SPAU 133

Lecture 4- Describing Consonants

voicing

- Voicing refers to the vibration of the vocal folds.

Place of Articulation

- Refers to the place where the air restriction happens (where the vocal tract gets narrower).

Different places of articulation

- Bilabial : [b], [m]
- Labiodental: [f] , [v]
- Interdental: [θ], [ð]
- Alveolar: [l], [n], [s], [t], [d]
- Post alveolar: [ʒ], [dʒ}, [ʃ], [tʃ]
- Palatal : [j]
- Velar: [k], [g]
- Glottal: [ʔ]
- Uvular: [x], [ɣ]
- Pharyngeal: [ħ]

2.2.4 Place of Articulation

The second aspect of describing consonants is stating where in the vocal tract the constriction is made—that is, where the vocal tract is made narrower. This is referred to as the **place of articulation** of a sound. When reading about each of the following points of articulation, refer to (4), which shows a schematic view of the vocal tract as seen from the side (called a **sagittal section**). To see how this diagram matches up with an actual human head, you may find it helpful to refer to the picture to the lower left, which shows this same diagram superimposed on a photograph. We begin our descriptions with the front of the mouth—the left side of the diagram—and work our way back toward the throat.

Bilabial consonants are made by bringing both lips close together. There are five such sounds in English: [p] *pat,* [b] *bat,* [m] *mat,* [w] *with,* and [ʍ] *where* (for some speakers).

Labiodental consonants are made with the lower lip against the upper front teeth. English has two labiodentals: [f] *fat* and [v] *vat.*

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

Alveolar sounds are made with the tongue tip at or near the front of the upper **alveolar** [ælvilɹ] **ridge.** The alveolar ridges are the bony ridges of the upper and lower jaws that contain the sockets for the teeth. (Think of the inside of a baby's mouth before teeth grow in.) The front of the upper alveolar ridge, which is the most important area in terms of describing alveolar consonants, is the part you can feel protruding just behind your upper front teeth. From now on, any reference to the alveolar ridge means specifically the upper alveolar ridge. English has eight alveolar consonants: [t] *tab,* [d] *dab,* [s] *sip,* [z] *zip,* [n] *noose,* [ɾ] *atom,* [l] *loose,* and [ɹ] *red.*

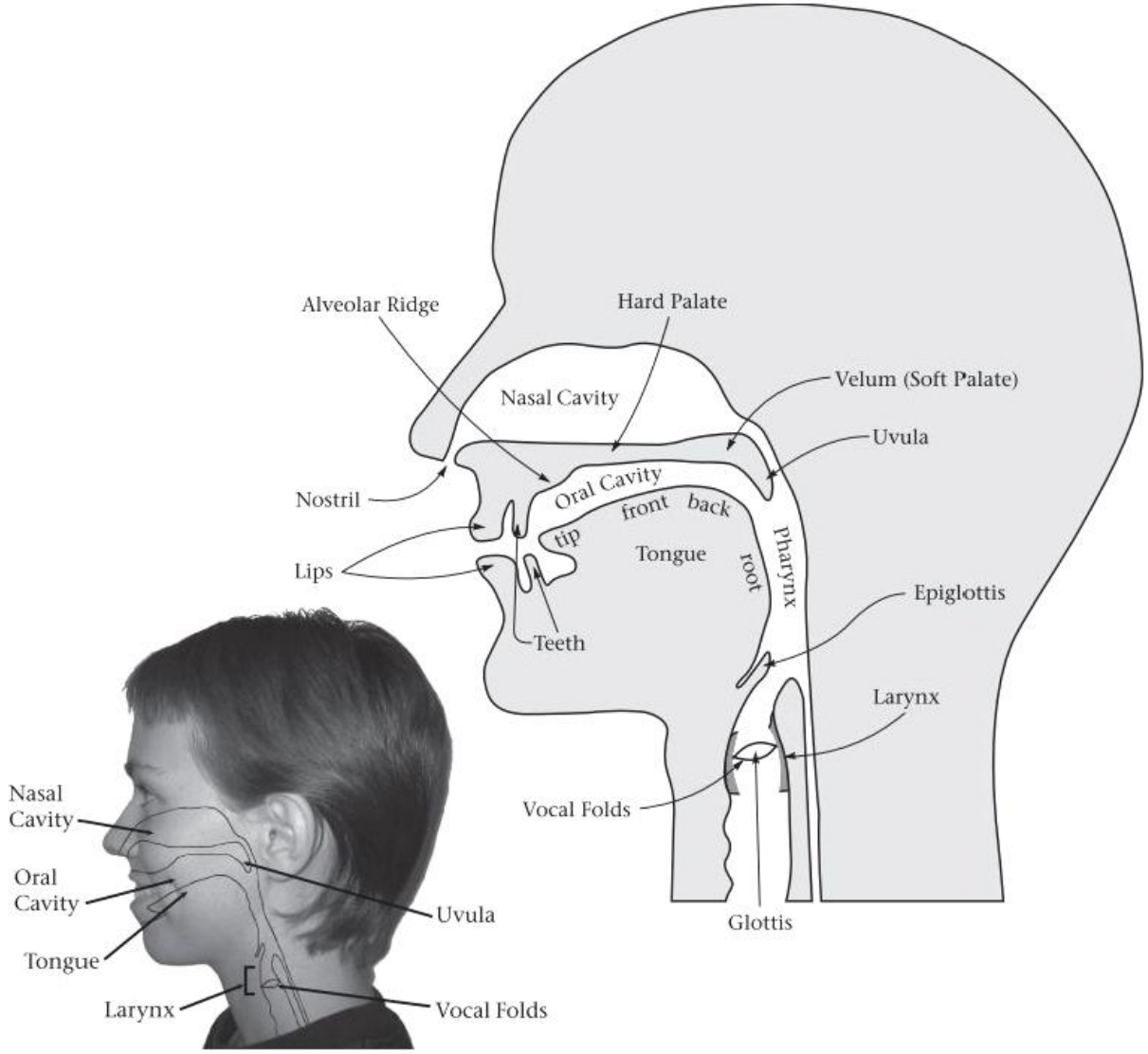
Post-alveolar sounds are made a bit farther back. If you let your tongue or finger slide back along the roof of your mouth, you will find that the front portion is hard and the back portion is soft. Post-alveolar sounds are made with the front of the tongue just behind the alveolar ridge, right at the front of the hard palate. English has four post-alveolar sounds: [ʃ] *leash,* [ʒ] *measure,* [ʧ] *church,* and [ʤ] *judge.*

