



Lecture Notes

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Course Title: Language Arts 1 (Main)

Course Goal: The goal of this online teaching is to allow students have access to learning materials in order to master Concepts in Language Arts meant for their present level

Class & Semester: HTC 1 Primary-2nd Semester Course Status: Core

Course Code: L.A 1 Main

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Topic: Phonetics and Phonology

Week: 3

Lecture No.:003

Learning Objective: By the end of this module, learners should be able to understand and master the basic concepts of Phonetics and phonology.

Questions:

Notes:

Week 3

Week 3

Questions:

Phonetics and Phonology

1. Define phonetics and phonology.
2. Clearly discuss the distinction between phonetics and phonology.
3. List and discuss any four organs of speech.

4a. Briefly distinguish between consonant and vowel sounds

4b. State and briefly discuss the parameters involved in the production of consonant and vowel sounds

4. Describe English consonant sounds in relation to their place of articulation.
1. Describe English consonant sounds in relation to their manner of articulation.
2. Describe the pure vowels of

Phonetics is a branch of linguistics that studies the sounds of human speech, or—in the case of sign languages—the equivalent aspects of sign. It is concerned with the physical properties of speech sounds or signs (phones): their physiological production, acoustic properties, auditory perception, and neurophysiological status.

Phonetics as a research discipline has three main branches:

Articulatory phonetics: the articulation of speech

Acoustic phonetics: the acoustics of speech

Auditory phonetics: the perception of speech

The field of articulatory phonetics is a subfield of phonetics that studies articulation and ways that humans produce speech. Articulatory phoneticians explain how humans produce speech sounds via the interaction of different physiological structures. Generally, articulatory phonetics is concerned with the transformation of aerodynamic energy into acoustic energy. Aerodynamic energy refers to the airflow through the vocal tract. Its potential form is air pressure; its kinetic form is the actual dynamic airflow. Acoustic energy is variation in the air pressure that can be represented as sound waves, which are then perceived by the human auditory system as sound.

Acoustic phonetics is the study of the physical properties of speech, and aims to analyze sound wave signals that occur within speech through varying frequencies, amplitudes and durations.

Auditory phonetics is a branch of phonetics concerned with the hearing of

the English RP

speech sounds and with speech perception.

Phonetic insight is used in several applied linguistic fields such as:

Forensic phonetics: the use of phonetics for legal purposes

Speech recognition: the analysis and transcription of recorded speech by a computer system

Speech synthesis: the production of human speech by a computer system

Phonology, on the other hand, is concerned with the abstract, grammatical characterization of systems of sounds or signs and how they pattern in and across languages. Phonology has been argued to relate to phonetics via the set of distinctive features, which map the abstract representations of speech units to articulatory gestures, acoustic signals or perceptual representations

2 Distinction between Phonetics and Phonology

Phonetics and phonology are two important intra-disciplinary branches of linguistics. Though closely inter-linked and serving the same purpose, i.e. dedicated to the study of human speech sounds and sound structures, phonetics and phonology differ from each other to an extent that each has been given a separate disciplinary status.

Phonetics provides objective ways of describing and analyzing the range of sounds humans use in their languages. More specifically, articulatory phonetics identifies precisely which speech organs and muscles are involved in producing the different sounds of the world's languages. Those sounds are then transmitted from the speaker to the hearer, and acoustic and auditory phonetics focus on the physics of speech as it travels through the air in the form of sound waves, and the effect those waves have on a hearer's ears and brain. It follows that phonetics has strong associations with anatomy, physiology, physics and neurology.

However, although knowing what sounds we can in principle make and use is part of understanding what makes us human, each person grows up learning and speaking only a particular human language or languages, and each language only makes use of a subset of the full range of possible, producible and distinguishable sounds. When we turn to the characteristics of the English sound system that make it specifically English, and different from French or Welsh or Limba or Themne, we move into the domain of phonology, which is the language-specific selection and organization of sounds to signal meanings. Phonologists are interested in the sound patterns of particular languages, and in what speakers and hearers need to know, and children need to learn, to be speakers of those languages: in that sense, it is close to psychology.

