

CHAPTER 5

ENGLISH PHONETICS:

The Sounds of English Language



Human can communicate both spoken and written language. In spoken language, the speech sound is very important. The study of speech sound is called **phonetics**. The study of speech sounds then involves three aspects: how the sounds are produced, how they are transmitted and how they are perceived. The study of production of speech sounds constitutes **articulatory phonetics**; the study of the transmission and physical properties of speech sounds, i.e. intensity, frequency and duration, constitutes **acoustic phonetics**; the study of the perception of speech sounds constitutes the study of **auditory phonetics**. The acoustic and auditory phonetics are excluded in the following discussion.

The study of articulatory phonetics has two subparts. First, we study the articulation, i.e. production of speech sound. Second, classifying sounds according to the properties they have.

The Production of Speech Sounds

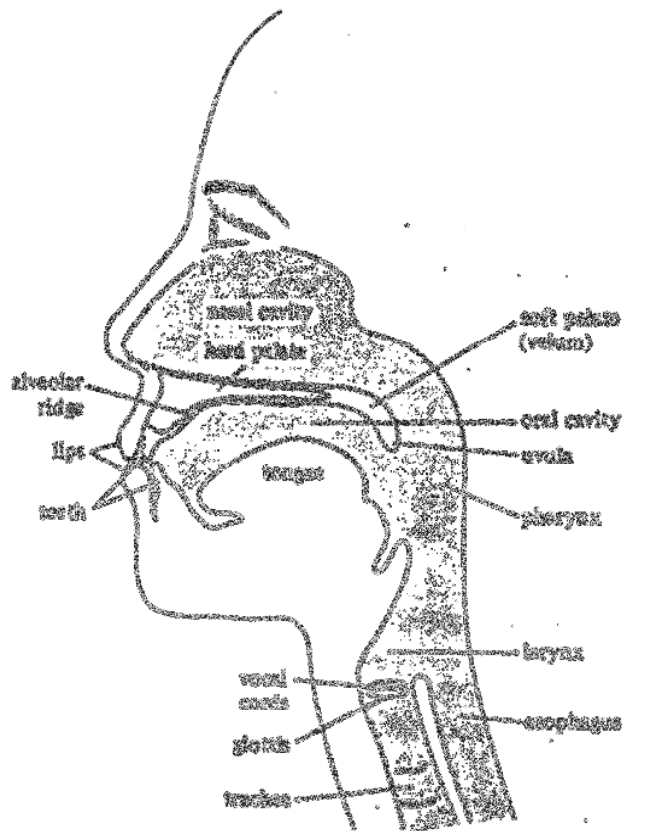
Human languages display a wide variety of sounds, called **phones** or **speech sounds**.

Articulators above the larynx

All sounds we make when we speak are the result of the muscles contracting. The muscles in the chest that we use for breathing produce the flow of air that is needed for almost all speech sounds; muscles in the larynx produce many different modifications in the flow of air from the chest to the mouth. After passing through the larynx, the air goes through what we call the **vocal tract**, which ends at the mouth and nostrils. Here the air from the lungs escapes into the atmosphere. We have a large and complex set of muscles that can produce changes in the shape of vocal tract, and in order to learn how the sounds of speech are produced it is necessary to become familiar with the different parts of the vocal tract. These different parts are called **articulators**, and the study of them is called **articulatory phonetics**.

Figure 2 is a diagram that is used frequently in the study of phonetics. It represents the human head, seen from the side, displayed as though it had been cut in half. You will need to look at it carefully as the articulators are described, and you will often find it useful to have a mirror and a good light placed so that you can look at the inside of your mouth.

Figure 2
The Vocal Tract

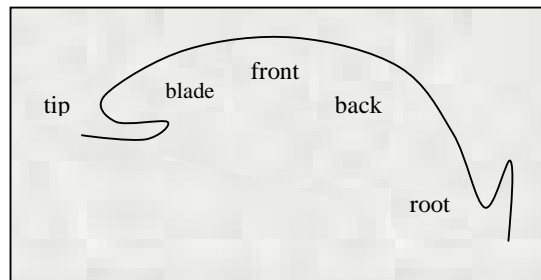


Source: Crane, L. Ben, *et al.* (1981: 58)

1. The **pharynx** is a tube which begins just above the larynx. It is about 7 cm long in women and about 8 cm in men, and at its top end it is divided into two, one part being the back of the mouth and the other being the beginning of the way through the nasal cavity. If you look in your mirror with your mouth open, you can see the back of the pharynx.

2. The **velum** or **soft palate** is seen in the diagram in a position that allows air to pass through the nose and through the mouth. Yours is probably in that position now, but often in speech it is raised so that air cannot escape through the nose. The other important thing about the velum is that it is one of the articulators that can be touched by the tongue. When we make the sounds [k] and [g] the tongue is in contact with the lower side of the velum, and we call these velar consonants.
3. The **hard palate** is often called the “roof of the mouth”. You can feel its smooth curved surface with your tongue.
4. The **alveolar ridge** is a hump directly behind the teeth. It is between the top front teeth and the hard palate. You can feel its shape with your tongue. Its surface is really much rougher than it feels, and is covered with little ridges. You can only see these if you have a mirror small enough to go inside your mouth (such as those used by dentists). Sounds made with the tongue touching here (such as [t] and [d] are called **alveolar**.
5. The **tongue** is, of course, a very important articulator and it can be moved into many different places and different shapes. It is usual to divide the tongue into different parts, though there are no clear dividing lines within the tongue. Although there are no obvious divisions on the surface of tongue itself, for the description of sounds it may be divided into a number of sections. Figure 2 shows the tongue on a larger scale with these parts shown:
 - a. **tip** or point
 - b. **blade**—this lies below the alveolar ridge
 - c. **front**—this is the middle section which lies below the hard palate
 - d. **back**—this section lies opposite the velum and the uvula
 - e. **root**—a relatively vertical section which faces backwards towards the back wall of the pharynx

