simulating normal coarticulation is one of the huge problems for getting computer speech to sound human and for getting animated movie speech to look real, although there are now phonetically correct simulations of mouth movements that are used in computer-assisted speech therapy; links to some sites are on your CD under Materials for Chapter 1.

1.2.1.3 Phonotactics: Sound sequence patterns

Finally, we speakers can't make sounds in any order that we please, although we can write letters in any old order. English speakers struggle with Russian words like *lba* "of the forehead," *rta* "of the mouth," and *vzglyad* "glance." Every language has its own permitted and disallowed sequences of sounds, and makes its own demands that children and adult learners must master. English allows words to begin with the sounds *st*, but you probably know that Spanish and Portuguese don't, and that German doesn't either; in German, this sequence of letters is pronounced as what we have to write in English as *sht*. These **PHONOTACTIC** (sound sequencing) restrictions seem understandable if putting several consonants in a row is somehow inherently difficult (and it probably is), but many phonotactic constraints have no such explanation. For example, English speakers have a hard time pronouncing the perfectly ordinary sound of *e* in *pet* when it's at the end of a word, as in the name of the Japanese drink *sake* (*sah-keh* is about as close as I can get to spelling it for you at this point).

So there are three major reasons to get away from the English alphabet: its unreliability, the fact that speech sounds are not actually produced discretely one after another, and the fact that producing new sequences of sounds is just as much a challenge as mastering new individual sounds. A fourth reason, of course, is that English is just one of the many languages

in the world that use the Roman alphabet. And as you know if you have studied almost any other spoken language, we use it in a very peculiar way, because the pronunciation of English changed drastically in the 1400s, long after the language began to be written, and the spelling didn't change along with the pronunciation.

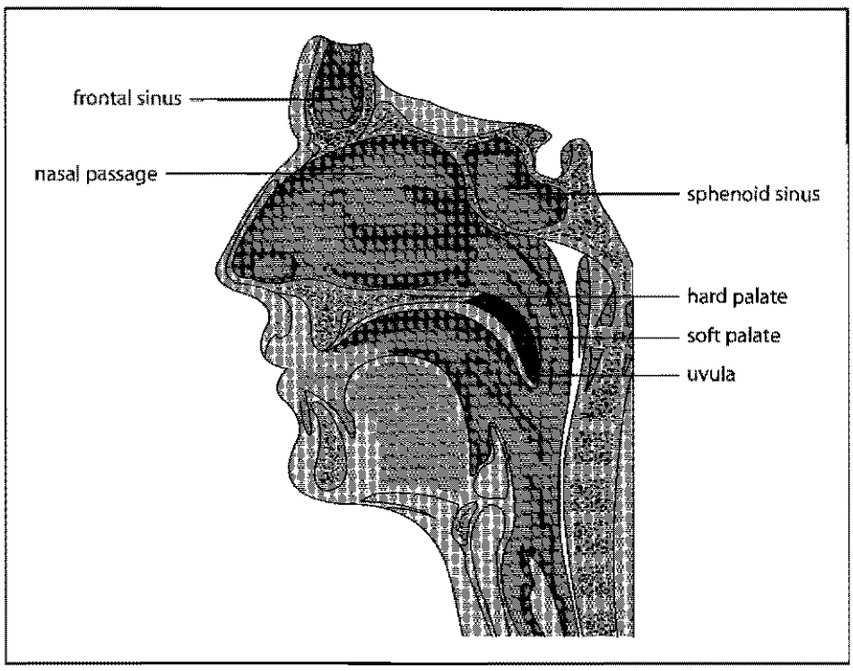
The unreliability problem is solved fairly well by using a more reliable alphabet, the **INTERNATIONAL PHONETIC ALPHABET (IPA)**, which will be introduced in the next sections of this chapter; this solves the fourth problem as well, because the IPA is not based on the way English uses the alphabet. This simple change of notation will not solve the problems of dealing with coarticulation and phonotactics, but we will keep them in mind every time that we discuss the challenges of learning pronunciation or analyzing the speech sounds that novice and skilled speakers really make.

1.2.2 How speech sounds are made: The vocal tract

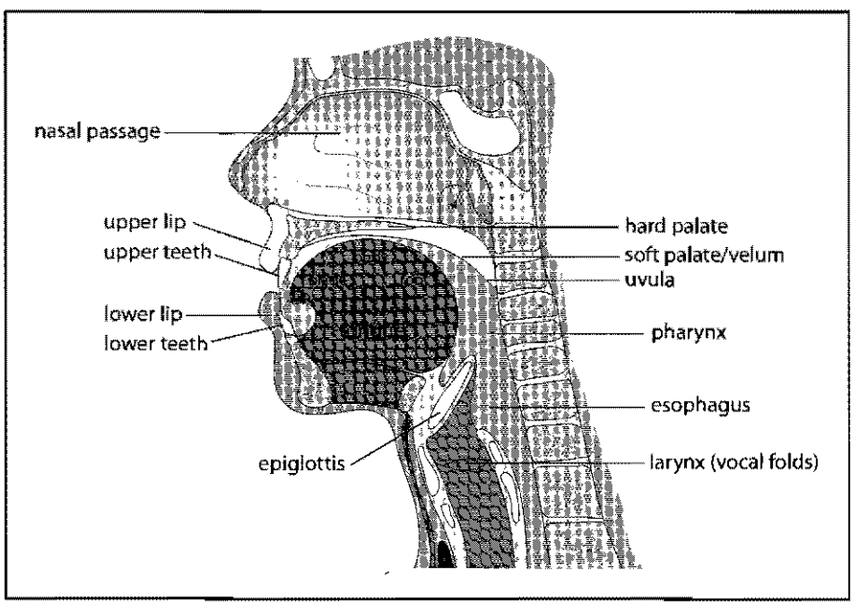
Here are two pictures of the vocal tract in cross-section. The first (Figure 1.1A) shows clearly where we have bones (spongy-looking in cross-section), cartilage (black), and the shaded hollows of our nasal passage, mouth, and some of our sinuses; it will help you visualize the structure of your head and how the cartilage at the back of your mouth (labeled "soft palate") hangs down, so that air can flow between your lungs and your nostrils when you are breathing normally through your nose, with your mouth closed.

The second picture (Figure 1.1B) is a more standard two-dimensional diagram that focuses on the parts of our mouth (aka oral cavity) that we use to make speech sounds. If you look carefully, you'll see that the velum in this one is in a different position: it's raised, blocking off the connection between your pharynx and your nasal passage, so that air can't get out through your nose. This is the position of your velum when you make most (but not all!) speech sounds; more about that soon. Materials for Chapter 1 on your CD has color images of these figures.

You'll need to learn the names of the parts of the vocal tract, because they are used to describe speech sounds in terms of how they are made. Pure memorization, so just do it and get it out of the way; there's an unlabeled diagram in Materials for Chapter 1 on your CD, so you can print out and fill in the labels. If you do that a few times, you should be fine. Watch the spelling and pronunciation of the anatomic words listed below; especially, don't confuse the alveolar ridge and the velum, which unfortunately sound like they are related words (they aren't). To help you remember and be comfortable with the new terms, which were perfectly ordinary words



A



B

Figure 1.1. A. Vocal tract; soft palate (velum) lowered to let airflow in and out through the nose. **B.** Vocal tract, velum (soft palate) raised to block airflow through the nose. (Images adapted from Shutterstock®. All rights reserved.)

in ancient Greek and classical Latin, I'm giving you some of their original meanings, too.

ALVEOLAR RIDGE (al-VEE-o-lar) [æl.'vi.o.lɚ], the gum ridge. Alveolus is Latin for "little pocket," in this case referring to the sockets that hold your teeth.

PALATE (PAL-et, ['pælət], the same as *pallet*), the roof of your mouth. (Linguists and phoneticians use *palate* to mean just the bony part of the roof of your mouth, and *velum* to mean the soft part behind that—look at the definition of *velum* and you'll see why that's the convenient thing to do.)

VELUM (VEE-lum) ['vi.ləm], also called the **SOFT PALATE** as in Figure 1.1A. Velum is from a Latin word meaning a sail or other hanging fabric, because it does start to hang down, like a tarp, forming the back of the roof of your mouth. To find your velum, run the tip of your tongue back along your palate, curling it as far back as you can. The front two-thirds or so of the palate is hard bone—this part is called the **HARD PALATE**. But just about as far back as you can get with your tongue, you may be able to feel that the roof of your mouth is softer—it's now made of cartilage instead of bone. We won't use the term **SOFT PALATE** in this book, because *velum* is shorter, and it has a convenient corresponding adjective, **VELAR**.

UVULA (YOU-view-luh) ['ju.vju.lə], a Latin word meaning "little grape," the plump little bulge that hangs like a tassel at the end of the velum.

LARYNX (LARR [as in Larry]-inks) ['lær.ɪŋks], the "voice box" (adjective form *laryngeal*; inflamed form *laryngitis*).

PHARYNX (FARR-inks; rhymes with larynx) ['fær.ɪŋks], the air tube leading from the lungs to the back of both the mouth and the nose.

We'll also need to be able to talk about parts of your tongue in order to describe some speech sound articulations accurately: from front to back, we'll distinguish the tongue **TIP**, **BLADE**, **BACK**, and **ROOT**. Figure 1.2 is a close-up diagram to show where those regions are.

When you're breathing quietly, airflow through your whole vocal tract is essentially noiseless; the airflow is like a stream flowing without obstructions. A stream becomes noisy when the flow becomes turbulent, for example, when it has to go over rocks or through a narrow channel; many speech sounds involve a similar kind of turbulent flow of air. And the vocal tract has another kind of sound generator that you won't find in a stream channel: a gadget that can generate a musical sound as well as a noisy sound.

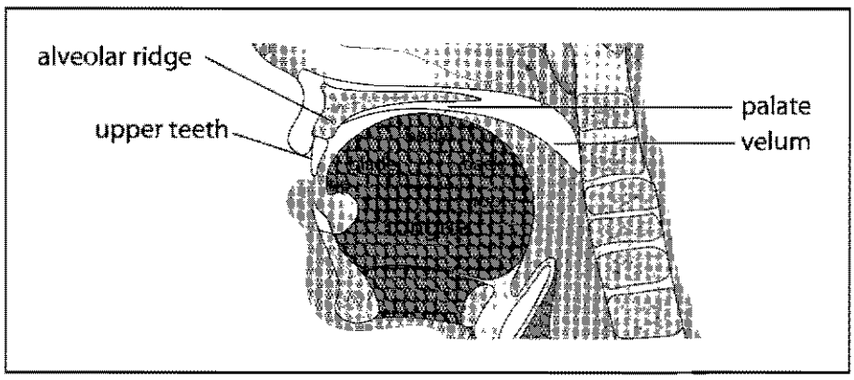


Figure 1.2. Mouth close-up. (Image adapted from Shutterstock®. All rights reserved.)

A Note About Sound Waves

Musical sounds—for example, singing and humming as well as the sounds of melodic instruments—are made when your ear is struck by sound waves that have regular, repeating patterns. Musical sounds from your voice and from almost all instruments have many tones, not just one: above the basic pitch, there are higher tones called **HARMONICS** in acoustic analysis. Noisy sounds—for example, hisses, bangs, and pops—are made by soundwaves that have irregular, nonrepeating patterns, which don't have harmonics. Examples of these two kinds of sound waves, with graphs of the corresponding air pressure variations, are on your CD in Materials for Chapter 1; they are the speech sounds "mmm" and "sss."

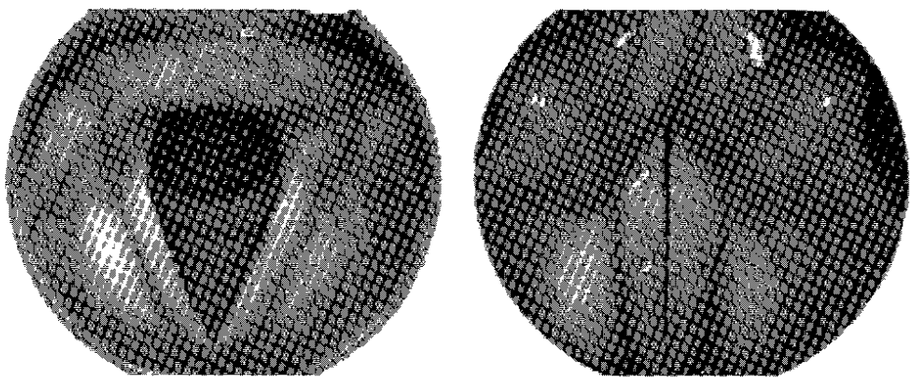
1.2.2.1 The larynx: Voice pitch and voice quality

Your larynx is the only source for the musical sound you make when you hum or when you sing a vowel sound (and some consonant sounds, as in the syllables *ma* and *la*). If you've got a good singing voice, your larynx can produce very regular-looking sound waves. If you tend to croak and

creak, as I do, it's because your vocal folds tend to vibrate irregularly. The outside of your larynx is easy to feel if you put your fingers lightly on your throat. But it's what is going on inside that's important. Inside your larynx are two flaps of tissue, properly called the **VOCAL FOLDS** (they are *not* cords, so we will not use the more common term). When someone's voice becomes really unpleasant to listen to, or is badly matched to their social role—a breathy "baby" voice in a woman running for public office, or a way of using voice pitch that sounds too masculine in a newly transgendered woman who would not be safe advertising her past life as a man—voice therapy focusing on how she uses her vocal folds can save her career, or possibly even her life.

The opening between the vocal folds has its own name: the **GLOTTIS**. The glottal opening can be widened, narrowed, or shut tight, like the opening between your two lips. Figure 1.3A shows the vocal folds, taken peering down someone's throat; the glottis is open in the left-hand picture, and almost but not quite closed in the right-hand picture (Figure 1.3B). The back of the person's neck would be at the top of these pictures. The tube that you can see below the vocal folds when they are held apart is the trachea ("wind-pipe"); it's going down toward the person's lungs.

The sound between the two vowels of *uh-oh* is made by closing your glottis tightly, so that no air can get from your lungs into your mouth. Sensibly, it is called a **GLOTTAL STOP**. Try holding that middle sound (which English has no letter for), and you'll feel that the airflow is completely choked off. In fact, a glottal stop is a silence, and not a sound at all. In the IPA, glottal stop is written using a question mark without the dot under it: [ʔ]. (The



A **B**

Figure 1.3. A. Vocal folds apart. **B.** Vocal folds together. (Both from *The Vocal Instrument* by S. L. Radionoff, p. 104). Copyright © 2008 Plural Publishing, Inc. All rights reserved. Used with permission.)

square brackets around IPA symbols are to make clear that we are referring to speech sounds, not to letters in the English or another alphabet.)

In some languages, the glottal stop functions like any other consonant, for example, in Hawai'ian (that's what the apostrophe between the two i's means). In the Roman type font used in the islands, it's actually written with a backward apostrophe, like this: *Hawai'ian*.

When your vocal folds are held just the right distance apart—more or less as shown in Figure 1.3B—and air from your lungs is pushed through the glottal opening between them at the right speed, the vocal folds will vibrate just the way your lips do when you make a "raspberry," only much faster. There's a link to a video of vocal fold vibration on your CD in the Materials for Chapter 1 folder.

For each vibration, the air blows the vocal folds a little farther apart; then they fall back loosely together, and are immediately blown apart again as the airflow continues. A deep male voice might have about 80 of these blow-open-and-let-lightly-close-glottis events (called **GLOTTAL PULSES**) in one second. A faster rate of vibration produces a voice pitch that's higher on the musical scale, and a screeching small child's vocal folds might have 800 vibrations per second or more. (Orchestras usually tune to the note *A* at 440 vibrations/second; every octave is a doubling of vibration rate [also called the **FREQUENCY**], so the next higher A is 880 vibrations/second.) Vocal fold vibration, often called **VOICING**, happens during almost all English vowels and many of the consonants; the "mmm" that you heard and saw graphed on your CD is voiced, but the "sss" is not.

1.2.2.2 The mouth: Articulated speech sounds

All four of the consonants [p], [t], [k], and [ʔ] are silences, so how do hearers know which one has been said? Make each sound by itself—for example, say just [p], not *pub*. A good way to do this is to say a syllable like *ip*. When you feel that you are into the [p], hold onto the closure part of the sound as long as you can. Feel and listen to what's happening. You'll find, in fact, that there is nothing to hear; and, furthermore, that you can't breathe during the actual period of silence.

All four of these sounds, reasonably, are called **STOPS** because the air that's coming from your lungs is stopped before it gets out of your mouth (which is why you couldn't breath during the [p]). But as you have discovered, the place where the stoppage occurs is different for each one. We can tell these sounds apart because we can hear their coarticulation with the sounds that come before and/or after them; that is, how the shape of your mouth or the nature of your vocal fold vibration changes (or fails to) as you move into and out of the closure itself.

