

The Vowels of American English

Marla Yoshida

How do we describe vowels?

Vowels are sounds in which the air stream moves up from the lungs and through the vocal tract very smoothly; there's nothing blocking or constricting it. The first sounds in the words *extra*, *only*, and *apple* are vowels.

In general, every syllable has a vowel sound (although, as we saw in the last chapter, the consonants /n/, /l/, and /r/ can sometimes be stretched out to be a syllable in themselves). Vowels are the “heart” of syllables.

When we compare American, British, Australian, or other varieties of English, we see that vowels differ much more than consonants. Within each of these varieties there are many dialects, and their vowels may also differ greatly.

Sometimes people assume that there are five vowel sounds in English: A, E, I, O and U. However, this is a misconception. These are vowel *letters*, not vowel *sounds*. Each vowel letter can represent more than one sound. For example, the letter *a* can represent /æ/ as in *hat*, /ey/ as in *hate*, /ɑ/ as in *car*, or /ε/ as in *care*. Also, each vowel sound can be represented in more than one way in spelling: The sound /iy/ can be written as *ee* in *seem*, as *ea* in *seal*, as *ie* in *piece*, as *ei* in *receipt*, as *ey* in *key*, as *i...e* in *machine*, and perhaps more. There's certainly not a one-to-one correspondence between letters and sounds, and English has many more vowel sounds than vowel letters.

For most speakers of American English, there are 14 vowel sounds, or 15 if we include the vowel-like sound in words like *bird* and *her*. The phonemic symbols for the vowels are shown in the table below. For each sound, you'll see at least two symbols. This is because different textbooks and authors use different versions of the phonemic alphabet, with different symbols for vowels. Many American textbooks use symbols similar to those in blue, while others use symbols like those in green. The symbols in British textbooks are similar, but not identical, to the symbols in green. You might see still more variations of the symbols in addition to the ones that are shown here. Here we'll use the first symbol listed for each vowel.

Vowels of American English			
Example	Symbols	Example	Symbols
beat	/iy/ /i:/	boot	/uw/ /u:/
bit	/ɪ/ /i/	book	/ʊ/ /u/
bait	/ey/ /eɪ/	boat	/ow/ /ou/
bet	/ɛ/ /e/	bought	/ɔ/ /ɔ:/
bat	/æ/ /æ/	box	/ɑ/ /a/
but	/ʌ/ /ə/	by	/ay/ /aɪ/ /aɪ/
sofa	/ə/ /ə/	cow	/aw/ /au/ /aʊ/
her	/ɜ/ /ɜ/ /ɛr/ /ɛr/	boy	/oy/ /ɔy/ /ɔi/ /ɔi/

Describing vowels is trickier than describing consonants. The tongue is floating freely around the mouth, not touching other parts of the vocal tract. This makes it harder to describe exactly what's happening in the mouth. When we describe the vowels of English, we traditionally talk about:

- Tongue position
- Lip rounding
- Tense and lax vowels
- Simple vowels, glided vowels, and diphthongs

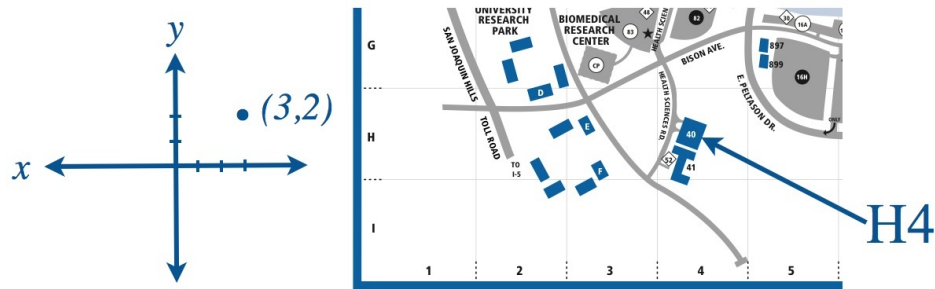
These categories are not as precise or reliable as those we use to describe consonants. Some of them are not even as firmly based on physical reality as we like to think, and they can vary a great deal among individual speakers. Still, the descriptions are useful in teaching, and it's important for teachers to know how vowels are traditionally described.