Phonetics is a subfield of descriptive linguistics while phonology is an area of theoretical linguistics.

Linguistics often consider phonology a major field of linguistics while, on the other hand, phonetics is regarded as a subfield placed under phonology.

Phonetics is the basis for phonological analysis. On the other hand, phonology is the basis for further work in morphology, syntax, discourse and orthography design.

Phonetics analyzes the production of all human speech sounds, regardless of any language it is dealing with. While, phonology analyzes the sound patterns of a particular language by determining which phonetic sounds are significant and explaining how these sounds are interpreted by the

native speaker.

Phonetics discusses the physical characteristics of speech sounds or signs, especially their physiological production, acoustic properties, auditory perception and neuro-physiological status. Phonology is primarily concerned with the abstract, grammatical characterization of systems of sounds or signs.

Phonetics is strictly about audible sounds and the things that happen in our mouth, throat, nasal, and sinus cavities, and the lungs to produce these sounds. It has nothing to do with meaning. It is only description. Phonology, on the other hand, is both physical as well as meaningful. It explores the differences between the sounds in a language that change the meaning of an utterance. Phonetics only asks, “Does this sound go here or not?” phonology asks, “Does the meaning change if this sound is put here instead of that one?” phonetics is concerned with the form i.e. the physical properties of sound. Phonology, on the other hand, is concerned with the function, i.e. the differences and similarities of sound.

The linguistic term ‘parole’ is the concern of phonetician while ‘langue’ is studied by phonologists.

In phonetics, the smallest structural unit is a phone. In phonology, on the other hand, the minimal unit of meaning is called a phoneme.

Phonetics deals the phonetic transcription of speech sounds. Phonology, on the other hand, deals with the phonemic transcription of speech sounds. In phonetic transcription, square brackets are used to enclose transcribed symbols. In phonemic transcription, on the other hand, slashes are used for the same purpose.

In phonetics, a phonetic symbol stands for one and the same sound regardless of language, but a phonemic symbol often stand for any one of the several actual sound.

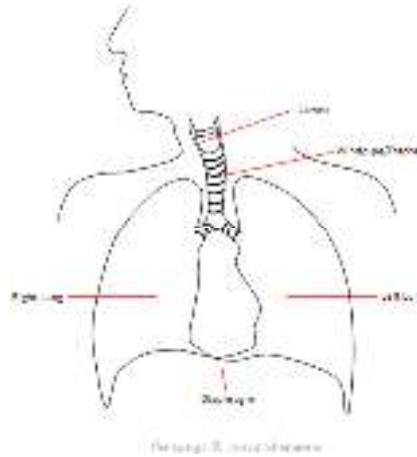
The Organs of Speech

The various organs which are involved in the production of speech sounds are called **speech organs** or the *vocal organs*. The study of speech organs helps to determine the role of each organ in the production of speech sounds. They include the **lungs**, the **vocal folds**, and most importantly the **articulators**.

The organs which actively move toward the passive articulators during sound production. There are: the jaws, lower lip, lower teeth, tongue, uvula, vocal folds or vocal cords of the larynx, lungs