[ʔ] chokes off the air when you hold your vocal folds tightly together, closing your glottis. When you close your glottis, the vocal folds keep the air from your lungs from getting through your larynx, so it doesn't get to your mouth at all. Closing your glottis doesn't change the shape of your mouth or your pharynx, so the coarticulation that tells your hearer that this particular silence was made by closing your glottis tightly comes from slowing down the vocal fold vibrations as you close down your glottis, and starting them up quite sharply as you let it blow open again.

[p] is the easiest of these four speech sounds to see: air from your lungs gets all the way to your tightly closed lips, and is blocked there, so it's called a **LABIAL** stop. Visualizing your mouth as a hollow place with a complicated shape—to be precise, visualizing the oral cavity, as it looks in Figure 1.1A—becomes really useful now: we can say that we hear the difference between [p], [t], and [k] because we hear the effect of the different ways each of them changes the shape of the oral cavity. If your hearer can't see you, she can still tell that you are making a [p] because closing your lips changes the shape of the air cavity in your mouth just the way a "wa-wa" mute changes the shape of the air cavity in a trumpet. We'll talk about how this and other **COARTICULATIONS** work in section 1.2.3.

[t] is harder to see, but almost as easy to feel: your tongue is making tight contact all around the inside of your upper and/or lower gum ridges, from behind your front teeth to inside your molars. In particular, the **BLADE** of your tongue—the part of your tongue just behind the very tip—is touching the alveolar ridge behind your front teeth; the tip of your tongue is probably in contact with those teeth, but it might be on the alveolar ridge a bit behind them. (Look at Figure 1.2 to check the where your tongue blade and alveolar ridge are.) English [t] is called an **ALVEOLAR** stop; but in making Spanish, French, and Italian [t] the tongue has much less all-around contact with the upper alveolar ridge and definitely touches the back of the upper front teeth, so it is a **DENTAL** stop in those languages and many others.

[k] may be harder to feel; usually, the whole back half of the tongue humps up and touches the velum, and the sides of this hump touch your upper molars to complete sealing off your airflow. (You might want to re-read the information about how to find your velum.) [k] is called a **VELAR STOP**. Try feeling this contact point for the velar stops in the words *book* and *coo*. The exact position of [k] is a little different; it depends on what vowels are next to the [k]. Try saying *beak* and then *book*, holding onto the [k] each time, and feeling where your tongue hits the roof of your mouth—if you can't feel a difference with these two words, try *key* and *coo*. Where your tongue hits for *beak* and *key*, which have the *ee* vowel (IPA symbol [i], as in *pizza*) is probably on your hard palate, in front of the velum, because the [i] is made with your tongue further front than any other English vowel. But we don't have to worry about that yet.

Lips, alveolar ridge, velum, and glottis are the four **PLACES OF ARTICULATION** for English stops—that is, the points where the vocal tract is closed off. [b], [d], and [g] are made at essentially the same places as [p], [t], and [k]—they are considered to be the three **VOICED (ORAL) STOPS** of English, because they do have more vocal fold vibration connected with them than the corresponding totally **VOICELESS STOPS** [p], [t], and [k] do. But there are some complications in the details of the way that these three pairs of sounds [p-b, t-d, k-g] contrast with each other, which we'll talk about in section 1.2.3.

For another class of sounds, the friction sounds or **FRICATIVES**, the vocal tract isn't closed off, but instead narrowed just enough to produce turbulent, noisy airflow, just as when a river pours through a narrow gorge. So the fricatives bring us another sound source to think about: airstream friction. English has eight fricatives. Four of them, including [f] and [s], are made by friction alone—these are the **VOICELESS FRICATIVES**. The other four, the **VOICED FRICATIVES**, including [v] and [z], are made at the same places of articulation as the first four, but with vocal fold vibration happening at the same time as the friction noise. Make these four sounds—hold each one as long as you can—and feel what's happening in your mouth. Also, press your finger lightly on the your throat where your larynx is, and switch back and forth between saying [fff] and [vvv] or [sss] and [zzz]; you should be able to feel the vocal fold vibration or at least some increase in laryngeal tension while you are making the voiced fricatives, but there's no larynx action during the voiceless ones.

The place of articulation for fricatives (and other sounds where the vocal tract isn't closed off) is defined as the place where the vocal tract is narrowest; for fricatives, that's where the airflow is fastest, most turbulent, and so makes the most noise. The fricatives [s] and [z] have their narrowest place just about where [t] and [d] have the front part of their contact, at the alveolar ridge, so they are called alveolar fricatives.

The other three pairs of fricatives are made at three new places of articulation. [f] and [v] are more or less labial, but they really only use the lower lip; if you watch yourself say [p] and [f] in a mirror and feel yourself switch between them, you'll see that when you say [f], you pull your lower lip back so that the narrowest place in the airstream is between your lower lip and your upper teeth. When we need the details, we say that [f] is a **LABIODENTAL** fricative, but when we can afford to speak loosely, it's just referred to as a labial fricative—a voiceless one, of course. [v] is made the same way, with voicing added, as you noticed earlier when you were switching between [f] and [v]. If you don't learn Spanish until after childhood, one of the Anglo accent problems you'll have to overcome is the habit of making a labiodental [v] (whether the Spanish word is spelled with *b* as in *Cuba* or *v* as in *vaca*), because in Spanish, this sound is a true **BILABIAL**

(two-lipped) voiced fricative: the narrowest place in your airstream has to be between your lips. As you see, in this case (and many others), comparison of pronunciation across languages is a place where the details matter. In IPA, the voiceless bilabial fricative is spelled with the Greek letter phi, [φ], and the voiced one with the Greek letter beta, [β].

What about the other four English fricatives? The four fricative sounds we've discussed so far have the same (single) symbol in IPA as they have in English spelling, but I've delayed introducing the other four because their IPA symbols are probably new to you. The first one of them is easy enough: the sound spelled "sh" in English is represented in IPA by the symbol ʃ, called "esh." If you make the sounds [sssʃʃʃsssʃʃʃ], you can feel the blade of your tongue sliding back to make the [ʃʃʃ] and front again for the [sss]. The narrowest place in the airstream for the fricative [ʃ] is at the front of your hard palate where it starts to slope down into the alveolar ridge, so this place of articulation for this sound is usually called **ALVEOPALATAL**. But on some phonetics Web sites, it's called **POSTALVEOLAR**, and you may also see the terms "palatoalveolar" and "prepalatal." If you're not sure you can feel this place, try saying [ʃ] and then, without moving any part of your mouth, breathing in; the cool spots on your tongue and the roof of your mouth are where the airflow is fastest, so that must be where the airstream is narrowest.

The voiced counterpart for [ʃ] is the fricative in the middle of the words *pleasure* ['plɛʒɹ], *treasure* ['trɛʒɹ], or at the beginning of Chinese family names like *Zhong*. In IPA it's [ʒ], called "ezh." By the way, the IPA vowel symbol [ɛ] that I've just used stands for the vowel of *red*; also, you may have noticed that IPA puts the accent mark ['] at the beginning of the stressed syllables of a word rather than over its vowel. (If you speak a Southern, New England, or urban New York variety of English, you probably don't have an [ɹ] as the second syllable of *pleasure* or *treasure*; instead, you probably have almost the same vowel as you do in the second syllable of *Martha*, which is written with the symbol [ə], called "schwa." Did you notice that this vowel sound is quite different from the one in the first syllable of *Martha*, even though they are both spelled *a*?)

The name *Martha* brings us to the last pair of English fricatives, which are famously hard for children learning English and also for almost all adult learners of English as a second language. This pair can also be a problem for skilled English speakers to think clearly about, because they are spelled the same, with the letter pair *th*. But *th* really does spell two entirely different speech sounds, just as the letter *a* did in *Martha*. One of the sounds is the voiceless fricative in the middle of *Martha*, the beginning of the words ***think***, ***theater***, and ***thigh***, and the end of the nouns ***broth***, ***bath*** and ***teeth***. IPA uses the Greek letter theta [θ] for this sound; try saying it by itself, [θθθ].

Its voiced counterpart is in the beginning of the words ***this***, ***the***, and ***thy***, the middle of ***brother***, and the end of the verbs ***bathe*** and ***teethe*** (as in "The baby's fussy because he's teething" = his new teeth are coming in). In IPA, this voiced fricative is spelled with the Icelandic letter [ð]. Try it by itself, also: say *the* but hold onto the friction sound spelled by the *th* instead of moving on into the vowel. (If you do it for more than few seconds, saying [ððð] will probably tickle your tongue!) You can call this sound "edh"; make sure to pronounce its name [ɛð] and not [ɛθ] or [ɛd]! Listen to and feel the similarities and differences between the two sounds when you say [θθθðððθθθððð], as you've done with the other three voiceless/voiced fricative pairs. The position of articulation that [θ] and [ð] share is a new one: your tongue sticks out a little bit between your upper and lower front teeth, and the bottleneck in the airflow is between your tongue and your upper front teeth. Try the breathing-in trick again if you want to feel this really clearly. The usual name for this place of articulation is **INTERDENTAL** (between the teeth), but occasionally you'll see the term "linguadental" (*lingua* is Latin for "tongue"). It's not at all clear why these two sounds are so rare and so difficult—especially when you think about the fact that [ð] is the commonest sound in English!—because it's easy to see and to describe how to say it. However, their sounds are very close to the sounds of [f] and [v] respectively, so maybe it's partly a perception problem—in fact, in some varieties of English, such as Cockney (spoken in parts of London), they have been replaced by [f] and [v]. Also, you have to move your tongue farther front than for any other speech sound, and then keep it just the right distance from your upper teeth so that you make the airstream friction. Counting the places of articulation for English stops and fricatives brings us to a total of seven. From front to back, they are: labial, labiodental, interdental, alveolar, alveopalatal, velar, and glottal. Make sure you know which sounds are made at each place! We'll start to organize them into a chart in section 1.2.3.

An equally hard and rare sound in the other direction (so to speak) is one found in Arabic, a voiceless pharyngeal stop; to make it you have to pull the root of your tongue straight back till you've squeezed your pharynx closed. (They have voiced and voiceless pharyngeal fricatives, too.) If you want to listen to speech sounds not found in English or to make sure that you understand the English sounds correctly, go to http://www.phonetics.ucla.edu/course/chapter1/chapter1.html and click on a symbol; if you do this, you can listen to each sound.

English also has the voiceless/voiced pair of alveopalatal sounds usually spelled *ch* as in *church* and *j* as in *judge*; these sounds are written in IPA as [tʃ] and [dʒ]. They are both hybrid sounds, which is why each one takes two symbols. As you would guess, [tʃ] begins with a voiceless stop—although it's not exactly an alveolar one (you can probably feel the difference

between where your tongue starts for saying *twos* as compared to *choose*; for *tease* versus *cheese*, the difference may not be detectable). Then your tongue moves a little away from the back-of-the-gum-ridge position so that [tʃ] ends with the alveopalatal voiceless fricative [ʃ].

The stop [tʃ] begins with is alveopalatal, but alveopalatal stops don't exist by themselves in English. The symbol *t* is pressed into service for the stop part of the sound, instead of making up a whole new symbol. As the *t* is written right next to the [ʃ], there's no confusion, and the combination lets us waffle on the question of whether this should be considered one complex speech sound, as we've introduced it, or as a sequence of two speech sounds. The story for [dʒ] is just the same, except that your vocal folds are vibrating during the [ʒ] and maybe during part of the [d].

1.2.3 Families of speech sounds: Sound features and sound waves

Even though we are only halfway through the English speech sounds at this point (we've done 7 stops, 8 fricatives, and 2 affricates), we've gained tremendous descriptive power. To see this, let's organize what we've learned already, beginning by putting the sounds we've learned into the standard IPA organizational chart (simplified a little, because we're just doing English speech sounds for now).

Like the periodic table of the elements in chemistry or the color wheel in art, a good chart is much more useful than a list like the alphabet, because it shows many of the relationships among its entries. The standard IPA chart for consonants is organized so that the principal places of articulation for consonants go from the front of the mouth to the back of the mouth; sounds that have the same places of articulation are in the same column. From top to bottom, the sounds are arranged in terms of how open the mouth is, which also separates them according to their types of airflow (also called their **MANNER OF ARTICULATION**). Right now we have only two manners of articulation, but we'll be adding more (Table 1.1A). The row and column labels (bilabial, labiodental, etc.) that we are using to pigeonhole English consonants are called **ARTICULATORY FEATURES**.

Notice that voiced and voiceless pairs of sounds that have the same place and airflow, like [p] and [b], or [s] and [z], are put in the same box, voiceless first. Affricates, because they are complex segments, having two manners of articulation combined, aren't usually put into the chart, but if you wanted to add them, it would seem sensible to put them in between the stops and the fricatives, like this (Table 1.1B). Now let's put those features to work. For example, suppose we're describing a fairly typical toddler

Table 1.1A. IPA Chart for English Stops and Fricatives

	Bilabial	*Labiodental*	*Interdental*	*Alveolar*	*Alveopalatal*	*Palatal*	*Velar*	*Glottal*
Stop	p b			t d			k g	ʔ
Fricative		f v	θ ð	s z	ʃ ʒ			

Table 1.1B. Modified IPA Chart for English Stops, Fricatives, and Affricates

	Bilabial	*Labiodental*	*Interdental*	*Alveolar*	*Alveopalatal*	*Palatal*	*Velar*	*Glottal*
Stop	p b			t d			k g	ʔ
Affricate					tʃ dʒ			
Fricative		f v	θ ð	s z	ʃ ʒ			

who says something like *bat* for both *bad* and *bag*, *tat* for *cat*, *dough* for *go*, and *dawt* for *dog*. Oh, and *tea* for *see*, *Pete* for *piece*, *pit* for *fish*, *dat* for *that*, *do* for *zoo*, *bat-tomb* for *vacuum* (as in "vacuum cleaner"—little kids *hate* that noise and learn the word pretty early), and also for *bathroom*.

Suppose we were still stuck with thinking in terms of letters, and had no way of organizing these changes (and the kid's correct sounds) except alphabetically. For the consonants that we've learned so far, we'd have to say something like: the toddler's *b* is okay; c in *piece*, *cat*, and *vacuum* turns into *t*, *d* is okay, *f* turns into *p*, *g* turns into *t* at the end of a word, but becomes *d* at the beginning of a word; the *h* is left out of *bath*, *th* in *this* turns into a *d*, *p* is okay, *s* turns into *t*, *t* is okay, *v* turns into *b*, and *z* turns into *d*. Hard to make any sense out of that! And do you really think the *s* in the middle of *Susie* will become a *t*?

But assuming that his other words follow the same patterns as the ones I've given you (things are always a bit more complicated with real kids than with the ones in textbook examples; never assume that a few words like this will give you a child's whole system), that whole list of changes in letters boils down to just three changes in sounds: velars are replaced by alveolars; fricatives are replaced by the nearest possible stop; and all final voiced consonants become voiceless. Check it out. What does this set of descriptions predict about how *Susie* will be pronounced?

Now, as for the complications in the voicing process: There are some unexpected details in the timing of when the articulators for a voiced sound like [b] or [v] get close to each other and when the vocal fold vibrations start and stop. And the timing is also dependent on how fast people are speaking, how relaxed they are, the neighboring sounds, and what language they are speaking. We're not going to even try to cover all that here, but the important thing to know is that in English, at the beginnings and ends of phrases, and next to voiceless sounds, these "voiced" sounds may actually lose part or all of their voicing—that is, the vocal folds may not be vibrating during some or even all of the time that your lips are closed for [b] or partly closed for [v]. A lot of what gives us English speakers our "Anglo" accents when we speak other languages is that we carry over these same timing patterns for vocal fold vibration, but each language has its own tiny variations on the way it does vocal fold timing, so these transferred patterns are rarely if ever correct.

If you go to http://www.chass.utoronto.ca/~danhall/phonetics/sammy.html, you can click on descriptions of speech sounds and see the articulation; if you go to http://www.phonetics.ucla.edu/course/chapter1/chapter1.html and click on a symbol, you can hear each sound. But those sites may be a bit confusing until we get through all of section 1.2. (These links are also on Materials for Chapter 1 on your CD so you can just click on them from there.)

1.2.4 The sonorant sounds and /h/

1.2.4.1 The nasal cavity: Sinus is not just a headache

There's a lot of empty space in the area labeled "nasal cavity" on your vocal tract pictures, and in the sinuses themselves, which are near it (and that's what *sinus* means: a hollow place). (Look at Figures 1.1A and 1.1B again.) The nasal cavity itself is not really empty, though; it contains structures that act like baffles, making the air follow a complex route through the nose, so that there's time en route for it to be filtered and moisturized before it gets to your lungs. If you understand musical instruments, you know what hollow spaces connected to a sound-maker are good for: adding resonance to the sound, which will make at least some of the harmonics (see A Note About Sound Waves on p. 11) louder, and, depending on the material and shape, will make others softer.