Tongue position

The way we move and shape our tongue plays a big part in giving each vowel its own sound. When you pronounce a vowel, even a small change in the position of your tongue can make a big difference in how the vowel sounds.

When we talk about tongue position, we mean: Where is the highest, tensest, or most active part of the tongue? The way we describe this position is something like graphing a point in math or finding a location on a map. We give two “coordinates” to describe where the point

is, like the x and y coordinates of a point on a graph or a location on a map.

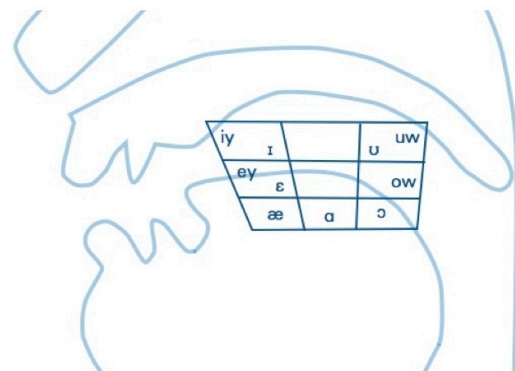


In describing a vowel, we list the vertical position of the tongue first: **high, mid, or low**. That is, is the tongue raised toward the top of the mouth, or farther down with a more open jaw? Then we name its horizontal position: **front, central, or back**. A description of the tongue position for vowels tells both of these “coordinates.” For example:

- /æ/ as in *cat* is a low front vowel. The most active part of the tongue is in the lower front part of the mouth.
- /ʌ/ as in *cut* is a mid central vowel. The tongue is resting in the middle of the mouth in a very neutral position.
- /uw/ as in *boot* is a high back vowel. The back of the tongue is bunched up high at the back of the mouth.

We can show the tongue positions for different vowels by using a diagram called a **vowel quadrant**. This chart is divided into nine sections, each representing a different tongue placement, vertically and horizontally. The diagrams below show two versions of the vowel quadrant. The first shows the vowel quadrant alone, and the second shows how the sections of the vowel quadrant are related to the parts of the vocal tract.

	Front	Central	Back
High	iy ɪ		uw ʊ
Mid	ey ɛ	ʌ, ə	ow
Low	æ	ɑ	ɔ



Vowels that are near each other in the vowel quadrant are pronounced with tongue positions that are close to each other and their sounds are similar, so learners are more likely to confuse them than pairs that are farther apart in the vowel quadrant. For example, learners often confuse *sheep* (/iy/) and *ship* (/ɪ/), whose vowels are in adjacent boxes, but they seldom confuse *sheep* and *shop* (/ɑ/), which are farther apart.














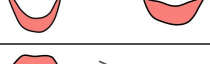

We can also use **sagittal section diagrams**, or “**Sammy**” **diagrams**, to show tongue positions for vowels. The diagrams at the end of this section show tongue positions for the vowels of English.

Lip rounding

Vowel sounds are also affected by the shape of the lips—whether they’re very rounded, just a little rounded, relaxed, or stretched a bit wide.

In English, the back vowels, /uw/, /u/, /ow/, and /ɔ/, are pronounced with varying degrees of lip rounding, and /r/ also has a little lip rounding, whether it’s used as a consonant (/r/) or a vowel (/ɝ/). The front and central vowels—/iy/, /ɪ/, /ey/, /ε/, /æ/, /ʌ/, /ə/, and /ɑ/—are unrounded. For the vowels /iy/ and /ɪ/, the lips may be spread or stretched a bit wide, and some textbooks even tell students to “smile” when they say the vowels in *heat* or *hit*. The table on the next page shows typical lip positions for American English vowels.

