

Description of English Consonants

What makes one consonant different from another?

Producing a consonant involves making the vocal tract narrower at some location than it usually is. We call this narrowing a **constriction**. Which consonant you're pronouncing depends on where in the vocal tract the constriction is and how narrow it is. It also depends on a few other things, such as whether the vocal folds are vibrating and whether air is flowing through the nose.

We classify consonants along three major dimensions:

- place of articulation
- manner of articulation
- voicing

The **place of articulation** dimension specifies where in the vocal tract the constriction is. The **voicing** parameter specifies whether the vocal folds are vibrating. The **manner of articulation** dimension is essentially everything else: how narrow the constriction is, whether air is flowing through the nose, and whether the tongue is dropped down on one side.

For example, for the sound [d]:

- Place of articulation = alveolar. (The narrowing of the vocal tract involves the tongue tip and the alveolar ridge.)
- Manner of articulation = oral stop. (The narrowing is complete -- the tongue is completely blocking off airflow through the mouth. There is also no airflow through the nose.)
- Voicing = voiced. (The vocal folds are vibrating.)

Voicing

The vocal folds may be held against each other at just the right tension so that the air flowing past them from the lungs will cause them to vibrate against each other. We call this process **voicing**. Sounds which are made with vocal fold vibration are said to be **voiced**. Sounds made without vocal fold vibration are said to be **voiceless**.

There are several pairs of sounds in English which differ only in voicing -- that is, the two sounds have identical places and manners of articulation, but one has vocal fold vibration and the other doesn't. The [θ] of *thigh* and the [ð] of *thy* are one such pair. The others are:

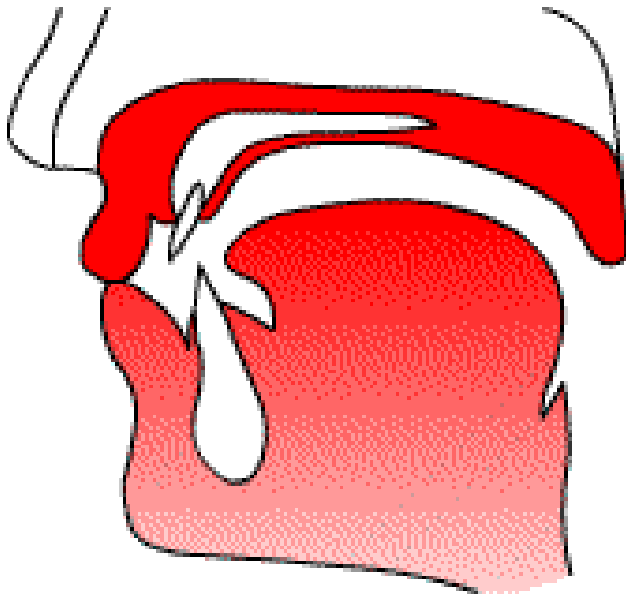
voiceless	voiced
[p]	[b]
[t]	[d]
[k]	[g]
[f]	[v]
[θ]	[ð]
[s]	[z]
[ʃ]	[ʒ]
[tʃ]	[dʒ]

The other sounds of English do not come in voiced/voiceless pairs. [h] is voiceless, and has no voiced counterpart. The other English consonants are all voiced: [ɹ], [l], [w], [j], [m], [n], and [ŋ]. This does not mean that it is physically impossible to say a sound that is exactly like, for example, an [n] except without vocal fold vibration. It is simply that English has chosen not to use such sounds in its set of distinctive sounds. (It is possible even in English for one of these sounds to become voiceless under the influence of its neighbours, but this will never change the meaning of the word.)

Places of articulation

The place of articulation (or POA) of a consonant specifies where in the vocal tract the narrowing occurs. From front to back, the POAs that English uses are:

Bilabial



In a bilabial consonant, the lower and upper lips approach or touch each other. English [p], [b], and [m] are bilabial stops.

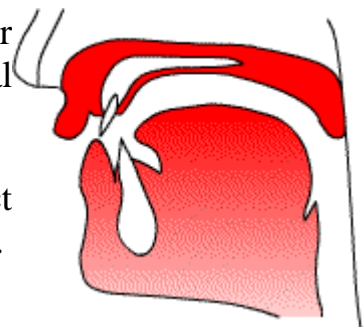
The diagram to the right shows the state of the vocal tract during a typical [p] or [b]. (An [m] would look the same, but with the velum lowered to let out through the nasal passages.)

The sound [w] involves two constrictions of the vocal tract made simultaneously. One of them is lip rounding, which you can think of as a bilabial approximant.

Labiodental

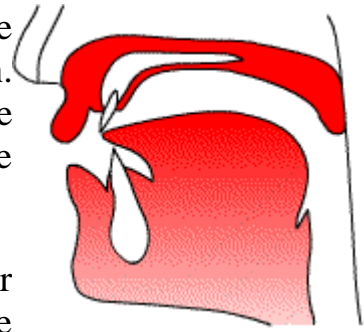
In a labiodental consonant, the lower lip approaches or touches the upper teeth. English [f] and [v] are bilabial fricatives.