People without training in speech science or linguistics tend to describe almost any speech whose sound they dislike as being "nasal," but language professionals can't afford to be so casual with technical terms. A speech sound is **NASAL** if the passageway between the mouth (aka the **ORAL CAVITY**) and the nasal cavity is open, as in Figure 1.1A, so that the nose and the sinuses provide a lot of resonance to the sound. It's **ORAL** (or **NON-NASAL**) if this passageway is closed, as in Figure 1.1B.

When you looked back at Figures 1.1A and B, you saw that in 1.1B, the velum is raised so that it touches the rear wall of the pharynx; only the uvula hangs down at its end. This is the position for all speech sounds *except* the nasal ones like [m], [n], [ŋ], and the nasal vowels as in French or Portuguese. (Actually, English also has nasal vowels; we'll discuss that in the Challenge section for this chapter on your CD.) In Figure 1.1A, a lot of velum is hanging down, which is the position for normal breathing and for nasal sounds.

Think of the velum as a trapdoor in the ceiling, leading to an attic: Pull down to open the trapdoor, push up to close it. To see how this works, look in a mirror and say a good long /aaa/. No air comes out of your nose when you say this, because the trapdoor is closed, as in Figure 1.1A. You'll see your uvula hanging at the back of your mouth—for the moment, think of it as the rope to a closed trap door. Now make the nasal vowel [ããã]—if you're not sure how to do this, get a friend who speaks some French to say the preposition *dans* "inside," or else imitate the [aaa/ããã] example on your CD. If you do it right, some air will come out of your nose—remember, that's what it means for a sound to be nasal. (Wet your finger and hold it right under your nose while you switch between the oral and nasal vowels—you should be able to feel the air flowing over your finger during the nasal one, but not the oral one.) In the mirror, you'll see your uvula move

DOWN when you switch from [aaa] to [ããã], because you had to *lower* your velum to let air go out of your nose. But it's very hard to feel what the velum is doing—it doesn't seem to have the proper nerves for reporting its movements to our brains in a way that we can become aware of, even though our automatic control of it for breathing, speaking, and swallowing is superb. However, try holding the blade of your tongue tight to your alveolar ridge and saying [dnndnndnn], not letting any air come out of your mouth, but only (during the [n]), out of your nose. You can probably feel the wiggly part of your velum moving, or at least the sense of the air not being able to leave your mouth during the [d] and something at the back of your mouth changing so that it can leave your mouth during the [n].

The best way to describe whether the passageway between your nose and your mouth is open (attic trap door down) or shut (attic trap door up) is to say that the velum is **lowered** for nasal sounds and **raised** for oral sounds. Try to avoid saying that the velum is "open" or "closed," because the velum is the hunk of cartilage that moves to cover or uncover the passageway; it's not the opening itself. This is important because it will help you keep a sharp mental picture of how nasal airflow is controlled. You need that picture to understand many developmental speech problems, what happens to speech sounds when someone has a stuffed-up nose, and some of the historical language changes that give us some peculiar-looking modern language patterns (like why there's a [b] in *remember*, but not in *memory*. (See the Challenges for Chapter 1 on your CD to read about these and other applications of what you've just learned.)

We can add the English nasal consonants very quickly to the IPA chart, now (Table 1.1C). In this new version, there's a nasal row, with labial [m] and alveolar [n] in their appropriate columns—on the voiced side of their boxes, of course, because they are made with vocal fold vibration, as you can feel by putting your finger lightly on your larynx when you hum them: /mmm/, /nnnn/.

What's new here is the velar nasal [ŋ], called "eng" or "angma." Remembering this new symbol is easy, because it's an *n* with a *g* tail. Zeroing in on the sound in your mind may be harder, because in some words *ng* spells [ŋ], but in other words it spells [ŋg]—and there are dialect differences in where that [g] shows up and where it doesn't. Try this: say "drink" slowly, and then do it going all the way through the sound spelled with the letter *n* as if you were going to say the [k] too, but leave the [k] off, and keep making the nasal sound (which you can do because the air will come out of your nose). Feel where the back of your tongue is humped up—it will be way back of the alveolar position for a real [n]. In fact, it's in the same velar position as the [k] which you were about to say, but the movable part of your velum, just behind where your tongue is hitting the

Table 1.1C. IPA Chart for English Stops, Fricatives, Affricates, and Nasals

	Bilabial	***Labiodental***	***Interdental***	***Alveolar***	***Alveopalatal***	***Palatal***	***Velar***	***Glottal***
Stop	p b			t d			k g	ʔ
Affricate					tʃ dʒ			
Fricative		f v	θ ð	s z	ʃ ʒ			
Nasal	m			n			ŋ	

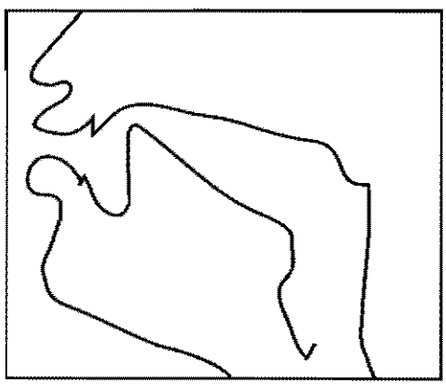
roof of your mouth, will be down to let the air out your nose. This velar nasal is the [ŋ]—hold on and hum it, [ŋŋŋŋ]. You make the [k] after it simply by raising the movable part of the velum to seal off your nasal opening—nothing else has to move. Try it slowly: [drɪŋŋŋŋk]. You can switch back and forth between the two velar sounds, [ŋŋŋŋkŋŋŋŋk], and feel your velum's wiggly part go up for the [k] and down for the [ŋ].

1.2.4.2 The semivowels

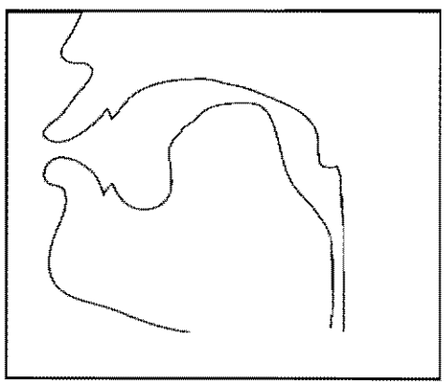
[Note: you might prefer to do the vowels in section 1.2.4.3 and then come back to the semivowels.] Three of the **SEMIVOWEL** sounds in IPA, [l], [r], and [w], have approximately the same values that they typically do at the beginnings of words in the English alphabet. The fourth English semivowel is the sound at the beginning of *you*; the International Phonetics Association chose the symbol [j] for this sound, because in quite a few languages of northern Europe (e.g., Dutch, Swedish, German, Finnish), "*y*" is how the letter *j* is pronounced. This can be hard for English speakers to get used to, and some American authors don't go with the IPA at this point. But the major speech pathology and phonetics journals are international, and most textbooks are written for international audiences, so we will use [ju] to spell *you*, and [jɛt] to spell *yet*. (Remember, IPA has [dʒ] for the first sound of *jet* [dʒɛt].) The best way to train yourself to stay with IPA is to practice making phonetic transcriptions and then check them, but it's a big help if you NEVER use *jay* as the name for the IPA symbol [j]. From now on, when you see it in the text, think of the name for the symbol [j] as **YOD**, which is approximately the name for whatever symbol spells the "*y*" sound in several alphabets, including Hebrew and Arabic.

You've probably figured out that calling the consonants [j] (*yod*, remember!), [l], [r], and [w] "semivowels" implies that they are in some way "in between" vowels and consonants. One of the ways that they are in the middle involves the size of the air channel that you use to make these four sounds. All the consonants in the earlier sections of this chapter involve closing your mouth or glottis, or else narrowing the air channel enough to make airstream friction. But the four semivowels have openings that are too wide to cause friction, though they aren't as wide as the openings for true vowels. (We'll modify that statement later in this section, but it'll do for now.) And like vowels, as we'll see soon, what distinguishes each of these sounds from the others is the way each different tongue shape changes the sound that comes into the pharynx and mouth from the vibrating vocal folds (did you notice that all four of them are voiced?). Another term you'll see a lot for [l] and [r] is the rather poetic descriptive term **LIQUIDS**, and for [j] and [w], **GLIDES**. We'll explain that one shortly.

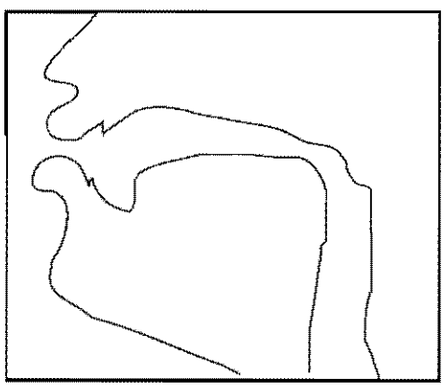
As for their positions of articulation, each of these sounds involves a mouth and pharynx shape that we haven't seen yet (more than one, actually—the shapes for [l] and [r] vary tremendously, depending on where they are in a word and what other sounds are next to them). MRI scans (on your CD) show that there are an amazing number of different tongue positions that will result in saying [r], and each person seems to use several different ones in different contexts. This wasn't known until recently, because it is terribly difficult to feel where your tongue is unless it is touching some other part of your mouth. In [r], [j] (*yod*!), and the vowels, your tongue is mostly arching itself into a complicated shape in the middle of your mouth (there may be a little contact with your molars), and at the same time, your tongue root may move forward or backward to change the shape of your pharynx. For making English [r], a lot of your tongue is raised up through most of the middle of your mouth (Figure 1.4A) and your tongue root may be pulled back, which makes the opening of your



A



B



C

Figure 1.4. A. An alveoplatal [r] articulation, tongue root pushed forward. **B.** A bunched, almost velar [r] articulation, tongue root pulled back. (A and B based on MRI scan in Zhou, X., Espy-Wilson, C. Y., Boyce, S., Tiede, M., Holland, C., & Choe, A. (2008). A magnetic resonance imaging-based articulatory and acoustic study of "retroflex" and "bunched" American English /r/. *Journal of the Acoustical Society of America, 123*(6), 4466–4481.) **C.** [w] articulation.

pharynx narrower. Most textbooks ignore the tongue root movement, which is a bit hard to feel, and they choose just one of the possible **ORAL** (mouth) tongue shapes for [r] to describe. That's why you'll sometimes see that [r] is put in the alveolar column, and sometimes in one of the columns further back in the mouth. When I make an [r], the narrowest part of the air channel is alveopalatal, and that's the column I'll use. This must be a fairly common air channel shape, because a lot of children who sound words out for themselves spell *train* as *chrain*. That makes good sense if the sound at the beginning of *train* is very close to the alveopalatal affricate [tʃ] sound at the beginning of *chain*. Try it yourself and see if *train* and *chrain* are almost identical for you, too. If they are, your [r] is probably alveopalatal.

It takes more than your tongue to make [r], and [w] as well (Figures 1.4B and C). Both of these sounds—[w] more than [r]—require pursing your lips towards a kissing position, as you can see in Figure 1.4 (put your fingers on your lips or look in a mirror to check this out). Making the kissing lip shape is called **LIP ROUNDING**, and it's also needed for making the vowels [u] as in *clue*, [o] as in *know*, and the sound spelled *oo* in *cook* or *u* in *put*, nowadays written with [ʊ] (the Greek letter upsilon) in IPA. [w] requires pursing your lips and raising the back of your tongue towards the velum at the same time (see Figure 1.4C), so it's sensibly called a **LABIOVELAR** semivowel, or a labiovelar glide. Because it has two positions of articulation at the same time and would have to go in two columns at once, [w] isn't entered on the official IPA chart, but Table 1.1D shows how we enter it and the other three semivowels. You'll see other unofficial versions, depending on what users are trying to communicate by using an IPA chart, and you can find the current official version on the International Phonetic Association Web site, www.langsci.ucl.ac.uk/ipa/

As for my promised explanation of the term *glide*, as well as an explanation of the **PALATAL** position for [j] (*yod*), first try these two feel-and-listen exercises:

1. Say *woo* [wu] slowly several times and track what your lips and tongue do. You should be able to tell that each of them moves only a little in moving from [w] to [u]: your lips open a bit wider and the back of your tongue moves down a tiny bit. Now say [wwww] and listen carefully: it should seem to turn into a [u] (as in *true*) even if you don't move your mouth at all! So here's the modification I warned you about: the semivowel [w] can have exactly the same mouth shape as the vowel [u], which means that the air channel for some pronunciations of the semivowel [w] is the same size as the air channel of the semivowel [u].

Table 1.1D. IPA Chart for English Stops, Fricatives, Affricates, Nasals, and Semivowels

	Bilabial	*Labiodental*	*Interdental*	*Alveolar*	*Alveopalatal*	*Palatal*	*Velar*	*Glottal*
Stop	p b			t d			k g	ʔ
Affricate					tʃ dʒ			
Fricative		f v	θ ð	s z	ʃ ʒ			
Nasal	m			n			ŋ	
Semivowel	(w)			l	r	j	(w)	

2. Do the same thing with *ye* [ji], and then with holding onto the yod by itself. When you say *ye* [ji], you might not have to move your tongue at all—the yod will just seem to turn into an *ee* [i]. Or you may feel small tightening movements at the sides of the back of your tongue. The highest part of your tongue is just below the hard palate when you make [j], which is why the yod is called a palatal glide; it's in pretty much the same position as that front-shifted [k] in *key* that we talked about in the section on velar stops.

So: we can only hear [w] and yod when they are transitions between two sounds or a sound and silence. When they are held, the perception morphs into the perception of *oo* [u] and *ee* [i]! That's an amazing phenomenon, and it also explains why these sounds are called glides: They only seem to exist as transitions between two other speech sounds, or between a speech sound and silence. The near-identity of [w] with *oo* [u] and of yod with *ee* [i] also helps to understand the problems that speakers of many languages—for example, Chinese (and Japanese, which is a totally unrelated language)—may have with distinguishing between [wu] and [u], or between [ji] and [i]: their language doesn't happen to make this tiny distinction. The common Chinese names spelled Wu (or Woo) and Yi (or Yee) in English may be pronounced with the glides at the beginning, but they usually are not. This makes it hard for English learners from those languages to hold onto the difference between *year* and *ear*. But they have no problem with saying the [w] in *weird* or the [j] in *you*, where the glide is in a very different place of articulation from the following vowel and can't just blend into it.

The sound English writes with the letter "L" is a wonderful sound—in fact, it's a whole family of sounds. At the beginnings of syllables—well, first start saying [ta] only don't actually say it; stop during the [t] and feel what your tongue is doing. Then do the same thing with [la]. Feel the difference? Switch back and forth between the [t] and [l] tongue positions quietly a few times and feel what seems to be moving. Also, in the [l] position, breathe in through your mouth for a second and see where your tongue gets cool. (In [t] position, you can't breathe either in or out.) For both the [t] and the [l], you're touching the blade of your tongue to your alveolar ridge, but for this [l], instead of the rest of your tongue making a tight seal against your teeth and gums all around your mouth, one or both of the sides of your tongue drop down below your upper teeth so that air can flow over the tongue-sides and out of your mouth. Because the position of the sides of the tongue is critical to making an [l] at the beginning of a syllable, [l] is called a **LATERAL** semivowel; it's the only lateral sound that English has. (Spanish, in many dialects, has two: the alveolar one and a palatal one, which is spelled [ll] in Spanish and symbolized by [λ] in IPA.

In some dialects of Spanish, though, the [ll] isn't a palatal lateral semivowel any more; it's just the palatal semivowel [j], the sound that we've learned to call "yod.")

If you try saying [la, li, lu] but stop during the [l] for each one, you'll feel big differences in what your lips are doing, and also substantial differences in your tongue position; it probably feels as if the whole rest of your mouth except for the blade of your tongue is starting to say the vowel while the blade is still doing the [l]'s alveolar contact. In other words, the coarticulation of [l] with the following vowel sounds is very strong.

[l] at the ends of (most) syllables in English is an entirely different sound, different enough to have its own IPA symbol, [ɬ], often called "dark L," or sometimes "velar L." What's velar about it? Say *all* (or any word that rhymes with it) as naturally as you can, and hold onto the [ɬ] at the end. You will probably find that your tongue isn't touching the roof of your mouth anywhere, so this sound is even closer to being a vowel than the word-initial [l]. For some speakers, the back of the tongue is humped up a bit towards the velum, which is why the dark [ɬ] is called velar. But it's not humped up like that for me. What about you? Can you tell? The sound is very different from the sound of word-initial [l]; listen to the pair of words *all/law* and the same two words reversed on your CD for a startling demonstration of this fact.