Figure 3
Sub-division of the tongue



- f. The **teeth** (upper and lower) are usually shown in diagrams like Fig.1 only at the front of the mouth, immediately behind the lips. This is for the sake of a simple diagram, and you should remember that most speakers have teeth to the sides of their mouths, back almost to the soft palate. The tongue is contact with the upper side teeth for many speech sounds. Sounds made with the tongue touching the front teeth are called **dental**.
- g. The **lips** are important in speech. They can be pressed together (when we produce the sound [p], [b]), brought into contact with the teeth (as [f], [v]), or rounded to produce the lip-shape for vowels like [u:]. Sounds in which lips are in contact with each other are called **bilabial**, while those with lip-to-teeth contact are called **labiodentals**.

The production of speech sound involves three distinct processes. They are:

- (i) initiation
- (ii) phonation
- (iii) articulation

Initiation

The production of any speech sound requires the creation of an airstream in the vocal tract. The airstream may be created by either compressing or rarefying the air in the tract. In English the airstream is initiated by lungs. When the lungs contract, they push air out, creating an out-flowing airstream. We call this **pulmonic egressive**—pulmonic

because it is initiated by the lungs, and egressive because it is out flowing.

Phonation

The pulmonic egressive airstream, as it passes through the larynx, may be modified by the vocal cords, through the introduction of voice. Without voice, speech would be reduced to an inaudible whisper. When the vocal cords are brought together, air passing out from the lungs causes them to vibrate, and voice is produced. Sounds produced with the vocal cords vibrating are called **voiced**. If the vocal cords are pulled back, they cannot vibrate. Sounds produced without the vocal cords vibrating are called **voiceless**. When we breathe the vocal cords are pulled back allowing the air to pass freely in and out of the lungs.

Articulation

As the airstream passes through the vocal tract, it may be modified by the movement of the articulation, that is by the lips and the tongue obstructing its passage through the vocal tract to varying degrees. This process is called **articulation**. The obstruction of the airstream may occur at any point in the vocal tract, and is the result of an active articulator moving towards a passive articulator. The location of the active articulator moving towards a passive articulator is the location on the roof of the mouth, for example the alveolar ridge, hard palate, etc.

In short, there are some processes in producing sounds. First, air proceeds from *the lungs* through *the trachea* to *the larynx*, commonly called the *voice box*, which houses *the vocal cords*. If the cords are slightly tensed, the passage of air sets the vocal cords vibrating, which gives a basic sound quality to the *air stream*, which continues into the *pharynx*, where basic voice quality is established. Voice quality determines the unique characteristics of each speaker's voice, so that an individual often can be recognized by voice alone. Above the pharynx is the *uvula*, which is a movable flap that controls the passage of air through the *nasal cavity*. The *uvula* is always open when an individual breathes through the nose, but it is only open at certain times during the course of speech. For the most part, *the velum* (or soft palate) is closed in speech, and the air moves through the *oral cavity* (the mouth), the dimensions of which change according to the interaction of the *tongue and lips*. These changes result in what all speakers of a language recognize to be the sounds of their language. The study of these speech sounds is called **phonetics**.

The production of any speech sounds involves the movement of an airstream. Most speech sounds are produced by pushing air from the lungs out of the body through the mouth and sometimes through the nose. Because lung air is used, these sounds are called *pulmonic* sounds; because the air is pushed *out*, they are called *egressive*. The majority of sounds used in languages of the world are produced by a **pulmonic egressive airstream mechanism**. All the sounds in English are produced in this manner.

Phonetic Transcription

Since the sixteenth century, efforts have been made to devise a universal system for transcribing the sounds of speech. The best known system is the **International Phonetic Alphabet (IPA)**. In this alphabet the relationship between symbol and sound is one to one.

English Consonants

Symbols	Examples
p	<i>pat, tap, pit, spit, tip, apple, ample, plague, appear</i>
b	<i>bat, tab, amble, brick, black, bubble,</i>
m	<i>mat, tam, smack, amnesia, ample, Emmy, camp, comb</i>
t	<i>Tap, pat, stick, mentor, scenting, kissed, kicked stuffed</i>
d	<i>dip, cad, drip, guard, sending, mender, loved, cured, robbed, batted</i>
n	<i>nap, can, snow, know, mnemonic, any, pint, diagnostic, design, sign, thin</i>
k	<i>kit, cat, charisma, character, stick, critique, antic, close, mechanic, exceed</i>
g	<i>guard, burg, bag, agnostic, longer, designate,</i>
ŋ	<i>sing, long, think, finger, singer, ankle, (the sound represented by the n in think is not produced in the same way as that represented by the n in thin; say the two words to yourself and notice that the tongue gestures are different)</i>
f	<i>fat, fish, philosophy, fracture, flat, phlogiston, coffee, reef, cough, comfort</i>
v	<i>vat, dove, rival, gravel, anvil, ravage</i>