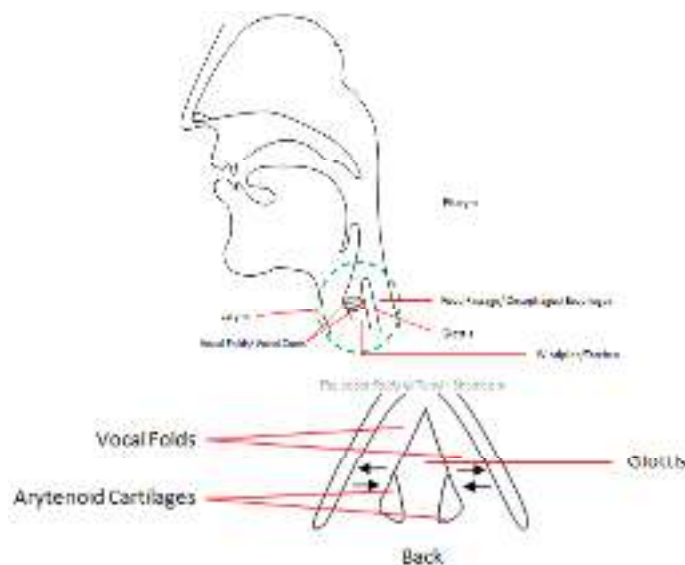
1. The Lungs

The airflow is by far the most vital requirement for producing speech sound, since all speech sounds are made with some movement of air. The **lungs** provide the energy source for the airflow. The lungs are the spongy respiratory organs situated inside the rib cage. They expand and contract as we breathe in and out air. The amount of air accumulated inside our lungs controls the pressure of the airflow.



2. The Larynx & the Vocal Folds

The larynx is colloquially known as the **voice box**. It is a box-like small structure situated in the front of the throat where there is a protuberance. For this reason the larynx is popularly called the **Adam's apple**. This casing is formed of cartilages and muscles. It protects as well as houses the **trachea** (also known as *windpipe*, *oesophagus*, *esophagus*) and the **vocal folds** (formerly they were called *vocal cords*). The vocal folds are like a pair of lips placed horizontally from front to back. They are joined in the front but can be separated at the back. The opening between them is called **glottis**. The glottis is considered to be in open state when the folds are apart, and when the folds are pressed together the glottis is considered to be in close state.

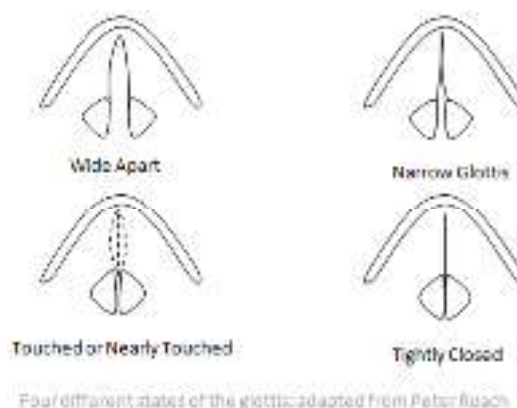


The inside of the larynx (seen from above), adapted from Peter Roach

The opening of the vocal folds takes different positions:

- i. Wide Apart: When the folds are wide apart they do not vibrate. The sounds produced in such position are called **breathed or voiceless sounds**. For example: /p/f/θ/s/.
- ii. Narrow Glottis: If the air is passed through the glottis when it is narrowed then there is an audible friction. Such sounds are also **voiceless** since the vocal folds do not vibrate. For example, in English /h/ is a **voiceless glottal fricative** sound.
- iii. Tightly Closed: The vocal folds can be firmly pressed together so that the air cannot pass between them. Such a position produces a **glottal stop** /ʔ/ (also known as *glottal catch*, *glottal plosive*).
- iv. Touched or Nearly Touched: The major role of the vocal folds is that of a vibrator in the production of speech. The folds vibrate when these two are touching each other or nearly touching. The pressure of the air coming from the lungs makes them vibrate. This vibration of the folds produces a musical note called voice. And sounds produced in such manner are called **voiced sounds**. In English all the **vowel sounds** and the **consonants** /v/z/m/n/are voiced.

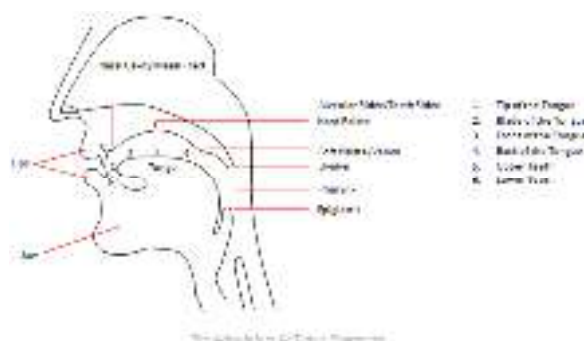
Thus it is clear that the main function of the vocal folds is to convert the air delivered by the lungs into audible sound. The opening and closing process of the vocal folds manipulates the airflow to control the pitch and the tone of speech sounds. As a result, we have different qualities of sounds.