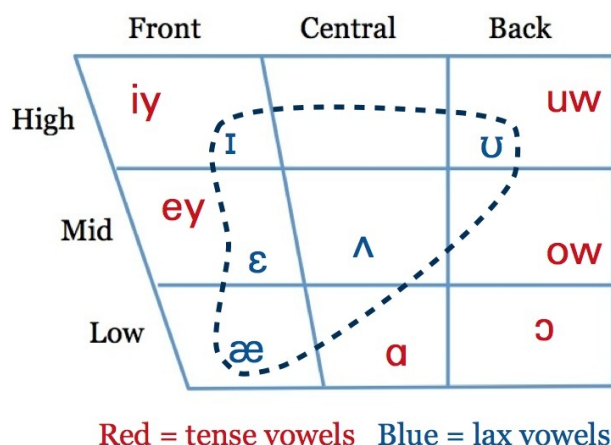
In reality, however, the lip positions that native speakers use for vowel sounds vary quite a bit. Some people don’t move their lips much, and others move their lips much more. Their lip positions may not look just like those in the chart, but they can still produce perfectly normal vowel sounds. Still, knowing and imitating these “standard” lip positions can help students to pronounce vowel sounds more understandably.

Lip positions for the vowels of English		
Vowel	Lip Position	Picture
/iy/	Unrounded, can be stretched a bit	
/ɪ/	Unrounded, can be stretched a bit	
/ey/	Unrounded, not so stretched	
/ɛ/	Unrounded, not so stretched	
/æ/	Unrounded, open wide	
/ɑ/	Unrounded, open wide	
/ʌ/, /ə/	Unrounded, neutral and relaxed	
/uw/	Very rounded	
/ʊ/	Moderately rounded	
/ow/	Rounded at the end of the vowel	
/ɔ/	Open and a bit rounded	
/əʊ/	A bit rounded	
/ay/	Unrounded → unrounded	
/aw/	Unrounded → rounded	
/oy/	Rounded → unrounded	

Tense and lax vowels

We can also divide vowels into two categories called **tense** and **lax** vowels. This is a distinction that separates pairs of vowels like those in *sheep* (/iy/) and *ship* (/ɪ/), *late* (/ey/) and *let* (/ɛ/), *fool* (/uw/) and *full* (/ʊ/). We traditionally think of these as being a difference in the tension or tightness of the muscles of the tongue or lips while saying the sound, but again, this is an oversimplification. There is sometimes not a great difference in physical tension of tense and lax vowels. (Ladefoged, 2006)

Which vowels are in each group? The vowel quadrant below shows the tense vowels in red and the lax vowels in blue. If you look at the dotted line that divides the two groups, you can see that the tense vowels are mostly toward the outside edges of the quadrant, indicating that they have more extreme tongue positions, and the tongue has to stretch or push a bit farther to get there. The lax vowels are closer to the middle of the quadrant; the tongue is not pushing out toward the extreme edges of the mouth, so in a sense, it is more relaxed.



Another difference between tense and lax vowels is in the positions in which they can be used in words. Tense vowels can occur both in **closed syllables** (those that end in a consonant sound, like *meet* or *goal*) and **open syllables** (those that do not have a consonant sound after the vowel, like *me* or *go*.) Lax vowels can occur in closed syllables, but not in stressed, open syllables. This means that we often find words that end in tense vowels: *Me, day, shoe, show, saw, happy, today, subdue*, etc. However, we never find words that end in lax vowels. That is, English doesn't have words like /mɪ/, /dɛ/, /ʃæ/, or /bu/.

Simple vowels, glided vowels, and diphthongs

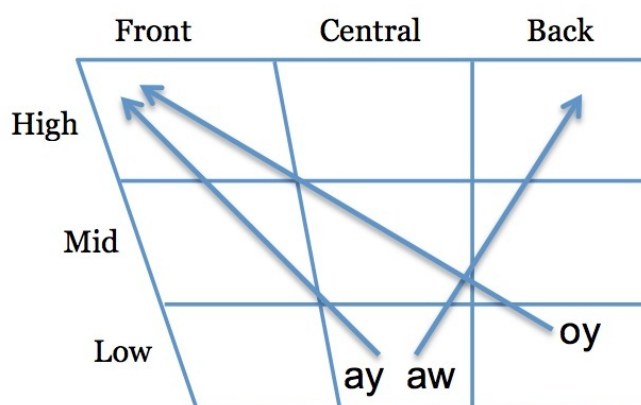
Finally, we can classify vowels based on how much tongue movement there is during the vowel. For example, when we say /æ/ as in *bad*, the tongue position and quality of the vowel stay constant throughout the sound, even if we continue to say the vowel for a long time. We call this type of vowel a **simple vowel** or a **pure vowel**.