s	sap, skip, snip, <i>psychology</i> , pass, pats, packs, democracy, scissors, fasten, deceive, descent, <i>sclerosis</i> , <i>pseudo</i> , rhapsody, peace, potassium
z	zip, jazz, razor, pads, kisses, Xerox, xylophone, design, lazy, maize, lies, physics, peas, magnesium
θ	<i>thigh</i> , <i>through</i> , <i>wrath</i> , <i>thistle</i> , <i>ether</i> , <i>wreath</i> , <i>think</i> , <i>month</i> , <i>arithmetic</i> , <i>teeth</i> , <i>Matthew</i>
ð	<i>the</i> , <i>their</i> , <i>then</i> , <i>wreathe</i> , <i>lathe</i> , <i>mother</i> , <i>either</i> , <i>rather</i> , <i>teethe</i>
ʒ	<i>shoe</i> , <i>shy</i> , <i>mush</i> , <i>marsh</i> , <i>mission</i> , <i>nation</i> , <i>fish</i> , <i>glacial</i> , <i>sure</i> , <i>deduction</i> , <i>Russian</i> , <i>logician</i>
Z	measure, vision, azure
±	<i>choke</i> , <i>church</i> , <i>match</i> , <i>feature</i> , <i>rich</i> , <i>lunch</i> , <i>righteous</i> , <i>constituent</i>
→	<i>judge</i> , <i>midget</i> , <i>George</i> , <i>magistrate</i> , <i>jello</i> , <i>gelatine</i> , <i>region</i> , <i>residual</i>
l	<i>leaf</i> , <i>feel</i> , <i>lock</i> , <i>call</i> , <i>palace</i> , <i>single</i> , <i>mild</i> , <i>plant</i> , <i>pulp</i> , <i>applaud</i>
r	<i>reef</i> , <i>fear</i> , <i>rock</i> , <i>cars</i> , <i>Paris</i> , <i>singer</i> , <i>prune</i> , <i>carp</i> , <i>furl</i> , <i>cruel</i>
j	<i>you</i> , <i>yes</i> , <i>playing</i> , <i>feud</i> , <i>use</i>
w	<i>with</i> , <i>swim</i> , <i>mowing</i> , <i>queen</i>
€	<i>which</i> , <i>where</i> , <i>what</i> , <i>whale</i>
h	<i>who</i> , <i>hat</i> , <i>rehash</i> , <i>hole</i> , <i>whole</i>
♣	<i>bottle</i> , <i>button</i> , <i>Latin</i> , <i>glottal</i>

The principal division of sounds is between vowel and consonants. Every language makes this distinction. Vowels are defined as those sounds produced with the oral cavity relatively open to the flow of air. Consonant, unlike vowels, are speech sounds produced with a narrowing of the vocal tract which is sufficient to prevent them from functioning as *syllable nuclei* (the nucleus is the ‘heart’ of the syllable, carrying stress, loudness, pitch information and usually consisting a vowel). In short, consonant are sound produced with a constriction or occlusion in the oral cavity.

When describing consonant it is necessary to provide information about three different aspects of the articulation of the consonant:

1. Is it voiced or voiceless?
2. Where is the sound produced? (Place/point of articulation)
3. How is the sound produced? (Manner of articulation)

Voiced and Voiceless Sounds

In articulatory phonetics, we investigate how speech sounds are produced using the fairly complex oral equipment we have. We start with the air pushed out by the lungs up through the trachea (or windpipe) to the larynx. Inside the larynx are the vocal cords, which take two basic positions.

1. When the vocal cords are spread apart, the air from the lungs passes between them unimpeded. Sounds produced in this way are described as **voiceless**.
2. When the vocal cords are drawn together, the air from the lungs repeatedly pushes them apart as it passes through, creating a vibration effect. Sounds produced in this way are described as **voiced**.

The distinction can be felt physically if you place a fingertip gently on the top of your 'Adam's apple' (i.e. that part of your larynx you can feel in your neck below your chin), then produce sounds such as Z-Z-Z-Z or V-V-V-V. Because these are voiced sounds, you should be able to feel some vibration. Keeping your fingertip in the same position, now make the sounds S-S-S-S or F-F-F-F. Because these are voiceless sounds, there should be no vibration. Another trick is to put a finger in each ear, not too far, and produce the voiced sounds (e.g. Z-Z-Z-Z) to hear and feel some vibration, whereas no vibration will be heard or felt if you make voiceless sounds (e.g. S-S-S-S) in the same way.

Place/Point of Articulation

As the airstream passes through the vocal tract, it may be modified by the movement of the articulators, That is by the lips and the tongue obstructing its passage through the vocal tract to varying degrees. This process is called **articulation**. The obstruction of the airstream may occur at any point in the vocal tract, and is the result of an active articulator moving towards a passive articulator. The active articulators are the lips and the tongue, and the passive articulators are

the locations on the roof of the mouth, for example the alveolar ridge, hard palate, etc.

We usually subdivide the articulatory process based on where in the vocal tract obstruction of the air flow occurs. It refers to place/point of articulation. The number of places of articulation may vary from one language to another. But in English, consonants can be divided into seven groups, namely: bilabial, labiodental, dental/interdental, alveolar, palatal, velar and glottal/pharyngeal.

