

Applied Phonetics and Phonology

English Phonetics and Phonology:

English Consonants

Tom Payne, TESOL at Hanyang University 2007

How Speech Sounds are Produced

Speech sounds are produced by a moving column of air in a resonating chamber – just like a musical instrument.

Different sounds are produced by varying the speed of the column of air, the size and shape of the resonating chamber, and by introducing various kinds of vibrations into the column.

How Speech Sounds are Produced

This is why different musical instruments sound different.

This is also why different people sound different when they talk.

How Speech Sounds are Produced

By changing the speed of the column of air, the shape of the resonator, and the kind of vibration introduced into the air stream, we produce the phonetic differences that constitute the sounds of speech.

Classification of Consonants

Most English consonants can be classified using three articulatory parameters:

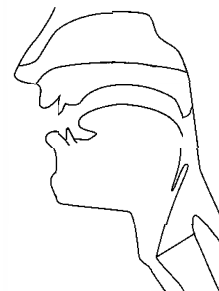
Voicing: vibration or lack of vibration of the vocal folds.

Place of Articulation: the point at which the air stream is most restricted.

Manner of Articulation: What happens to the moving column of air.

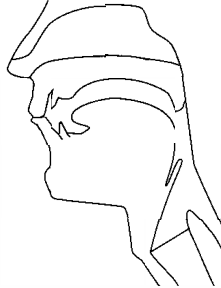
Classification of Consonants

Meet Sammy, the sagittal diagram: Our phonetic friend:



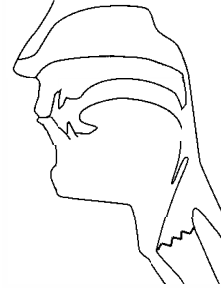
Classification of Consonants

Bilabial sounds are pronounced with the lips together. Here Sammy is pronouncing a [p]:



Classification of Consonants

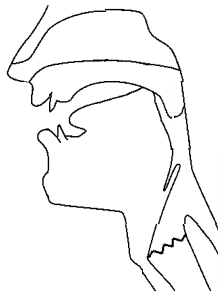
To make the sound [m], Sammy simply lowers his velum, to allow the column of air to pass through his nose:



This increases the size of the resonating chamber, and allows the consonant to be pronounced continuously.

Classification of Consonants

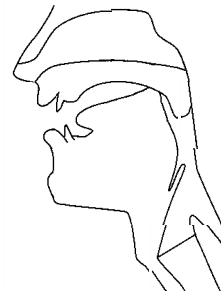
Velar sounds are pronounced with the tongue near or touching the velum, or “soft-palate”:



What sound is this?

Classification of Consonants

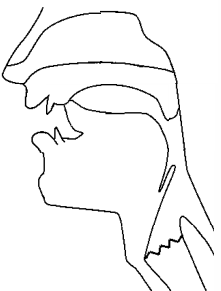
Velar sounds are pronounced with the tongue near or touching the velum, or “soft-palate”:



Now what sound is Sammy pronouncing?

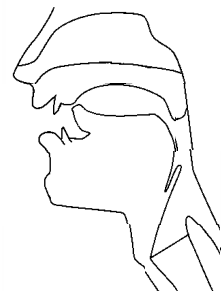
Classification of Consonants

Alveolar sounds are pronounced with the tongue near or touching the alveolar ridge, just behind the top teeth. What is Sammy saying now?



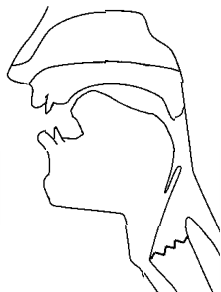
Classification of Consonants

So far we have only seen stops. To produce a fricative, the air stream is impeded, but not stopped. What sound do you think this is? Watch the larynx!



Classification of Consonants

Palatal fricatives, like /ʃ/ and /ʒ/ are pronounced with the tongue behind the alveolar ridge:



What sound is this?