If you try saying different words spelled with the letter L (making sure that they actually do have some kind of [l] sound—there are quite a few silent L's in English, for example, in *calf*), you'll discover other variations in its tongue position and sound.

1.2.4.3 Vowels and /h/

Vowels are the last major category of English sounds—and they are indeed major: English has more different vowel sounds than most other languages, even though there are also many vowel sounds that other languages have and we don't. Spelling of vowels is the least reliable part of English orthography, and reforming it, if we ever do, will be a huge mess because variation in pronunciation from one English dialect to another is greater for vowels than for any other class of sounds (although the cross-dialect variation on when and how /r/ is pronounced is just as bad). All through this section, we've been using English-based vowel spellings like *oo* and *ee* as a temporary measure, although I've put in the IPA symbols occasionally. Now let's learn the IPA that we need.

Table 1.2 gives you a standard list of American English vowels, adapted a little from the great phonetics textbook, *A Course in Phonetics*, by Peter Ladefoged (which is the book you should work through if you really want to learn phonetics from a linguistic point of view). The symbol names are

Table 1.2. IPA Chart for (almost all) American English Vowels

i	heed, he, beat, heat	lowercase *i*	ʌ	Hudd, mud	wedge; turned *v*
ɪ	hid, bid, hit, kid	small capital *I*	ɜ	herd, hurt, bird, curd	reversed epsilon
eɪ	hayed, hay, bade, hate	lowercase *e*+ɪ	aɪ	high, hide, bide, height	lowercase *a*+ɪ
ɛ	head, bed	epsilon (Greek)	aʊ	how, cow, cowed	lowercase *a*+ʊ
*æ	*had, *bad, hat	ash	ɔɪ	(a)hoy, boy, Lloyd	open *o*+ɪ
**ɑ	**hard, bard, hod, cod	script *a*	**ir	**ear, beard	lowercase *i*+r
**ɔ	**haw, bawd, caw	open *o*	**ɪr	**ear, beard	small capital *I*+r
oʊ	hoed, hoe, code	lowercase *o*+ʊ	**ɛr	**ber(ry), mer(ry)	epsilon+r
ʊ	hood	upsilon (Greek)	**er	hare, bare, mare, Mar(y)	lowercase *e*+r
u	who, hoot, booed	lowercase *u*	aɪr	hired, hire	

Note: Asterisks mark places where speakers whose dialects vary from the model that Ladefoged used. See text on pp. 31–32 for explanation of individual sounds.

also given; "Greek" means that the symbol is taken from the Greek alphabet. If there are two symbols together, it means that the position of your tongue and lips changes during the course of making the vowel; these complex vowels are called **DIPHTHONGS**. (And you'll notice that the list ends with a triphthong.) These are the vowels that can appear in stressed syllables. We also need one more symbol, for a vowel that only appears in unstressed syllables like the second syllable of *sofa* or the first syllable of *about*. This is the [ə], called "shwa."

The list in Table 1.2 works well for people from most of the Middle Atlantic states. If you are from somewhere else, you'll need more time with the CD to get some of the sound distinctions, and to figure out what symbols are more accurate for you. We'll discuss some likely problems below, and there are others in the exercises for this chapter. Once you've

mastered these symbols, you should practice IPA by transcribing that sample of the Chaos poem I gave you in section 1.2.1; there are two recordings of it on your CD, one with my Middle Atlantic accent and the other with a "General American" accent. Then you should be ready to think clearly about the speech sound aspect of whatever phonetic problem is part of your life: teaching reading, accent reduction, computer understanding of human language, and so on.

The asterisks in Table 1.2 mark places where my students and I over the years have had problems because our dialects differed from the American model that Ladefoged chose. You'll need to listen carefully to the CD to understand the discussion of these problems, so you'll find most of the material of this section (1.2.4.3) on the CD as well.

*1. The problem with /æ/ is that in the Northeast and some neighboring areas, it has moved towards /i/ and also developed into the diphthong /ɪə/, at least in some contexts. The word *bad*, for example, is pronounced /bɪəd/ by many millions of people, so there's no point in complaining about it if you don't happen to be one of them.

2. The major problem with /ɑ/ and /**ɔ/ is that more than half of all Americans can't easily hear the difference between them. If you ask a friend to say the names *Don* and *Dawn* naturally while you're not looking, and you can't tell the difference between them, one or both of you is in that half. On the other hand, if you're American and it's never even occurred to you that these names (and the word pairs *cot* and *caught*, *tot* and *taught*, *rot* and *wrought*) could be pronounced and sound the same for some people, you're probably from the Northeast or Middle Atlantic states. A second problem is the symbol /ɑ/ itself; keeping it distinct from the symbol /a/ is almost impossible, because the Roman alphabet simply treats them as alternative ways of writing lower case A. And a third problem is that almost no American English dialect has the distinction that the IPA makes between the sound it writes as /a/ and the sound it writes as /ɑ/, so I'm not going to try to teach or make that distinction in this text. If you want to learn IPA absolutely properly, study the IPA chart on the Web using the IPA's sound examples (link on your CD)

3. The problem with /ir/ and /**ɪr/ is that most American English speakers say *ear*, *beard*, and words like them with a vowel sound somewhere between /i/ and /ɪ/, so if you are already sensitive to speech sounds, neither of these spellings will make you happy. Don't worry about it; there's no dialect of English where the difference between [ir] and [ɪr] matters.

4. Finally, the problem with /ɛr/ and /**er/ is like the problem with /**ɑ/ and /**ɔ/, only more complicated. For some people in the United States, especially people from the Northeast like me, the vowel sound in *merry* is /**ɛr/ (the same ɛ as in *messy*), and it's not at all confusable with the vowel sound /**er/ in *Mary* (which is the same as the vowel in *mare*). Furthermore, neither of these vowels is confusable with the vowel in *marry*, which is very close to—and best transcribed as—/æ/, because it's almost the same as the vowel in *Mattie*.

But if you are from California, the last paragraph was total garbage to you: *Merry, marry*, and *Mary* are pronounced identically, as it is by the two Western speakers on the CD. When you listen to the way I say them on the CD, you'll be able to tell the difference, but it will still be almost impossible to tell which word I say corresponds to which meaning—except that, luckily, the pronunciation of the vowels actually corresponds to their English spellings: respectively, in school grammar terms, they are short *e*, short *a*, and long *a*. Depending on where you grew up, you might also distinguish one of these three words from the other two, but which one's the distinct one for you may be different than it is for the person sitting next to you.

Does this matter? Well, people who make distinctions get very annoyed if they are forced to overlook them in making transcriptions, and people who don't make them really have to sweat to learn to hear them. So if the people who are studying phonetics and the people who are grading them have different dialects, some kind of agreement will have to be reached. Beyond the short term of learning phonetics, though, there's a lesson here: Reading teachers will be able to tune their advice to their students' questions better (particularly in judging whether or not the advice to "sound out" a particular word is going to work) if they understand that sound differences which are clear to them may not exist in their students' dialects, and that their students might be puzzled by how to spell sound differences which aren't easily heard by the teacher. The opportunities for mismatches like these are multiplied dozens of times, of course, if the teacher and the student are native speakers of different languages. We'll come back to this in Chapter 8.

A worse scenario occurs if a child who moves from a different dialect area is falsely judged to have a speech disorder because of pronunciation differences, and the most politically sensitive situation of all for phonetics is trying to decide fairly whether a child who is not a native speaker of English (or of the teacher's dialect of English) should have speech therapy. We'll talk about the psycholinguistic basis of speech perception when we look at experimental studies in Chapters 5 and 8.

1.2.5 Contrasting classes of sounds: Phonemes and minimal pairs

1.2.5.1 Phonemes

If you've heard the term **PHONEME** before, you may be wondering why we haven't used it yet, because you know that it is commonly used as we have used the term "speech sound": to avoid the misleading term "letter" when what you mean is in fact a speech *sound*, and not the letter that may be used to write it. But linguists and psycholinguists have something more in mind when we use the term "phoneme."

Think about what you've just learned about the ways the sound we hear as "L" varies in different contexts: Isn't it amazing that we hear them as "the same speech sound" until our attention is focused on the articulatory and auditory differences among them? How can people not notice such big differences? Of course, one reason is that they are all spelled with the same letter "L,", which makes it harder to think about the differences—that's the same problem you may have had in learning to hear the difference between the two sounds that English spells *th*, but that IPA distinguishes as theta [θ] and edh [ð]. But for theta [θ] and edh [ð], we have at least one pair of words, *thigh* [θai] and *thy* [ðai], which are kept from being homonyms only because one has theta [θ] where the other has edh [ð] (another such pair is the noun *teeth* and the verb *teethe*). In linguistic terminology, we say that the words *thigh* and *thy* **CONTRAST** (mean different things), and furthermore, that they are a **MINIMAL PAIR**: What keeps them apart is only a single sound (and in this case, only a single feature: voicing). We can also say that the sounds theta [θ] and edh [ð] **CONTRAST**: that is, if you choose to say one of them rather than the other, then you are choosing between two different words (*thigh* [θai] and *thy* [ðai]) or between a real word and a nonword—for example, [beið] *bathe* and [beiθ] *beith*. So they are separate phonemes.

But the many "L" sounds that we discussed in section 1.3.2—including the two that IPA distinguishes routinely, [l] and [ɬ]—never contrast in English. If somebody says the word *like* as [ɬaik], we hear them as mispronouncing an [l], but not as saying a different English word or as saying a sound that could be an English word but doesn't happen to be. So the various "L" sounds all belong to the same phoneme in English; the technical linguistic way to say this is that they are all **ALLOPHONES** of the phoneme /l/.

Understanding whether two speech sounds belong to the same phoneme or not in the first language of someone learning English can make a big difference in an ESL instructor's effectiveness. If that's a concern of

yours, you might like to look now at section 5.5 on speech sound perception in Chapter 5, as well as the phonetics/phonology materials in Chapter 9, sections 9.1.1 and 9.2.1.

1.2.5.2 An English consonant that isn't a phoneme

One important English consonant has been left out of our discussion because it tends to vanish when you try to find it, and also because it's a speech sound, but it's not a phoneme. How is that possible? Well, if you say *water* in a relaxed way (put it where it's not the most important word in a sentence: try rapidly saying *When're ya gonna water the LAWN?*), you probably feel that the consonant spelled with the *T* is more like a /d/ than a /t/. The same sound is in the middle of all sorts of familiar words that are spelled with a *T* or a *D* between two vowels (or between a vowel and an *R*), but it only occurs when speech is natural and relaxed. As soon as you start to say the words distinctly, the /t/ or /d/ shows up. That elusive in-between sound is called an alveolar **FLAP** or a **TAP**, because you make it by flipping the tip or blade of your tongue up to the back of your alveolar ridge, often not even making a tight contact. Its IPA symbol is [ɾ], and we never put it in angle brackets / /, because it's not a phoneme on its own in English; it's just one of the ways of saying either the phoneme /t/ or the phoneme /d/. (Remember, if a speech sound is "one of the ways of saying a phoneme" it's called an **ALLOPHONE** of the phoneme.)

Here are some pairs of words that you probably pronounce identically when you're not paying attention to your pronunciation, but that separate out when you try to think about them. Trying to hear yourself say the flap [ɾ] is a bit like trying to see the back of your own head. To see the back of your head, you need mirrors held at the proper angle, and to hear yourself say the flap in these words, you need to record yourself saying them at the right tempo. Listen to them on the CD before you try. (If you speak a variety of British English, you may have a different pattern for using the flap speech sound. Or you may use a different sound for the /t/, perhaps a glottal stop, so this whole discussion may not make any sense to you.) Here are the words on the CD: *Ladder, latter; madder (than a wet hen), matter; padder, patter; kiddies, kitties; biddy, bitty.* When you record yourself, you might well do what I suggested for *water:* Put each one in a casual-sounding sentence where another word near it is the one that is carrying the most stress.

For some people the words *rider* and *writer* are another pair that are identical when they are both pronounced with that flap allophone in the middle; for other speakers, the stressed vowels in these two words are a little different depending on which one is intended, so they aren't quite

homonyms even when they both have the flap sound. Try recording and listening to yourself saying these two words, too, if you're curious.

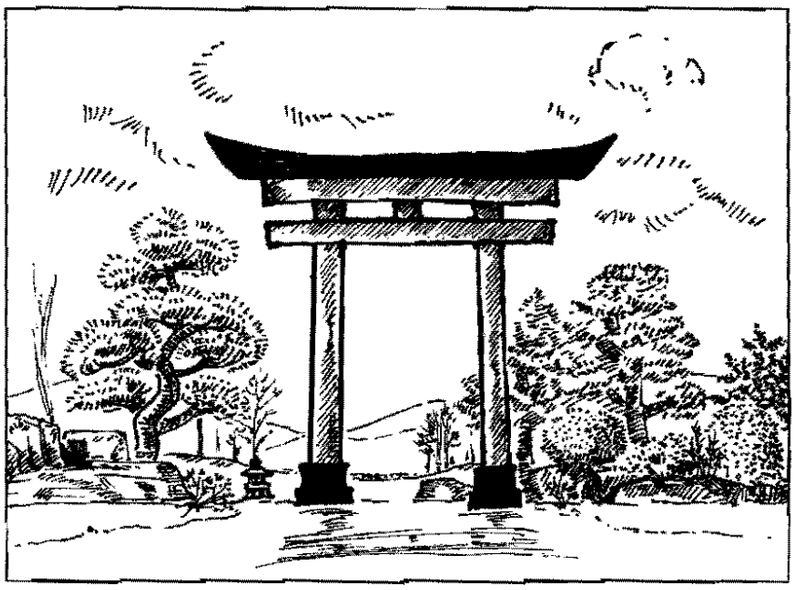
1.2.5.3. Minimal pairs and language testing

We often turn to minimal pairs of words to test the language abilities of people (and machines). Can someone with hearing loss point to a picture of a rat versus a rack, which differ only in their final consonant sound? Can a young child with immature pronunciation point to a picture of a ring versus a wing, even though she says them both [wɪŋ]? Can a child with difficulty in learning to read tell you, when you say the words aloud, whether it's the first sounds or the last sounds that differ in *coat* and *goat*, *cone* and *comb*? (If not, you know that you know you have to help him with PHONEMIC AWARENESS before he is going to be able to understand how letters are used in spelling.) Can a speech synthesizer produce the difference between *peace* [pis] and *peas* [piz] clearly enough so that native English listeners can tell them apart even in a noisy situation? Can an American trying to learn Japanese hear the vowel length differences between /tori/ *bird*, /toori/ *street*, and /torii/ *shrine gate* (Figure 1.5)? Can she imitate those three different words successfully? Can she remember which sound goes with which meaning? (Listen to those three words on your CD and see if you can do it. Be careful—the /oo/ is not pronounced like the "oo" in *boot* or in *took*—it's almost the same sound as /o/ in *code*.)

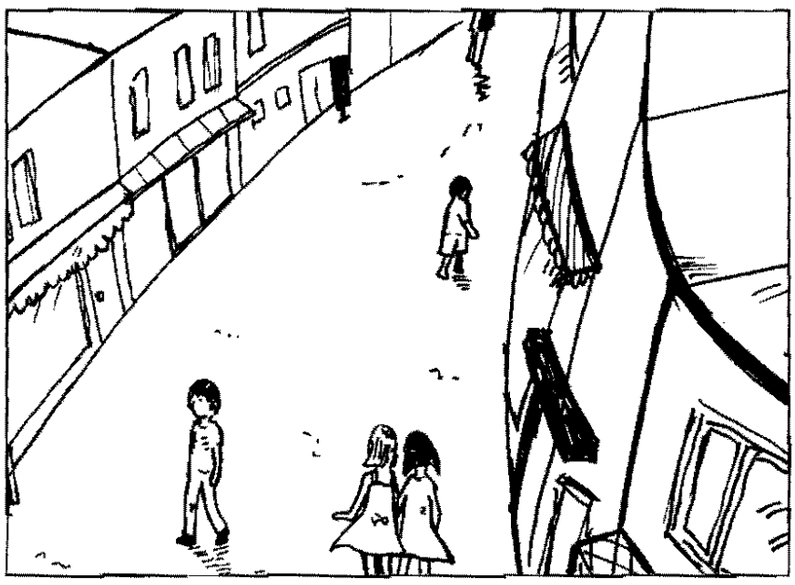
Can an English learner whose first language is Spanish hear the difference between *sick* [sɪk] and *seek* [sik]? Produce it? Remember which sound goes which meaning? In Spanish, those two sounds never contrast, and speakers don't have to learn to produce and remember them until they try to learn a language like English. So they're facing the same problem that you have when you try to hold onto the Japanese short /o/ and long /oo/ sounds, which don't contrast in English.

