

Running head: PHONETICS IN LINGUISTICS

1

## PHONETICS IN LINGUISTICS

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### Abstract

Phonetics is the study and classification of speech sounds. It is an important branch of linguistics. We are able to segment a continuous stream of speech into distinct parts and recognize the parts in other words. Everyone who knows a language knows how to segment sentences into words and words into sounds. Our linguistic knowledge allows us to ignore non-linguistic differences in speech and we are capable of making sounds that are not speech sounds in English but are in other languages. For some words even though we write an alphabet in a word we skip them and those are called silent letters. Similarly many other ways are also followed like using a combination of same letter to represent a single sound and etc. Syllabic sounds that can function as the core of a syllable. Phonetics mainly helps us the speaker to pronounce the words clearly using the vocal chords followed by the respiratory system. It includes the speed, pitch, tone language, stress and intonation. Whereas for the listener phonetics focuses on the perception of sounds or the way in which sounds are heard and interpreted. Phonetics describes the sounds using symbols of IPA which is INTERNATIONAL PHONETIC ALPHABET which helps one to study a language especially languages that use letters that are silent or have multiple pronunciations. With phonetic languages, there is a direct relationship between the spelling and the sound. It is important to understand that English is not a phonetic language. That is because we often do not say a word which is spelled the same way as it is written. Three categories of sounds should be recognised at the outset which is phones, phonemes and allophones.

*Keywords:* sound segment, speech sound, phonetic alphabet, phonetic classes.

## PHONETICS IN LINGUISTICS

**Introduction**

The word 'Phonetics' comes from the Greek word phone meaning sound or voice. It is a branch of linguistic that comprises the study of the sounds and their production. One way of looking at the grammar of a language is to consider it to be a set of statements that explains the relation between the meanings of all possible sentences in a language and the sounds of which they are composed.

The Phonetic Alphabet that is in 1888 the International Phonetic Alphabet (IPA) was invented in order to have a system in which there was a one-to-one correspondence between each sound

**Phonetic symbols**

used in the dictionary

**Consonants**

p	pen	/pen/	s	so	/səʊ/
b	bad	/bæd/	z	zoo	/zu:/
t	tea	/ti:/	ʃ	shoe	/ʃu:/
d	did	/dɪd/	ʒ	vision	/'vɪʒn/
k	cat	/kæt/	h	hat	/hæt/
g	got	/gɒt/	m	man	/mæn/
tʃ	chain	/tʃeɪn/	n	no	/nəʊ/
dʒ	jam	/dʒæm/	ŋ	sing	/sɪŋ/
f	fall	/fɔ:l/	l	leg	/leg/
v	van	/væn/	r	red	/red/
θ	thin	/θɪn/	j	yes	/jes/
ð	this	/ðɪs/	w	wet	/wet/

**Vowels and diphthongs**

i:	see	/si:/	ʌ	cup	/kʌp/
i	happy	/'hæpi/	ɜ:	bird	/bɜ:d/
ɪ	sit	/sɪt/	ə	about	/ə'baʊt/
e	ten	/ten/	eɪ	say	/seɪ/
æ	cat	/kæt/	əʊ	go	/gəʊ/
ɑ:	father	/'fɑ:ðə(r)/	aɪ	five	/faɪv/
ɒ	got	/gɒt/	aʊ	now	/naʊ/
ɔ:	saw	/sɔ:/	ɔɪ	boy	/bɔɪ/
ʊ	put	/pʊt/	ɪə	near	/nɪə(r)/
u	actual	/'æktʃʊəl/	eə	hair	/heə(r)/
u:	too	/tu:/	ʊə	pure	/pjʊə(r)/

(r) indicates that British pronunciation will have /r/ only if a vowel sound follows directly; otherwise it is omitted. In American pronunciation, every 'r' of the ordinary spelling is retained.

in language and each phonetic it helped others in a way that how can they pronounce any word in any language.