Palatal sounds are made with the body of the tongue near the center of the hard portion of the roof of the mouth (the '**hard palate**'). English has only one palatal sound: [j] *yes*.

Velar consonants are produced at the **velum,** also known as the soft palate, which is the soft part of the roof of the mouth behind the hard palate. Sounds made with the back part of the tongue body raised near the velum are said to be velar. There are three velar sounds in English: [k] *kill,* [g] *gill,* and [ŋ] *sing*.

Glottal sounds are produced when air is constricted at the larynx. The space between the vocal folds is the glottis. English has two sounds made at the glottis. One is easy to hear: [h], as in *high* and *history*. The other is called a glottal stop and is transcribed phonetically as [ʔ]. This sound occurs before each of the vowel sounds in *uh-oh* and in the middle of a word like *cotton*.

(4) Sagittal section of the vocal tract



Lecture 5

Manners of Articulation

What do we mean by manners of articulation?

- How the airstream is constricted or modified in the vocal tract to produce the sound.

Different Manners of Articulation

- Stops: complete airstream obstruction. /p,t,k/ - /b,d,g/
- Fricatives: nearly complete airstream obstruction /f,s/ - /v,z/
- Affricates: briefly stopping the airflow completely, then releasing the articulator slightly so the frication noise is produced. [t͡ʃ] [d͡ʒ]
- Nasals: relaxing the velum and lowering it, thus opening the nasal passage to the vocal tract. /m,n/
- Approximants
  - Liquids
  - Glides: slight closure of the articulators
- flap

Stops are made by obstructing the airstream completely in the oral cavity. (Stops can also be referred to as plosives, a term that references the release of built-up air pressure when the constriction is opened.) Notice that when you say [p] and [b], your lips are pressed together for a moment, stopping the airflow. [p] and [b] are bilabial stops. [b] is a voiced bilabial stop, while [p] is a voiceless bilabial stop. [t], [d], [k], and [g] are also stops. What is the three-part description (voicing, place, and manner) of each? The glottal stop, [ʔ], is a little different because the closure is not in the oral cavity but in the larynx: the vocal folds momentarily close tight, stopping the airflow. If you press your fingertips lightly on your Adam's apple while saying *uh-oh,* you can feel movement with the closure and then the release in the glottis. And if you stop halfway through *uh-oh,* holding all of your articulators in place, then you should be able to feel a catch in your throat, which is the glottal stop (note that if you keep holding it, you will run out of air, as with all stops!).

Fricatives are made by forming a nearly complete obstruction of the vocal tract. The opening through which the air escapes is very small, and as a result a turbulent noise is produced (much as air escaping from a punctured tire makes a hissing noise). Such a turbulent, hissing mouth noise is called **frication,** hence the name of this class of speech sounds. [ʃ], as in *ship,* is made by almost stopping the air with the tongue just behind the alveolar ridge. It is a voiceless post-alveolar fricative. How would you describe each of the following fricatives: [f], [v], [θ], [ð], [s], [z], [ʒ], and [h]?