1.2.6 Special sounds in unskilled and disordered speech

The speech sounds made by children who are learning their first language, whether normal or delayed, are often not good matches for anything on the IPA chart. Speech may sound "wet" because there's too much saliva in the child's mouth, or it may be hypernasal—the /b/'s sounding sort of like [m] and the /d/'s sounding sort of like [n]—because the child doesn't raise her velum enough to shut off all the nasal airflow when she's trying to make these sounds. Or her tongue may touch too much of the roof of her



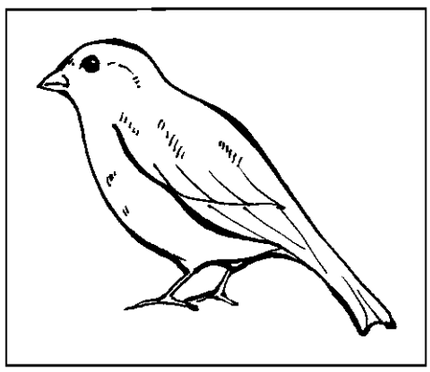
A



B

Figure 1.5. A. Torii (shrine gate). Artist: Kenta Honda. **B.** Toori (street). Artist: Nozomi Okamoto. *continues*

mouth, or the place of articulation that she uses for some sound may be in between two nearby places that the target language uses. On your CD in the Materials for Chapter 1, there are three short sound files from four-



C

Figure 1.5. *continued* **C.** Tori (bird). Artist: Nozomi Okamoto.

year-olds who were being seen at a major speech clinic. In the first pair of files, a little boy has problems with the /s/'s in the words *sister* and *parents*; it's difficult to figure out exactly what is odd about his fricative. In the third file, a little girl replaces the /ð/ in brother with an /l/-like sound that's fairly close to the standard European Spanish palatal lateral liquid [ʎ] (called *elye,* spelled *ll*, as in *llamar* "to call").

Children who are born deaf and adults who have speech problems because of brain injury also make many unusual speech sounds; so, of course, do people who have physical problems with their mouth or face after injury or because of incompletely repaired birth defects like cleft palate, and people with many kinds of muscle control problems that produce "slurred" speech.

Sounds made by speakers with all these kinds of articulatory problems can be wickedly difficult to transcribe, partly because it's hard to hear them accurately, and partly because we seldom have appropriate symbols for them. As we'll say many times throughout this book, we learn to hear the sounds that our own language (or languages) use, and we have a hard time with new ones. Individual clinics and research groups have to decide how much detail they want to add to the IPA for English by adding sounds used in other languages and by adding additional marks, called DIACRITICS, to the basic IPA chart.

1.3 Syllables and How to Count Them

English speakers are taught rules for dividing written words into syllables, but unfortunately, those rules aren't very good for dividing up spoken words. Let's start with counting the number of syllables in words, and then worry about exactly where the division between the syllables goes.

(A funny thing about counting syllables: Most of us, including linguists, have to use our fingers to get the count right if a word has more than two syllables. It's hard to count and to think about the sounds of a word at the same time.) For most words, it's easy to count the syllables if you use your fingers to tally them; starting with the first sentence of this section, *English* has two syllables, *speakers* has two, the four words *are taught rules for* are all monosyllables, *dividing* has three syllables, and so does *syllables* itself. The only longer word in this paragraph is *monosyllables*, with five.

Let's put some of those words into IPA, and then we can see a few less obvious points more clearly: /'ɪŋglɪʃ/, /'spikɪz/, /də'vaɪdɪŋ/, /'sɪləblz/. (The IPA accent mark ', annoyingly, goes right before the first consonant of a stressed syllable instead of over the vowel, probably because vowels often have to carry other marks like nasalization and pitch, so that the airspace above it gets crowded. That forces us to decide which sound actually is the first consonant of the stressed syllable, and that's often a pain, though these four words don't cause trouble. (I'll show you what "'trouble" means in the Challenge section.)

Almost every syllable has a vowel in it, which seems to form its heart —the technical way to say this is that the vowel is the **SYLLABLE NUCLEUS**. But the final syllables of /'spikɪz/ and /'sɪləblz/ have liquids at their hearts —as their nuclei, that is. With /'sɪləblz/ it's especially easy to be sure of this, because you can feel that the blade of your tongue stays glued to your alveolar ridge during the entire /blz/ sequence—it's right there while you're saying the /b/ and it stays there for making the /l/ and the /z/. With /'spikɪz/, your tongue has to move to make the /krz/ sequence—the back has to come down from the velum to stop making the /k/ and the blade has to go up at the end to make the /z/—but you don't have to make any sound in between them besides the /r/. So: liquids can be syllable nuclei, at least when the syllable is unstressed, and so can nasals in words like *bottom, button, baking*.

But with some words, the syllable count seems to depend on how you say the word, or even just how you think of it. Think about how you say the words *fire, hire, higher, towel, owl*. You and your friends may well disagree about these and other problem words, which mostly involve glides next to liquids at the ends of words; the question is whether that liquid is a syllable nucleus, or whether it belongs to the stressed syllable that makes up the rest of the word. (The *hire/higher* pair is from the superb introductory but fast-moving phonetics textbook by Peter Ladefoged, which, as I've already mentioned, is what you should read next if you're starting to enjoy phonetics. Get the 6th edition [by Ladefoged and Johnson], unless a newer one has come out, and if you buy it used, make sure your copy has the CD.)

1B. MEANINGFUL UNITS OF LANGUAGE

1.4 Morphemes: The Meaningful Units of Speech

Until now, the only time we've talked about meaning has been when we talked about minimal pairs or sets of words. But the rest of this chapter is all about meaning—although not always about the kind of meaning you can give a definition of. We're still going to have to continue working through a big load of definitions in the rest of this chapter, but to keep it from being totally indigestible, I'm putting some of the very basic ones only in the glossary. So if you don't find a definition of a term shortly after you see it in GLOSSARY format and you want to be sure you know what it means, look it up. Words from this chapter that I'm postponing to the glossary are the terms **NOUN**, **VERB**, **ADJECTIVE**, and **ADVERB**, and a few other **PARTS OF SPEECH**.

Think about the difference between the words *girl* and *girls*. Of course you know that the second one has the plural ending, and it means there's more than one girl being referred to. So *girls* has two meaningful parts: the main one, *girl*, which can also stand by itself, and the noun plural marker, spelled *s*, which has to be attached to something—in fact, quite specifically, to a noun (or another kind of word doing the job of a noun). These two meaningful pieces are called **MORPHEMES**. The word *girl* by itself is just one morpheme; because it can stand alone, it's called a **FREE MORPHEME**. But the ending, because it has to be attached to something, is called a **BOUND MORPHEME**. In this section, we'll look at two kinds of bound morphemes and two kinds of free morphemes. These distinctions are important, even though there are gray areas along the boundaries between the kinds of morphemes, because people's minds treat the different kinds in different ways, whether we're looking at aphasia, normal speech errors, first or second language learning, or at producing and understanding spoken and written language. Even a computer-based reading machine or search engine needs to be programmed to respond to the differences we're going to talk about next.

1.4.1 Free morphemes I: Content words

CONTENT WORDS—at least the kinds of content words that are labels for people and animals (*daddy, Susie, cat*), things (*milk, teddy*), properties (*hot, nice*) and actions (*throw, eat*)—are one of the two main kinds of words that children learn early. (Social-emotional words like *hi, no, bye-bye* are

the other main kind. These words are also free morphemes, because they can be said without being attached to any other word, but they are neither content words nor function words. We won't say any more about them.)

We'll say that a **CONTENT WORD** is a word with a meaning that can be defined by referring to things and events in the real or imagined world, like the labels we've just listed, but also going on to include abstract concepts like *wish* or *justice* and fictional concepts like *wizard*. In school grammar terms, content words include almost all **NOUNS**, **VERBS**, and **ADJECTIVES**, plus many of the **ADVERBS**. The content words are bolded in this sentence from the *New York Times* (April 30, 2009); the non-boldfaced words are **FUNCTION WORDS**, which we'll talk about in section 1.4.2.

> *To **inaugurate** the **new baseball season**, the **tasting panel sampled** **18 pilsners** from **American craft breweries**.*

1.4.2 Free morphemes II: Function words and words in the "gray area" between content words and function words

As challenging as it would be to define all the content words in that example sentence, it's nothing compared with the impossibility of defining essentially meaningless words like *the* and *to* (when it's used as it is here, as an **INFINITIVE MARKER**). Look in a dictionary and you can see the problems that these words cause for lexicographers. They are typical examples of **FUNCTION WORDS**—the "little words," people with **NONFLUENT APHASIA** sometimes call them, when they are trying explain which words drive them crazy because they can't remember how to say them or when to use them.

DEFINITE and **INDEFINITE ARTICLES**—in English, the words *the, a, an,* plus, in informal speech, *some* as in *some girl I know says . . .* and *this* as in *this guy you said you'd introduce me to . . .* ; in Spanish, *la, el, las, los, uno, una, unos, unas*—are hard-core function words. Instead of defining them, you have to explain and demonstrate their functions (which is why they are called function words, or in some books, **FUNCTORS**): that is, you have to explain how they are used and give examples. Many languages, including Russian, Polish, Chinese, and Japanese, have no articles; when someone whose first language is one of these learns a second language that does have them, like English or French or German or Hawaiian, learning where to put articles is a major challenge, because there are no rules that can be trusted completely.

Other central examples of function words are **CONJUNCTIONS** (English *and, or, but, if, because*, and several others), the English infinitive marker *to*, the **EMPTY PREPOSITIONS**—the ones that don't tell you where some-

thing is or is going—(*of, for, by* when it links a work to an author or an artist, and many others in various expressions), and **PRONOUNS** (*I, me, we, it, you, they, us, our, ours*). We'll mention others as we need them, later in the book.

There's a broad gray boundary area between clear examples of content words and clear examples of function words. Major inhabitants of this boundary zone are **DIRECTIONAL PREPOSITIONS** like *from, in, near,* and *under*, which often have quite clear meanings but which, as we'll see in section 1.6, have a lot of the same grammatical functions as the empty prepositions. A good English grammar resource, like one of those listed at the end of this chapter, will give you more information about all of these words, though it may not classify them in the same practically oriented way as in this book.

1.4.3 Bound morphemes I: Inflectional morphemes

We began section 1.4 by talking about plural markers being **BOUND MORPHEMES**—that is, morphemes that have to be attached to some other morpheme. Plural markers get added to almost all nouns when you're talking about more than one (the exceptions are words like *sheep*), although a handful of nouns are **IRREGULAR** and use their own special plural markers: *man/men, woman/women, child/children, ox/oxen*. When we talk about the English plural morpheme or marker, we mean the whole family of forms that can mark the plural, regardless of how they are spelled or pronounced. Look again carefully at *man/men* and *woman/women* [wʊmən/wɪmɪn]: In these two words, the past tense marker isn't an ending, it's the change in the vowels. A morpheme doesn't have to show up as a **SUFFIX** (or a **PREFIX**) that you can cut off; sometimes it's another kind of change in the form of a word. In *children*, the plural marker actually has two parts: the vowel change from /aɪ/ to /ɪ/ and the *-ren* ending.

The most widespread bound morphemes in English (and in many other languages) are called **INFLECTIONAL MORPHEMES**, a term that is annoying at first, because in everyday language, *inflection* is used to mean the rise and fall of voice pitch. It's never used that way in linguistics or psycholinguistics, though; when we talk about changing voice pitch, we use the terms **INTONATION** or **TONE**. We'll discuss why these very common bound morphemes form a category that need a name after we look at the rest of them—English has only a few, but if you know any other language of Europe or India, you know that some languages have quite a lot of them.

Another inflectional morpheme that you know is the **PAST TENSE MARKER**. The regular one, for example the one added to *walk, climb,* or *pet* (the verb), is made in writing by adding *-ed*, which, if you think about

it, is pronounced /t/ in *walked* but /d/ in *climbed* and /əd/ in *petted*. This pattern is important to think about when you are teaching reading to children or English to foreigners—for example, in explaining why *naked* doesn't rhyme with *raked*. The *-ed* family of past tense markers gets added to most English verbs, but there are a lot more irregular verbs than there are irregular nouns. The irregular verbs—the exceptions to the "add *-ed*" pattern—are among the commonest verbs of all: *be, do, come, go, bring, take, sing,* and so on. The past tense marker in those words can be a vowel change, or it can be more drastic. (Isn't it annoying that the most irregular words in any language are also the ones that are so common that you have to learn them first? More about why that's true in the Challenge section for Chapter 9.) We've also got a few verbs—all ending in *-t*, so that they already sound like good past tenses if they are used to mean a past event—that never change: *put, let,* and *set* are the most common.

The English **THIRD PERSON SINGULAR MARKER** (spelled *-s* at the end of the verb in *he gives*, *-es* in *she kisses*) is an ending that has no meaning at all; it's just required by the grammar. It's very regular; even the irregular cases, which we hardly notice except for *is* and *was*, are still all written with *-s* or *-es* and pronounced /s/, /z/, or /əz/ in a totally predictable way. (Our other irregular third person singular-marked verbs are *has* instead of *haves*; *does*, pronounced [dʌz] instead of [duz]; and *says*, pronounced [sɛz] instead of [sɛiz].)

The most important other inflectional morphemes in English are the **POSSESSIVE** ending that's written *'s* for nouns, and the *-ing* added to verbs to make **PROGRESSIVE** forms like *is walking*, *was going*. They are completely regular, and almost completely predictable from the rest of the grammar of the phrases in which they are used.

Now, why do these five bound morphemes deserve to be put in this special category called "inflectional"? That'll be easier to explain when we can compare them with the other main kind of bound morpheme in English, **DERIVATIONAL MORPHEMES**.

1.4.4 Bound morphemes II: Derivational morphemes and how to take long words apart

Let's look at some familiar long words: *possibility, oxygenation, magnify, marvelous, prototype, semitrailer*—that will do to start with. One of the neatest things about words is that many of them, like these six, seem to come apart into reusable pieces. Or, looking at it the other way, many long words seem to have been built up from shorter parts, as if they were made with a big construction toy. Bound morphemes that are used to make new

words are called **DERIVATIONAL MORPHEMES**. These prefixes and endings change the meaning of the basic word to some extent, and the endings often change its grammatical class as well. Think how hard it would be to learn new words if you couldn't find familiar parts inside a great many of them, like *possible* in *possibility* or *marvel* in *marvelous*. It's true, however, that you can't usually figure out the meaning of a new word like *containerization* completely. That's because derived words are often built on one very particular meaning of the base form. In the case of *containerization*, as you probably know, it's built on the sense of *container* referring to a huge steel box, exactly the size of the back part of a standard semi-trailer truck, which can be loaded onto ships, trains, and trucks with all its contents safe inside. So it would be a joke if you used *containerization* to mean putting your leftovers into little plastic containers.

Even when we can't take a word apart completely because some of its pieces don't exist in English, like *possible*, it may have a recognizable ending like the *-ible/-able* that makes it an adjective, or the *-tion* or the *-er* that makes it a noun, or the *-ize* or *-ify* that makes it a verb. These endings are all derivational morphemes.

Now we can look back to section 1.4.3 and compare derivational to inflectional morphemes. With very few exceptions, when we add an inflectional morpheme like a plural or a past tense marker or the progressive *-ing*, we don't feel that we have a new word—we'd think it was silly to have a dictionary that had separate definitions for, say, the singular and plural forms of nouns. That's because the meaning of the plural form is completely predictable from knowing the meaning of the singular combined with the idea of having more than one of something.

But adding derivational morphemes (in clear cases) creates combinations that feel like new words. Why do they seem to be new? Because we don't necessarily know exactly what the combined forms mean just by looking at what their parts mean. In other words, the less predictable the meaning of the combination of two morphemes, the more we need to have a new dictionary entry for the combination, as we do for *containerization*.

So now we can define both inflectional and derivational morphemes. **INFLECTIONAL MORPHEMES** are bound morphemes that intuitively feel (to ordinary folks and to dictionary makers) like they don't make a new word when they are added to a base form, and **DERIVATIONAL MORPHEMES** are bound morphemes that do seem to make a new word when they are added to a base form.

Another difference between these two categories that you often find stated in linguistics or grammar textbooks is that inflectional morphemes don't change the part of speech (a plural noun is still a noun) but derivational morphemes do (*possible* is an adjective, *possibility* is a noun). This

statement, although true most of the time, has three problems. First, it applies only to suffixes, not prefixes (*semitrailer* and *trailer* are both nouns). Second, some inflections can perfectly well be considered to change a word's part of speech: the *-ing* form of a verb can be freely used as an adjective and sometimes as a noun (*the singing children*, *the children's singing*), and the possessive form of a noun behaves grammatically very much like a definite article; have you noticed that we can say *the cat* or *George's cat* or *the black cat* or *George's black cat*, but not *the George's cat*? And third, even some derivational suffix morphemes DON'T change the part of speech: *Child* and *childhood* are both nouns, although they are very different kinds of nouns.