Other vowels have a small change in tongue position from the beginning to the end. For example, when we say /eɪ/ as in *day*, our tongue moves just a bit, from the position of /ɛ/ to the position of /i/. We can call vowels of this type **glided vowels** or **vowels with glides**. (In some textbooks, glided vowels aren't considered a separate group. Some authors

include them with the simple vowels, while others group them together with the diphthongs.)

It may be difficult to hear the difference between the simple vowels and glided vowels when someone is speaking at a normal speed, but when you say the vowels slowly, you should be able to hear and feel the change in tongue position. In particular, it's the slight glide at the end of /ey/ and /ow/ that makes them sound different from /e/ or /o/-type vowels in many other languages.

Finally, some vowels have a big change in tongue position and sometimes also in lip rounding from the beginning to the end of the sound. For example, /ay/ as in *buy* sounds like a combination of the vowels /a/ and /iy/ blended together, with the first part longer and more prominent, and the second part lasting a shorter time than the first. We call these vowels **diphthongs**. The vowel quadrant shown below illustrates the diphthongs by drawing arrows from the beginning to the ending tongue positions for each one.



In addition to the change in tongue position, the diphthongs /aw/ and /oy/ also have a change in lip rounding; /aw/ begins with unrounded lips and changes to rounded lips, and /oy/ moves from rounded to unrounded.

The glided vowels and diphthongs in American English all end in the glides /y/ or /w/. We've already seen glides as a category of consonants, which are also called semivowels. We can see now why they have this name, which means "half-vowel." They sound like quick vowels, but function as either vowels or consonants, depending on the context.

The vowel /ə/

There is one more vowel-like sound in English: /ə/. This is the sound in words like *bird*, *first*, and *her*. In many textbooks this sound is analyzed as a combination of a vowel plus a

consonant, and represented by the symbols /ər/, /ɜr/, /ə˞/, or /ɜ˞/. In others, it's represented by a single symbol, /ɝ/. Whichever symbols we use, this sound is best thought of as a single vowel sound, rather than a vowel sound followed by a consonant. The only difference between the vowel /ɝ/ and the consonant /r/ is in timing: /ɝ/ lasts longer so that it becomes the “heart” of the syllable.

There is actually more than one way to pronounce the /ɝ/ sound. Some people pronounce it with the tip of the tongue curled back a bit. In fact, the /r/ and /ɝ/ sounds are often called **retroflex** sounds, a name that comes from a Latin word meaning “bent backward.” However, other people pronounce /r/ and /ɝ/ with the back of the tongue bunched up at the back, without curling the tip. Both ways can produce the same sound. With both tongue positions, the lips are slightly rounded.



/r/ with the tongue curled



/r/ with the tongue pulled back

An endangered vowel sound: /ɔ/

Languages and their sounds are changing all the time. One change that is happening now in American English involves the vowel sound /ɔ/. For many speakers, the vowel /ɔ/ is merging with /ɑ/. This means that these speakers pronounce words that are listed in most dictionaries with the vowel /ɔ/, like *caught*, *saw*, and *walk*, with an /ɑ/ sound instead. So *caught* and *cot* sound alike: /kat/, and *dawn* and *don* sound alike: /dan/.

The merging of /ɔ/ and /ɑ/ is occurring mainly in the Western and Midwestern areas of the United States and is more common among younger speakers than older speakers (Ladefoged 2005, p. 28). We might say that in many areas of the United States, /ɔ/ is an “endangered sound.” As time goes by, it’s being used less and less in some words, and may eventually die out as a separate phoneme.