3. The Articulators

Articulators transform the sound into intelligible speech. They can be either **active** or **passive**. They include the pharynx, the teeth, the

alveolar ridge behind them, the hard palate, the softer velum behind it, the lips, the tongue, and the nose and its cavity. Traditionally the articulators are studied with the help of a sliced human head figure like the following:



(i) The Pharynx: The pharynx lies between the mouth and the food passage, that is, just above the larynx. It is just about 7cm long in the case of women and 8cm long in the case of men.

(ii) The Roof of the Mouth: The roof of the mouth is considered as a major speech organ. It is divided into three parts:

a. **The Alveolar Ridge/Teeth Ridge:** The alveolar ridge is situated immediately after the upper front teeth. The sounds which are produced touching this convex part are called **alveolar sounds**. Some alveolar sounds in English include: /t/d/.

b. **The Hard Palate:** The hard palate is the concave part of the roof of the mouth. It is situated on the middle part of the roof.

c. **The Velum or Soft Palate:** The lower part of the roof of the mouth is called soft palate. It could be lowered or raised. When it is lowered, the air stream from the lungs has access to the nasal cavity. When it is raised the passage to the nasal cavity is blocked. The sounds which are produced touching this area with the back of the tongue are called **velar sounds**. For example: /k/g/.

(iii) The Lips: The lips also play an important role in the matter of articulation. They can be pressed together or brought into contact with the teeth. The **consonant sounds** which are articulated by touching two lips each other are called **bilabial sounds**. For example, /p/ and /b/ are bilabial sounds in English. Whereas, the sounds which are produced with lip to teeth contact are called **labiodental sounds**. In English there are two labiodental sounds: /f/ and /v/.

Another important thing about the lips is that they can take different shapes and positions. Therefore, **lip-rounding** is considered as a

major criterion for describing **vowel sounds**. The lips may have the following positions:

a. **Rounded**: When we pronounce a vowel, our lips can be rounded, a position where the corners of the lips are brought towards each other and the lips are pushed forwards. And the resulting vowel from this position is a **rounded** one. For example, /ə u/.

b. **Spread**: The lips can be spread. In this position the lips are moved away from each other (i.e. when we smile). The vowel that we articulate from this position is an **unrounded** one. For example, in English /i:/ is a long vowel with slightly spread lips.

c. **Neutral**: Again, the lips can be neutral, a position where the lips are not noticeably rounded or spread. And the articulated vowel from this position is referred to as **unrounded vowel**. For example, in English /ɑ:/ is a long vowel with neutral lips.



The Teeth: The teeth are also very much helpful in producing various speech sounds. The sounds which are made with the tongue touching the teeth are called **dental sounds**. Some examples of dental sounds in English include: /θ/ð/.

(v) The Tongue: The tongue is divided into four parts:

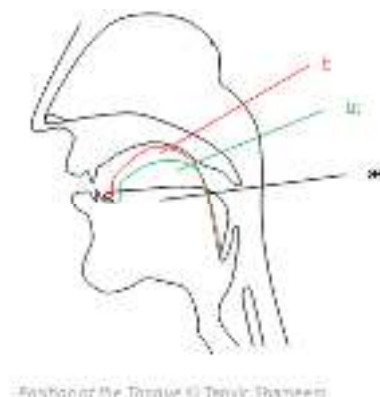
- a. The tip: It is the extreme end of the tongue.
- b. The blade: It lies opposite to the alveolar ridge.
- c. The front: It lies opposite to the hard palate.
- d. The back: It lies opposite to the soft palate or velum.