Phonetics can be categorized to 3 types as follows:

Articulatory  
Phonetics

Acoustic Phonetics

Auditory Phonetics

### Articulatory Phonetics

Most speech sounds are produced by pushing air through the vocal cords

Glottis = the opening between the vocal cords

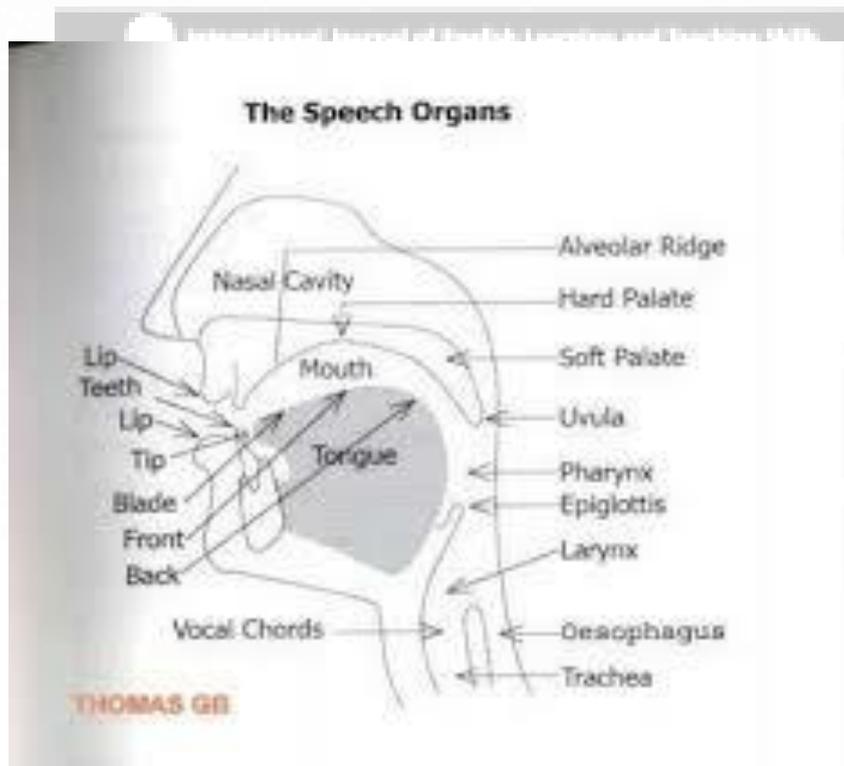
Pharynx = tubular part of the throat above the larynx

Larynx = ‘voice box’

Oral cavity = mouth

Nasal cavity = nose and the passages

connecting it to the throat and sinuses



## PHONETICS IN LINGUISTICS

5

It is the study of the production of speech by the organs of speech by the speaker. Speech sounds is in terms of the movements of the vocal organs that produce them in a traditional method. The main part consists of lungs and respiratory system along with all the vocal organs. The organ of speech consists of lips, teeth, alveolar ridge, hard palate, velum, uvula, glottis and various parts of the tongue. And can be further divided into passive articulators and active articulators.

The airstream passes the vocal cords. The space present between the vocal cords is known as the glottis. When the vocal cords are apart, as they are normally while breathing out, the air from the lungs have a free passage into the pharynx and the mouth. But when the vocal cords are adjusted in such a way that there is a narrow passage between them, the airstream will cause them to be sucked together. As they are together there will be no flow of air, and the pressure below them will be built up until and unless they are blown apart. The flow of air between them will cause them to be sucked together again, and this vibratory cycle will continue.

Sounds produced due the vibration of the vocal cords and are said to be voiced, as opposed to those in which the vocal cords are apart, which is to be voiceless or is to be mute.

The air passages above the vocal cords are known collectively as the vocal tract. For phonetic purposes they are divided into:

the oral tract within the                      the pharynx                      the nasal tract within the nose  
mouth

Many of the speech sounds are characterized by movements of the lower articulators those are the tongue or the lower lip that is toward the upper articulators within the oral tract. The upper surface includes several important structures from the point of view of speech production, The upper lip and lower lip help to produce bilabial sounds /p, b, m/. If they are held together, the sounds produced in that position are bilabial stops: / p, b/. If the lips are held together, they produce different vowels.