Because of this merging of sounds, for teaching purposes it’s much less important to teach the difference between /ɔ/ and /ɑ/ than it is to teach the difference between, for example, /ɑ/ and /æ/. If students pronounce *cot* and *caught* the same way, they’ll be understood, but

if they pronounce *cot* and *cat* in the same way, people will be confused.

“Invisible /y/”

Learners sometimes have trouble knowing how to pronounce words spelled with the vowel letters *u*, *ue*, *eu*, *ew*, or *ui*. In American English, these letters sometimes represent the sound /uw/, as in the words *suit* (/suwt/) or *true* (/truw/), and sometimes /yuw/, as in the words *music* (/myuwzik/), *computer* (/kəmpyuwtə/), and *pew* (/pyuw/). In some words spelled with these letters, the vowel sound can even be pronounced either way, such as *new* (/nuw/ or /nyuw/). What’s happening here?

We sometimes say that the /yuw/ pronunciation in words like this has an “invisible /y/” because we hear a /y/ sound, but it’s not represented in spelling. We might think of /yuw/ as another diphthong, but with the glide at the beginning instead of the end.

In standard American English, invisible /y/ is not found after certain sounds: /r/, /ɟ/, and /tʃ/, and it’s less often found after /t/, /d/, /s/, /z/, /n/, and /l/, although some people do pronounce it in words like *new* (/nuw/ or /nyuw/) or *Tuesday* (/tuwzdey/ or /tyuwzdey/). In British English, the “invisible /y/” is much more common, with pronunciations like /syuwt/ for *suit* or /tyuwb/ for *tube*.

The “invisible /y/” is never found in words spelled with *oo* or *o*, like *food* (fuwd), *moon* (muwn), or *move* (muwv). This is true in both American and British English.

“Invisible /y/” can cause confusion if the learner’s language has words that are similar to those in English, but without the “invisible /y/,” like German *Musik* (/muzik/, not /myuzik/) or Spanish *regular* (/řegular/, not /řegyular/), especially in languages that are also written with the Latin alphabet.

Vowel length

We often hear about “long vowels” and “short vowels.” When people call vowels “long” or “short,” they *do not* mean that the sounds are identical except for length. We don’t want students to think that the *only* difference between the vowel pairs /iy/ and /ɪ/, /ey/ and /ɛ/, or /uw/ and /ʊ/ is that one is longer in duration and the other is shorter. Many students have learned this, but it just doesn’t work as a way of producing understandable vowels.

In reality, the difference between the vowels in each of these pairs depends primarily on two points: 1) tongue position and 2) tenseness or laxness. As we saw earlier, these factors

change the quality of the vowels and make them sound different. Students *must* pronounce these pairs of vowels with different vowel quality, not simply with a difference in length.

What affects vowel duration?

As it happens, the time duration of any vowel sound varies a lot. All vowel sounds tend to be longer in some environments and shorter in others. Here are two important principles that affect the time duration of vowels:

The following sound: The duration of a vowel depends a lot on the sound that comes after it. Vowel sounds are usually shorter in duration before voiceless sounds and longer before voiced sounds. They're longest of all when they come at the end of a word.

There are also slight variations in vowel length before different kinds of voiced sounds. Vowels are longer before “smooth” sounds like nasals and liquids (which are all voiced in English) than before “rough” sounds: voiced stops, affricates, and fricatives. However, this length difference is so small that it's hard to detect without special measuring instruments.

The same changes in vowel length also happen in words like *spent* and *spend*, *port* and *poured*, *bolt* and *bold*, even though another consonant—/n/, /r/, or /l/—comes between the vowel and the final sound. The vowel in the first word in each of these pairs is shorter than the vowel in the second word.