Classification of Consonants

With the three parameters of voicing, place of articulation and manner of articulation, we can uniquely identify (almost) all the phonemic consonants of English.

Places of Articulation

Lips: Bilabial consonants /p, b, m, w/
Lips and teeth: Labiodental consonants: /f, v/
Teeth: Interdental consonants /θ, ð/
Alveolar ridge: Alveolar consonants /t, d, s, z, n, l/
Central palate (or hard palate): Palatal consonants /ʃ, ʒ, r, tʃ, dʒ, y/
Velum (or soft palate): Velar consonants /k, g, ŋ/
Glottis: Glottal fricative /h/

Voiced and Voiceless

Voicing introduces vibration into the resonating column of air. When the vocal folds are tensed, they vibrate as the air stream passes them. The result is a **voiced** sound, such as /z/ and /v/. When the vocal folds relax, the air stream passes them without causing vibration. The result is a **voiceless** sound, such as /s/, /f/ and /t/.

Manner of Articulation

The process by which the moving column of air is shaped is called the manner of articulation. For English, these are:

Stops: /p, t, k, b, d, g/
Fricatives: /f, v, θ, ð, s, z, ʃ, ʒ, h/
Affricates: /tʃ, dʒ/
Nasals: /m, n, ŋ/ (sometimes called “nasal stops”)
Liquids: /l, r/
Glides: /w, y, hw/

The Stops

Stops occur when the air stream stops completely for an instant before it exits the vocal tract.

Voiceless stops in English are the /p/ in pour and slap, the /t/ in time and adept, and the /k/ in cold and poke.

Voiced stops are the /b/ in bow and crab, the /d/ in dock and blood, and the /g/ in game and bag.

The Fricatives

Fricatives occur when the air stream is audibly disrupted but not stopped completely.

Voiced fricatives are the /v/ in very and shove, the /ð/ in thy and bathe, the /z/ in zoo and wise, and the /ʒ/ in measure and Zha Zha.

Voiceless fricatives are the /f/ in fool and laugh, the /θ/ in thigh and bath, the /ʃ/ in shock and nation, the /s/ in soup and miss, and the /h/ in hope and ahoy.

The Affricates

Affricates start out as a stop, but end up as a fricative. There are two affricates in English, both of which are palatal. Therefore we do not need to mention place of articulation to describe affricates.

The voiceless affricate is the /tʃ/ in lunch and chapter.

The voiced affricate is the /dʒ/ in germ, journal and wedge

The Nasals

Nasals occur when velum is lowered allowing the air stream to pass through the nasal cavity instead of the mouth. The air stream is stopped in the oral cavity, so sometimes nasals are called “nasal stops.” We will just call them “nasals.”

Nasals are the /m/ in mind and sum, the /n/ in now and sign, and the /ŋ/ in sing, longer and bank.

The Liquids

Liquids occur when the air stream flows continuously through the mouth with less obstruction than that of a fricative. Both liquids in English are voiced, so we don't need to mention voicing when we describe liquids.



The Liquids

The “lateral” liquid, /l/, is pronounced with the restriction in the alveolar region at the beginning of syllables, as in low and syllable, but in the velar region at the ends of syllables, as in call, halter, and (optionally) syllable. It is called “lateral” because air flows around the sides of the tongue

The “central” liquid is the /r/ in rough and chore. This also has various pronunciations. It is called “central” because air flows over the center of the tongue.

So the terms “central” and “lateral” replace the place of articulation in descriptions of the liquids.

The Glides

Glides occur when the air stream is unobstructed, producing an articulation that is vowel-like, but moves quickly to another articulation making it a consonant. Sometimes glides are described as semi-vowels.

The glides in English include the /w/ in witch and away, and the /y/ in yes and yoyo.

Some English speakers have a voiceless alveolar glide. This is transcribed /hw/ and occurs in whether, and why.