The alveolar ridge which is a small protuberance that is just behind the upper front teeth that can easily be felt with the help of tongue. The 80% part of the roof of the mouth is formed by the hard palate in the front, and the soft palate which is velum at the back. The soft palate is a muscular flap that can be raised so as to shut off the nasal tract and prevent air from going out through the nose. At the lower end of the soft palate is a small hanging appendage also known as the uvula.

There are many specific names for different parts of the tongue. The tip and blade are the most mobile parts. Behind the blade is the called front of the tongue which is actually the forward part of the tongue and lies underneath the hard palate when the tongue is at rest. The remainder of the body of the tongue is divided into:

- the centre,
- the back
- and the root

The centre is partly beneath the hard palate and also partly beneath the soft palate.

The back that is beneath the soft palate and the root that is opposite to the back wall of the pharynx.

The tip of the tongue helps to produce /t, d, z, etc/. The blade of the tongue helps to produce /tʃ, dʒ, ʃ, etc. The front of the tongue helps to produce palatal sound /j/ and the back of the tongue helps to produce /k, g/ sounds.

The major division in speech sounds is between vowels and consonants. According to most authorities vowel is a sound and is also a syllabic that is produced without any major constrictions in the vocal tract. Thus, there is a relatively free passage for the air.

### Consonants

In the formation of consonants, the airstream through the vocal tract is obstructed in some way. Consonants are mainly classified according to the place and manner of this obstruction. The principal terms that are required in the description of English articulation are mainly the structures of the vocal tract that they involve are:

- bilabial
- dental, blade and the upper front teeth
- alveolar, blade and the teeth ridge
- retroflex, tongue tip and the back part of the teeth ridge
- palatal-alveolar, tongue blade and the back part of the teeth ridge
- palatal, front of tongue and hard palate
- Velar, back of tongue and soft palate.

Velar mainly denotes a sound in which the back of the tongue and the soft palate are involved and retroflex implies a sound involving the tip of the tongue and the back part of the alveolar ridge.

There are six basic manners of articulation that can be used at these places of articulation:

stop	approximant	tap
fricative	trill	lateral

## PHONETICS IN LINGUISTICS

8

1. Stops: involve closure of the articulators to obstruct the airstream. When the soft palate is down so that air can go out through the nose, there is said to be a nasal stop. The words such as my and night have the sounds that occur at the beginning. When the articulators are open, the airstream will be released with a plosive quality. The words such as pie, tie, buy, die, and guy have sound occur in the consonants.
2. A fricative sound: mainly involves the close approximation of two articulators, so that a turbulent airflow is produced when the airstream is partially obstructed. Examples of such types are the initial sounds which are present in the words thigh, sigh, and shy.
3. Approximants: are produced only when one articulator approaches another but does not make the vocal tract so narrow that results a turbulent airstream. Examples of such types are the sounds made with semivowel, and glide words like we and you.
4. A trill: results when an articulator is held loosely fairly close to another articulator, so that it is set into vibration by the airstream.
5. A tap: is produced only if one articulator is thrown against the other, when the loosely held tongue tip makes a single tap against the upper teeth or the alveolar ridge it is said as tap.
6. Lateral: the sound which is produced when the airstream is obstructed in the mid-line of the oral tract, and when there is incomplete closure between one or both sides of the tongue and the roof of the mouth. The sounds at the beginning and end of the word lull will come under this category.



PHONETICS IN LINGUISTICS

THE INTERNATIONAL PHONETIC ALPHABET (2005)

CONSONANTS (PULMONIC)

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Epi-glottal	Glottal
Nasal	m	ɱ	n			ɳ	ɲ	ŋ	ɴ			
Plosive	p b	ɸ β	t d			ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ	ʔ̚
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	ħ̥ ʕ̥	h ɦ
Approximant		ʋ	ɹ			ɻ	j	ɰ				
Trill	ʙ		r						ʀ		ʀ̥	
Tap, Flap		ⱱ	ɾ			ɽ						
Lateral fricative			ɬ ɮ			ɮ̠	ɬ̟	ɮ̥				
Lateral approximant			l			ɭ	ʎ	ʟ				
Lateral flap			ɭ			ɮ̠						