Because many English derivational morphemes (for example, *-tion, -ity, -ous, in-*) originated in words borrowed from Latin or from French, which is descended from Latin (English itself is not), the modern languages that developed from Latin have those morphemes too, in very similar or even identical forms. So second language learners whose first language is Italian, French, Spanish, Portuguese, or a few others have an easy time learning how these derivational morphemes are used, and English speakers learning the Romance languages have an easy time learning their equivalents like Spanish *-cion, -idad, -oso, in-*. But speakers of Chinese, Japanese, and other languages that work rather differently from the major languages of Western Europe benefit very strongly in English classes by being shown how derivational morphemes give us related sets of words like *derive, derivation, derivative, derivational*. Even though you can't tell exactly what the meaning of the new word will be by knowing the meaning of the base form, you can almost always use the meaning of the base to help you remember the meaning of the derived form, and vice versa.

By the way, we English speakers can use some words that were originally nouns as verbs, and the reverse as well, without putting any derivational ending on them to change their part of speech: *a light, to light something*; *a house, to house someone*. Chinese speakers can do the same kind of thing with many of their nouns and verbs, but in many other languages, this kind of simple shift of a word's PART OF SPEECH isn't possible.

1.4.5 Compound words: Taking more long words apart

English speakers also make new words by joining other words together—that is, using our new terminology, by joining existing free morphemes to make COMPOUND WORDS, like *webmail, inbox, hovercraft, payback*. (Many other languages do this too.) And, of course, some of these words can then have derivational and/or inflectional endings added to them, as in *sleep-*

walker-s or *birdwatch-ing*. Sometimes, though, it's difficult to decide whether the name of a new object or institution, like *compact disc* or *day-care*, is one word or two, which takes us to the next topic: words.

1.5 Words

Everybody who can read a language written in an alphabet knows what a word is: a meaningful string of letters that has white space or a punctuation mark before and after it (unless it's in a Web address). But we've started to see that defining "word" is not quite that simple—in fact, as philosophers, psychologists, and linguists will tell you, it's very difficult, and we're not even going to try it here.

What we've said about "word" so far is this: If you add an inflection like plural or past tense to a base word form, like *books* from *book*, it isn't a different word, just a different form of the same word, because the meaning of the inflected form is almost 100% predictable from the uninflected form, so it doesn't need a separate dictionary entry or subentry. The same is true for the *-ing* form of most verbs, like *seeing*: if you know what *see* means, you know what *seeing* means. But you can't quite predict the meanings of words that are formed by adding derivational morphemes, like *cookie* (from *cook*). You also can't fully tell the meaning of the verb *book* from the noun *book*, so those—even though they are exactly the same sets of letters—are treated by dictionary makers as separate words. (Amazingly, there are people with aphasia who will look at a picture of a comb and tell you that they can't think of what it's called, but it is used to comb your hair with. So the dictionary makers are right about noun and verb pairs with identical forms, like *a book/to book* and *a comb to/comb*, being different words!)

All we'll add to this discussion of "word" is how to decide whether or not a particular combination of two words should be considered to make one new word. Dictionary makers do, sensibly, continue to follow the principle of predictability, although rather roughly. If the meaning of the combination is not predictable from its parts (plus a bit of common sense), as in *hot dog* or *keyboard* or *greenhouse*, the combination is a compound word, and it is relatively likely to be listed in the dictionary. If the meaning of two words together gives pretty much what you'd expect from combining their meanings (or some of their meanings), like *white horse*, then the combination isn't considered a compound.

What makes life interesting is that there are probably thousands of two-word combinations whose meaning isn't fully predictable, but which

are not listed in even the largest dictionaries—although true unabridged dictionaries like the *Oxford English Dictionary* (the one that takes up 20 fine-print volumes) do include very large numbers of them. As far as how they are written, as we hinted at the end of section 1.4.2, combinations of two words are a complete grab-bag. Dictionary makers follow the usage of high-prestige print sources like major newspapers (which could just as well have become standardly written as *news papers* or *news-papers*). There is no principle for deciding how to write a compound word.

Being able to take apart compounds is important for beginning English readers, whether they are English-speaking children or adult second language learners, and it's not only because disassembling a word helps to figure out its meaning. Looking to see whether a word could be a compound can be essential to sounding it out correctly—for example, you'd never be able to connect the written words *chophouse* and *goatherd* to any words you have ever heard if you tried /f/ as a reading for the *p* + *h* sequence and /θ/ or /ð/ for *t* + *h*. In the same way, being alert for prefixes (which are derivational morphemes) can keep a reader from saying *misled* as /maizld/—an error that some people miserably recall making when they were reading the word aloud for the first time.

1.6 Utterances: Phrases, Clauses, and Sentences in Speech

1.6.1 What's an utterance?

If you look at a transcript of a real conversation like the one in Materials for Chapter 1 on your CD, you'll see that people say lots of things (UTTERANCES in linguistic terminology) that are treated as complete in spite of being only phrases, not complete sentences. The idea that people do or should talk to each other in complete sentences is just silly; the question *Where's my mittens?* can be answered equally well by *They're on the bed* or just *On the bed*. Even just *bed* is possible, though grumpy-sounding. Only some language textbooks for foreigners and some programs for children with language difficulties insist on complete sentences all the time. This is rather poor preparation for understanding what native speakers are likely to say, although it might be a good model for a second-language learner to use for speaking until her accent is no longer very strong.

For analysis of conversations, then, we divide speech into utterances, which may or may not be sentences. But as listeners, we start to interpret

words as soon they come to our ears, and as readers, we start to attribute a meaning as quickly as possible after we see a word. We don't wait to get to the end of the utterance, even though that sometimes leads us to misunderstand the speaker or the writer temporarily, if the beginning of a sentence is ambiguous, like this one: *The truck unloaded at the rear door was rented.* (In case you're not quite getting it: This sentence has to mean *The truck that was unloaded at the rear door was rented*, but until you get past *door*, you're probably expecting *unloaded* to be the main verb, as it is in *The truck unloaded at the rear door and drove off.*)

With the elegant piece of laboratory equipment called an **EYE-TRACKER**, which makes a millisecond-by-millisecond record of exactly where a person is looking as they read or as they look at a picture, you can see that someone who is reading this kind of sentence usually stops when they hit the second verb—in our example, the word *was*—because that's when they discover that the first verb—in our example, the word *unloaded*—can't be the main verb of the sentence. They then go back to the beginning of the sentence and choose the right interpretation: that the first verb (*unloaded*) is being used as an adjective to describe the truck. We'll have a lot more to say about experiments like this in Chapter 5, section 5.5.2.

1.6.2 Pieces of utterances: Phrases and clauses

It's a good thing that long, complicated sentences are made up of smaller sequences of words, or we'd never be able to figure them out. That's partly because the details of what most words mean can't get filled in until we see them in their context; for example, you can't make a good mental picture of what *push* means in a sentence until you know whether what's being pushed is a door, a swing, a button, or a pencil. Other reasons will become clearer as we move through the next several chapters.

We need to take sentences apart into two kinds of groups of words: phrases and clauses. We could get pretty far just using the term "phrase" informally, to mean a few words that intuitively seem to go together. But we also need the formally defined terms **NOUN PHRASE** and **PREPOSITIONAL PHRASE**, because the words in these particular kinds of phrases become tightly bound together in our minds—we know this because whole noun phrases and whole prepositional phrases can move around together in speech errors like *The Grand Canyon went to my sister*, where the two noun phases *the Grand Canyon* and *my sister* have obviously switched places. Linguists and grammarians use these terms this way: a **NOUN PHRASE** is a **NOUN** or a **PRONOUN**, plus perhaps other words or groups of words that

tell you more about it in order to help you identify it (in grammar school terms, that modify its meaning; this definition isn't perfect, and you can try to improve it once you feel that you understand the idea.)

Prepositions are words whose job is to link noun phrases—and only noun phrases—to the rest of a sentence, and a **PREPOSITIONAL PHRASE** is a noun phrase with a **PREPOSITION** in front of it. So, if you understand what a noun phrase is and isn't, you're also all set to deal with prepositional phrases. (There are two other important categories of words—conjunctions and relative pronouns—that are used to link other kinds of multiword units into a sentence. We'll get to them when we look at clauses.) Just one more grammar term here: in a prepositional phrase, like *to the Grand Canyon*, the noun phrase (*the Grand Canyon*) that follows the preposition (*to*) is called the **OBJECT OF THE PREPOSITION**.

Some examples will help: the groups of words in the first column of Table 1.3 are noun phrases, the ones in the second column are prepositional phrases with the prepositions **bolded**, and the ones in the third column are neither noun phrases nor prepositional phrases. Why not? What's wrong with each of them? Which ones seem to be some kind of unit, and which ones are just a sequence of words?

We'll also find it useful to talk about **VERB PHRASES**, even though a verb phrase is probably not such a tight mental unit as a noun phrase or a prepositional phrase. A verb phrase is defined as a **VERB**, its **OBJECTS**, and any **ADVERB**ial words or phrases that tell you more about it (modify it).

Table 1.3. Noun Phrases and Prepositional Phrases

Noun Phrases	***Prepositional Phrases***	***Neither Noun Phrase nor Prepositional Phrase***
She		she saw
them	**for** them	gave them
Susannah	**by** Susannah	Susannah called last night
our house	**under** our house	painted our house
the brick house down the street	**after** the brick house down the street	house down the
the blonde twins your brother had a crush on	**of** the blonde twins your brother had a crush on	that your brother had a crush on
Joseph and Samantha	**from** Joseph and Samantha	and Samantha

Okay, what are the objects of a verb? First of all, they are noun phrases, just like the objects of a preposition. But objects of a verb are noun phrases that are hooked into the sentence directly by the verb, without needing a preposition to introduce them. So, in English, the objects of a verb are the noun phrases that come right after that verb, like *the boys* in *He's picking up the boys after school lets out* (or noun phrases that would be fine coming right after the verb if you moved them there, as in *The boys, he's picking up after school lets out*).

Table 1.4 gives you some verb phrases, with the objects of the verb **bolded**. Remember that we are talking about syntax here, not about meaning: *took **a gift** for them* and *took **them a gift*** have the same meaning (specifically, the same semantic roles, which we'll talk about in section 1.7), but they have different grammatical forms: The verb phrase *took **a gift** for them* has an object and a prepositional phrase, but the verb phrase *took **them a gift*** has two objects—in school grammar terms, it has a direct object and an indirect object.

And, to get ready for our discussion of clauses, the last column has verb phrases with subject noun phrases, in *italics*. Remember that the objects of a verb are considered part of the verb phrase, but the subject is not. Instead, the combination of a SUBJECT with the verb phrase that gives information about it makes the last important unit that we need to talk about: a CLAUSE.

The CLAUSE is the most important multiword chunk for linguistic and psycholinguistic analysis. In lawyer-speak, a clause is a single provision in a law or a contract, no matter how complex its grammatical structure, but linguists and psycholinguists define a clause as a verb phrase with an

Table 1.4. Verb Phrases and Simple Clauses

Verb Phrase, No Object	***Verb Phrase, One Object***	***Verb Phrase, Two Objects***	***Clause***
go			*You and George* go
see clearly	see **Susannah**		*I* see clearly now
brings up	brings **a cake**	brings **her a cake**	*Jon* brings her a cake
took	took **a gift** for them	took **them a gift**	*My folks* took them a gift
boil for five minutes	boil **it** for five minutes		*(you)* Boil it for five minutes

implicit or explicit **SUBJECT**. And what's a subject. You already know that it's a noun phrase, and the examples in Table 1.4 remind you of some of the different kinds of noun phrases. But there's something special about the subject noun phrase: In English (and in all the languages that are closely related to English), it is different from object noun phrases, because it affects the form of the verb. The most dramatic example of these changes in the verb form, as you know, are those that happen to the present tense of the verb *to be* when it's combined with different subjects: *I* ***am****; he, she, it* ***is****; you, we, they* ***are****. Sam* ***is****, people* ***are****, George and Susanne* ***are****.* And in the past tense, *to be*, unlike any other English verb, has two different forms: *I, he, she, it, Sam* ***was****; you, we, they, people, George and Susanne* ***were****.* The standard way to talk about this is to say that the verb must **AGREE** with its subject noun phrase, even though for all the other verbs in English, the only **AGREEMENT** change is putting on the third person singular marker *-s* that we talked about in section 1.4.3 (plus, for *have, do,* and *say*, as we mentioned in that section, a change in the pronunciation of the sound that comes just before that -s).

A very large number of languages don't have any kind of agreement between subjects and verbs. So for people whose first language has no subject-verb agreement, remembering to put that third person singular marker *-s* where it's needed in English is a pain. Even for people who are learning English as a second language who grow up with subject-verb agreement in their first language, the third person singular marker is a nuisance. It takes a while for children whose first language is English to learn it, too, especially children with developmental language disorders.

Now, what about that "(you)" listed as the subject for the instruction, *Boil it for five minutes*? Obviously, in instructions and in orders like *Stand up!, Don't slam the door!,* or *Please take off your hat*, the person who is being instructed or given an order is expected to do (or not do) what the verb phrase says. So school grammar says that the sentence has an "understood" *you* subject, which is what the "(you)" is supposed to mean. For the subjectless sentences of casual speech, like, *Come here often? Looks like he's had a few*, or *Had a bad night, I'm afraid*, which are especially common as the first words of a new conversation or topic, some linguists say that they also have a kind of a pronoun subject (*You, he,* or *it, I*) that gets omitted. Other linguists would prefer to say that these verb phrases simply have no subject, and that the information about whom the verb phrase applies to is supplied by the context. (Remember that utterances don't have to be complete sentences or complete clauses.) We'll stay away from this controversy, and just use the school grammar term "the understood subject" if we need to.

There are some other roles that we'll need for our analyses, too—not ones that are central to the action, but nevertheless, roles we use all the time: MODIFIERS of nouns (ADJECTIVES like *red* or *terrific*, numbers, POSSESSIVES like *mine* or *their*), ADDRESSEE—the person or people you are talking to (*Hey, **Joe! Mom**, where are my sneakers? **Congregation**, please rise*), PREPOSITIONS (***under** the bed; **after** midnight*), OBJECTS OF PREPOSITIONS (*under **the bed**; after **midnight***), and ADVERBS, the large miscellaneous collection of words that modify sentences, adjectives, and verbs: ***Frankly**, I don't care; He's **really** sweet; It's full **enough**; Do it **now***).

1.7 Basic Syntactic and Semantic Roles: The Jobs That Words Do In Clauses

There are two ways of looking at how words work in clauses, and we need both of them in the classroom, the clinic, and in any application in which a computer is supposed to act as if it understands spoken or written language. One way is to look at the SYNTAX of the clause, as we have started to do already: which word is the subject, which words are adjectives, which words are in prepositional phrases, and so on. We need these concepts in order to be able to explain why a sentence sounds grammatical or ungrammatical.

The other aspect of clause structure is how the noun phrases contribute to its meaning, and this is very different from what we've done so far. The noun phrases in a clause have different SEMANTIC ROLES or FUNCTIONS: some of them refer to the AGENT (the person, animal, or person-like entity who carries out an action), and others to the UNDERGOER (the person or entity that is affected by an action). In section 1.7.2, we'll see why syntax isn't enough, and why we need to think about semantic roles in order to communicate who did what to whom.

1.7.1 Basic syntactic roles in a clause

We introduced the basic syntactic roles when we discussed clauses in section 1.6.2, so we can keep this section short; we only need it to help us compare syntactic roles with semantic roles. A clause is normally composed of a subject noun phrase and a verb phrase. The verb phrase may contain one or two object noun phrases; some verbs can have objects, others can't, some must. The whole clause and any part of it can have a

prepositional phrase modifying it. Really complex sentences can be built up when we use a clause to modify part or all of another clause, or to be its subject or object. Here are some examples to refer to:

George gave me an idea yesterday.

Subject *George*, verb phrase *gave me an idea yesterday*, objects *me* and *an idea*. *Yesterday* is an adverb that modifies the whole verb phrase.

Chris will be okay by tomorrow.

Subject *Chris*, verb phrase *will be okay by tomorrow*, no object. *Okay* is an adjective (in school grammar, a **PREDICATE ADJECTIVE**) that modifies *Chris*. *By tomorrow* is a prepositional phrase that modifies the verb phrase.

Sam thinks that Chris will feel okay by tomorrow.

Subject Sam, verb phrase *thinks that Chris will feel okay by tomorrow*; object *that Chris will feel okay by tomorrow*, which is the clause *Chris will feel okay by tomorrow* preceded by the connecting word *that*. (The usual linguistic term for the *that* when it's used this way is "complementizer." We won't need it in this book, so I'm not putting it in the Glossary.)

