Phonetics: the sounds of language

SPEECH ORGANS (or vocal organs): those parts of the body used in speech production.

The primary function of the speech organs is biological: we do not have unique speech organs (organs developed for speech only).

1. THE LUNGS

Biological function: to exchange CO₂, oxygen

Speech function: to supply air for speech

LUNGS: the source of moving air

During speech production short inspirations are followed by expirations whose length are keyed to the length of the utterance.

The maintaining the steady air pressure necessary for speech is controlled by

a. intercostals (the muscles between the ribs)

b. diaphragm (the large sheet of muscle that separates the chest from the abdomen)
2. LARYNX

Biological function: protecting the lungs by preventing food particles and fluids entering from the trachea (=windpipe).

↓

a tube composed of cartilages leading from the larynx and connects to the lungs.

Speech function: it produces voice for speech sounds

LARYNX: the sound source

The larynx is a structure of cartilages and muscles situated atop the trachea.

Cartilages:

a. thyroid

b. cricoid

c. aritenoids: these move the vocal folds

↓

two horizontal bands of muscles

The space between the vocal folds is called the glottis.

STUDY Fig. 2.2 on p. 16.

GLOTTAL STATES:

1. VOICELESSNESS: the vocal folds are pulled apart.

Examples: see, head, flag etc.
2. **VOICING**: the air vibrates the vocal folds that are brought close together.

   Examples: *zip, veal, jug* etc.

3. **WHISPER**: the front (anterior) portions of the vocal folds are pulled together, while the back (posterior) portions are kept apart.

4. **MURMUR** (breathy voice or whispery voice): the vocal folds vibrate, but their position is more relaxed, so enough air can escape (breathy quality).

   STUDY Fig. 2.3 on p. 18.

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**THE VOCAL TRACT**: the *air passages* above the larynx

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*oral cavity or oral tract*

*nasal cavity or nasal tract*

   STUDY Fig 2.1 on p.16.

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**SUPRAGLOTTAL ORGANS**: those above the larynx

1. **LIPS → labial sounds**

   a. **bilabials** (the articulation involves both lips):

      *bit, pot, man*

   b. **labiodentals** (the articulation involves the lower lip and upper teeth):

      *five, van*
2. **TEETH** $\rightarrow$ **dental sounds**: the tongue is placed against or near the teeth.

   Interdental sounds (the tongue is placed between the teeth):
   
   *think, this*

3. **ALVEOLAR RIDGE** $\rightarrow$ **alveolar sounds** (the tongue is placed near the alveolar ridge or touches it):

   *see, top, life, dip, zip*

   (Alveolar ridge: a small protuberance behind the upper teeth.)

4. **PALATE** $\rightarrow$ **palatal sounds** (the tongue is on or near the palate):

   *yes*

   (Palate: the arched bony structure that forms the roof of the mouth.)

   **Alveopalatal** (or palatoalveolar, or postalveolar) sounds:

   *shoe, pleasure, chip, job*

   (the place behind the alveolar ridge)

5. **VELUM** $\rightarrow$ **velar sounds** (the tongue is on or near the velum):

   *car, goat, song*

   (Velum or soft palate: the soft, muscular part of the roof of the mouth.)

   **Labiovelar sounds** (the tongue is raised to the velum while the lips are rounded at the same time):

   *well*
6. **UVULA** $\rightarrow$ **uvular** sounds (the tongue is on or near the uvula):

Inuit *aivig* ‘walrus’

There are no uvular sounds in English.

(Uvula: the soft fleshy tip of the soft palate)

7. **PHARYNX** $\rightarrow$ **pharyngeal** sounds (the airflow is modified by tongue retraction in this area, or by constricting the pharynx).

There are no pharyngeal sounds in English (many Arabic dialects have pharyngeal sounds).

8. **ARTICULATIONS OF THE VOCAL FOLDS** $\rightarrow$ **glottal sounds**.