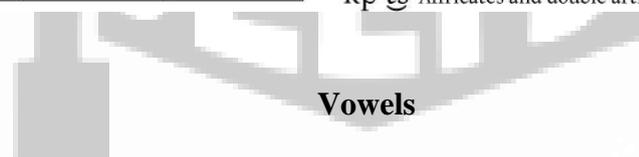
Where symbols appear in pairs, the one to the right represents a modally voiced consonant, except for murmured *ɦ*. Shaded areas denote articulations judged to be impossible. Light grey letters are unofficial extensions of the IPA.

CONSONANTS (NON-PULMONIC)

Anterior click releases (require posterior stops)	Voiced implosives	Ejectives
⦿ Bilabial fricated	ɓ Bilabial	ʼ <i>Examples:</i>
Laminal alveolar fricated ("dental")	ɗ Dental or alveolar	pʼ Bilabial
! Apical (post)alveolar abrupt ("retroflex")	ɟ Palatal	tʼ Dental or alveolar
‡ Laminal postalveolar abrupt ("palatal")	ɠ Velar	kʼ Velar
Lateral alveolar fricated ("lateral")	ɣ Uvular	sʼ Alveolar fricative

CONSONANTS (CO-ARTICULATED)

- ɱ Voiceless labialized velar approximant
- ʋ Voiced labialized velar approximant
- ɰ Voiced labialized palatal approximant
- ç Voiceless palatalized postalveolar (alveolo-palatal) fricative
- ʝ Voiced palatalized postalveolar (alveolo-palatal) fricative
- ɧ Simultaneous x and f (disputed)
- kp̚ ts̚ Affricates and double articulations may be joined by a tie bar



Vowels have been mainly specified in terms of the position of the highest point of the tongue and the position of the lips. The highest point of the tongue is in the front of the mouth for the vowels in

Heed

Head

Hid

Had.

The height of the tongue for the vowels is between the two extremes, and they are therefore called mid-vowels.

PHONETICS IN LINGUISTICS

High vowels: [i] [ɪ] [u] [ʊ]

Front vowels: [i] [ɪ] [e] [ɛ] [æ]

Mid vowels: [e] [ɛ] [o] [ə] [ʌ] [ɔ]

Central vowels: [ə] [ʌ]

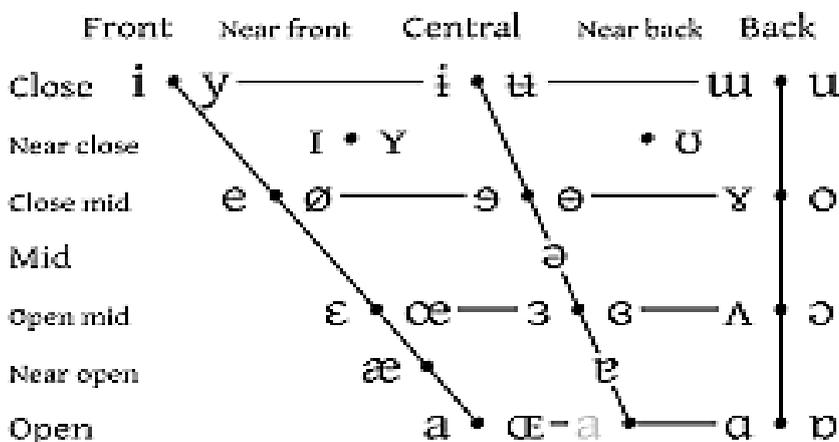
Low vowels: [æ] [a]

Back vowels: [u] [ʊ] [o] [ɔ] [ə] [a]

- The specification of vowels in terms of the position of the highest point of the tongue is not entirely satisfactory for a number of reasons.
- the shape of the tongue as a whole is very different in front vowels and in back vowels
- the height of the tongue in front vowels varies by approximately equal amounts for what are called equidistant steps in vowel quality
- the width of the pharynx varies considerably, and to some extent independently of the height of the tongue, in different vowels