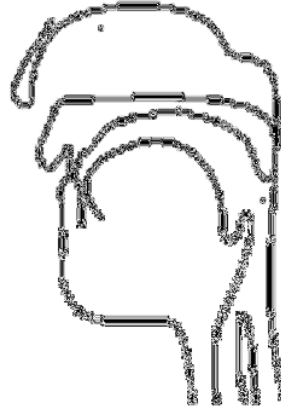
Bilabial

Bilabial sounds are made with both lips. There are five such sounds possible in English: [p] *pat*, [b] *bat*, [m] *mat*, [w] *with*, and [w^h] *where* (present only in some dialects). We could say that the lower lip is the active articulator and the upper lip the passive articulator, though the upper lip usually moves too, at least a little



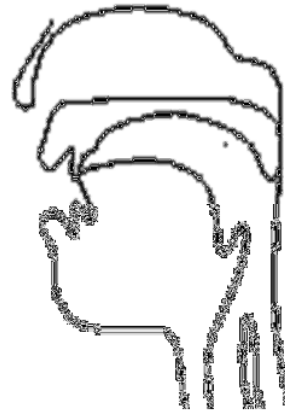
Labiodental

Labiodental consonants are made with the lower lip against the upper front teeth. English has two labiodentals [f] as in *fat* and [v] as in *vat*. The lower lip is the active articulator and the upper teeth are the passive articulator



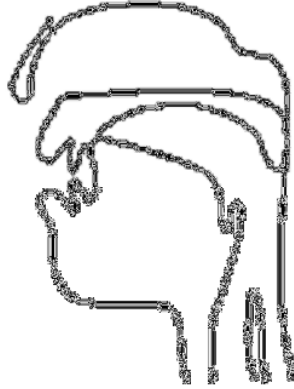
Dental/Interdental

Interdentals are made with the tip of the tongue between front teeth. There are two interdental sounds in English: [θ] *thigh* and [ð] *thy*



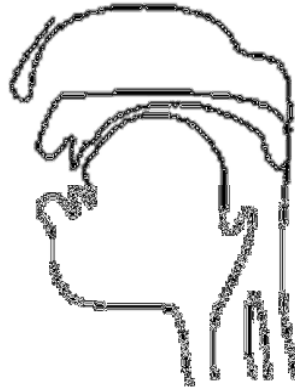
Alveolar

Just behind your upper front teeth there is a small ridge called the alveolar ridge. English makes seven sounds at or near this ridge: [t] *tab*, [d] *dab*, [s] *sip*, [z] *zip*, [n] *noose*, [l] *loose* and [r] *red*.



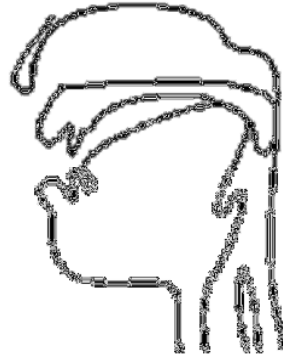
Palatal

If you let your finger glide back along the roof of your mouth you will note that the anterior portion is hard while the posterior portion is soft. Sounds made near the hard part of the roof of the mouth are said to be palatal. English makes five sounds in the palatal region: [ʃ] *leash*, [ʒ] *measure*, [tʃ] *church*, [dʒ] *judge* and [j] *yes*.



Velar

The soft part of the roof of the mouth behind the hard palate is called the velum. Sounds made near the velum are said to be velar. There are three velar sounds in English: [k] *kill*, [g] *gill*, and [ŋ] *sing*.



Glottal/Pharyngeal

The space between the vocal folds is the glottis. English has two sounds made at the glottis. The first is easy to hear: [h] as in *high* and *history*. The second is called a glottal stop and it is written phonetically as [ʔ] (a question mark without the dot). This sound occurs before each vowel sound in *uh-oh*.

The place of articulation and the manner of articulation of English consonants are summarized in table below:

Table 1
English Consonants

Manner of Articulation	State of Glottis	Bilabial	Labiodental	Dental/ interdental	Alveolar	Palatal	Velar	Glottal
Stop	-voi	p			t		k	ʔ
	+voi	b			d		g	
Fricative	-voi		f	θ	s	ç		
	+voi		v	ð	z	ʒ		
Affricate	-voi					tʃ		
	+voi					dʒ		
Nasal	+voi	m			n		ŋ	
Liquid	+voi				l, r			
Glide	+voi	w				j		h

Manner of Articulation

So far, we have concentrated on describing consonant sounds in terms of where they are articulated. We can also describe the same sounds in terms of how they are articulated. It refers to manner of articulation. Based on the manner of articulation, English consonants may be grouped into six groups, namely: stops, fricative, affricates, nasals, liquid, and glides.

Stops

Stops are made by totally obstructing the airstream. Notice that when you say [p] and [b] your lips are closed together for a moment, stopping the air flow. [p] and [b] are bilabial stops. [b] is voiced bilabial stop. [t], [d], [k], and [g] are also stops.

Fricatives

Fricatives are made by forming a nearly complete stoppage of the airstream. The opening through which the air escapes is so small that friction is produced (much as air escaping from a punctured tire makes a 'hissing' noise) [ʃ] is made by almost

stopping the air with the tongue near the roof of the mouth. It is a voiceless palatal fricative. [f], [v], [θ], [ð], [s], [z], [ʃ], [ʒ] are also fricatives.

Affricates

The affricates are special group of sounds that are formed by combining a stop and a fricative. In English, only one pair of sounds occurs in this category, [tʃ] as in *chain* and *rich* and [dʒ] as in *Jane* and *ridge*. Notice that in pronouncing [tʃ], one seems to pronounce [t] following by [ʃ]. Similarly, [dʒ] is much like a phonetic compound, consisting of [d] following by [ʒ].