The tongue is responsible for the production of many speech sounds, since it can move very fast to different places and is also capable of assuming different shapes. The shape and the position of the tongue are especially crucial for the production of **vowel sounds**. Thus when we describe the vowel sounds in the context of the function of the tongue, we generally consider the following criteria:

- **Tongue Height**: It is concerned with the vertical distance between the upper surface of the tongue and the hard palate. From this

perspective the vowels can be described as **close** and **open**. For instance, because of the different distance between the surface of the tongue and the roof of the mouth, the vowel /i:/ has to be described as a relatively **close** vowel, whereas /æ/ has to be described as a relatively **open** vowel.

- **Tongue Frontness / Backness:** It is concerned with the part of tongue between the front and the back, which is raised high. From this point of view the vowel sounds can be classified as **front vowels** and **back vowels**. By changing the shape of the tongue we can produce vowels in which a different part of the tongue is the highest point. That means, a vowel having the back of the tongue as the highest point is a back vowel, whereas the one having the front of the tongue as the highest point is called a front vowel. For example: during the articulation of the vowel /u:/ the back of the tongue is raised high, so it's a **back** vowel. On the other hand, during the articulation of the vowel /æ/ the front of the tongue is raised high, therefore, it's a **front** vowel.



(vi) The Jaws: Some phoneticians consider the jaws as articulators, since we move the lower jaw a lot at the time of speaking. But it should be noted that the jaws are not articulators in the same way as the others. The main reason is that they are incapable of making contact with other articulators by themselves.

(vii) The Nose and the Nasal Cavity: The nose and its cavity may also be considered as speech organs. The sounds which are produced with the nose are called **nasal sounds**. Some nasal sounds in English include: /m/n/ŋ/.

Speech organs, or articulators, produce the sounds of language. Organs used for speech include the lips, teeth, alveolar ridge, hard palate, velum (soft palate), uvula, glottis and various parts of the tongue. They can be divided into two types: passive articulators and active articulators. Active articulators move relative to passive articulators, which remain still, to produce various speech sounds, in particular manners of articulation.[1] The upper lip, teeth, alveolar ridge, hard palate, soft palate, uvula, and pharynx wall are passive articulators. The most important active articulator is the tongue as it is involved in the production of the majority of sounds. The lower lip is another active articulator. The glottis is not an active articulator because it is only a space between vocal

folds.

☐ Active Articulators

The organs which actively move toward the passive articulators during sound production.

Classification of English Speech Sounds

Speech sounds may be classified into two groups-Vowels and Consonants

Vowels

Vowels are voiced sounds during the production of which the air escapes through freely and continuously without any audible frictional voice. All other articulated mouth sounds are consonants.

Vowels are thus articulated with a stricture of open approximation, i.e. the active articulator, the tongue raised towards the passive articulator, the roof of the mouth in such a way that there is sufficient space between them for the air to escape freely and continuously.

The highest level to which the tongue can be raised and a sound produced without frictional voice is called vowel limit.

Classification of Vowels

Vowels can be classified along the following dimensions:

- i. The position of the lips.
- ii. The part of the tongue that is raised.
- iii. The height to which the tongue is raised.

According to the position of lips, vowels can be divided into two categories:

- i. Round Vowels.
- ii. unrounded Vowels

Rounded vowels are those vowels during the production of which the lips are rounded. E.g. /U:/ as in 'cool'; and /ɔ:/ as in 'short'. There are two main types of rounding called close lip rounding and open lip rounding.

Unrounded vowels are those during the production of which the lips are opened or neutral. E.g. Vowels like /i:/ as in 'sea' and /e/ as in 'get'

According to the part of the tongue that raises, vowels can be classified into three categories:

- i. Front Vowels
- ii. Back Vowels
- iii. Centre Vowels

Front vowels are those vowels during the production of which the front of the tongue is raised towards the hard palate. There will be sufficient space between the front of the tongue and the hard palate for the air to escape without any friction; e.g. /i:/ as in 'beat'; /e/ as in 'bet'

Back Vowels are those vowels during the production of which the back of the tongue is raised towards the soft palate, e.g. /ɑ:/ as in 'calm'. /u:/ as in 'cool'.

