

Phonetics

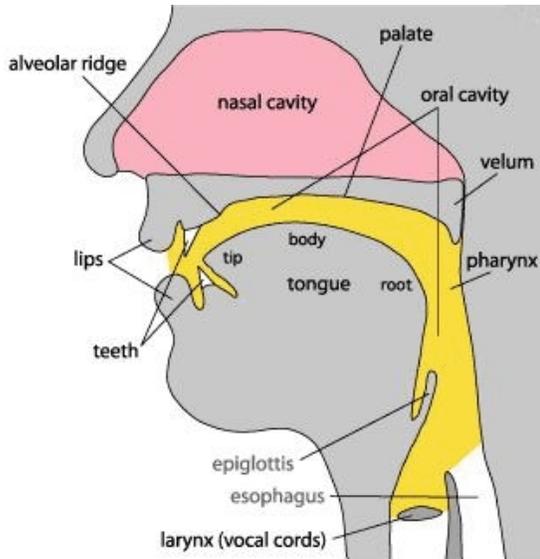
Phonetics is the study of the inventory and structure of language sounds.

Sounds in language - phones/speech sounds

Nonspeech sounds - raspberry, burp, growl

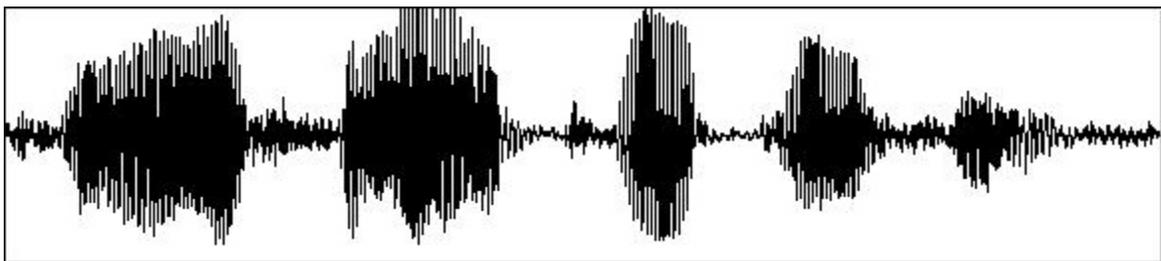
Two approaches to the study of phonetics:

articulatory phonetics - the physiology of speech production



acoustic phonetics - the physics of speech sounds

“Kay saw two pieces.”



K.....ay.....s.....aw.....t.....wo.....p.....ie.....c.....e.....s.....

In this section we will focus on articulatory phonetics

There have been efforts since the 16th century to devise a universal system to transcribe speech sounds. The best known is the International Phonetic Alphabet (or [IPA](#))

Goal: represent each sound of human speech with 1 symbol.

These sounds (**phones**) are written in **square brackets []** to indicate that they are individual speech sounds that stand apart from a language's organization of the sound system.

Although the ideal is to use a single symbol for a single sound, phoneticians take shortcuts when writing down the sounds for languages. For example, [p] is used for different sounds in English and Russian. English speakers press their lips together while Russian speakers draw their lips slightly inward. But since each form is frequent in its respective language, phoneticians write both as [p].

However, [p] and [t] are distinct categories of sound in all languages.

Speech requires:

air supply	lungs
sound source - vibrator	larynx (vocal cords)
set of filters	pharynx
	oral cavity
	nasal cavity

Air flows out lungs, up **trachea** (windpipe) and through the **larynx** (a box of cartilage and muscle - **voice box/Adam's apple**). Sheets of muscle line the inner wall. A set of these muscles flare outward - the **vocal folds/cords**. The folds can be pulled together or apart. The space between the folds is the **glottis**. The glottis has various positions or glottal states:

1. **voiceless** - the vocal folds are pulled apart
2. **voiced** - the vocal folds are close together and vibrating. This produces voicing, which can be felt by touching the voice box with your finger while speaking.
3. **whisper** - the front of the folds are closed while the back is open.

Sound Classes

The phones can be grouped together on the basis of their phonetic properties
e.g. **voiced** vs. **voiceless**

The most basic distinction is between Consonants and Vowels

Consonants - made with a narrow or complete closure of the vocal tract

Vowels - produced with little obstruction. They are more sonorous than consonants. They seem louder and last longer.

Consonants are distinguished by their place of closure/constriction **place of articulation**
labial, dental, alveolar, palatal, velar, uvular, pharyngeal and glottal

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

© 2005 IPA

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					ʁ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

The **manner of articulation** specifies the type of constriction

stop - a complete closure of the airway

nasal - lower velum (allow air to pass through the nose)

fricative - continuous airflow with an audible noise

strident - loud [s, z, ʃ, ʒ], not [f, v, ,]

sibilant is another term for strident

affricates - combine a stop and fricative - a slowly released stop

liquids - [r, l] - **continuants** without an obstruction

laterals - [l] - air passes over the sides of the tongue

retroflex - [ɻ] - curling back tongue tip or bunching tongue up and back in mouth

Another [ɻ] sound is the **flap** - tongue tip strikes the alveolar ridge as it passes across it.

