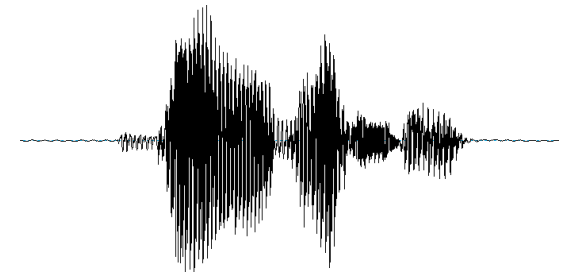
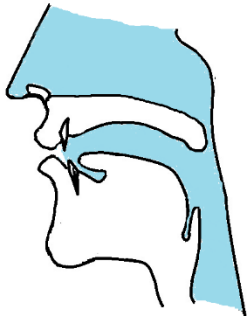


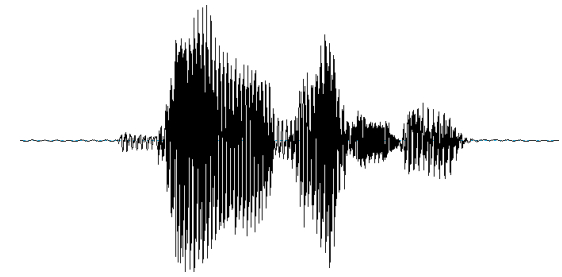
ABOUT THIS COURSE



- This course deals with all the major aspects of phonetics and phonology.
- Phonetics and phonology are two branches within linguistics which focus on linguistic sounds.
- Both derived from the Greek word phon ‘sound’.



ABOUT THIS COURSE



There are **8** main components. These are:

1) Human speech apparatus:

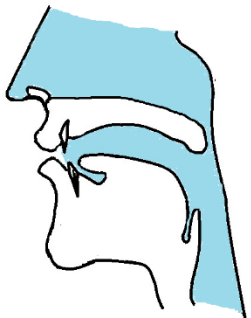
- Articulation of vowels and consonants, representation of sounds

2) Sounds of the world's languages:

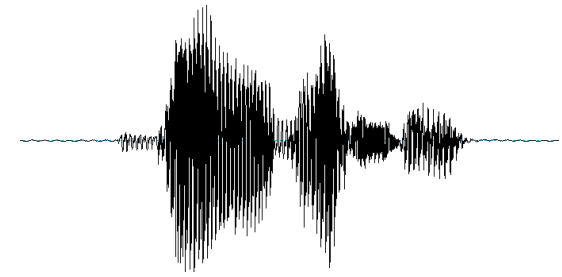
- Language endangerment and language varieties
- Different air stream mechanisms, ejectives, clicks and retroflexes
- Voiceless sonorants, consonant and vowel lengthening

3) Properties of sound:

- Acoustic analysis: Fourier transform, source-filter theory
- Resonance, spectrograms, vowels and vowel charts
- Acoustic properties of consonants and vowels



ABOUT THIS COURSE



4) Basic overview of speech perception

- Categorical perception and VOT
- Categorical perception in infants

5) Identifying phonemes

- Phonological analysis Syllables

6) Phonemics:

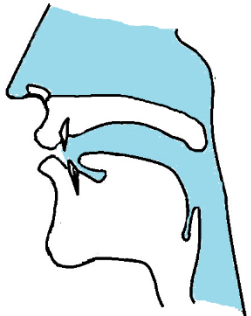
- Natural class, Distinctive Feature groups, Markedness & Underspecification

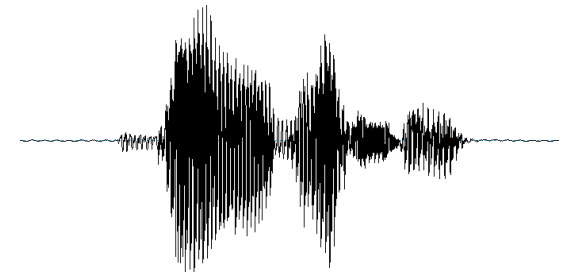
7) Phonological rules

- Phonological alternations, Phonological alternations II

8) Tone languages and pitch accent languages

- Intonation – sentence level prosody
- Intonational phonology

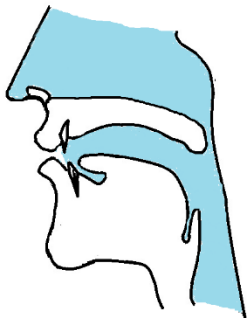


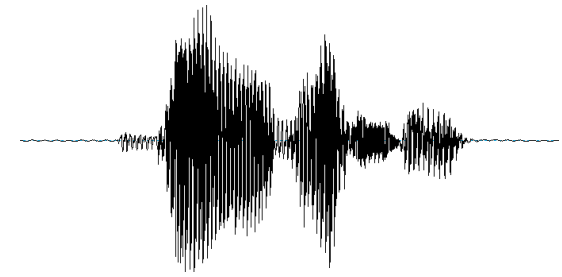


- Linguistics puts a lot of emphasis on spoken language.
- It is the most important and primary form of communication for humans.
- But does it deserve such intense scientific enquiry?

Research shows that speaking involves a wide array of intricate mental abilities

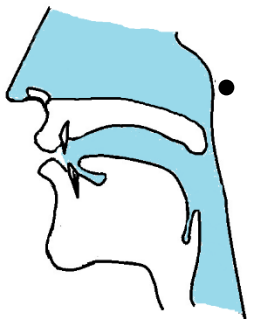
- Writing systems are only about 5000 years old and they also do not reflect speech changes from generation to generation.
- Most of the world's languages do not have a writing system.
- Children learn to speak first, reading and writing comes much later.

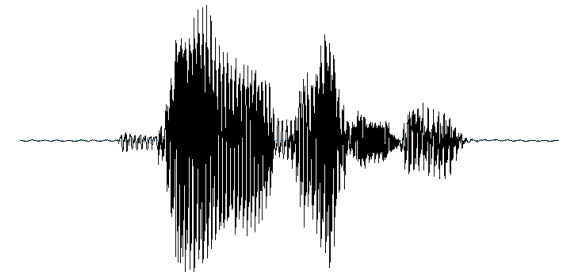





Alphabet \neq sounds

- An individual sound refers to a stable portion of sound energy in a spoken language
- In the monosyllabic word 'no' we can think of two relatively stable portions of sound.
- This is reflected in the English writing system as two alphabets. In connected speech the words may not stand out so clearly.
 - It is important to maintain the distinction between the writing system and sounds because the relationship may be obscured by various irregularities in the sound to alphabet mapping.
 - The English spelling is known to be quite irregular in representing sounds.



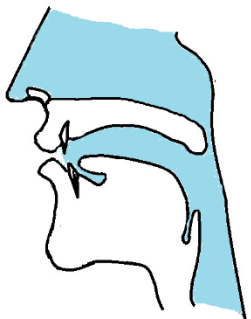


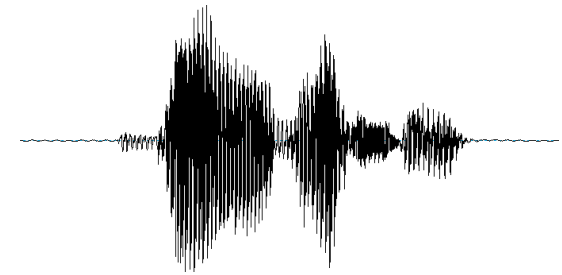
Yes, English can be weird. It can be understood through tough thorough thought, though.

 Traducir del inglés

1/5/15 17:55

6.635 RETWEETS **5.029** FAVORITOS





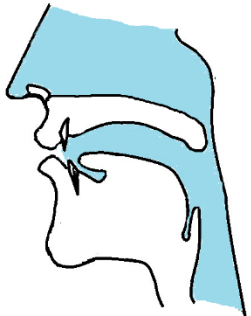
IF THE GH SOUND IN ENOUGH IS PRONOUNCED “F”
& THE O IN WOMEN MAKES THE SHORT “I” SOUND
& THE TI IN NATION IS PRONOUNCED “SH”
THEN THE WORD

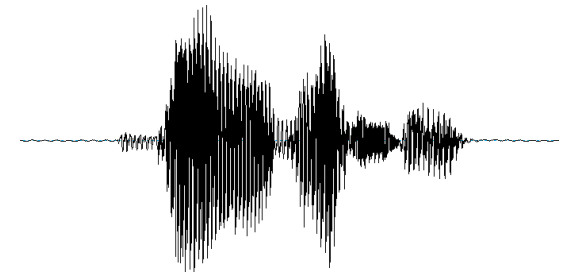
“GHOTI”

IS PRONOUNCED JUST LIKE

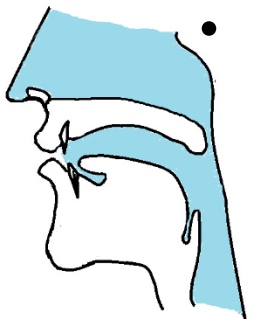


“FISH”





- Hence linguists use an internationally approved system of transcription, in which each symbol represent a particular sound (irrespective of the languages) , and it contains many symbols to represent the diversity across languages.
- This system is called the International Phonetic Alphabet (IPA), it first came into being 1886 and has been modified regularly to include new discoveries in the sound inventories of the languages of the world.
- Linguists need a system of ‘writing down’ or transcribing the sounds of all languages in the world using symbols which are similar to writing systems but different because they have to be consistent and regular across languages.



THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

CONSONANTS (PULMONIC)

© 2020 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	ʙ			r					ʀ		
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			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
ʘ Bilabial	ɓ Bilabial	ʼ Example:
ǀ Dental	ɗ Dental/alveolar	pʼ Bilabial
ǃ (Post)alveolar	f Palatal	tʼ Dental/alveolar
ǂ Palatoalveolar	ɠ Velar	kʼ Velar
ǁ Alveolar lateral	ʄ Uvular	sʼ Alveolar fricative

OTHER SYMBOLS

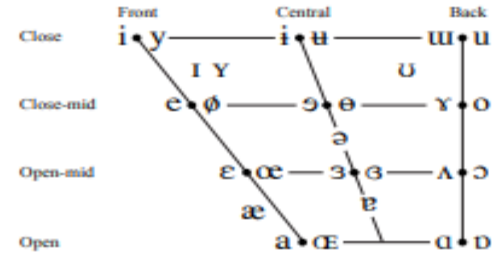
ʍ Voiceless labial-velar fricative	ɕ ʑ Alveolo-palatal fricatives
ʋ Voiced labial-velar approximant	ɺ Voiced alveolar lateral flap
ɥ Voiced labial-palatal approximant	ɟɥ Simultaneous ɟ and ɥ
ʜ Voiceless epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʢ Voiced epiglottal fricative	
ʡ Epiglottal plosive	

DIACRITICS

ˠ Voiceless	ᵿ ɖˠ	ˡ Breathily voiced	ᵿ ɖˡ	ˠ Dental	ᵿ ɖˠ
ˡ Voiced	ᵿ ɖˡ	ˠ Creaky voiced	ᵿ ɖˠ	ˡ Apical	ᵿ ɖˡ
ʰ Aspirated	ᵿ ɖʰ	ˠ Lingsolabial	ᵿ ɖˠ	ˠ Laminal	ᵿ ɖˠ
ˠ More rounded	ᵿ ɖˠ	ˠ Labialized	ᵿ ɖˠ	ˠ Nasalized	ᵿ ɖˠ
ˠ Less rounded	ᵿ ɖˠ	ˠ Palatalized	ᵿ ɖˠ	ˠ Nasal release	ᵿ ɖˠ
ˠ Advanced	ᵿ ɖˠ	ˠ Velarized	ᵿ ɖˠ	ˠ Lateral release	ᵿ ɖˠ
ˠ Retracted	ᵿ ɖˠ	ˠ Pharyngealized	ᵿ ɖˠ	ˠ No audible release	ᵿ ɖˠ
ˠ Centralized	ᵿ ɖˠ	ˠ Velarized or pharyngealized	ᵿ ɖˠ		
ˠ Mid-centralized	ᵿ ɖˠ	ˠ Raised	ᵿ ɖˠ		
ˠ Syllabic	ᵿ ɖˠ	ˠ Lowered	ᵿ ɖˠ		
ˠ Non-syllabic	ᵿ ɖˠ	ˠ Advanced Tongue Root	ᵿ ɖˠ		
ˠ Rhoticity	ᵿ ɖˠ	ˠ Retracted Tongue Root	ᵿ ɖˠ		

Some diacritics may be placed above a symbol with a descender, e.g. ɳ̌

VOWELS



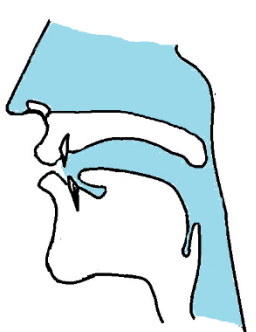
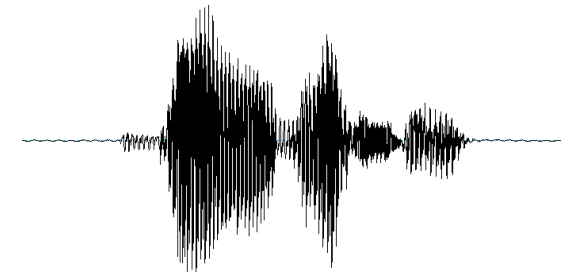
Where symbols appear in pairs, the one to the right represents a rounded vowel.

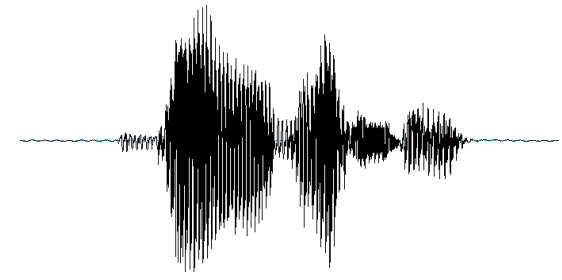
SUPRASEGMENTALS

ˈ Primary stress	ˈfoʊnəˈtɪʃən
ˌ Secondary stress	
ː Long	eː
ˑ Half-long	eˑ
˚ Extra-short	e˚
ˌ Minor (foot) group	
ˎ Major (intonation) group	
ˌ Syllable break	ti.ækt
ˌ Linking (absence of a break)	

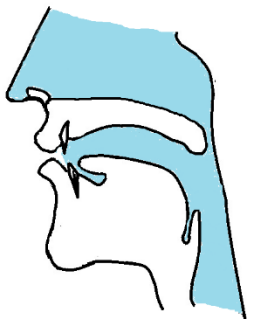
TONES AND WORD ACCENTS

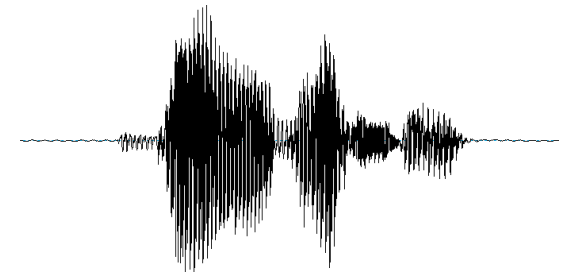
LEVEL	CONTOUR
˥ Extra-high	˥ = ˥ Rising
˦ High	˦ = ˦ Falling
˧ Mid	˧ = ˧ High rising
˨ Low	˨ = ˨ Low rising
˩ Extra-low	˩ = ˩ Rising-falling
˨˩ Downstep	˨˩ = ˨˩ Global rise
˨˩ Upstep	˨˩ = ˨˩ Global fall





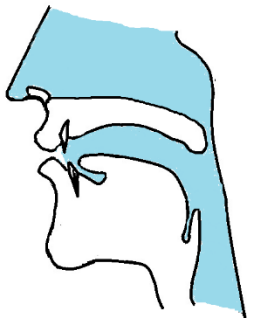
<https://www.internationalphoneticalphabet.org/ipa-sounds/ipa-chart-with-sounds/>

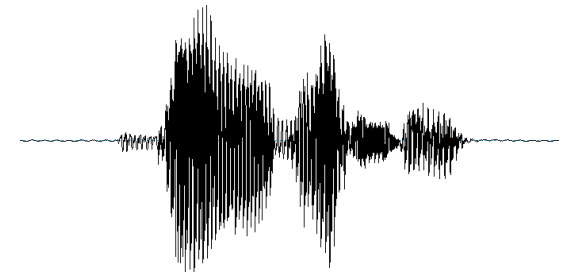




Transcription

- Consonant symbols in the IPA chart correspond to Roman letters, and represent their usual sound values.
- [s] [f] [h] etc.

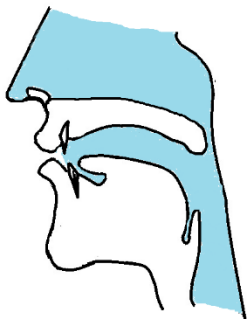


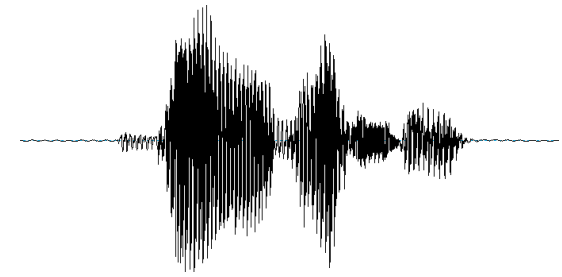


Transcription

□[θ ð]

- Both spelled with *th*;
- Each individual speech sound corresponds to a unique symbol, and each symbol to a sound.
- A sequence of sounds must be represented as a sequence of symbols.

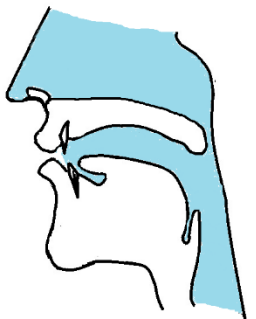


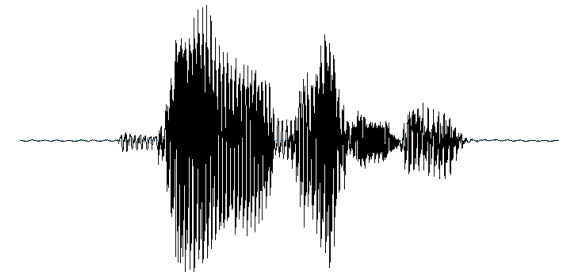


Transcription

□[ʃ 3]

- The *sh* sound in shop deserves its own symbol, [ʃ] (English also uses ti for this sound, as in nation).
- And the middle consonant in measure 3

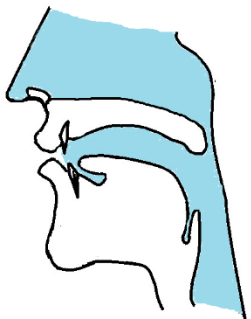


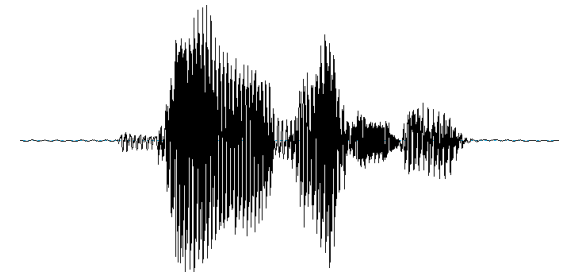


Transcription

□[ŋ]

- Singer does not have a [ng] sequence phonetically.
- It's a single consonant sound, similar to **n**, but with the back of the tongue in the position of [g].

