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The Production of speech sounds

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1-Introduction

Human speech is produced through a complex and highly coordinated physiological process involving several organs of the body. Unlike written language, which is static, speech is dynamic and continuous, requiring precise control of airflow and muscular movement. This chapter focuses on how speech sounds are physically produced, an area known as articulatory phonetics.

Understanding the production of speech sounds is essential for describing and classifying the sounds of English. It provides the scientific basis for later chapters on consonants, vowels, stress, and connected speech. Without a clear understanding of how sounds are articulated, it is impossible to analyze pronunciation accurately.

2-The Airstream Mechanism

Speech begins with air movement. Most speech sounds in English are produced using a pulmonic egressive airstream, which means that air is pushed out of the lungs.

2.1 The Lungs and Breathing

The lungs act as the main source of energy for speech. During normal breathing, air flows in and out without control. During speech, however, airflow is carefully regulated. Speakers control:

- The amount of air released
- The speed of airflow
- The timing of sound production

This controlled airflow allows speakers to produce long utterances, stress patterns, and variations in loudness.

3-The Vocal Tract

The vocal tract is the passage through which air travels from the lungs to the outside. It consists of several important structures that shape speech sounds.

The vocal tract can be divided into three main areas:

- The larynx
- The oral cavity
- The nasal cavity

Each part plays a crucial role in sound production.

4-The Larynx and Vocal Cords

4.1 Structure of the Larynx

The larynx, commonly known as the voice box, is located at the top of the trachea. Inside the larynx are two folds of muscle known as the vocal cords (or vocal folds). The space between the vocal cords is called the glottis.

4.2 Voicing

The position and movement of the vocal cords determine whether a sound is voiced or voiceless.

- Voiced sounds occur when the vocal cords vibrate as air passes through them (e.g. /b/, /d/, /z/).
- Voiceless sounds occur when the vocal cords are apart and do not vibrate (e.g. /p/, /t/, /s/).

Students can feel this difference by placing their fingers on their throat while producing sounds like /z/ and /s./

4.3 Types of Glottal States

The vocal cords can take different positions:

- Wide apart → voiceless sounds
- Close together and vibrating → voiced sounds
- Completely closed → glottal stop [ʔ] (as in some pronunciations of butter)

5-The Supralaryngeal Vocal Tract

Above the larynx lies the supralaryngeal vocal tract, which includes all the organs that modify the airflow to produce different speech sounds.

6- The Oral Cavity and Its Organs

6.1 The Tongue

The tongue is the most important articulator. It is divided into several parts:

- Tip, Blade, Front, Back, Root

Different tongue positions produce different sounds. Small movements can result in significant sound changes, especially in vowels.

2. The Roof of the Mouth

The roof of the mouth consists of:

- Alveolar ridge: just behind the upper teeth
- Hard palate: the bony part of the roof
- Soft palate (velum): the soft, movable part at the back

The soft palate plays a key role in directing airflow.

6.3 The Velum and Nasal Sounds

The velum can be raised or lowered:

- Raised velum → air flows through the mouth (oral sounds)
- Lowered velum → air flows through the nose (nasal sounds)

In English, nasal sounds include /m/, /n/, and /ŋ/.

6.4 The Lips

The lips can take different positions:

- Spread (as in /i:/)
- Rounded (as in /u:/)
- Closed (as in /p/, /b/, /m/)

Lip position is especially important for vowel quality and bilabial consonants.

6.5 The Teeth

The upper teeth are used in the production of dental and labiodental sounds, such as:

/ θ/ and / ð/ (dental)

/ f/ and / v/ (labiodental)

7-The Nasal Cavity

The nasal cavity becomes involved in speech when the velum is lowered. Air then passes through the nose, producing nasal resonance.

English has three nasal consonants:

/ m, n, / ŋ/

Nasal sounds are always voiced in English.

8 .Articulators: Active and Passive: Articulators are classified into two types:

8.1 Active Articulators

These move during speech:

-Tongue, Lower lip, Vocal cords

8.2 Passive Articulators

These remain stationary:

-Upper teeth, Alveolar ridge, Hard palate

Speech sounds are produced when an active articulator moves toward a passive articulator.

9 .Manner of Articulation :The manner of articulation refers to how airflow is modified or obstructed.

Major manners include:

- Plosives: complete closure and release (e.g. /p/, /t/, /k/)
- Fricatives: narrow constriction causing friction (e.g. /s/, /f/)
- Affricates: plosive + fricative (e.g. /tʃ/)
- Nasals: airflow through the nose (e.g. /m/)
- Approximants: slight narrowing (e.g. /r/, /j/)
- Laterals: air flows around the sides of the tongue (e.g. /l/)

10 .Place of Articulation: The place of articulation describes where the constriction occurs in the vocal tract.

Common places include:

- Bilabial, Labiodental, Dental, Alveolar, Postalveolar, Palatal, Velar, Glottal

Each place contributes to the distinctive sound quality of consonants.

11 .Coordination of Speech Organs

Speech is not produced sound by sound in isolation. Instead, articulators move continuously, overlapping with one another. This phenomenon is known as coarticulation. Coarticulation explains why sounds change slightly depending on their surrounding sounds and prepares students for later discussions of connected speech.

12 .Importance of Studying Speech Production: Understanding how speech sounds are produced helps students:

- Improve pronunciation accuracy
- Diagnose pronunciation problems
- Understand accent variation
- Learn transcription effectively
- Prepare for phonological analysis

This knowledge is essential for teachers of English, linguists, and language learners.

13 .Conclusion

This chapter has examined the physical processes involved in the production of speech sounds. By studying the airstream mechanism, the vocal organs, and their coordination, students gain a scientific understanding of how spoken language is formed. The next chapters will build on this foundation by applying these principles to the detailed study of English consonants and vowels, using the articulatory framework introduced here.