Redundancy, Syllables and Consonant Clusters

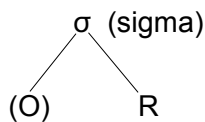
Redundancy

Sometimes we don't need to specify all three articulatory parameters (voicing, place and manner of articulation) in order to uniquely identify certain consonants. This is because some features entail certain other features. For example, the manner feature of "nasal" entails "voiced." This is because there are no voiceless nasal consonants in English. To specify voicing for nasal consonants would be **redundant**.

Syllabic and Non-Syllabic Sounds

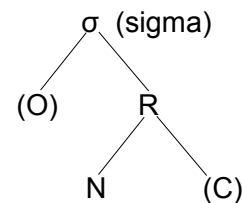
A **syllable** is a peak of sonority, often surrounded by less sonorous segments.

A **syllable** consists of an obligatory **rhyme**, preceded by an optional **onset**.



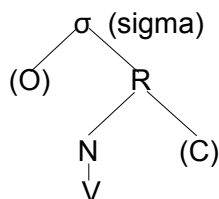
Syllabic and Non-Syllabic Sounds

A **rhyme** consists of an obligatory **nucleus**, followed by an optional **coda**.



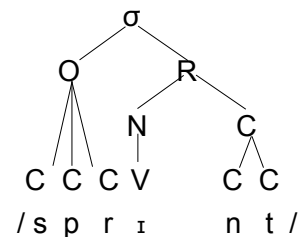
Syllabic and Non-Syllabic Sounds

A syllable **nucleus** consists of an obligatory **sonorant** (or resonant) segment, usually a vowel:



Syllabic and Non-Syllabic Sounds

The onset and coda, when present, may consist of one or more less sonorant segments:



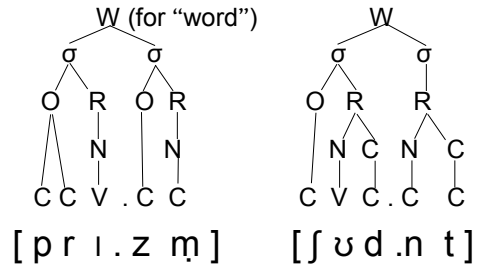
Syllabic and Non-Syllabic Sounds

In fact, there is a sonority hierarchy that goes something like this:

- Vowels (most sonorant)
- Nasal consonants
- Liquids
- Glides
- Voiced fricatives
- Voiceless fricatives
- Voiced stops
- Voiceless stops (not sonorant at all)

Syllabic and Non-Syllabic Sounds

Therefore, relatively sonorant consonants can be the nucleus of a syllable:



Syllable Structure

Appendix 4 (p. 375) of your text lists the possible syllable structures of English.

Consonant clusters (pp. 80-89) are complex syllable onsets and codas.

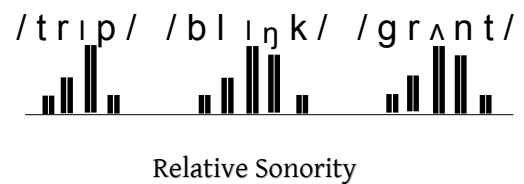
However, not just any consonant cluster may occur in the onset or coda.

There is a universal (in all languages) tendency for sonority to gradually increase in the onset, and decrease in the coda.

This is called the **Sonority Sequencing Principle**.

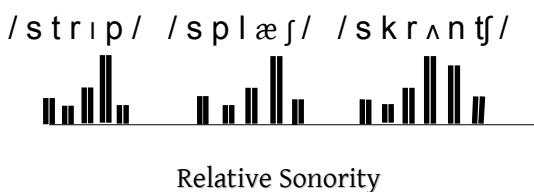
Syllable Structure

Many syllables of English conform to this universal tendency:



Syllable Structure

HOWEVER, some do not. In particular, those consonant clusters that start with /s/ slightly violate the universal tendency:



Syllable Structure

For this reason, L2 learners of English often have difficulty with these clusters. They tend to make them more natural by inserting, or deleting segments:

[ə s . t r i p] [s ə . p l æ ʃ] [k r ʌ . n t ʃ]