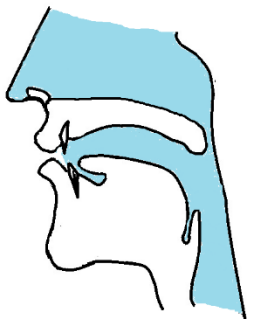


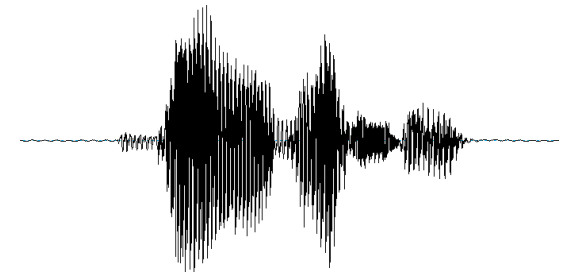


Transcription

□tʃdʒ^h

- Church and judge
- These are actually not single consonants at all: they are [t] plus [ʃ], and [d] plus [ʃ ʒ], sequences





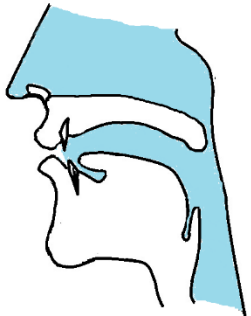
Transcription

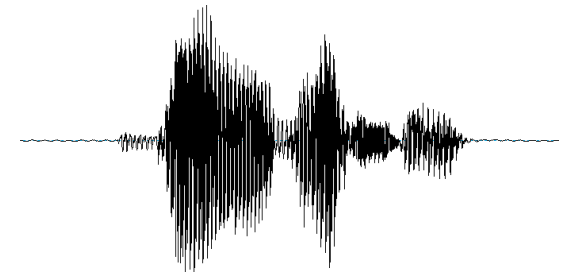
□[ɹ]

- This ‘inverted r’ symbol represents the English **r** sound.

□[j]

- [j] represents the sound usually written in English as **y**.
- [j] is never pronounced as in juice.



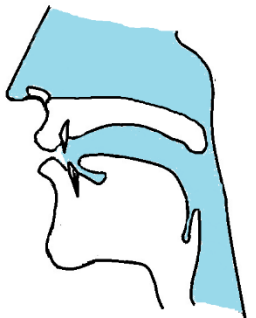


Transcription

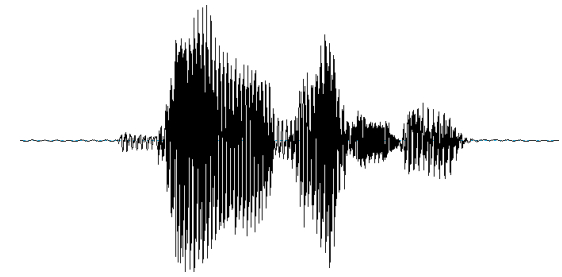
- Number of letters in the alphabet may not be indicative of the sound

□[g]

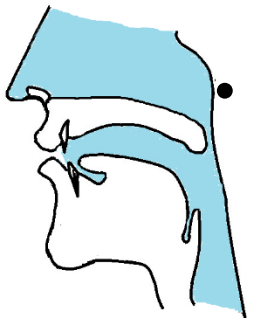
- This symbol is always pronounced as a 'hard' g, as in get or bag, never as in gem or age.
- 'box' is simply a [ks] sequence.

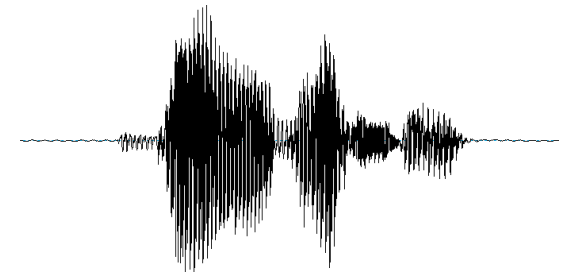


Transcription

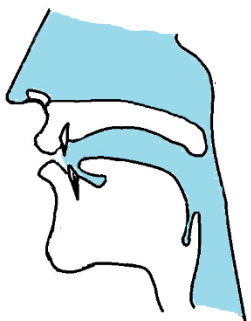


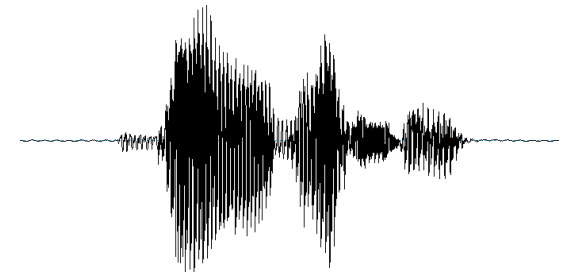
- These extra letters are used in IPA to denote different sounds, not found among the basic sounds of English.
- **Vowels:** The vowels require more careful study, as the symbols are less familiar; and even the familiar symbols generally do not have the phonetic values we would.
- The sounds we produce are determined by our lips, teeth, tongue and other vocal organs.
- Every language has sounds that are distinct from each other.
- Sound development - Articulatory ease and auditory distinctiveness





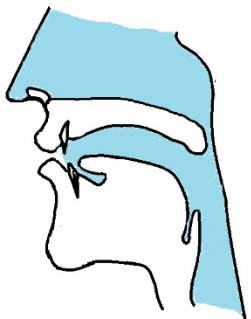
- How brains organize and help in memorizing sounds
- Sufficient number of vowels and consonants are required to form word which are distinct from each other.
- Mostly the sounds in a language form a pattern. If a language has the sound /p/ it may also have /b/ and /m/, If it has /t/ it may also have /d/ and /n/

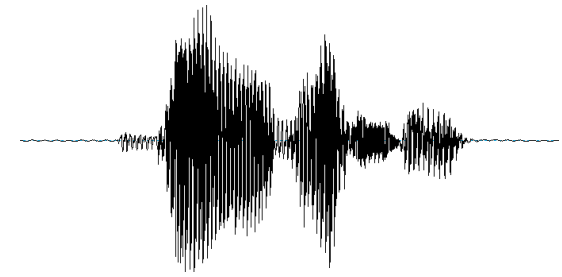




❑ Despite plenty of variations, the sounds that all languages use have many features in common:

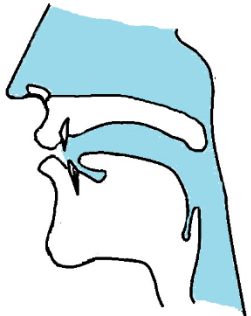
- Vowels and consonants
- Pulmonic air stream
- Change in pitch for intonation

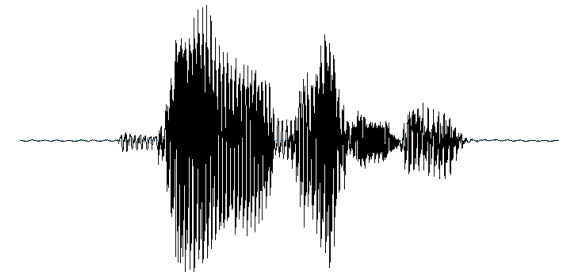




Phonetics and phonology

- ❑ **Phonetics** deals with the production of speech sounds by humans, various aspects of their physical, measurable properties.
- ❑ **Phonology** is about **sound patterns** especially different patterns of sounds in different languages, or within each language.
- It deals with the mental organization of sounds and sound patterns.



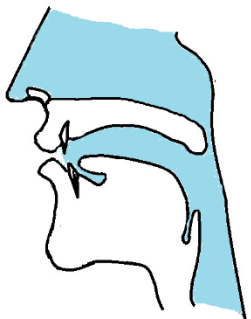


Phonology

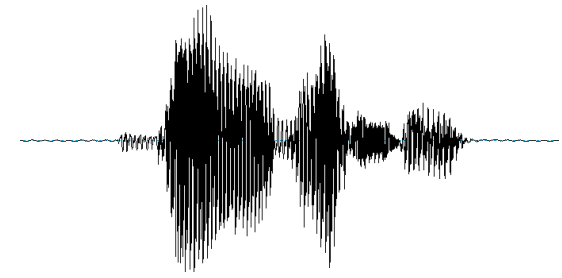
□ Pattern

- Consonant cluster
- A word can start with /str/ in English but not with /ftr/ /tr/ /str/
- Words can start with /pl/ /pr/ /tr/ (but not /tl/)

□ Aspiration

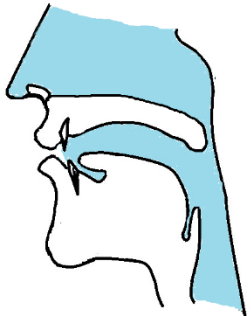


Speech Production

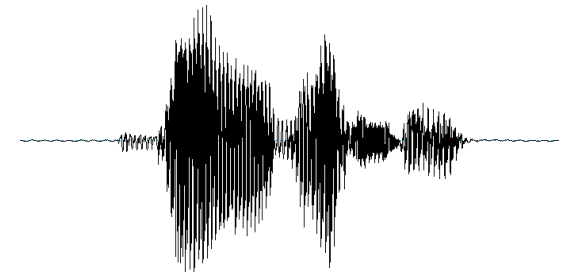


□ Speech Production

- To produce speech, air must flow from the lungs through the vocal tract and the vocal folds
- or the nose or nasal cavity, and the mouth or oral cavity
- Vocal folds vibration produce voicing for some sounds
- Air releases through the nose for certain sounds which are nasal or nasalized.



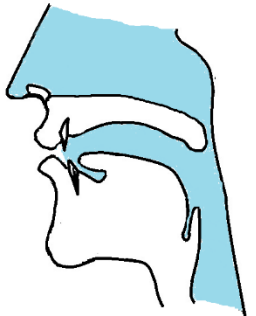
Phonetics



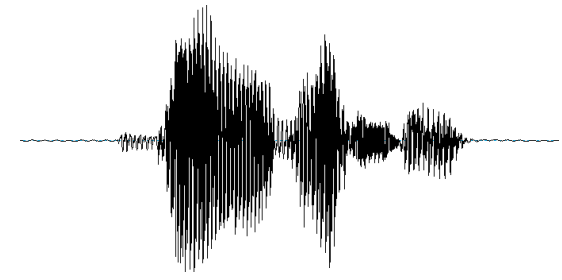
1) Articulatory phonetics

2) Acoustic phonetics

3) Auditory phonetics

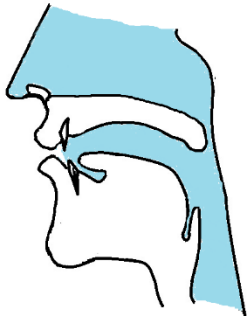


Articulation

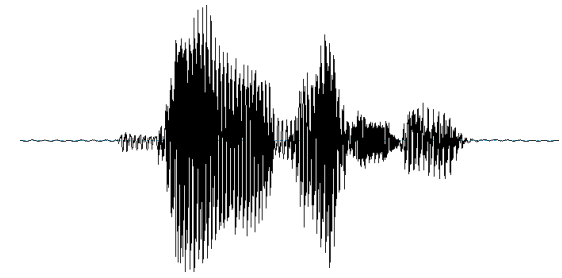


□ We classify consonants according to the following characteristics:

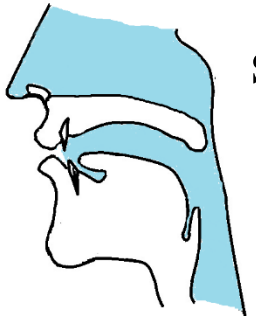
- (a) Vocal fold vibration - voicing
- (b) Manner of articulation – fully stopped or constricted
- (c) Place of articulation – the place of constriction
- (d) Air flow through the nasal cavity
- (e) Lip rounding



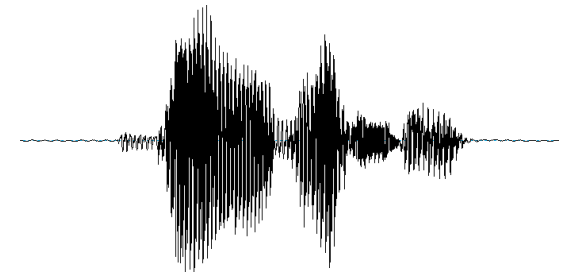
Phoneme



- The smallest unit of language which distinguishes meaning – the basic organisational unit of phonology – is termed a phoneme. The brackets used are slashes: / /.
- The distribution of phonemes in English is fairly systematic (see consonant and vowel charts below).
- The consonants appear in pairs of voiced and voiceless members and the vowels in sets of long and short vowels.