Duration of Vowels			
Shorter		Longer	
Before voiceless sounds	Before voiced sounds	At the end of words	
<i>beat</i>	<i>bead</i>	<i>bean</i>	<i>bee</i>
<i>pick</i>	<i>pig</i>	<i>peer</i>	
<i>mate</i>	<i>made</i>	<i>main</i>	<i>may</i>
<i>spent</i>	<i>spend</i>	<i>spell</i>	
<i>port</i>	<i>poured</i>	<i>pour</i>	
<i>bolt</i>	<i>bold</i>	<i>bowl</i>	<i>bow</i>

Why is this change in vowel length important? It's often hard to hear the difference between final voiced and voiceless sounds. Stop consonants at the end of words are often unreleased; that is, they're not pronounced completely. This makes pairs of sounds like /p/ and /b/, /t/ and /d/, /k/ and /g/ hard to distinguish on their own. The listener's brain uses

the length of the vowel sound to help figure out which consonant was heard. For example, listeners unconsciously tell the difference between words like *seat* and *seed* from the length of the vowel, not so much from the difference in the final consonants. This is why it's important for speakers to make vowel sounds a bit longer before voiced consonants.

Vowel length and stress: All vowel sounds tend to last longer in stressed syllables than in unstressed syllables. This is an important factor in making stressed syllables sound “stressed.” For example, the first syllable in *city* /sɪtiy/ will last longer than the second syllable because it's stressed. The fact that /ɪ/ is sometimes called a “short vowel” and /iy/ is called a “long vowel” doesn't matter. It's important for students to know that within a polysyllabic word (a word with more than one syllable), the stressed syllable will last longer than the unstressed syllable or syllables.

In the same way, within a sentence, words that have more stress or emphasis will last longer than words that are unstressed. For example, in this sentence:

My **friend** should have **called** me.

The words *friend* and *called* are stressed more than the others, and so they last longer. The words *my*, *should*, *have*, and *me* are unstressed, and so they are very short. The words last different lengths of time, even though they each have one syllable.

What do students need to know about vowel length? From a teaching perspective, there are three points that are most important for students to know:

- The difference between tense/lax pairs of vowels like /iy/ and /ɪ/, /ey/ and /ɛ/, or /uw/ and /ʊ/ is more than just length. We have to pronounce the sounds differently, not just make one longer than the other.
- Vowels are longer before voiced sounds or at the end of a word and shorter before voiceless sounds.
- Vowels are longer in stressed syllables and shorter in unstressed syllables.

Vowels in unstressed syllables

Words can be divided into **syllables**—rhythmic units of sound that each get one “beat.” In a word with more than one syllable, one of the syllables is **stressed**, or emphasized. Other syllables are unstressed. In English, vowels in unstressed syllables are often different from those in stressed syllables. They become weaker, quicker, and less clear than vowels in stressed syllables. We say these syllables and their vowels are **reduced**.

Vowels in unstressed syllables often (but not always) become a sound represented by the

symbol /ə/ (called *schwa*). It is a sound that, for most speakers of American English, is very similar to /ʌ/: a mid-central, lax, unrounded vowel. When saying /ə/, the tongue sits in a relaxed position in the middle of the mouth. (The difference between these the symbols /ʌ/ and /ə/ is that /ʌ/ is customarily used to represent a vowel in a stressed syllable, and /ə/ is used to represent only an unstressed vowel.) Because it is found in so many unstressed syllables, and because there are more unstressed syllables than stressed syllables, /ə/ is the most common vowel sound in English.

The table below shows some examples of vowel sounds in unstressed syllables. The first column lists the vowels most commonly found in unstressed syllables; the examples in the right-hand column show less common vowels in unstressed syllables.

Vowels in unstressed syllables			
More Common Unstressed Vowels		Less Common Unstressed Vowels	
Vowel	Examples	Vowel	Examples
/ə/	sófa, glásses, abóut	/ey/	maíntáin, rótae
/ə/	wáter, curtáil, órderly	/ɛ/	Sepatémbér, medicátion
/ɪ/	músic, vánish, inténsé	/ʊ/	chíldhood, hándbook
/iy/	cítý, háppy, twéntieth	/ay/	librárian, citátion
/ow/	sháadow, hotél, piáno	/aw/	éyebrow, outsíde
/uw/	ménu, usúrp, vénue	/oy/	hárd-boiled, exploítation