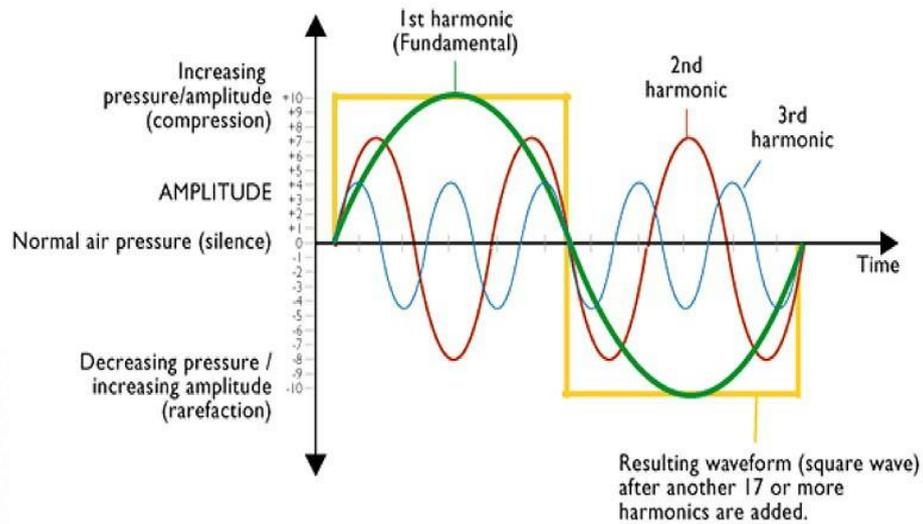
Many languages have a strong tendency for front vowels which is to have spread lip positions, and back vowels to have lip rounding. But languages such as French and German have front rounded vowels.