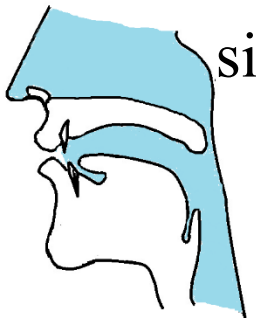


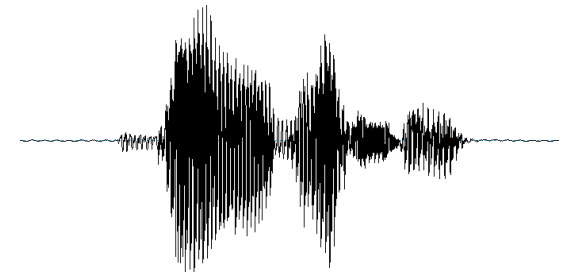
Phoneme



- It is possible to distinguish phonemes not just in the way they are pronounced but also in their relative length.
- Length may also be a characteristic of consonants. Such lengthened consonants are called geminates.
- Long consonants are indicated in transcription by doubling the consonant in question.
- Vowel length is shown by placing a length mark after the relevant vowel, e.g. see /

si:/.



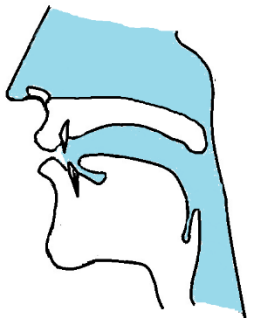


Phone & allophone

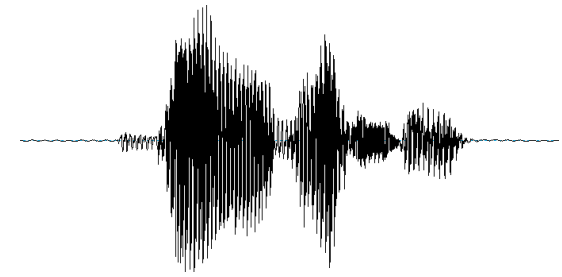
In any language there will be sounds which are used to differentiate meaning and those which do not serve this function.

Phone

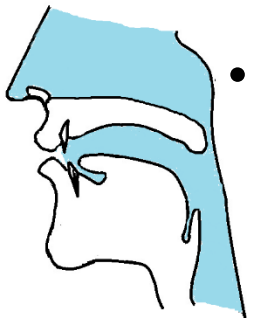
This is the smallest unit of human sound which is recognisable but not classified. They are not the same as allophones



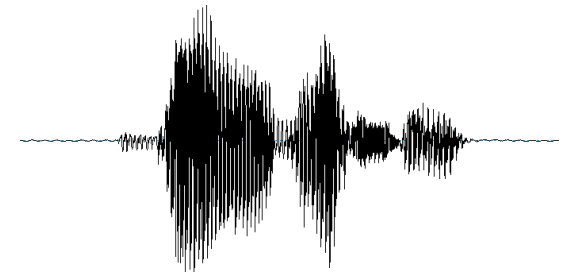
Allophone



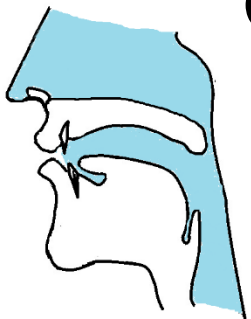
- Allophone concerns itself with the realization of a phoneme.
- The phoneme is a unit in the sound system of a language. This means that it is an abstract unit.
- Why non-distinctive?
- Because the different pronunciations do not realise a difference in meaning. No in English contrast of [t] versus [t̪].
- Allophones are in complementary distribution.
- They cannot occur in the same position in a syllable.



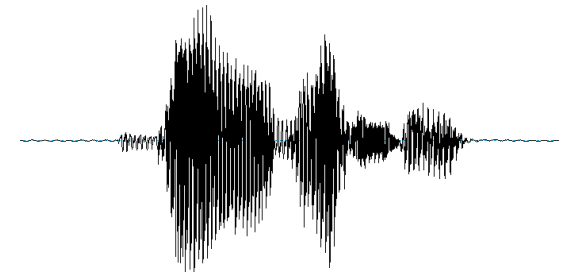
Consonant production



- Speech sounds are the result of movements of parts of the vocal tract, particularly the lips, tongue tip, tongue body, and larynx (the major articulators) which obstruct the air flowing out of the lungs.
- Consonants - produced by a certain degree of obstruction of the airstream coming from the lungs.
- whereas in vowels, the mouth remains relatively open.
- We can describe types of consonants in terms of how much obstruction is involved (manner of articulation).



Articulation: Airstream Mechanism



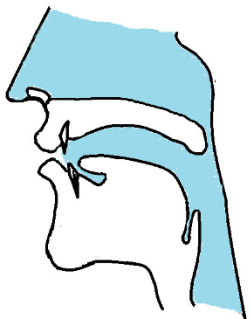
Pulmonic



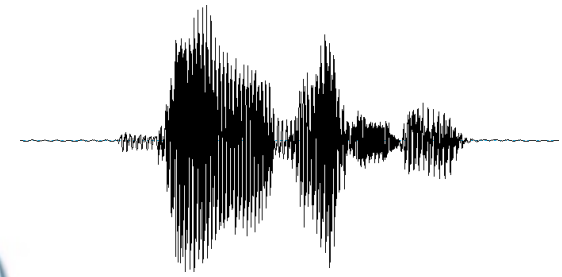
Glottalic



Velaric



Airstream Mechanism



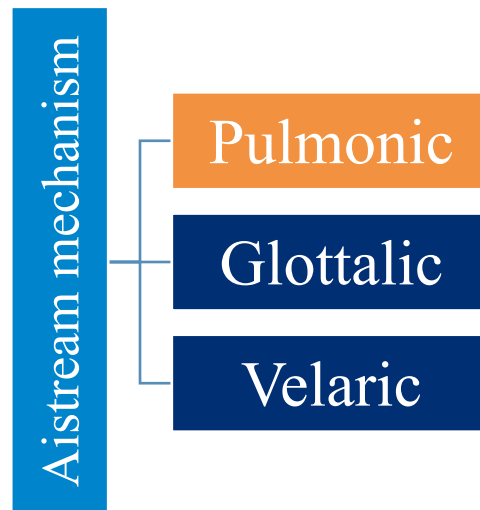
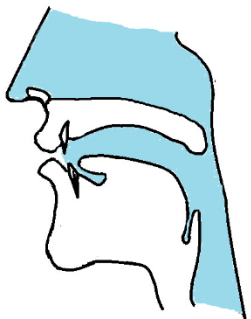
Pulmonic



Glottalic

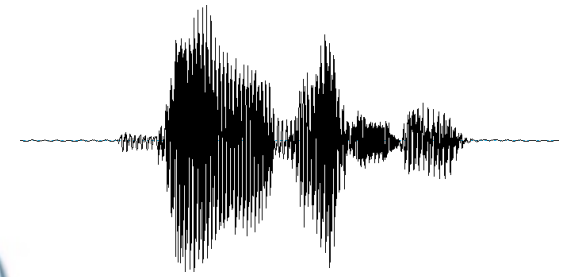


Velaric



- Air direction: egressive
- Stop consonants: plosives
- E.g. [p t k] [b d g]
- Voicing: voiceless / voiced

Airstream Mechanism



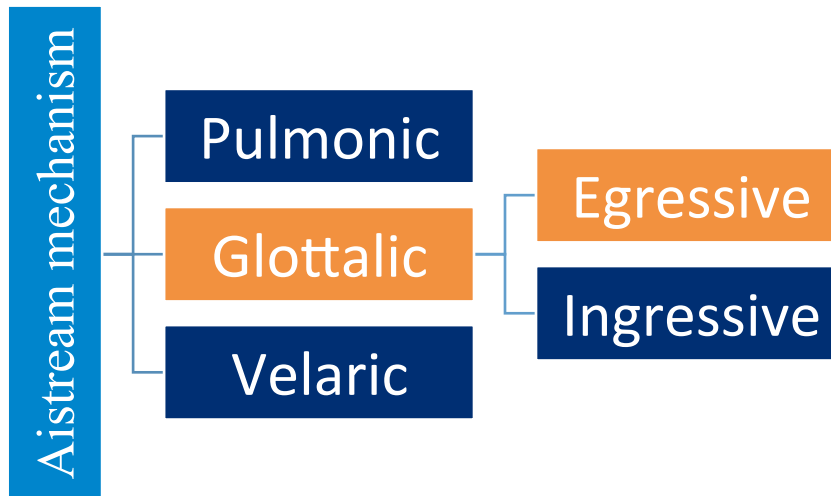
Pulmonic



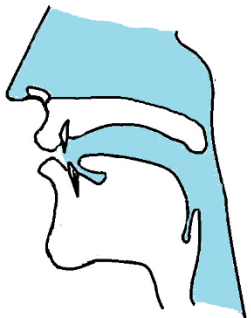
Glottalic



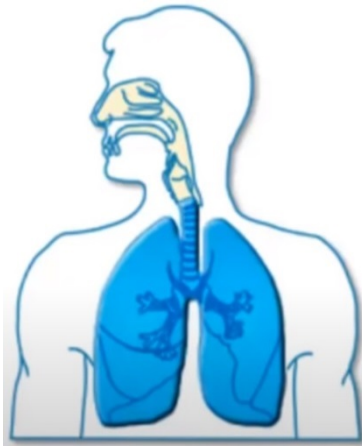
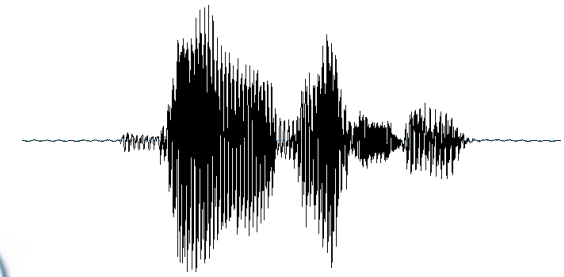
Velaric