Affricates are complex sounds, made by briefly stopping the airstream completely and then releasing the articulators slightly so that frication noise is produced. They can thus be described as beginning with a stop and ending with a fricative, as reflected in the phonetic symbols used to represent them. English has only two affricates, [ʧ], as in *church,* and [ʤ], as in *judge.*[2] [ʧ] is pronounced like a very quick combination of a [t], pronounced somewhat farther back in the mouth, followed by [ʃ]. It is a voiceless post-alveolar affricate. [ʤ] is a combination of [d] and [ʒ]. What is its three-part description (voicing, place, and manner)?

Nasals are produced by relaxing the velum and lowering it, thus opening the nasal passage to the vocal tract. In most speech sounds, the velum is raised against the back of the throat, blocking off the nasal cavity so that no air can escape through the nose. These sounds are called oral, because the air flows through the oral cavity instead. So when the velum is lowered and air escapes through the nasal cavity, like it is with [m], as in *Kim,* [n], as in *kin,* and [ŋ], as in *king,* the sounds are referred to as nasals. These are sometimes called nasal stops, because there is a complete obstruction of the airflow in the oral cavity, but unlike oral stops, the air continues to flow freely through the nose. For [m], the obstruction is at the lips; for [n], the obstruction is formed by the tongue tip and sides pressing all around the alveolar ridge; and for [ŋ], the obstruction is caused by the back of the tongue body pressing up against the velum. In English, all nasals are voiced. Thus [m] is a voiced bilabial nasal (stop); the only difference between [m] and [b] is that the velum is lowered for the articulation of [m], but raised for the articulation of [b]. How would you describe [n] and [ŋ]?

Approximants, like all consonants, involve constriction of the vocal tract, but the constrictions are not narrow enough to block the vocal tract or cause turbulence. Approximants can be further divided into liquids and glides. We separate these categories mostly because they pattern differently in English, but we will also point out some minor articulatory differences.

Liquids are formed with slightly more constriction than glides, and their quality changes (is "liquid") depending on where they occur in a word, e.g., the beginning or end of a syllable (see the discussion of clear versus dark [l] in Section 2.4.6). The first liquid we have in English is the alveolar lateral liquid [l]. In this sound, the front of the tongue is pressed against the alveolar ridge, as in [d], but unlike in a stop, where the tongue is sealed all the way around the ridge, the sides of the tongue are relaxed (lateral = side), letting the air flow freely over them. You can feel this by starting to say *leaf* and pausing your tongue at the [l], and then inhaling sharply. The air will cool the side(s) of your tongue, showing you the airflow pattern. (Not everyone has the same pattern: do you feel air on the left or right side of your tongue? or both?) Liquids are usually voiced in English, so [l] is a voiced alveolar lateral liquid.

The other liquid in English is [ɹ]. There is a great deal of variation in the ways speakers of English make r-sounds; most are voiced and articulated in the general alveolar region, and a common type also involves curling the tip of the tongue back behind the alveolar ridge to make a **retroflex** sound. Another common type involves "bunching" the tongue up near the roof of the mouth, but for our purposes [ɹ] as in *red* may be considered a voiced alveolar retroflex liquid.

Nasals and liquids are classified as consonants, so we would not normally expect them to be syllabic. (See Section 2.1.3.) However, they sometimes act like vowels in that they can function as syllable nuclei. Pronounce the following words out loud, and listen to the liquids and nasals in them: *prism, prison, table,* and *hiker.* In these words the nucleus of the second syllable consists only of a syllabic nasal or liquid; there is no vowel in these second syllables. In order to indicate that these are **syllabic consonants**, a short vertical line is placed below the phonetic symbol. The final *(o)n* of *prison* would be transcribed [n̩], likewise

Glides are made with only a slight closure of the articulators (so they are fairly close to vowel sounds), and they require some movement (or "gliding") of the articulators during production. [w] is made by raising the back of the tongue toward the velum while rounding the lips at the same time, so it is officially classified as a voiced **labial-velar** glide, though we will usually categorize it as bilabial for the sake of simplicity. (Notice the similarity in the way you articulate the [w] and the vowel [u] in the word *woo*: the only change is that you open your lips a little more for [u].) [ʍ] is produced just like [w], except that it is voiceless; not all speakers of English use this sound. Speakers who use it say it in, for example, the word *which* [ʍɪʧ], making it distinct from *witch* [wɪʧ]. [j] is made with a slight constriction in the palatal region. It is a voiced palatal glide. Compare the pronunciation of *yawn* [jɔn] and *eon* [iɑn], and notice the similarity between [j] and the vowel [i].

The last manner of articulation that we will discuss here is the **flap**. A flap (sometimes called a tap) is similar to a stop in that it involves the complete obstruction of the oral cavity. The closure, however, is much faster than that of a stop: the articulators strike each other very quickly. In American English, we have an alveolar flap, in which the tip of the tongue is brought up and simply allowed to quickly strike the alveolar ridge before it moves into position for the next sound. This voiced sound is symbolized by the IPA character [ɾ] and occurs as the middle sound in the words *writer* and *ladder*.