VOWELS

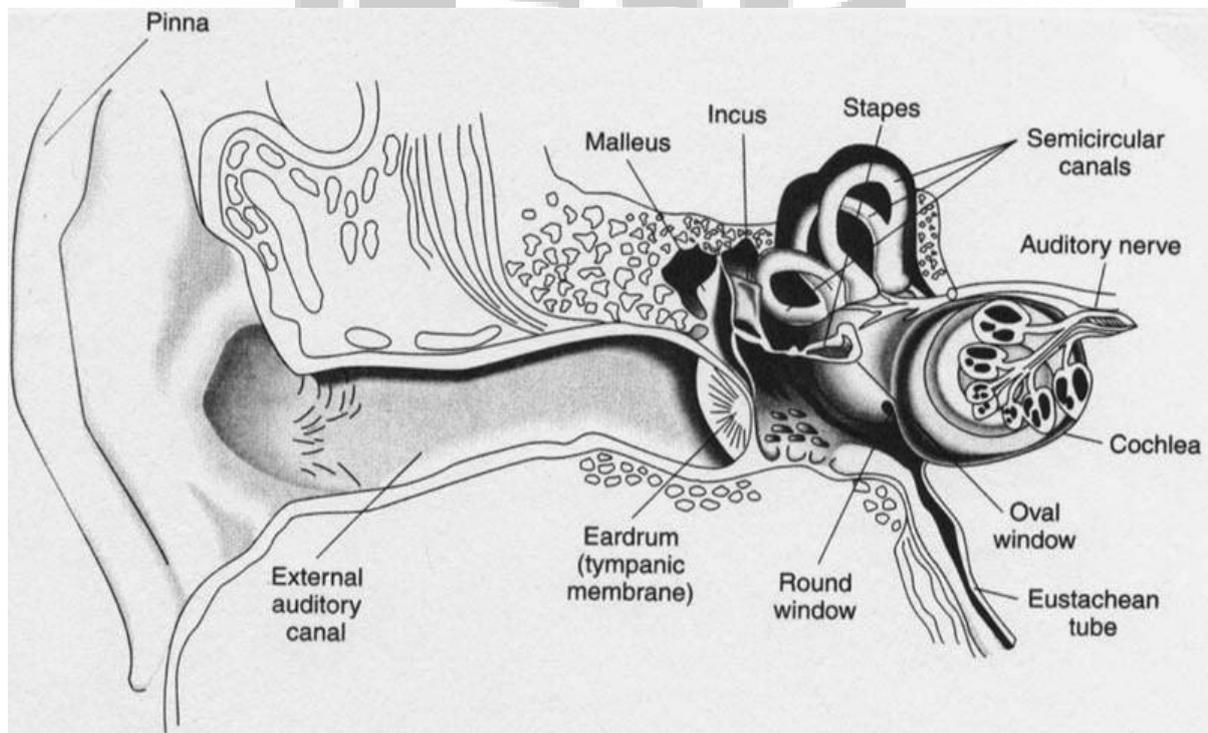


Vowels at right & left of bullets are rounded & unrounded.





### Auditory Phonetics



If articulatory phonetics studies the way in which speech sounds are produced, auditory phonetics focuses on the perception of sounds or the way in which sounds are heard and

## PHONETICS IN LINGUISTICS

13

interpreted. Thus, we can say that auditory phonetics deals with the other important participant in verbal communication, the listener.

It is a field of linguistic study which relies heavily on biology and more specifically on anatomy and physiology. In auditory phonetics, we deal with two distinct operations which are closely interrelated and influence each other. Keeping it very simple, we can state, that any sound coming from any source, be it someone speaking to you, is spreading from that source as a sound wave, causing the molecules on its way to crowd together and move apart again or in other words, to vibrate. When these vibrating air molecules reach your ear, they cause the eardrum in your middle ear to vibrate, too and this vibration is then carried on from the eardrum to the three little bones: mallet, incus and stirrup.

From the stirrup, the vibration is carried on to the inner ear, and into the cochlea, a little coil-like organ filled with liquid. Inside the cochlea there are two membranes: the vestibular membrane and the basilar membrane. It is the latter that plays a central role in the act of audition, because this is, where the auditory receptor cells are located.

Depending on the frequency of the sound coming in, a different part with different receptor cells of the basilar membrane is stimulated. Thus, low-frequency (grave) sounds will make the membrane vibrate at the less stiff (upper) end, while high- frequency (acute) sounds will cause the lower and stiffer end of the membrane to vibrate. The cells on the basilar membrane convert these vibrations into neural signals that are transmitted via the auditory nerves to the central receptor and controller of the entire process, the brain, where we identify the incoming sound as actual sound with a specific pitch.

## Consonant chart for English

	labial	dental	alveolar	palatal-alveolar	palatal	velar	glottal
1)	p b	t d				k g	
2)	f v	θ ð	s z	ʃ ʒ			h
3)				tʃ dʒ			
4)	m		n			ŋ	
5)			l, r				
6)	w				j		
	(labio-velar)				(palatal)		

1) stops, 2) fricatives, 3) affricates, 4) nasals, 5) liquids, 6) glides  
 The left symbol of each pair is voiceless, the right one voiced.



## VOWEL CHART AND SYMBOLS

### Monophthongs

Front		Back	
i:		u:	High
ɪ		ʊ	
e	ə	ɜ:	Mid
	ʌ	ɔ:	Low mid
æ		ɑ: ɒ	Low

*beat* /bi:t/, *bit* /bɪt/, *bet* /bet/, *bat* /bæt/, *bard* /bɑ:d/, *bo(ttom)* /bɒtəm/, *bull* /bʊl/,  
*but* /bʌt/, *bought* /bɔ:t/, *boot* /bu:t/, *(butt)er* /bʌtə/, *bird* /bɜ:d/;

*Diphthongs* rising: ai, au, ɔi *bile* /bail/ *bow* /bau/ *boil* /boil/  
 ei, əʊ *bait* /beit/ *boat* /bəʊt/  
 centring: iə, eə, uə *pie* /piə/ *pear* /peə/ *poor* /puə/

### **Conclusion**

From the above all context we can understand how phonology and phonetics interact over the course of phonetic change with the hope of broadening our knowledge of both sound change, and the general relationship between phonology and phonetics.



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