- Air direction: egressive
- Stop consonants: ejectives
- E.g. [p' t' k']
- Voicing: voiceless



Airstream Mechanism



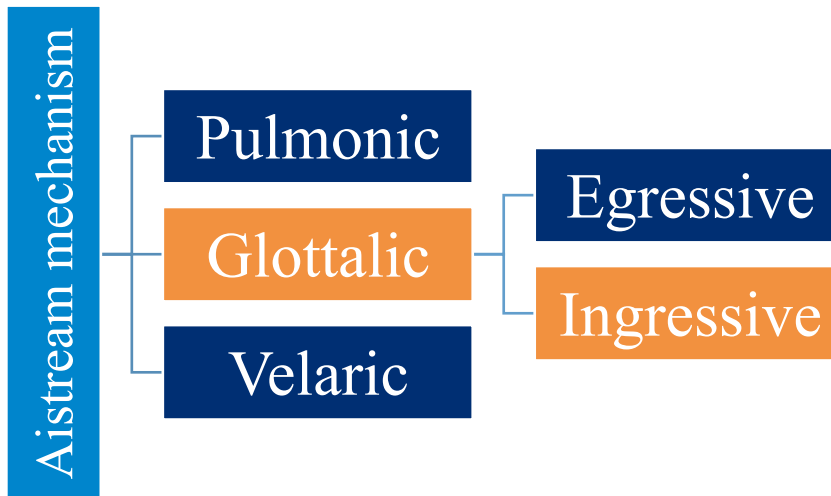
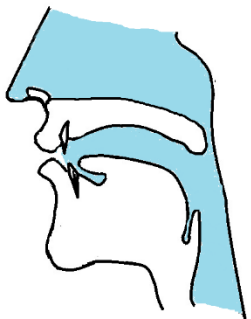
Pulmonic



Glottalic

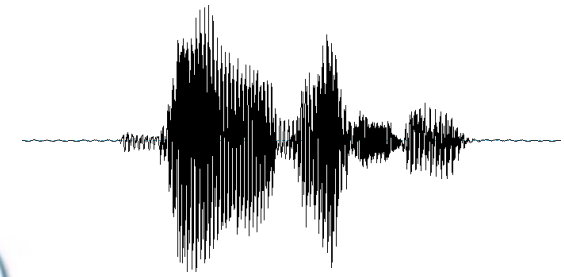


Velaric



- Air direction: ingressive
- Stop consonants: implosives
- E.g. [ɓ ɗ ɠ]
- Voicing: voiced

Airstream Mechanism



Pulmonic



Glottalic



Velaric

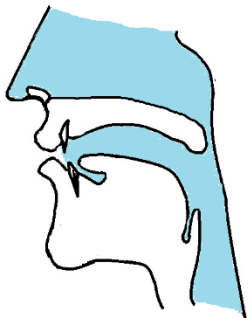
Airstream mechanism

Pulmonic

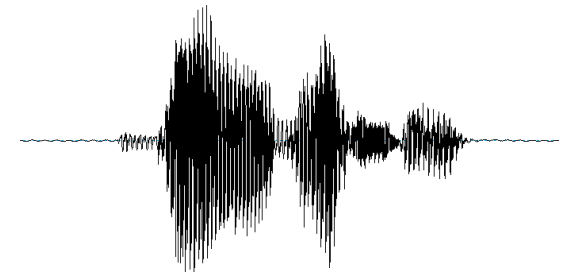
Glottalic

Velaric

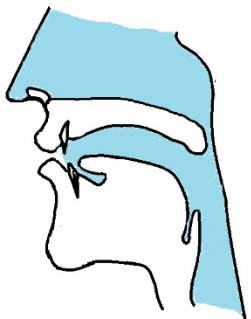
- Air direction: ingressive
- Stop consonants: clicks
- E.g. [ǀ ǂ ǁ]
- Voicing: voiceless / voiced



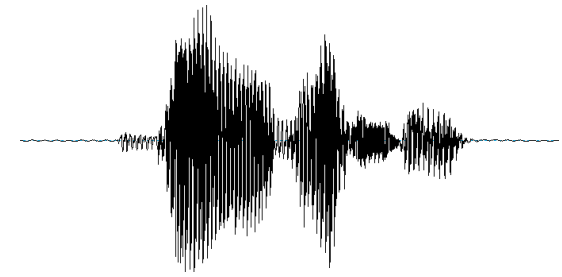
Consonant production



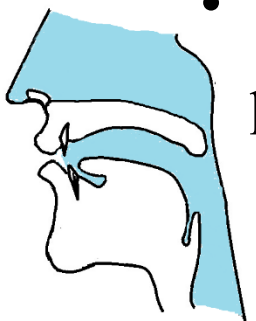
- The alveolar ridge – the ridge shaped gums just behind the upper teeth.
- The palate - the roof of the mouth.
- The 'soft palate' is called the velum, and ends in the uvula (this is the fleshy appendage you can see hanging down in the back of your throat).
- If the velum is raised, this closes the velo-pharyngeal port, preventing the passage of air from the nasal passages and the rest of the vocal tract.



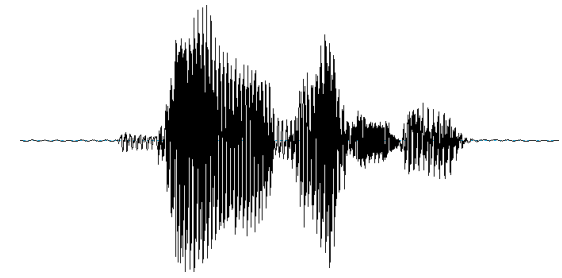
Consonant production



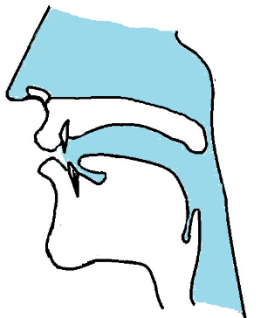
- The tongue is a muscle body, which we can divide into tip (the only part you usually see), body, and root.
- The epiglottis is a flap which covers the trachea (or windpipe') allowing food into the esophagus.
- The larynx is a sort of valve, encased in cartilage.
- It opens wide during breathing and closes when you swallow.
- This voicing (pulsing of air in the glottis as it passes through the vibrating larynx) is leads to voicing.



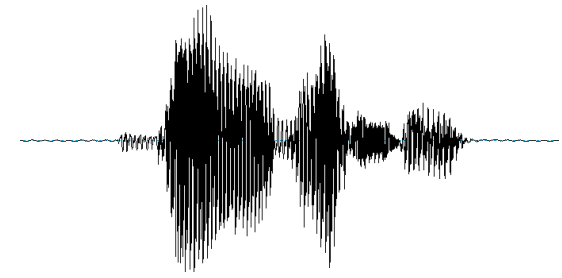
Consonants – Manner of articulation



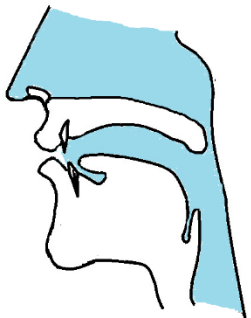
- **Stops** ([p,t,k,b,d,g]) involve a **complete obstruction** of airflow, due to full closure at some point in the mouth.
- **Nasals** ([m,n,ŋ]) involve complete closure in the mouth, but the velum is lowered, and air flows through the velo-pharyngeal port, and out the nose.
- **Fricatives** ([f,v, θ, ð,s,z, ʃ, ʒ, h]) have partial constriction in the mouth, such that airflow is pushed out of a narrow passage, creating a hissing sound.
- **Affricates** is a term sometimes used for sequences made with the same articulator, including [tʃ, dʒ] which are stop + fricative sequences.



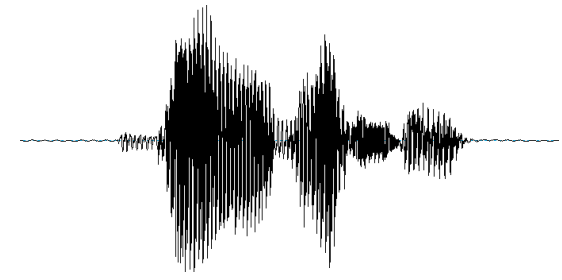
Consonants – manner of articulation



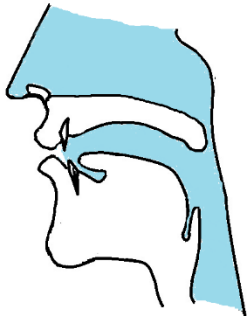
- **Approximants** ([l, ɹ, j, w]) have some obstruction, less than fricatives but more than vowels.
- In an [l], the tip of the tongue often makes full contact with the alveolar ridge,
- [l] is therefore called a lateral approximant; the others are central.