1.7.2 Basic semantic roles

We can't tell who did what to whom just by looking at the subject and the object (or objects); we also have to look at the verb itself quite carefully. This may seem odd—isn't the subject of the sentence the **AGENT**, the person who's doing what the verb phrase says? In sentences like *Joe kissed Samantha*, yes, the subject is the Agent (we're going to Capitalize semantic role terms to make them easier to spot). But what about who-did-what-to-whom in the sentence *Samantha was kissed by Joe*? In syntactic terms, *Samantha* is now the subject, but in semantic terms, she's still the **UNDERGOER**, the person affected by the action. And *Joe*, even though he's stuck out there on the end as the object of the preposition *by*, still did the kissing—he's still the Agent. So there's a big difference in the way the two sentences work to convey meaning. The reason for this difference, of course, is that the verb *kissed*, in the first sentence, is in the **ACTIVE VOICE**, but the verb *was kissed*, in the second sentence, is in the **PASSIVE VOICE**. So to

understand and explain the difference between how clauses work when their verb is in the active voice and when it's in the passive voice, we need to separate the syntactic terms "subject" and "object" from the semantic roles like Agent and Undergoer that are played by the people and things being mentioned.

For some verbs, the subject is the Undergoer even when the verb is in the active voice. Here are some examples of sentences like that; if you think about it, you'll see that they have no Agent noun phrase at all, just an Undergoer, plus some other semantic information, mostly about where the Undergoer went.

The ball rolled under the car.

His cell phone fell into the water.

I accidentally tripped over that stone.

Her hat blew off.

My computer crashed again.

Stock prices dropped in early trading, but rose again before the market closed.

It often takes real-world knowledge to decide which semantic role the subject is playing. In a sentence like *I got my car totaled*, the subject is almost certainly the Undergoer, but in *I got the jar opened*, the subject is probably the Agent (although she might have gotten someone else to turn the lid for her: the sentence doesn't make that clear). It's not the grammar that tells us this; it's the probability that in real life, we don't want our cars smashed but we do want our jars opened.

So in sections 1.7.1 and 1.7.2, we've seen that an essential part of understanding what is happening around us is organizing events in terms of their causes and effects, including human (and animal) agents' intentions (or lack of them). We've also seen that language encodes this understanding by somehow linking each thing that we talk about with a semantic role, and that semantic roles are about meaning, while syntactic roles are not. School grammar often mixes these two aspect of clause structure together, but people who work with language need to keep them separate: A computer program that is near-perfect at figuring out the object of a clause may be nowhere near accurate at figuring out who the Undergoer is, and an aphasic person may know perfectly well who the undergoer of an action is but be quite unable to make that person's name be the subject of a verb phrase.

1.7.3 Combining words: Using syntax and semantics in understanding language

When beginning readers read sentences aloud one word at a time, we worry whether they are getting any meaning out of the way the words are combined. A very simple sentence, for example, *Joe likes Sam,* can probably be understood pretty well that way, in fact—let's see how it might be done. Suppose a reader assumes that a sentence that starts with *Joe* is about Joe, which means that it's likely to tell us about how Joe looks or what he feels or does. (A child with no experience of being read to could fail to have even this starting assumption—she could fail to realize that words in a line of text are not a list to be learned like spelling words, but are supposed to represent sentences. This is one reason that reading aloud to children is important for their success in school.)

After reading *Joe*, our beginner encounters *likes*, and if she expects the words written in a line of text to mean something, as the words that she hears one after another in conversation do, she can recognize that *likes* could mean a way that Joe feels, so that the two words start to make sense as a statement *Joe likes*. But what is it that Joe likes? A typically developing child over the age of three knows that after *Joe likes* comes at least one more word, containing information about what or who it is that Joe likes, whether it's ice cream, skateboarding, or one of his friends. Or at least, there must be an object pronoun like *it*, *us*, *you*, or *her*. In school-grammar terminology, the verb *likes* is **TRANSITIVE**—that is, it begins a verb phrase that must be completed with an object noun phrase, which could be the name of a person or a thing, or an activity, like *to go fishing* or *flying kites*. Psycholinguists would describe the word *likes* as being represented in our minds as being attached to two possible **FRAMES**: a **TRANSITIVE FRAME** with a **SLOT** for a noun after it, and another kind of transitive frame with a slot for a verb form that names an action (like *to go* or *flying*). (There's a linguistic term for these action-naming verb forms, although you don't have to know it: they are nominalized verb forms, which simply means that they have been made into nouns.)

A useful technical way of describing the same thing is to say that the word *likes* **PROJECTS** a noun phrase or a verb phrase. What this means, at least in this book, is simply that English speakers expect to hear a noun phrase (which might be a verb form that has been made into a noun) after *likes*. *Sam* will do very nicely to fill that slot.

Linguists often use **TREE DIAGRAMS** for representing sentence structures; Figure 1.6 shows you a typical tree diagram for the structure of *Joe likes Sam.*

In English, a verb frame also can be thought of as projecting the slot for its subject (although this isn't standard terminology). This is a useful

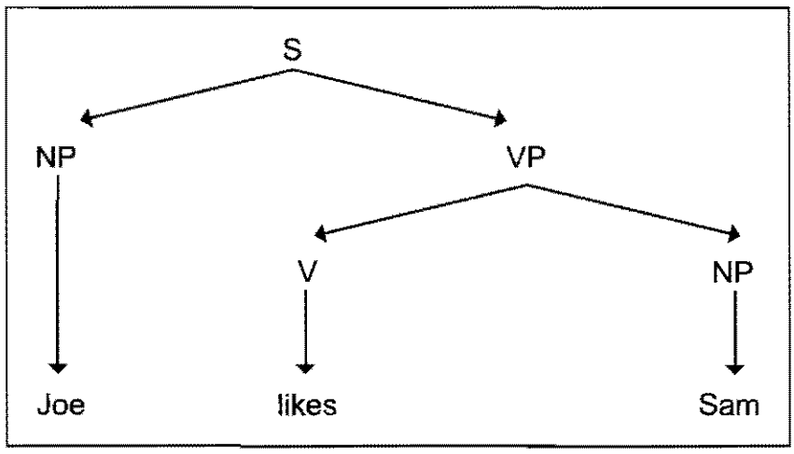


Figure 1.6. Tree diagram for *Joe likes Sam.*

description of something you know about verbs, because if you see just *likes Sam* at the top left of a page of text, you'll automatically assume that there was a word or phrase referring to the person who likes Sam at the end of the previous page (even if LIKES SAM is in all capital letters, so that you can't tell just from looking at the letters that the beginning of the sentence was missing). And if a sentence in Yoda-speak is read to you, you know where really belongs the noun phrase that shows up at the end of the sentence.

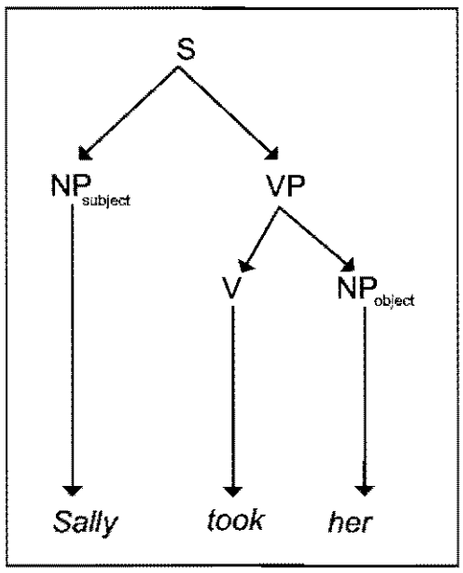
Most sentences have richer structures than *Joe likes Sam*. Readers have to be able to hold onto several possibilities for the sentence structure until they find out which one accounts for all of the words. And this is where reading one word at a time falls apart as a description of what a reader needs to do. Let's compare the structures of two sentences that are simple enough for a child's book, a beginning ESL reader, or a reading test for people with aphasia, and see why we don't just read words and combine their meanings—in other words, why readers need (subconsciously, of course) to compute sentence structures. Look at these example sentences:

Example 1.7.3A. *Sally took her to the zoo.*

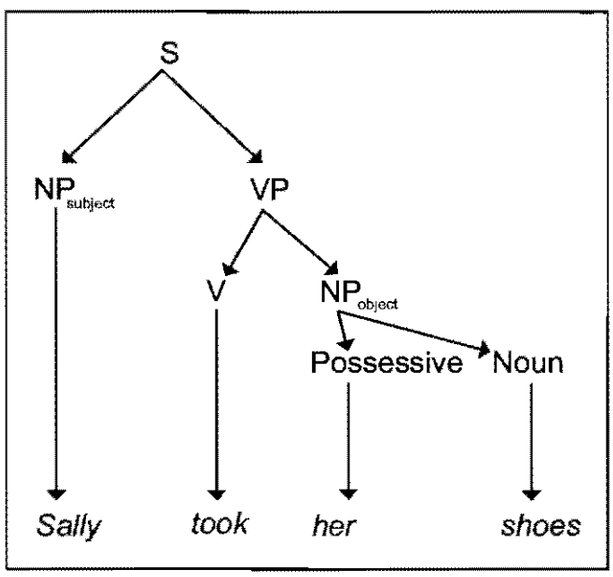
Example 1.7.3B. *Sally took her shoes off.*

These two sentences begin with the same three words, but their structures are quite different, except for the fact that Sally is the subject of both of them. When you read the first one, you understood that the word *her* is referring to another female creature for whom Sally arranged a trip—to the zoo, as it turns out. But the same word *her* in the second sentence is referring to someone who owns something—in this case, shoes. (Maybe it's Sally, maybe it's someone else.)

Figure 1.7 shows you trees for first parts of each of them, which should make it easy to see the differences in sentence structure that go along with these two meanings: in Example 1.7.3A, *her* is the whole



A



B

Figure 1.7. A. Partial tree for example 1.7.3A. **B.** Partial tree for example 1.7.3B.

object of *took*, but in Example 1.7.3B, it's only part of the object; the whole object is *her shoes*.

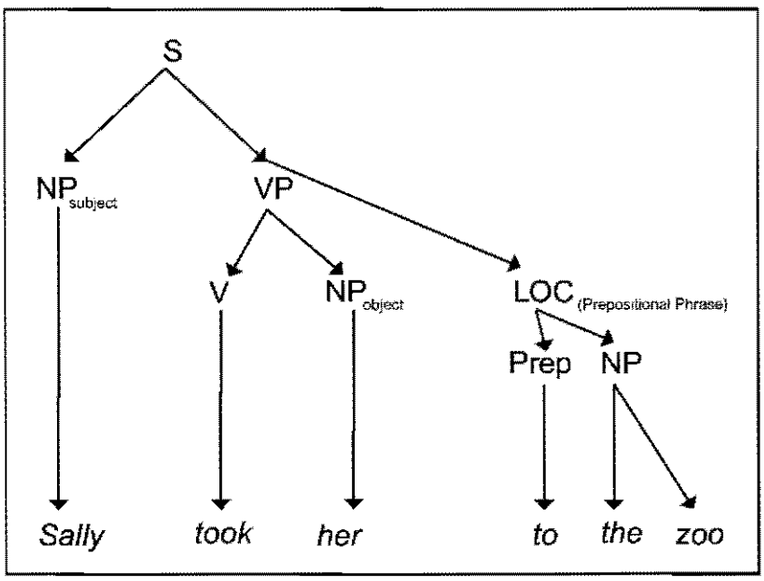
(These trees are modified from what you'll see in most linguistics textbooks, so that we can focus on what's essential for this pair of sentences.)

We're not quite done with figuring out how these two sentences work because the verb *take* has several different frames it might be used in, corresponding pretty well to its several meanings. In addition to the object slot, the frame for both of these sentences has a **LOCATIVE** slot (LOC) for indicating a change of place for that object. (The meaning of *take* in our examples is something like *cause to change location*.) Now Example 1.7.3A has the locative prepositional phrase *to the zoo*, and Example 1.7.3B has the **LOCATIVE PARTICLE** *off*. Figure 1.8 gives you the completed trees that represent what the hearer has to know in order to understand these sentences.

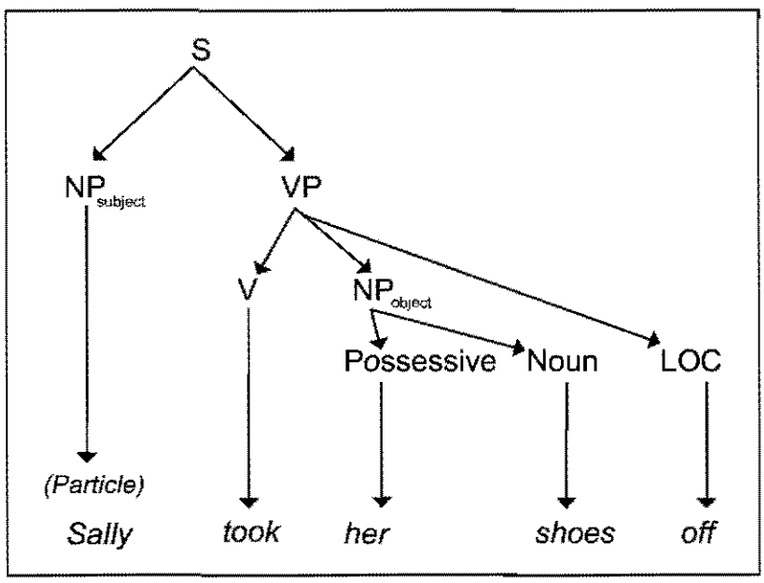
In natural speech, the pacing of our words and the rises and falls of our voice pitch—the **PROSODY** of the sentence—gives our listeners some information about how words are to be grouped together (listen to these two sentences on your CD under Materials for Chapter 1). This helps listeners decide which structure they are in the middle of hearing.

But in reading, there's no prosody on the page, so we often have to hold onto a word in our minds and wait for more information before we know how to interpret it. In these two sentences, the syntactic job of the word *her* becomes clear when we hear or read the word after it. If that next word is the preposition *to*, we know that *her* must be the object of the verb. But if the next word is a noun meaning something that could belong to Sally, like *shoes*, we know that *her* must modify it, and that the object must be the noun phrase *her shoes*. (However, we don't know whether the *her* in 1.7.3B. *Sally took her shoes off* means Sally or someone else—we'll need more information to figure out its semantic job.)

In some sentences, readers must wait a bit longer to deal with a word that might belong to two different structures. If we make up our minds too quickly and are wrong, we may have to go back and see how else the sentence could work, as in the example *The truck unloaded at the rear door was rented*. (Misinterpretation of a sentence's structure can happen when we're listening, too.) An unskilled reader working one word at a time might be trapped into the wrong interpretation by a sentence like one of these, and need help in retracing her decisions about what it means. All this may seem like an unbelievable amount of work to go through in order to understand such simple sentences, and it would be if we had to do it deliberately and consciously. But we do it unconsciously most of the time, except when we've really gotten off on the wrong track. We'll see more about sentences that lead us off the right track in Chapter 5; they are called **GARDEN PATH SENTENCES**.



A



B

Figure 1.8. A. Completed tree for example sentence 1.7.3A. **B.** Completed tree for example sentence 1.7.3B.

1.8 Pragmatics

PRAGMATICS is the part of linguistics that's sometimes called "how to do things with words." How do people choose words to have the effects that they want on other people—to be polite, to be understood, to make other people feel like insiders or outsiders, to make them feel good or ashamed, to encourage or console, impress or inform? The topic of pragmatics is huge but easy to understand, so you can read about it for yourself—there are some suggested readings in Materials for Chapter 1 on your CD.

Here's a pragmatic consideration for practical use in adult second language teaching: People need to know polite ways to ask for things in their new language, even if the polite forms are complex. For example, English learners need to be able to use, *Could I please have* instead of *I want*. It's hard enough to be a foreigner; one doesn't also want to be perceived as rude.

A lot of the differences between written and spoken language are also matters of pragmatics. Expressions that make fine, lively colloquial narratives like, *So then this guy comes up to me and says* . . . won't do in a formal report of an incident, and the formal alternatives like, *At that point a man I didn't know came toward me and said* . . . may have to be taught explicitly. People with aphasia, as we'll see later, typically have most of their sense of pragmatics spared by their brain injuries, but if they can't find the syntax or the words that they need to express themselves, what they say may nevertheless strike the people listening to them—including clinicians—as being pragmatically inappropriate.