Nasals

In English, the three nasals, [m, n, ŋ], are made with the lips and the tongue in the same respective position as they are for [p, t, k]; however, air pressure does not build up as it does in the stops. Instead, the uvula (the flap that controls the opening to the nasal passage) is open, allowing the air to flow through the nose. In English, the nasals are always voiced. Whereas [m] and [n] may occur at the beginning as well as at the end of a syllable in English, as in *mom* and *nun*, [ŋ] occurs only at the end of syllable, as in *sing*.

Liquid

The consonants [l] and [r], as heard in *lilt* and *roar*, are called liquid. Both sounds are normally voiced. An [l] sound is formed by touching the tip of the tongue to the alveolar ridge and allowing air to escape to each side. The [r] sound in English is formed by curling the tip of the tongue up behind the alveolar ridge and flipping it forward and upward without actually touching the alveolar ridge.

Glides

Glides are made with only a slight closure of the articulators. In fact, if the vocal tract were any more open you would produce a vowel sound. [w] is made by rising the back of the tongue toward the velum while rounding your lips at the same time; it is thus classified as a *voiced bilabial glide*. (Notice the similarity in the way you articulate [w] in the *woo* and then [u] vowel in this word; the only change is that you open your lips

a little more for [u]). The [y] glide, much like the [w], is formed with the tongue and lips in the same position as they are when making the sound 'ee' (as in *bee*).

Both [w] and [y] always appear either before or after a vowel in English. In both cases, the sound 'glide' rapidly to or from the articulatory position for that vowel. Since [w] and [j] possess certain vowel-like properties--for example lack a definite constriction of the oral cavity--they are not true consonants and are often called **semi vowels**.

In conclusion, the description of consonants is based on a combination of the following: the degree of obstruction of the air flow, for example, stop, fricative, or nasal; place of obstruction, for example, dental, alveolar, or palatal; and voicing, that is all consonants are neither voiced or voiceless. Since it is the combination of voice, place and manner that defines the quality of each consonant, by using these three qualities we are able to provide descriptive labels for all English consonants as follows:

[p] = a bilabial, stop, voiceless sound
[b] = a bilabial, stop, voiced sound
[m] = a bilabial, nasal, voiced sound
[f] = a labiodentals, fricative, voiceless sound
[v] = a labiodentals, fricative, voiced sound
[t] = a dental, fricative, voiceless sound
[Δ] = a dental, fricative, voiced sound
[t] = an alveolar, stop, voiceless sound
[d] = an alveolar, stop, voiced sound
[s] = an alveolar, fricative, voiceless sound
[z] = an alveolar, fricative, voiced sound
[n] = an alveolar, nasal, voiced sound
[l] = an alveolar, liquid, voiced sound
[Σ] = a palatal, fricative, voiceless sound
[Z] = a palatal, fricative, voiced sound
[±] = a palatal, affricate, voiceless sound
[->] = a palatal, affricate, voiced sound
[k] = a velar, stop, voiceless sound
[g] = a velar, stop, voiced sound
[N] = a velar, nasal, voiced sound
[j] = a palatal, glide, voiced sound

English Vowels

symbols	Examples
i	beet, beat, we, see, sea, receive, key, believe, amoeba, people, Caesar, vaseline, fiend, money, lily
ɒ	bit, consist, injury, bin
e	bate, bait, ray, profane, great, air, eight, gauge, rain, reign, they
ɛ	bet, serenity, reception, says, guest, dead, said
æ	pan, bad, act
u	boot, who, sewer, duty, through, poor, to, too, two, move, Lou
ʊ	put, foot, butcher, could
	but, among, does, cover
o	boat, go, grow, over
ɔ	bought, caught, wrong, saw, ball, author, awe
a	pot, father, palm, car, hospital
ɔː	sofa, alone, principal, science, telegraph, difficult, suppose, vision, television

Vowels are voiced continuous sounds involving no interruption in the flow of air through the oral cavity. Different vowel sounds result from changing the shape of the mouth; each vowel is associated with a different configuration of the tongue and lips. For example, to say 'ee' represented phonetically as [i], the lips are somewhat pulled back and the tongue is arched up toward the palate. To say 'oo' as in *woo* and *Sue*, represented as [u], the tongue is raised toward the back of the mouth and the lips are rounded and pushed forward.

We will need to describe vowels in terms of different features from those we use for consonant. Vowels are sounds produced with a relatively open vocal tract, so they actually do not have a point of articulation (place of constriction) or a manner of articulation (type or degree constriction), and they are almost voiced.

We can change the shape of the vocal tract, and thus change vowel quality, in various ways:

1. we can raise or lower the body of the tongue
2. we can advance or retract the body of the tongue

3. we can round the lips or not
4. and we can make these movements with a tense or lax gesture

Each of these features will be discussed in turn.

Tongue Height

If you repeat to yourself the vowel sounds of *seat*, *set*, *sit*--transcribe [i], [ɛ], and [æ]--you will find that you naturally open your mouth a little wider as you change from [i] to [ɛ], and then a little wider still as you change from [ɛ] to [æ]. These varying degrees of openness correspond to different degrees of tongue height: high for [i], mid for [ɛ], and low for [æ].

High vowels like [i] are made with the front of the mouth less open because the tongue body is raised, or high. The high vowels of English are [i, u, ʊ] as in *leap*, *loop*, *lip*, *look*. Conversely, low vowels like [æ] in *sat* are pronounced with the front of the mouth open and the tongue lowered. [æ, a], as in *cat* and *cot*, are the English low vowels. Mid vowels like [ɛ] in *set* are produced with an intermediate tongue height; in English, these mid vowels include [e, ɛ, ɜ, ɝ, ɔ] as in *bait*, *bet*, *but*, *about*, *caught*, *boat*.