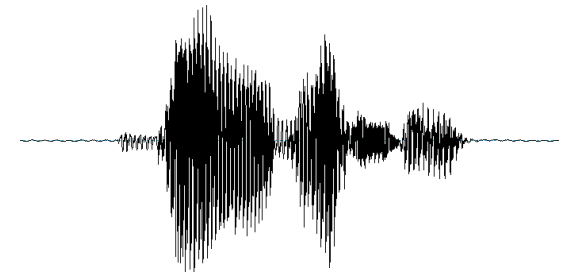
Consonants – place of articulation



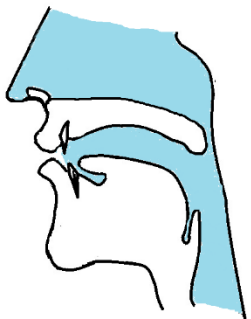
- Consonants can be described in terms of where the obstruction occurs in the vocal tract (place of articulation).
- **Bilabials** ([p,b,m,w]) - closure or constriction of the two lips.
- **Labiodentals** ([f,v]) - constriction of the upper teeth and lower lip.
- **Dentals** ([θð]) - constriction of the tongue tip and the upper teeth.
- **Alveolars** ([t,d,n,s,z, ɹ,l]) - constriction of the tongue tip and the alveolar ridge.



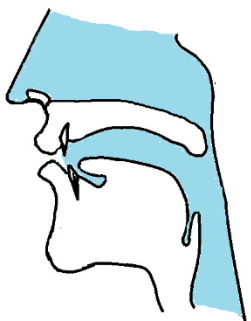
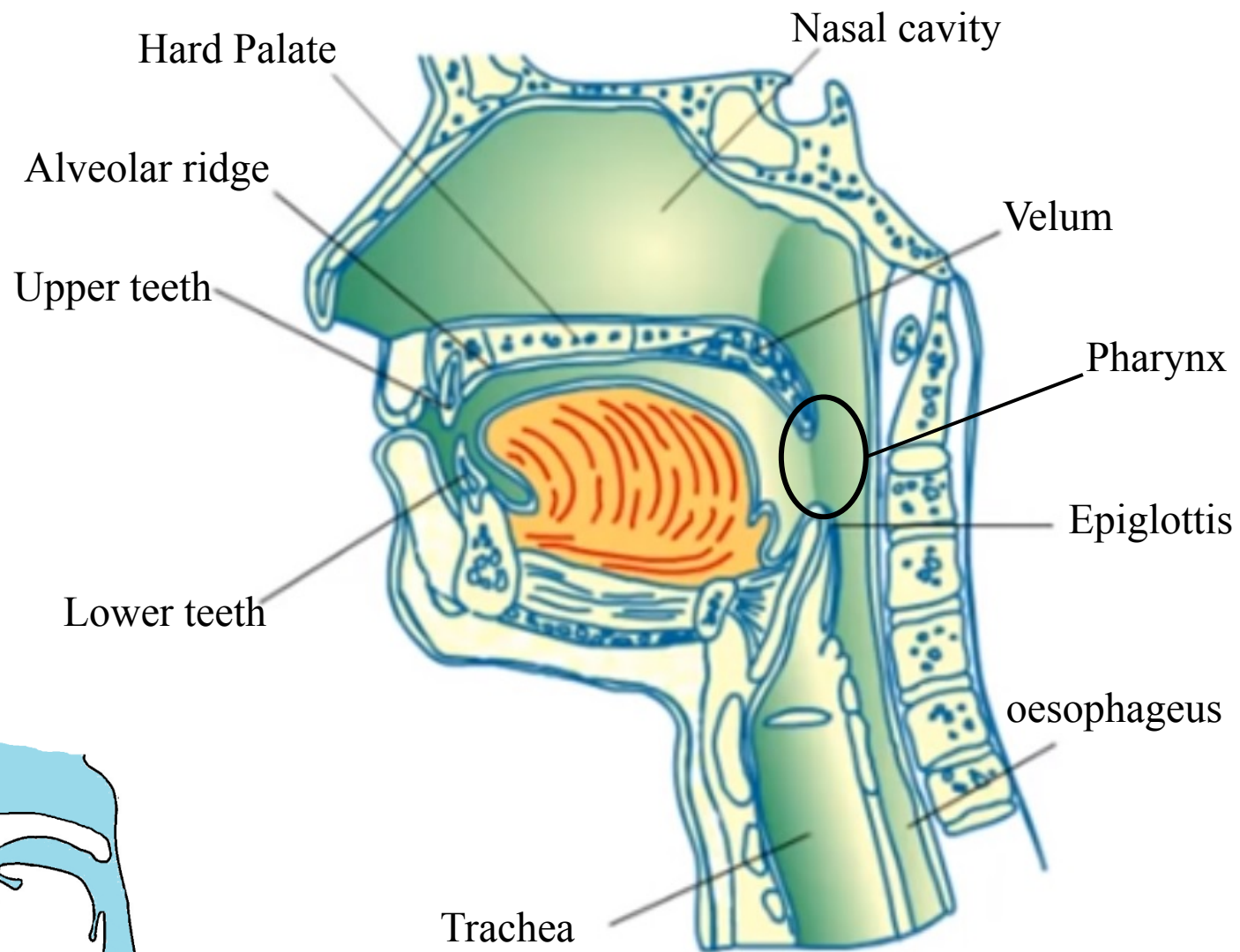
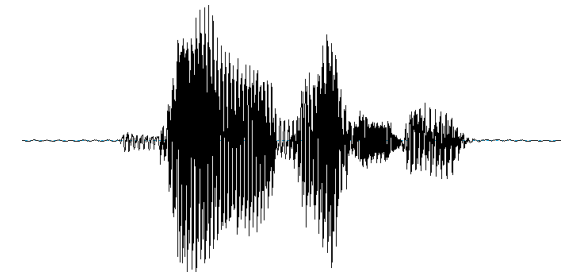
Consonants – place of articulation



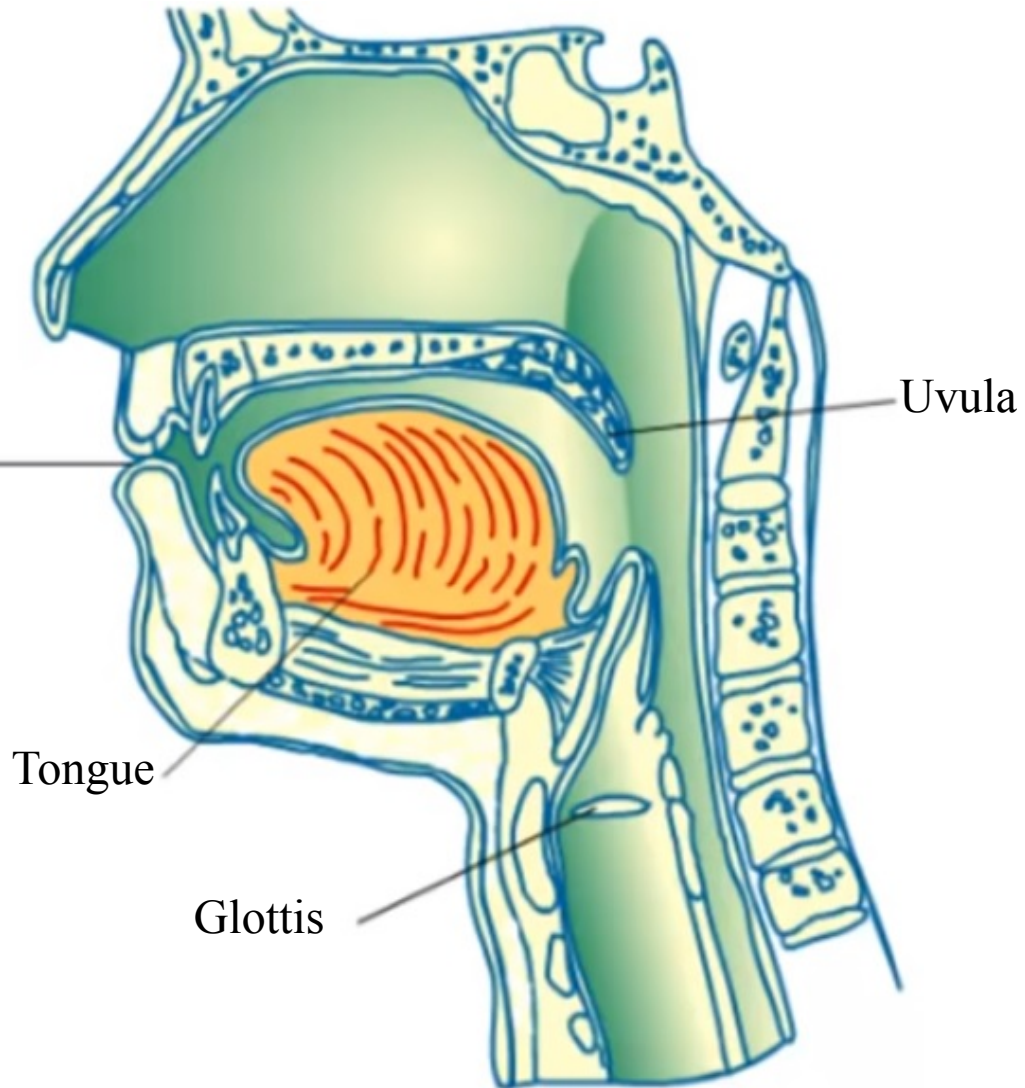
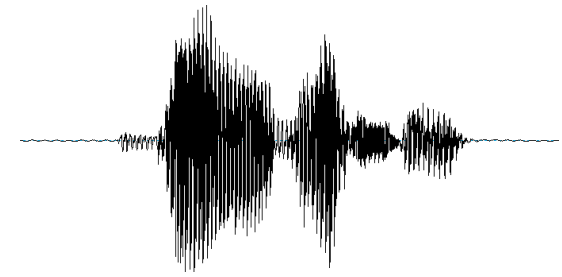
- **Post-alveolars** (or palato-alveolars) ([ʃ ʒ]) involve constriction of the tongue tip and the palate, just behind the alveolar ridge.
- **Palatals** ([j]) involve constriction of the tongue body and the palate.
- **Velars** ([k,g,N]) involve constriction of the tongue body and the velum.
- **Glottals** ([h]) involve constriction of the glottis