Centre Vowels are those vowels during the production of which the centre of the tongue is raised towards that part of the roof of the mouth where the hard palate and soft palate meet. E.g. /ʌ/ as in 'but' and /ɜ:/ as in 'bird'.

According to the height to which the tongue is raised, vowels can be

classified into four categories:

- i. High/close
- ii. Low/ open
- iii. Half high/Half close
 - iii. Half low/ half open.

i. High/Close vowels:

These are those vowels during the production of which the tongue is raised close to the roof of the mouth. e.g. /i:/ as in 'beat'; /u:/ as in 'fool'.

ii. Low/Open vowels:

These are those vowels during the production of which the tongue is kept low in the oral cavity. E.g. /ɑ:/ as in 'calm'; /æ/ as in 'cat'.

iii. Half high/half close

For half high/ half close, the tongue occupies the position one third of the distance from close to open

iv. Half low/ half open

For half open, the tongue occupies a position two third of the distance from close to open. In the production of the vowel/i:/ there is greater tension of the tongue. There is less tension of the tongue in the production of the vowel /i/ as in 'sit'. On the basis of this criterion, vowels can be classified as follows:

i. Tense vowels

ii. Lax vowels

Tense vowels are those vowels which require considerable muscular tension on the part of the tongue. E.g., /i:/ as in 'leap'

Lax vowels are those vowels in which the tongue is held loosely. E.g. /i/ as 'lip'

The three term label i.e. rounded/unrounded vowel (on the basis of the position of the lips); front /back/central vowel (on the basis of the part of the tongue that is raised in the production of vowels) and close/open/half close/ half open (on the basis of the height to which the tongue is raised) are not sufficient to describe the actual vowels in the language accurately. For this purpose, cardinal Vowel system has been developed.

Vowels of English Received Pronunciation

In English R.P (Received Pronunciation), there are twenty distinct vowel sounds. Of these twelve are monophthongs or pure vowels and the remaining eight are diphthongs. The twelve pure vowels are given below with their three term labels:

1. /i:/ as in beat /bi:t/ - long unrounded, front, close.
2. /i/ as in bit /bit/ -short unrounded, front (slightly retracted), half close (slightly raised)
3. /e/ as in bet /bet/ -unrounded, front, open (closer to half open)
4. /æ/ as in bat /bæt/ -unrounded, front open (closer to half open)
5. /ʌ/ as in but /bʌt/ -unrounded, central, half open
6. /ɑ:/ as in bard /bɑ:d/-unrounded, back, open
7. /ɒ/ as in God /gɒd/-rounded, back, open

8. /ɔ:/ as in caught /Kɔ:t/ - rounded, back half open
 9. /ʊ/ as in put /put/ - rounded back, slightly fronted, half close (slightly raised)
 10. /u:/ as in I bot /bunt/ - rounded, back open
 11. /ɜ:/ as in bird /bɜ:d/ - unrounded central, between half-close and half open
 12. /ə/ as in ago /əgəʊ / - unrounded central, between half close and half open

Diphthongs

Diphthongs are sounds during the articulation of which the tongue starts in the position of a particular vowel and move in the direction of the position of Diphthongs in which the glide is from one vowel position to that of a close or high vowel may be called closing diphthongs.

The closing diphthongs of English R.P are:

1. /ei/ as in make /meik/
2. /ɔi/ as in boy /bɔi/
3. /ai/ as in high /hai/
4. /əʊ/ as in go /gəʊ/
5. /aʊ/ as in how /haʊ/

Summary: We have successfully discussed Basic Phonetics and Phonology and organs of speech.

Assignment:

1. Clearly distinguish Phonetics and Phonology given adequate examples of each.
2. List the organs of speech

Further Reading: Read on Phonetics and Phonology.

References:

Saidu Challay 2015 An introduction to language and linguistics research publishers ISBN 978-0-620-64839-4