Tongue Advancement

Besides being held high or mid, or low, the tongue can also be pushed forward or pulled back within the oral cavity. For example, in the *high front vowels* [i], the body of the tongue is raised and pushed forward just under the hard palate. The *high back vowel* [u] in *boot*, on the other hand, is made by raising the body of the tongue in the back of the mouth--toward the velum. The tongue is advanced or pushed forward for all the front vowels, [i, ʊ, e, ɛ, æ], as in *see*, *Mick*, *take*, *Fred*, *bake*, and retracted or pulled back for the back vowels [u, ɔ, o,], a] as in *you*, *look*, *so*, *soft*, *doc*. Central vowels require neither fronting nor retraction of the tongue

Lip Rounding

Vowel quality also depends on lip position. When you say the [u] in *two*, your lips are rounded. For the [i] in *tea*, they are unrounded. English has four rounded vowels: [u, ʊ, o, ɔ], as in *you*, *could*, *go*, *wrong*. All other vowels in English are unrounded. In the vowel chart, the rounded vowels are enclosed in a dotted-line rectangle.

Tenseness

Vowels that are called *tense* are produced with an extra degree of muscular effort. Lax vowels lack this extra effort. For example, *tense front* vowels are made with a stronger or more extreme tongue fronting gestures than lax front vowels, which are produced with a weaker fronting movement: compare tense [i] in *meet* with lax [ɪ] in *mitt*, or tense [e] in *late* with lax [ɛ] in *let*. *Tense rounded vowels* are made with stronger or tighter lip rounding than their lax counterparts: compare tense [u] in *boot* with lax [ʊ] in *put*.

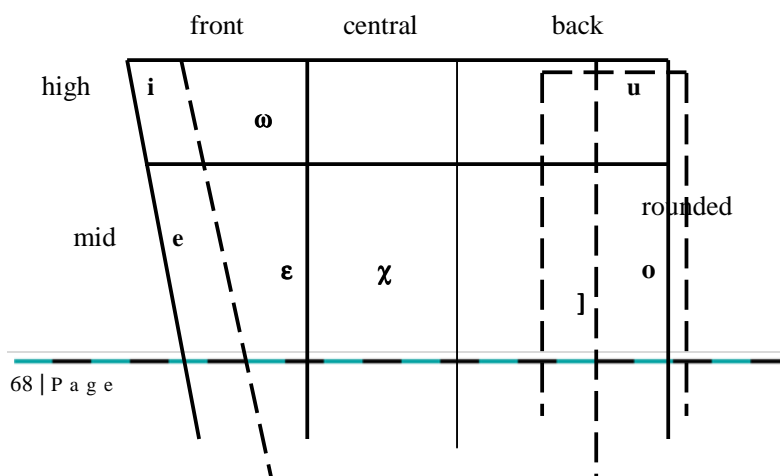
Now, we can consider some sample description of English vowels

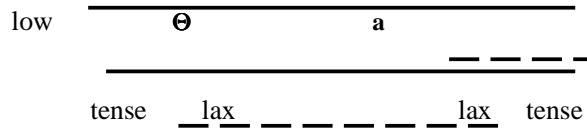
- [i], as in *beat*, is high, front, unrounded and tense
- [ɪ], as in *caught*, is mid, back, rounded, and lax
- [a], as in *cot*, is low, back, unrounded, and lax
- [ʌ], as in *cut*, is mid, central, unrounded, and lax
- [e], as in *cake*, is mid, front, unrounded, and tense

How would you describe each of the following English vowels? Specify height, advancement, rounding, and tenseness

- [ɔ], as in *bit*
- [o], as in *boat*
- [ɛ], as in *be*
- [u], as in *boot*
- [æ], as in *cat*
- [ʊ], as in *could*

The features of all English vowels can be summarized in the following chart:

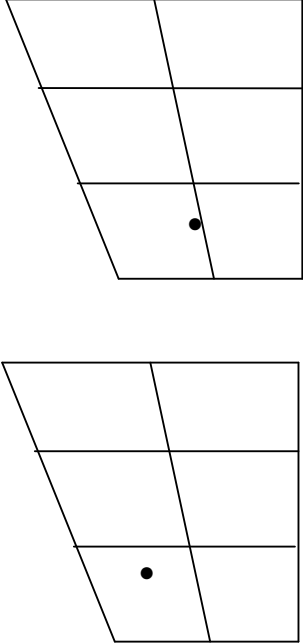
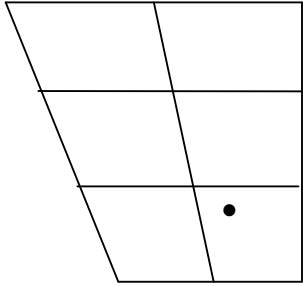
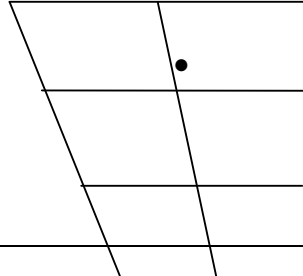




English Short Vowels

English has large number of vowel sounds; the first ones to be examined are short vowels. The symbols for these short vowels are [ɪ, ε, ə, ɜ, ʌ, ɪ]. Each vowel is described in relation to the cardinal vowels.