[D] - e.g., bitter, butter

Other languages make use of different [manners of articulation](#).

	Bilabial	Alveolar	Dental	Retroflex	Palatal	Velar	Uvular	Glottal
Plain	p	t	ʈ	ɖ	c	k	q	ʔ
Nasals	m	n	ɳ	ɻ	ɲ	ŋ	ɴ	
Ejectives	pʼ	tʼ				kʼ	qʼ	
Implosives	ɓ	ɗ				ɠ		
Click	⦿	ǀ						
Lateral affricate		ɬ			ʎ			

Pharyngeals: Arabic

voiceless [ħ] is the sound you make when cleaning glasses

ʔælə:m ‘pain’ ʔiila ‘it was made to transfer to’

ʔálə:m ‘flag’ ʔiila ‘it dwindled’

ħæl ‘solution’ ħaɖ ‘border’

hæl ‘he lost his way’ ʔaɖ ‘counting’

Vowels are produced by varying the shape of the oral cavity

	Front	(Central)	Back
High	iy ɪ		uw ʊ
Mid	ey ɛ	ə ʌ	ow ɔ
Low	æ	a	

[iy, ey, ɔ, ow, uw] are **tense** vowels - they have a greater degree of constriction in the tongue body or tongue root.

Lax vowels have less constriction.

	Tense		Lax
h <u>e</u> at	[iy]	h <u>i</u> t	[ɪ]
m <u>a</u> te	[ey]	m <u>e</u> t	[ɛ]
		m <u>a</u> t	[æ]
		c <u>u</u> t	[ʌ]
		_____a <u>b</u> out	[ə] also sofa
sh <u>oo</u> t	[uw]	sh <u>ou</u> ld	[ʊ]
c <u>oa</u> t	[ow]	ca <u>u</u> ght	[ɔ] in some dialects
		vs. c <u>o</u> t	[ɑ]

Syllabic liquids and **nasals** are so resonant they function as syllabic nuclei.

bird [bɹd] [bærd] [bəɹd]

American IPA

button [bʌtɹ̩]

rhythm [rɪð̩]

Glides [y] yes, boy IPA [j]
[w] wet, now

[y] ~ [I] when prolonged
[w] ~ [u] “ “

sometimes transcribed as sequence [iɛs]

voiceless [w̥] [ɱ] which, when, where

Simple vowels and **diphthongs** - change in quality

pit, set, cat, dog, but, put, suppose - no change in voice quality
say, buy, cow, ice, lout, go, boy - change in voice quality

It is harder to feel vowel articulations since they have less constriction

Diphthongs

eyes [ɔy] tied [ɔy]
loud [ɔw] down [ɔw]

Nasalized vowels are made with a lowered velum

win [wĩn]

French pain [pɛ̃] ‘bread’

Other vowels

	Unrounded	Rounded
High	i I	ü Û
Mid	e ɛ	ö œ
Low	æ	

Suprasegmentals or prosodic features include: pitch, loudness, length
pitch distinguishes [s] and [ʃ]

There are two kinds of controlled pitch movement: tone & intonation
different pitch different meaning: **tone**

Sarcee H M L
[miʔ] ‘moth’ [miʔ] ‘snare’ [miʔ] ‘sleep’

Languages also contrast **level tones** with **contour tones**: Mandarin

H	LH	MLH	HL
[ma] 'mother'	[ma] 'hemp'	[ma] 'horse'	[ma] 'scold'

Intonation is a pitch movement unrelated to a difference in word meaning.

It signals a meaning difference beyond the word level

declarative Fred parked the car. Terminal intonation contour

interrogative Fred parked the car?

Length long vs. short vowels and consonants

Yap [θis] 'to topple' [θi:s] '(a) post'

Italian [fatɔ] 'fate' [fat:ɔ]

Stress, or prominence, combines the effects of pitch, loudness and length

primary ' acute

secondary ` grave

present [prɛ́zənt] [priyɛ́nt]

Coarticulation is how the articulation of one sound affects that of another
e.g., the nasalization of a vowel before a nasal consonant

bank [bæ̃ŋk] keep cool

Coarticulation makes articulation easier, less effortful

Articulatory processes are adjustments in articulation

Assimilation - one sound becomes more like another

backwards or **regressive** [bæ̃ŋk]

forwards or **progressive** please [plɪyɪz] pure [pyʊr]

negative morpheme /in-/

impossible, intangible, inconsequential

Dissimilation is when one sound becomes less like another

fifths [fθs] [fts]

Deletion is the elimination of a sound

fifths [fɪfθs] [fɪfs]

parade [pə'reɪd] [pə'reɪ]

Epenthesis is the insertion of a vowel or consonant

prince [prɪns] [prɪnts]

Metathesis is the reordering of a sound sequence

spaghetti [spæʒɪ'ti]

children often modify the initial [spə] [pəs]

prescribe perscribe