The diagram to the right shows the state of the vocal tract during a typical [f] or [v].



Dental

In a dental consonant, the tip or blade of the tongue approaches or touches the upper teeth. English [θ] and [ð] are dental fricatives. There are actually a couple of different ways of forming these sounds:

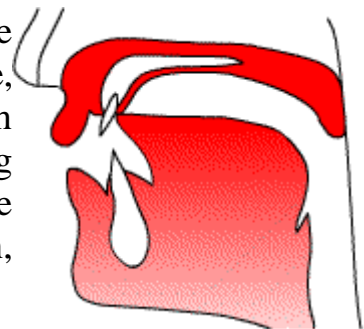


- The tongue tip can approach the back of the upper teeth, but not press against them so hard that the airflow is completely blocked.
- The blade of the tongue can touch the bottom of the upper teeth, with the tongue tip protruding between the teeth -- still leaving enough space for a turbulent airstream to escape. This kind of [θ] and [ð] is often called **interdental**.

The diagram to the right shows a typical interdental [θ] or [ð].

Alveolar

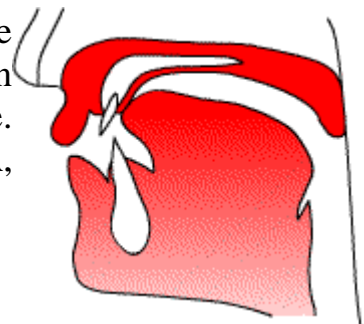
In an alveolar consonant, the tongue tip (or less often the tongue blade) approaches or touches the alveolar ridge, the ridge immediately behind the upper teeth. The English stops [t], [d], and [n] are formed by completely blocking the airflow at this place of articulation. The fricatives [s] and [z] are also at this place of articulation, as is the lateral approximant [l].



The diagram to the right shows the state of the vocal tract during plosive [t] or [d].

Postalveolar

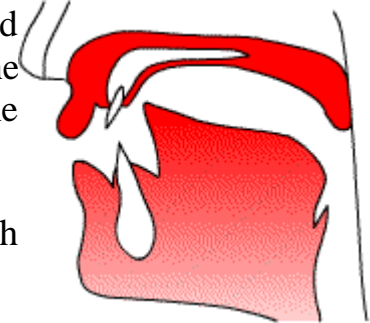
In a postalveolar consonant, the constriction is made immediately behind the alveolar ridge. The constriction can be made with either the tip or the blade of the tongue. The English fricatives [ʃ] and [ʒ] are made at this POA, as are the corresponding affricates [tʃ] and [dʒ].



The diagram to the right shows the state of the vocal tract during the first half (the stop half) of an affricate [tʃ] or [dʒ].

Retroflex

In a retroflex consonant, the tongue tip is curled backward in the mouth. English [ɻ] is a retroflex approximant -- the tongue tip is curled up toward the postalveolar region (the area immediately behind the alveolar ridge).



The diagram to the right shows a typical English retroflex [ɻ].

Both the sounds we've called "postalveolar" and the sounds we've called "retroflex" involve the region behind the alveolar ridge. In fact, at least for English, you can think of retroflexes as being a sub-type of postalveolars, specifically, the type of postalveolars that you make by curling your tongue tip backward.

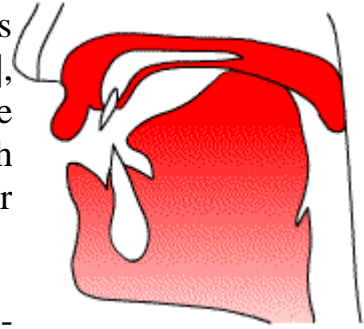
(In fact, the retroflexes and other postalveolars sound so similar that you can usually use either one in English without any noticeable effect on your accent. A substantial minority North American English speakers don't use a retroflex [ɻ], but rather a "bunched" R -- sort of like a tongue-blade [ʒ] with an even wider opening. Similarly, a few people use a curled-up tongue tip rather than their tongue blades in making [ʃ] and [ʒ].)

Palatal

In a palatal consonant, the body of the tongue approaches or touches the hard palate. English [j] is a palatal approximant -- the tongue body approaches the hard palate, but closely enough to create turbulence in the airstream.

Velar

In a velar consonant, the body of the tongue approaches or touches the soft palate, or velum. English [k], [g], and [ŋ] are stops made at this POA. The [x] sound made at the end of the German name *Bach* or the Scottish word *loch* is the voiceless fricative made at the velar POA.



The diagram to the right shows a typical [k] or [g] -- though where exactly on the velum the tongue body hits will vary a lot depending on the surrounding vowels.

As we have seen, one of the two constrictions that form a [w] is a bilabial approximant. The other is a velar approximant: the tongue body approaches the soft palate, but does not get even as close as it does in an [x].

Glottal

The glottis is the opening between the vocal folds. In an [h], this opening is narrow enough to create some turbulence in the airstream flowing past the vocal folds. For this reason, [h] is often classified as a glottal fricative.