Vowels and consonants: A blurry line

In looking at vowels and consonants, we’ve seen something surprising: The differences between vowels and consonants are not as clear-cut as we might imagine, and some sounds can have qualities of both. For example, we’ve seen that a few consonants (/n/, /r/, and /l/) can also be used as the “heart” of syllables when they become vowel-like syllabic consonants. They’re consonants, but they function as vowels. Also, the consonant /r/ and the vowel /ə/ are actually the same sound—the difference is in duration and function within a syllable. Finally, the glides /w/ and /y/ are used as consonants in words like *win* and *yes*, but they can also be the final part of the diphthongs /ay/, /aw/, and /oy/. Like many rules and categories in language, the boundary between vowels and consonants is a little blurry.

Sources of learner problems with vowels

New sounds: English has more vowel sounds than many other languages. In fact, the average number of vowels in the languages of the world is five or six. English has more than twice that number! Vowels that are found in English but not in the learner's language are often challenging since the learner's tongue and lips need to get used to moving into unfamiliar positions and new combinations of movements.

Differences between the phonemes of different languages: Some pairs of vowels that are separate phonemes in English may be allophones of the same phoneme in other languages. For example, /iy/ and /ɪ/ are separate phonemes in English, and we find many minimal pairs such as *sleep* and *slip* or *least* and *list*. But these sounds are variations of a single phoneme /i/ in Japanese, Spanish, Korean, and many other languages. Other pairs of tense and lax vowels are also often confused in this way: /iy/ and /ɪ/, /ey/ and /ɛ/, /uw/ and /ʊ/. Other similar vowels, such as /ɛ/ and /æ/ or /ʌ/ and /ɑ/, may also be heard as variations of the same sound in many languages.

Glided vowels: English vowels that end with a /y/ or /w/ glide can also cause problems, particularly /ey/ and /ow/. Many languages have vowels that are similar to these, but without the final glide. Speakers of these languages may keep the vowel sound consistent throughout the vowel instead of adding the final glide, leading to vowel sounds that may be hard to recognize.

Vowels followed by /r/: Learners from some language backgrounds have particular problem with vowels followed by /r/, especially in words like these:

- *stir* and *star* *stir* and *store*
- *curd* and *card* *curd* and *cord*
- *were* and *wore* *word* and *ward*

Reduced vowels: In English, many unstressed vowels are reduced to /ə/. In many languages, this does not happen; vowels retain their “full” quality, whether they're stressed or unstressed, or spoken slowly or quickly. Speakers of these languages may pronounce unstressed syllables in English with “full” vowels too, and this can make it hard for listeners to understand which words are meant.

In conclusion, vowels are the “heart” of syllables. They're slippery and sometimes harder to describe and define than consonants, but both teachers and learners need to try to produce them as accurately as possible in order to be understood easily.

Sagittal section diagrams for English vowels



/iy/ (beat)



/ɪ/ (bit)



/ey/ (bait)



/ε/ (bet)



/æ/ (bat)



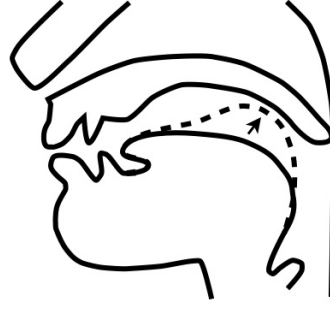
/ʌ/ (but)



/uw/ (boot)



/ʊ/ (book)



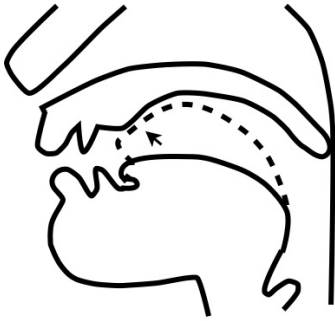
/ow/ (boat)



/ɔ/ (bought)



/ɑ/ (box)



/aɪ/ (by)



/ɔɪ/ (boy)



/aʊ/ (cow)