Passive Articulators

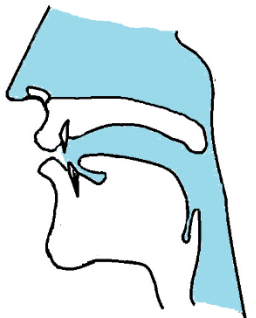


Active articulators

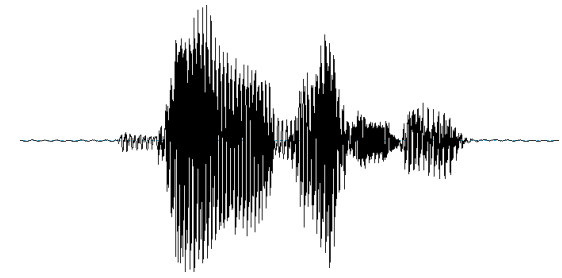


Produced consonants: [p , b]

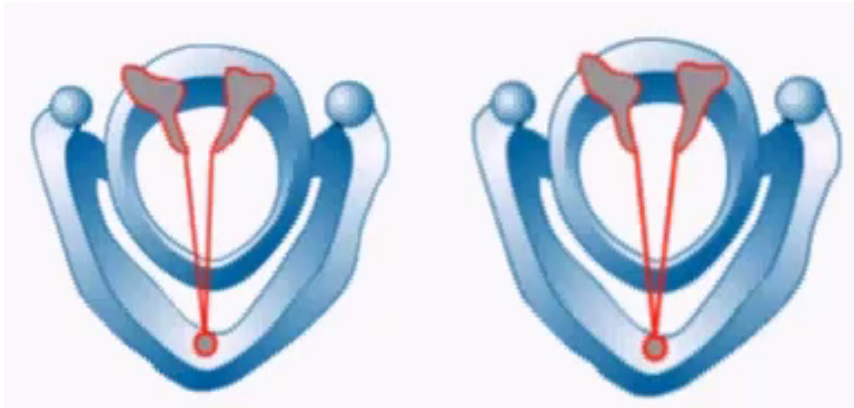
Produced vowels: [u , o]



Voicing



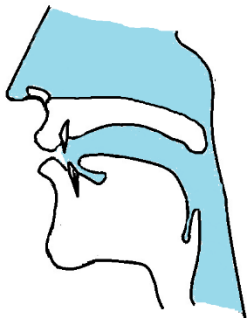
Vocal folds (cords)



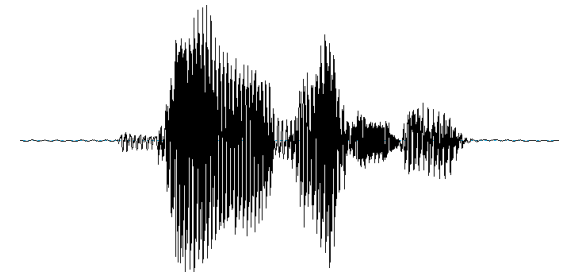
voiced

voiceless

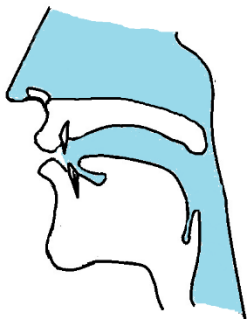
- We can also classify consonants in terms of the state of the larynx (phonation) during their pronunciation.



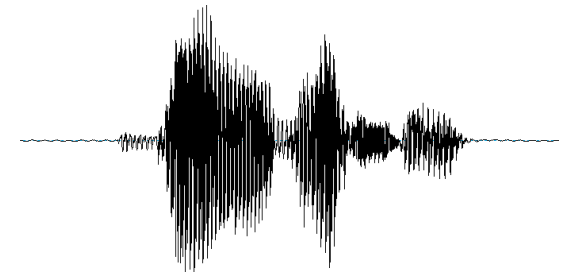
Voicing



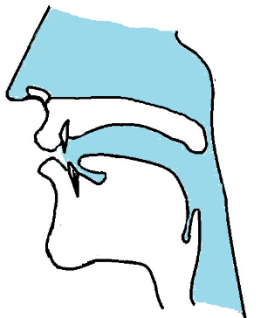
- Make the sound vvvvvv or zzzzzz, and keep it going for a count of five.
- Now make the sound fffff /sssss.
- Now alternate these two: ssssszzzzzsssss. Fffffvvvvvffff.
- Notice the vibration or buzz that zzzzz or vvvvv had that sssss and ffff did not have.
- That “buzz” is caused by the vibrating of your vocal folds—which you can check by putting your fingers on your throat fffff and vvvvv.



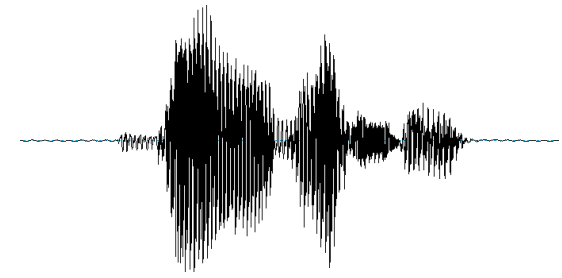
Voicing



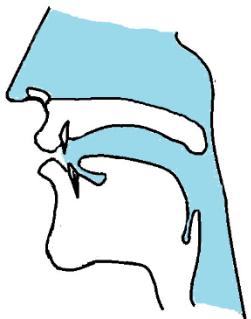
- Sounds produced with vibrating vocal folds are said to be voiced; those produced without vocal cord vibration are voiceless.
- Voiced consonants ([b,d,g,v, ð,z, ʒ,m,n, ŋ,l, ɹ,j,w])
- In voiceless consonants ([p,t,k,f, θ,s, ʃ,h]), the glottis is more open, so that air passes through without vibrating.

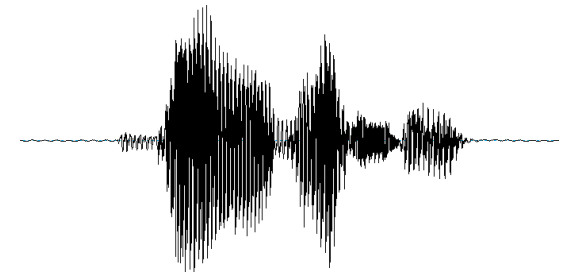


Vowels



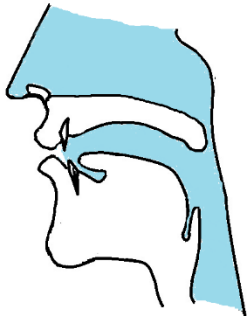
- Vowels are sounds which are produced without any obstruction of the vocal tract.
- They are nearly always voiced and are usually produced with airflow solely through the oral cavity.

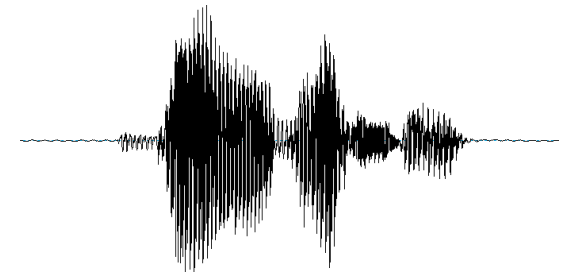




Vowels

- Every language has a certain number of vowel sounds so that that contrast with one another
- Many languages have just five vowels (Spanish, Hawaiian, Japanese, Swahili)
- They can be represented with the IPA symbols a, e, i, o, u
- Phonetic sounds are used to define contrasting sounds

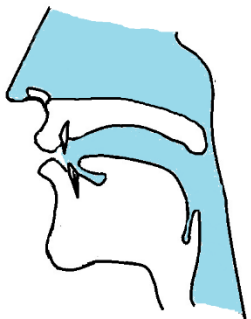


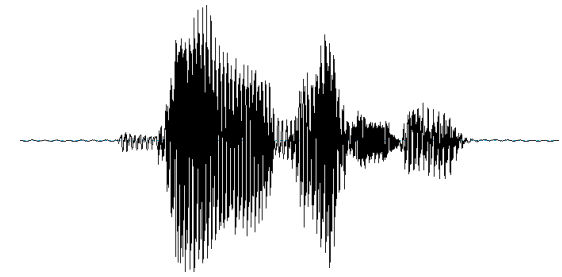


Vowels

□ The vowel quadrangle:

- There are two horizontal levels of vowels between these vertical extremes
- Rounded and unrounded pairs:
- Represents the side view of the oral cavity with the face turned to the left

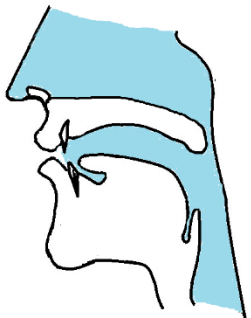




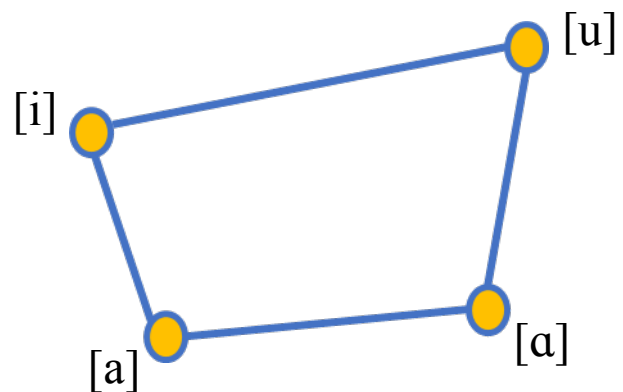
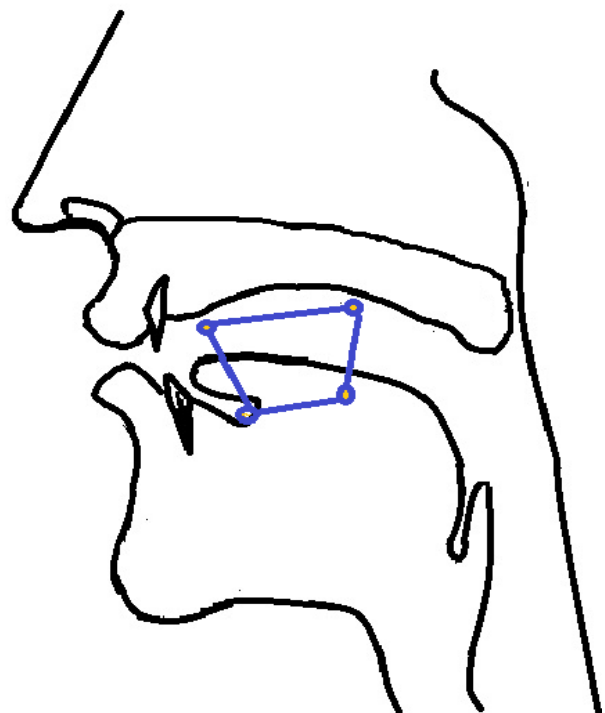
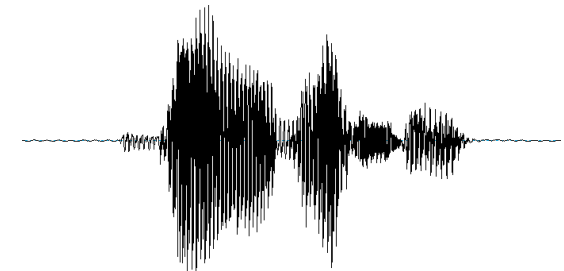
Vowels