*head, house*

THE TONGUE: primary articulatory organ

- **TIP** (or **APEX**)
- **BLADE**: it lies below the alveolar ridge at rest
- **BODY** (or **FRONT**): it lies below the palate at rest
- **BACK**: it lies below the velum at rest

**TEXT**

**BODY and BACK**: **DORSUM**

- **ROOT**: the part of tongue opposite the back wall of the pharynx

STUDY Fig 2.4 on p. 20.
CONSONANTS, VOWELS AND GLIDES

CONSONANTS: The airflow may be stopped, impeded or diverted (through the nasal tract); the vocal folds may or may not vibrate during articulation.

VOWELS: The airflow is free; the vocal folds vibrate during articulation.

Differences between consonants and vowels:

1. ARTICULATORY:

   consonants → the airflow is blocked or impeded by creating a narrow passage with the articulators

   vowels → the airflow is free

(see above)

2. ACOUSTIC:

   Consonants are less sonorous than vowels; vowels are perceived as louder and longer sounds.

3. FUNCTIONAL:
Vowels function as the *nucleus* of a syllable: they are *syllabic*.

\[ \downarrow \]
due to their greater sonority

Consonants do not function as the nucleus of a syllable.

(Some consonants, however, may be syllabic; we shall discuss this later.)

**STUDY Table 2.2 on p. 19.**

**GLIDES:**

The articulation is similar to vowel articulation, but it moves rapidly to the articulation of the nest sounds, or it quickly terminates → *momentary articulation*.

Examples of glides: *we, yes; now*

(Glides are also called semivowels.)

**CONSONANTS**

The three dimensions of consonant production are:

1. manner of articulation
2. place of articulation
3. state of the vocal folds (voiced or voiceless sounds)
MANNERS OF ARTICULATION

STOPS: consonants produced with a complete closure of airflow in the vocal tract.

STOPS

ORAL STOPS NASAL STOPS
(=plosives) (=nasals)

Oral sounds: the air flows through only the oral tract.

Nasal sounds: the velum is lowered, allowing the air to pass through the nasal passages.

ENGLISH STOP CONSONANTS

PLACES OF ARTICULATION:

bilabial
alveolar
velar
glottal

BILABIAL STOPS:

STATE OF THE VOCAL FOLDS:

1. ORAL: spin [p] voiceless
   \bin [b] voiced
2. NASAL: *make* [m] **voiced**

The closure in the oral cavity is made with the two lips.

**ALVEOLAR STOPS:**

STATE OF THE VOCAL FOLDS:

1. ORAL: *stick* [t] **voiceless**
   
   *deep* [d] **voiced**

2. NASAL: *nose* [n] **voiced**

The oral cavity is blocked by placing the blade of the tongue against the alveolar ridge.

**VELAR STOPS:**

STATE OF THE VOCAL FOLDS:

1. ORAL: *skin* [k] **voiceless**
   
   *go* [g] **voiced**

2. NASAL: *sing* [ŋ] **voiced**

The oral cavity is blocked by placing the back of the tongue against the velum.

**GLOTTAL STOP:**

*uh-uh* → the vowels here are separated by closing of the airflow in the glottis: the vocal folds are pressed together a voiceless sound is produced: [ʔ]

**STUDY Tables 2.3 and 2.4 on p. 23.**
ADDITIONAL PLACES OF ARTICULATION FOR ENGLISH STOP SOUNDS:

Depending on the neighbouring sounds, the following additional places of articulation may be identified:

STATE OF THE VOCAL FOLDS:

DENTAL STOPS:

1. ORAL: *eighth* [t] voiceless
   
   *width* [d] voiced

2. NASAL: *ninth* [n] voiced

The diacritic [ ] indicates dental articulation.

Closure: the tip of the tongue is against the upper teeth.

Compare the following pronunciations:

Dental stops: Alveolar stops:

*eighth* [t̚]  *eight* [t]

*width* [d̚]  *wide* [d]

*ninth* [n̚]  *nine* [n]
LABIODENTAL NASAL STOP:

*emphasis* \([\text{ɪ}\text{n}\text{ʃ}]/\) 

*symphony* \([\text{s}\text{ɪ}\text{m}\text{f}\text{n}]/\) 

The closure is between the lower lip and the upper front teeth.