	<p>ɪ (example words: 'bit', 'pin', 'fish'). The diagram shows that, though this vowel is in the close front area, compared with cardinal vowel [i] it is more open, nearer in to the centre. The lips are slightly spread.</p>
	<p>ε (example words: 'bet', 'men', 'yes'). This is a front vowel between cardinal vowel [ε] and [E]. The lips are slightly spread.</p>

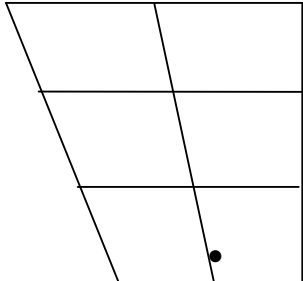
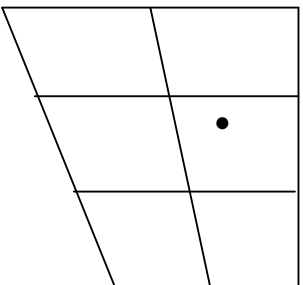
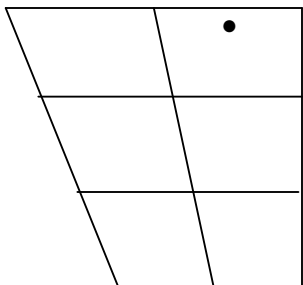
	<p>ə (example words: ‘bat’, ‘man’, ‘gas’). This vowel is front, but not quite as open as cardinal vowel [a]. The lips are spread</p> <p>(example words: ‘but’, ‘some’, ‘rush’). This is a central vowel, and the diagram shows that it is more open than the open-mid tongue height. The lip position is neutral</p>
	<p>ɒ (example words: ‘pot’, ‘gone’, ‘cross’). This vowel is not quite fully back, and between open-mid and open in tongue height. The lips are slightly rounded</p>
	<p>ʊ (example words: ‘put’, ‘pull’, ‘push’). The nearest cardinal vowel is [ʊ], but it can be seen that [Y] is more open and nearer to central. The lips are rounded.</p>



Long Vowels

There are five long vowels in English. The symbol consists of one vowel symbols plus a length mark made of two dots, [:]. Thus, we have [i:, ɛ:, A:, ɔ:, u:]. We will now look at each of these long vowels individually.

	<p>i: (example words: ‘beat’, ‘mean’, ‘peace’). This vowel is nearer to cardinal vowel [i] (that is, it is more close and front) than the short vowel of ‘bid’, ‘pin’, ‘fish’. The lips are only slightly spread and this results in a rather different vowel quality</p>
	<p>ɛ: (example words: ‘bird’, ‘fern’, ‘purse’). This is a central vowel which is well-known in most English accents as a hesitation sound (spelt ‘er’), but which many foreigners find difficult to copy. The lip position is neutral.</p>

	<p>A: (example words: ‘card’, ‘half’, ‘pass’). This is an open vowel in the region of cardinal vowel. The lip position is neutral</p>
	<p>: (example words: ‘board’, ‘torn’, ‘horse’). The tongue height for this vowel is between cardinal vowel [] and [o], closer to the latter. This vowel is almost fully back and has quite strong lip-rounding</p>
	<p>ʊ: (example words: ‘food’, ‘soon’, ‘loose’). The nearest cardinal vowel to this is [ʊ], but it is much less back and less close, while lips are only moderately rounded</p>

Monophthong and Diphthongs

Monophthong—one sound. If the sound of a vowel remains relatively unchanged during its production, then we call it **monophthong**. [e] and [A:] are monophthongs.

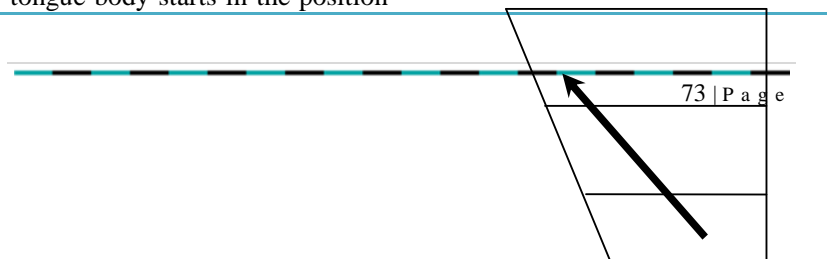
Diphthong—two sounds. If a sound of a vowel continually changes within a single syllable then we call it a **diphthong**. The change in sound quality may be achieved by a movement of the tongue and/or lips. The vowels in *toy*, *tie* and *town* ([I], [AI], [AY]) respectively) are all diphthongs.

At this point, we still have not described the vowel sounds of English words--e.g. *hide*, *loud*, *coin*. Unlike the simple vowels described above, the vowels of these words are diphthong, two part vowel sounds consisting of a vowel and a glide in the same syllable. If you say *eye* slowly, concentrating on how you make this vowel, you should find that your tongue starts out in the position for [a] and moves toward the position for the vowel [i] or the palatal glide [j]. This diphthong, which consists of two articulations and two corresponding sounds, is written with two symbols; [aj], as in [haʊd] *hide*. To make the vowel of *loud*, the tongue and the lips start in position for [a] and move toward the position for [u] or [w], so this diphthong is written [aʊ], as in [laʊd] *loud*. In the vowel oʊ *coin*, the movement is from [o] position toward position [I] or [j], so the vowel of *coin* is written [oʊ], as in [koʊn] *coin*.