1.9 The Gap Between What People Know and What They Do: Kinds of Linguistic Knowledge

1.9.1 Tacit knowledge and how you find out about it

By now you might be rather tired of being told things about your language. You knew how to speak it, so did all this stuff about tongue position, word endings, and sentence formation have anything new in it besides the terminology? If it's inside your head (and where else could it be?), why can't you just know it by thinking about it? Well, you can't see inside your eye, or hear what's happening inside your ear, or taste how the taste buds in your tongue work, either. People have to study them scientifically to know how they work.

You are quite right, though, that simply knowing about linguistics won't, by itself, help you speak. Knowing the mathematics of forces and

trajectories doesn't help you with scoring a home run or a touchdown, either, and being a skilled ball player doesn't help you with physics. Knowing about things in a way that you are aware of (**EXPLICIT KNOWLEDGE**) and knowing how to do them (usually called **TACIT KNOWLEDGE**—*tacit* is a Latin verb form meaning *he/she/it is silent*) are very different kinds of knowledge. (And as the late and well-loved linguist Jim McCawley of the University of Chicago pointed out, there are still more kinds of knowledge, like knowing how particular things taste, look, smell, and sound—think of how you recognize cinnamon by its taste and smell, or snare drums by their sound.)

So how can you find out what you or someone else tacitly knows how to do with language, if you can't do it by asking them things like, "What is the right order of words in an English question?" You do it the same way you do any other science: by observing, recording your observations, making a sensible guess about the pattern formed by the events you've observed (in formal language, by making a **HYPOTHESIS** about the what the pattern is), figuring out some new things that should be true if you were right about the pattern, and then seeing if those new things are in fact true (formally, "testing the hypothesis"). It's no different from detective work, except that, in testing a scientific hypothesis, you're not solving a single case, but a whole class of similar cases. And you probably can't do it in time for the final commercial—but then, neither can real detectives, only the ones on television.

1.9.2 Spelling and speaking: The eyes fool the ears (and the tongue)

Sometimes, your explicit knowledge about your language—or rather, what you think you know about it—is actually wrong, and it can mislead you in your attempts to observe your tacit knowledge in action. We'll look briefly at how knowledge of spelling can distort the way you hear your own pronunciation. It's not really your eyes that are fooling your ears when this happens, of course; what's misleading you are the connections you have been making between letters and sounds since you learned to read English. Those well-learned associations between letters and sounds are competing with your actual perception of the sounds you make, and with your perception of what your vocal tract is doing when you are making those sounds. In the first part of this chapter, you had to work hard to build new connections between IPA symbols and sounds, so that you could think in terms of sounds rather than of spelling. What was hardest about this process probably wasn't making the new connections; it was keeping the old and by-now-automatic connections between sound and letter from

interfering with the new ones. For example, remembering that *think* and *this* begin with two different English phonemes, respectively theta /θ/ and eth /ð/, is hard because those two sounds are both spelled the same way. Remembering that the symbol /e/ is pronounced in IPA only like the main part of the vowel in *eight* is hard because seeing it also calls up the other sounds English uses *e* for, like the /ɛ/ of *head* and the /i/ of *heed*.

So it's pretty common for speakers to think that they are pronouncing words in CITATION FORM (a super-distinct pronunciation like a person running a spelling bee uses), when, in fact, we rarely use such forms for the common function words of our language. People also often think that they are pronouncing words differently that are spelled differently, even when they are actually pronounced the same (or are usually pronounced the same). For example, we make a pronunciation distinction between the citation forms of *than* /ðæn/ and *then* /ðɛn/, but when we actually say *She's a lot taller than me* and *So then is that okay?* they are both usually pronounced /ðn/, with the /n/ doing the job of the vowel. Listen to these examples on your CD; we'll discuss this problem more in Chapter 8, section 8.5.1.

Another good example of how spelling fools us is with the word *that*; listen to the CD example showing how it's produced in some common contexts: *I told you about that time that I met him/The one that I bought/ I bought that one.* Using a sound wave analysis program like Praat (introduced on your CD) to cut up speech into pieces is immensely helpful in finding out facts like these.

Surprisingly, people who are not good at reading aren't actually better off at thinking about sounds than those of us who have been brainwashed by the alphabet. Usually, they have even less practice at thinking about speech sounds than those of us who can pretty much sound out unfamiliar words. They keep getting distracted by their connections between sounds and meaning, probably because they can't use alphabet letters—as limited as those are—to help keep their minds focused on the sounds instead of the meanings.

1.9.3 Right and wrong: Tuxedos at the gym

Another way that what we believe about our language is different from how we actually behave has to do with our ideas about speaking "correctly." Educated people often think, first, that speaking colloquially is wrong, and second, that they don't do it themselves. But what's appropriate pragmatically has little to do with correctness, and everything to do with where you are, who you're talking to, and what role you're playing. "Talking like a book" with friends at a bar is as out of place as wearing for-

mal dress at an exercise class. (If you've grown up with your nose in a book, like a lot of us who have grown up to be professors and scientists, the patterns of language in what you have been reading may have gotten inside your head so seriously that you have to work very hard to talk like people who weren't quite so nerdy when they were young.) Language teachers and remediators have to think about what level or levels of formality their students or clients need to use or avoid. Everyone needs to be able to understand and use *gonna* and *wanna*, because those forms surround us on all but the most formal occasions. But most of us also need to know when not to use them.

Understanding the ways that people are expected to talk in different social settings is part of the topic of SOCIOLINGUISTICS; you may have seen books or newspaper articles by sociolinguists Deborah Tannen or William Labov. Sociolinguists also study dialects, the way that people feel about their own dialect, and what people think about those who speak various other dialects of their language. (Almost every language, even those with few speakers, has several dialects, and usually one of them is spoken by people who are (or were) politically dominant, so that one gets to be considered the "correct" way to speak in formal settings.)

1.10 Language Families and Language Types

If you are almost any kind of language professional (a language teacher, clinician, translator, or someone who works on international Web sites) you need to know the basics of LANGUAGE TYPOLOGY—the study of how languages are alike and different—because you never know what kind of language may walk into your life. The way children and adults read, write, speak, and understand English can all be affected by what other languages they learned first, so the more you know (or can find out) about how those other languages are like and unlike English, from the details of their sounds and writing systems to their ways of signaling politeness or intimacy, the better you can deal with whatever comes up.

1.10.1 Some important differences between languages

Languages, like personality types or cultures, can differ and be similar in many different ways. If you know only one or two languages, you may be startled at some of the big differences out there. For example, one of the biggest differences (although interestingly, it doesn't cause a lot of trouble for second language learners) is whether the object of a verb comes after

the verb (*I found my wallet!*) as it does in English and Chinese, or before it (*I my wallet found!*), as it does in Japanese and Turkish and Hindi (just to name a few), or whether it sometimes come before it and sometimes after it, depending on the construction that the verb phrase is in, as is true for German, Dutch, Swedish, and their close relatives. (Learning to switch between two word orders is much more of a problem than just learning to use a new order). There are other possible word order and construction order differences, too: do you say *My red coat is in the closet* or *My coat red is in the closet* (as you would in French)? *The girl I met yesterday is from Kyoto* or *Yesterday I met girl Kyoto from is* (as you would in Japanese)?

Another substantial difference is whether you need to have a subject in every (or almost every) sentence as English, French, and German do (we even have to say *It's raining, Es regnet, Il pleut* when there's no "it"), or whether you can leave out meaningless subjects and just say the equivalent of *Is raining*, as you can in Portuguese, Spanish, and Italian (*Esta chovendo, Esta llovendo, Sta piovendo*), not to mention Russian and many other languages. In Chinese and Japanese (and again, in many other languages), you can leave out both subjects and objects if the person you are talking to can perfectly well figure out what they are, or doesn't need to know, but in English, we can only leave out the objects of a few transitive verbs like *eat* and *drink* (*We ate already*, *We drank all night*). It's moderately difficult to remember to leave words out in a new language; it's much more challenging to remember to put them in if your own language wouldn't need them.

Although all languages have nouns and verbs, lots of words can be either a noun or a verb depending on the construction they are being used in (*light* is a verb in *light my fire*, a noun in *light of my life*), as we've already seen for English in section 1.4.4. In Chinese, the situation is more confusing; in some constructions, people can disagree about whether a word is being used as noun or as a verb. Here's another difference: Many languages (for example Russian, Finnish, and Japanese) don't have any indefinite and definite articles that would correspond to *a* or *the*; some, like Hebrew, have only definite articles.

In section 1.6.2, we mentioned verb AGREEMENT (the way the form of a verb can depend on the person and number of its subject—*I was/you were* or *we sing/she sings*) and how some languages don't have it. But you probably know that in the languages English speakers are most likely to learn in school, Spanish or French (and others closely related to them, like Portuguese and Italian), every verb has several different forms, depending on its subject. In English, only the verb *be* has a whole suite of different forms (*I am, you are, he/she/it is, we are, they are*), but for Spanish and French, every verb has at least this many forms and you have to choose the right one depending on its subject. And you probably also know another

typological difference between the morphology of English and those languages: They have **GRAMMATICAL GENDER**. All nouns are either **MASCULINE** or **FEMININE** (whether or not they can have biological gender, though nouns referring to male creatures are usually masculine and those referring to female creatures are usually feminine). Articles and most of the adjectives that modify a noun also have masculine and feminine forms, and they have to **AGREE** with the noun they modify—that is, they have to have the same gender as the noun. We'll come back to some of these differences between languages and the problems they make for second language learners in Chapter 9 and for multilingual aphasia evaluation in Chapter 10.

1.10.2 Being similar and being related

Now we have to take a step back and talk about two different ideas: languages being *similar* and languages being *related*. Languages change over time; grandparents have been complaining about the way their grandchildren talk, undoubtedly, since language began. A language that's spoken by people who lose contact with each other—settlers in two different mountain valleys, for example, or colonists who settle new countries across oceans—will change in different ways in the separate places. Very quickly, then, within a generation or two, different ways of speaking develop in the new places, and these become recognizably different **DIALECTS** in another generation or two. If changes keep accumulating to the point where people from the different groups can barely understand each other, so that translators and language lessons are necessary, the two forms of the original language are now separate languages. (Unless politics intervenes: If they both have the same government, they will probably still be called dialects of the same language. Everybody who is interested in how language is affected by politics should know the famous saying by Max Weinreich [originally stated in Yiddish, a dialect of German]: "A language is a dialect with an army and a navy.")

The situation is pretty much the same for languages as it is for people, except that languages (usually) have only one "parent": Two languages are related if they have descended from the same language, somewhere back in time. All the descendents of one language are, unsurprisingly, called a language family. Languages that separated only one or two thousand years ago may still look a lot alike, like the languages of Europe that came from Latin (the **ROMANCE LANGUAGES** and dialects: French, Provençal, Italian, Portuguese, Spanish, Catalan, Romanian, Romansh, and so on, some of which have never been completely separated from the others).

But we can trace back relationships that are much older than that. Latin itself is part of the huge **INDO-EUROPEAN FAMILY** of languages, whose

common ancestor (which we call Proto-Indo-European) must have been spoken about 6,000 years ago. Three thousand years later, the Indo-European family included not only the immediate ancestor of Latin, but a number of Latin's rather distant cousins. One of those distant cousins is called Proto-Germanic, because it was the ancestor of the **GERMANIC FAMILY** of languages (which includes English, German, Dutch, and the languages of western Scandinavia). Another cousin, called Proto-Slavic, was the ancestor of the **SLAVIC LANGUAGES** (including Russian, Polish, Czech, and Bulgarian); still another was the ancestor of the **INDO-IRANIAN** languages of Iran, Afghanistan, and northern India. As the time gulf widened over the next three millennia, the descendents of these distantly related languages, like cousins who share one great-great-great-grandparent, eventually came to look very different indeed, like modern-day English (in the Germanic branch of the family), Italian (Romance branch), Russian (Slavic branch), Hindi (Indo-Iranian branch), and Irish (**CELTIC** branch).

In contrast, unrelated languages sometimes look a lot alike. How can that happen? Often, it's because their speakers have been in contact, and there once were (or still are) many bilingual speakers. When two languages are spoken by the same group of people (who might be neighbors, traders, scholars, soldiers, or missionaries), at least one of the groups is likely to have learned a lot of words and constructions from the other. That's true for Japanese and for Korean, which both borrowed a lot of vocabulary and morphology from Chinese. (They also borrowed the oldest parts of their writing systems—the original forms of the kanji in Japanese and the hanja in Korean, which we'll say more about in Chapter 8.)

And then, there's the equivalent of marriages between, say, third cousins. English and French come from different branches of the Indo-European family (Germanic and Romance) and so they shouldn't look much alike. But after the Norman Conquest about a thousand years ago, English absorbed a huge amount of French vocabulary and phonology, though it kept most of its Germanic-type syntax.

Finally, languages that are completely unrelated and that had no contacts as far back as we can trace them, like English and Japanese before the modern era, may still have one or two striking things in common (Japanese uses a present progressive tense almost the same way English does). It's a coincidence, just as you may find one friend who looks sort of like another of your friends, perhaps around the eyes or with the same little gap between his front teeth. Coincidences like that arise in languages because all languages are solutions to the same great problem: how to communicate about human needs with human brains and human vocal and auditory apparatus, (or, for signed languages, with human eyes and hands).

One more thing: there's a lot of folklore about languages that's not true, but is believed almost passionately by their speakers. If someone tells

you that his or her language is a gift from God, or is the oldest in the world, or is exactly the same as was spoken by a religious leader thousands of years ago, just be polite about it. Even if the language has been written pretty much the same way for all that time, the spoken form will have changed, but there's no point in arguing.

Exercises for Chapter 1

Section 1A

1.1 When will sounding out words work, and when will memorizing spelling be needed?

Could you sound out the spelling difference between *merry, Mary,* and *marry,* or are they pronounced the same in your dialect of English? How about *caught, cot*? *Ann* and *Ian*? If you were teaching spelling, how could you find out whether your students should be able to hear the difference between two words that are spelled differently or whether they need to just memorize the spelling for each word, as we all do for *meet* and *meat*?

1.2 When can you use spelling to help someone learn grammar and pronunciation, and when will spelling mislead them? (I am not making this example up, by the way. I wish it hadn't happened, but it did.)

In a kindergarten-age classroom for children with slow language development, a teacher is using a multichannel approach. These children omit some unstressed words, and her lesson goal is to get them to attend to the unstressed words in some simple model sentences. So she writes some of the words that they tend to omit on the blackboard after she says a model sentence, and then she goes over these words one at a time, emphasizing the sounds and the letter names. After saying a short sentence containing the word *is*, she writes I S on the board, and then says the names of the letters and then the word again, emphasizing all the sounds: *I S, is*. Transcribe what she said (the two letter names and then the word *is* itself) into IPA.

Now imagine you are her supervisor. Explain diplomatically but accurately why her strategy was not likely to be helpful to the children for this particular word. What is another word that you could use as an example of where the same problem would arise? What would you suggest that she try instead of the strategy that she is using?

1.3 (Figure 1.9) If you are from California, you can immediately understand the joke in this cartoon by Joe Chiappetta.

Figure 1.9. Harry potter. Sally Daddy cartoon copyright Joe Chiappetta, used with permission from www.joechiappetta.blogspot.com.

But most people from the Northeast have to think a minute to get it. Look back at the *merry, marry, Mary* story in section 1.2.4.3, note 4 of the vowel chart, and explain why people from the Northeast will be slow to understand this joke.

Section 1B

1.4 How can you explain what makes a sentence ambiguous? Here are examples of three different kinds of ambiguity to think about:

A. Referent ambiguity
Sarah insulted Amy, and then she kicked her.

B. Syntactic ambiguity
Kissing cousins can be serious trouble.

C. Temporary syntactic ambiguity ("garden path" sentence)
The truck unloaded at the rear door was rented.

1.5 More English derivational morphemes. English has a good number of derivational morphemes that are not borrowed from Latin (or Greek). How would you show a young reader or a second language learner where the "joints" between the morphemes are in words like *wilderness, wonderful, bewitch, earlier, funnier, lively,* and how would you explain the way that taking these words apart can help your student understand them?

1.6 Your computer's grammar checker can recognize a lot of grammatical morphemes and what they do. For example, your grammar checker "knows" that *-s* is a plural ending on nouns, but that not all word-final *s*'s are endings, so it doesn't "think" that *kiss* or *basis* is plural, and doesn't mistakenly tell you that *A kiss is sweet* is incorrect.

However, your spellcheck program is dumb: if you give it a new word like *morpheme*, and then you write *morphemes* for the first time, it will tell you that *morphemes* is a spelling error. Why? What would the spellcheck have to "know" about a new word to avoid annoying you this way? How could it "find out" that information?

Note on English Grammars. There are hundreds of English reference grammars, but if you have a choice, consider the series of larger and smaller grammar books edited by Quirk, Swartvik, Leech, and Greenbaum (in various orders of authorship), published by Longman. The largest is *A Comprehensive Grammar of the English Language*.

References

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