Symbols	Examples
aj/aI	bite, sight, by, die, Stein, aisle, choir, liar, island, height, sign
aw/aY	about, brown, doubt, coward
oj/ I	boy, doily

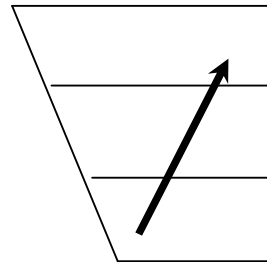
In simple vowels, or monophthongs, the tongue body has a relatively stable position throughout. But there are other vowels where the tongue body does not stay in one place, even in the most abstract diagrams with artificial slices. Complex vowels which are characterized by movement are called *diphthongs*. To transcribe a diphthong, we need two symbols: the first indicating the starting position and the second indicating the finishing position or the direction of movement.

In the English diphthong [aj], the tongue body starts in the position

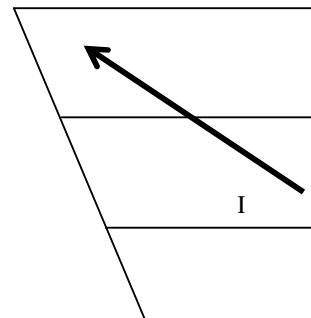


for [a] -- between [æ] and [ʌ]. Almost immediately, it begins moving upwards and forwards. Occasionally it gets as far as [i], but usually only as far as [ɪ] or even lower. In a broader transcription, we can ignore the exact position of the end-point and simply use the glide [j] as a cover symbol.

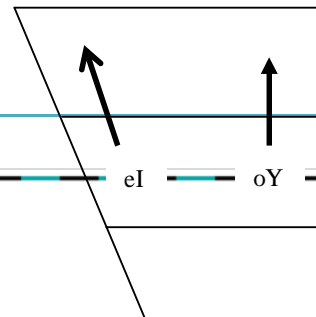
In the English diphthong [aʊ], the tongue body starts out in the same position (for most Canadian speakers) and moves upwards and backwards, towards [u], [Y], or [o]. In a broader transcription, we can use the glide [w] as a cover symbol for the end-point. The lips become increasingly rounding throughout the diphthong.



In the diphthong [ɪ], the tongue body begins in the position for [ɪ] and moves upwards and forwards. The lips become increasingly less rounded throughout the diphthong.



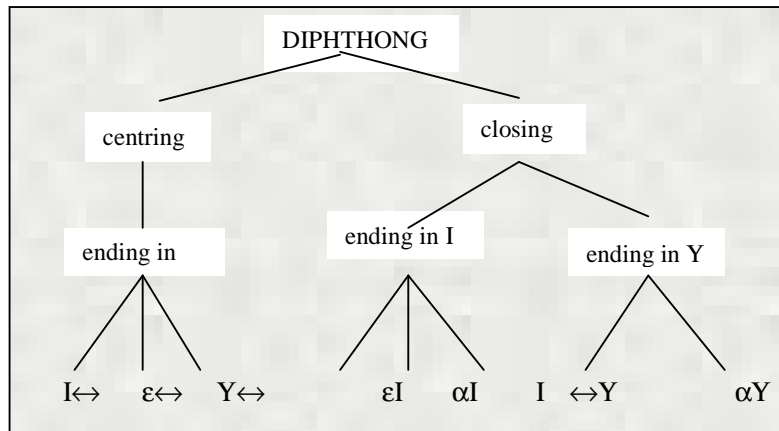
In most dialects of English, the vowels we have been transcribing [e] and [o] also involve an upwards movement of the tongue body. In narrower transcriptions of these dialects, they would be



written [eɪ] and [oʏ]. A tendency to pronounce all tense mid vowels as diphthongs is one of the most noticeable accent features of English-speakers trying to speak other languages.

The total number of diphthongs is eight (though [Y↔] is increasingly rare). The easiest way to remember them is in terms of three groups divided as in this diagram

Figure 4
English Diphthongs



Triphthongs

The most complex English sounds of vowel type are the **triphthongs**. They can be rather difficult to pronounce, and very difficult to recognize. A triphthong is a glide from one vowel to another and then to a third, all produced rapidly and without interruption. For example, a careful pronunciation of the word ‘hour’ begins with a vowel quality similar to [A:] goes on to a glide towards the back close rounded area (for which we use the symbol Y), then ends with a mid-central vowel (schwa, \leftrightarrow). We use the symbols $\alpha Y \leftrightarrow$ to represent the way we pronounce ‘hour’, but this is not always an accurate representation of the pronunciation.

The triphthongs can be looked on as being composed of the five closing diphthongs described in the last section, with \leftrightarrow added on the end. Thus we get:

ϵI	+	\leftrightarrow	=	$\epsilon I \leftrightarrow$	‘layer’, ‘player’
αI	+	\leftrightarrow	=	$\alpha I \leftrightarrow$	‘liar’, ‘fire’
I	+	\leftrightarrow	=	$I \leftrightarrow$	‘loyal’, ‘royal’
$\leftrightarrow Y$	+	\leftrightarrow	=	$\leftrightarrow Y \leftrightarrow$	‘lower’, ‘mower’
αY	+	\leftrightarrow	=	$\alpha Y \leftrightarrow$	‘power’, ‘hour’

The principal cause of difficulty for the foreign learner is that in present-day English the extent of the vowel movement is very small, except in very careful pronunciation. Because of this, the middle of the three vowel qualities of the triphthongs (that is, the I or Y part) can hardly be heard and the resulting sound is difficult to distinguish from some of the diphthongs and long vowels. To add to the difficulty, there is also the problem of whether a triphthong is felt to contain one or two syllables. Words such as ‘fire’ [$\phi \alpha I \leftrightarrow$] or ‘slower’ [$sl \leftrightarrow Y \leftrightarrow$] are more likely to be heard as two syllables.