□ Cardinal vowel system

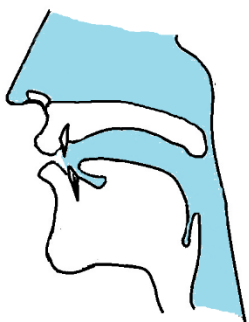
- Introduced at the beginning of the 20th century by the English phonetician Daniel Jones.
- Extreme positions are the reference points



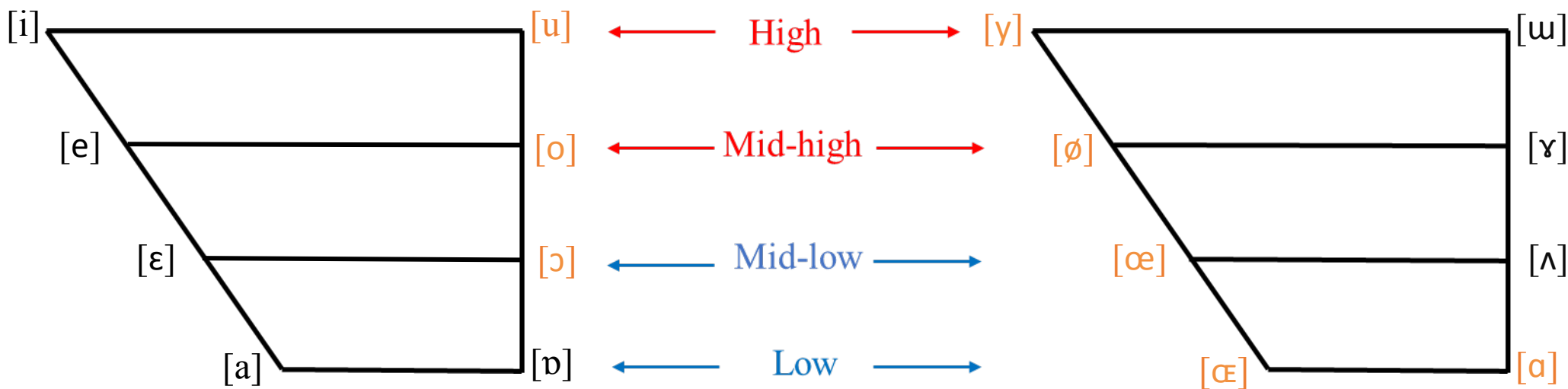
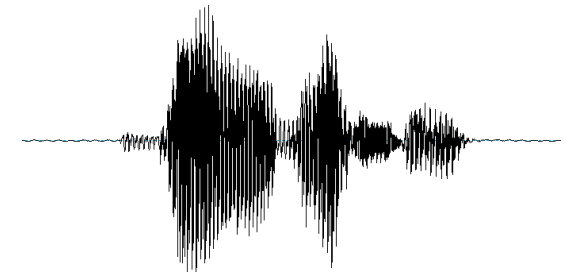
Cardinal Vowels



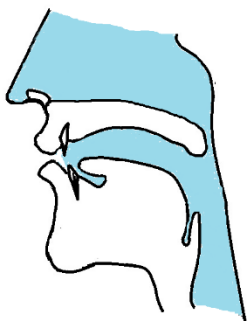
Tongue height & position



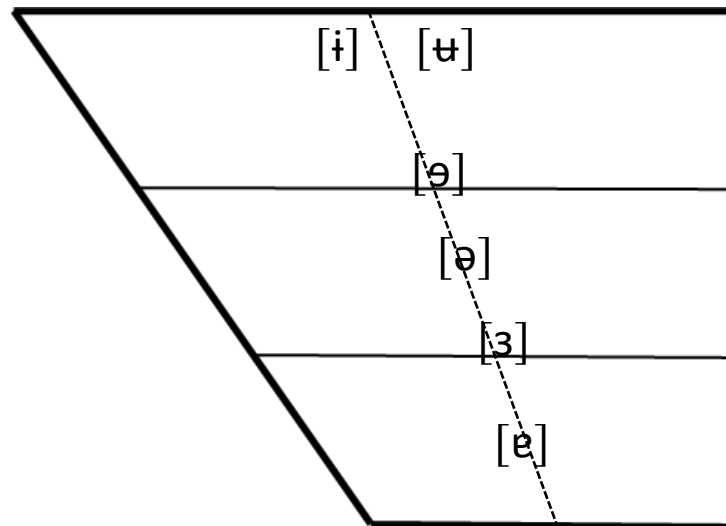
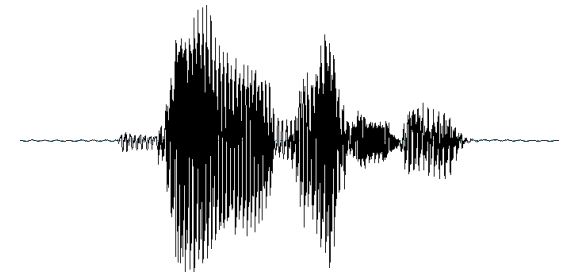
Cardinal Vowels



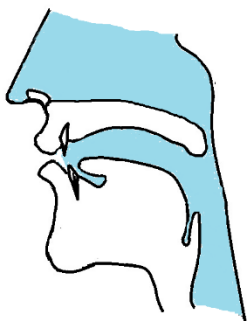
Rounded vowels ■
Unrounded vowels ■



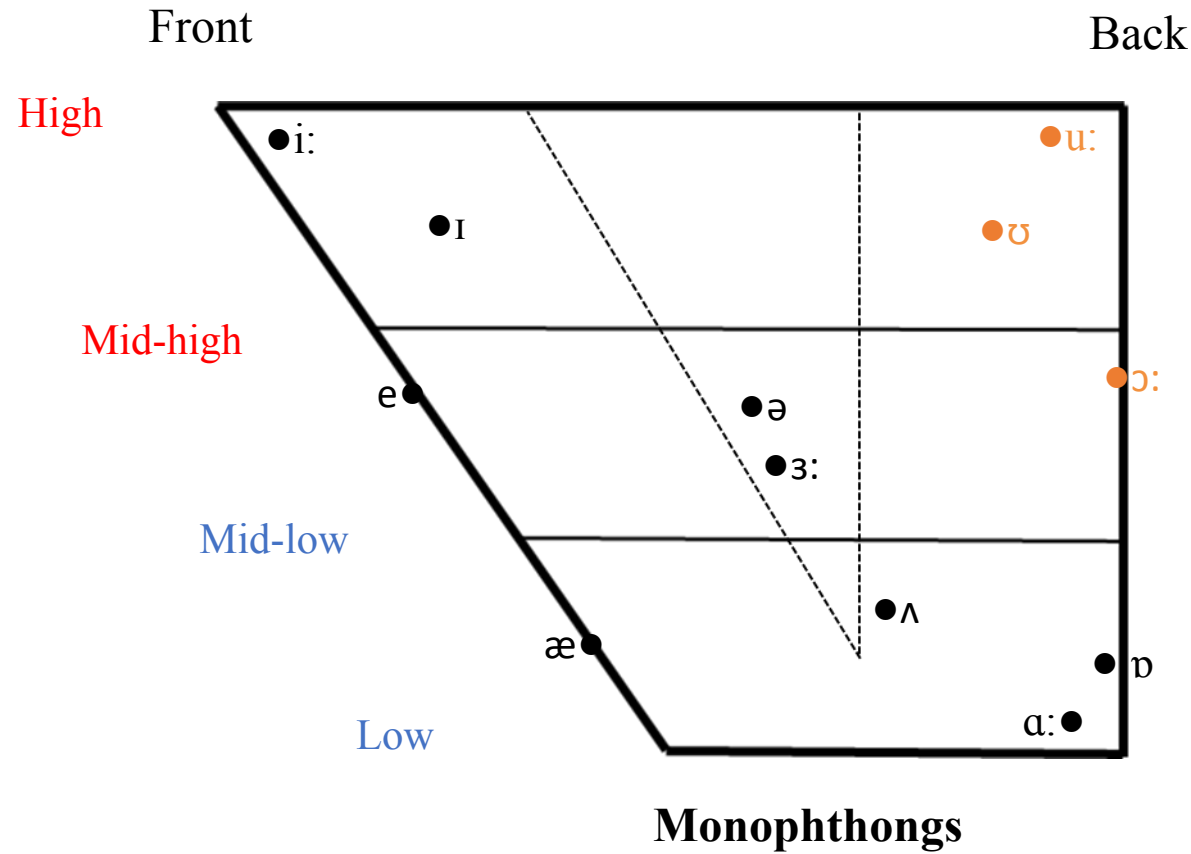
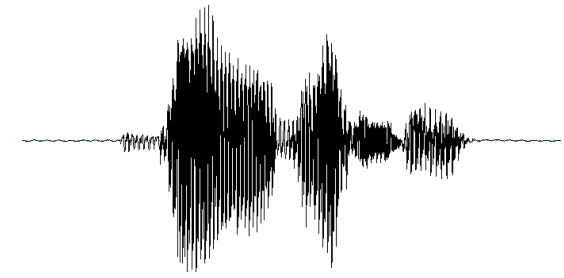
Cardinal Vowels



Central set



British English Vowels



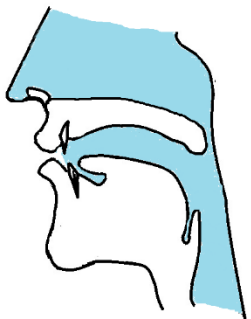
Rounded vowels ■
Unrounded vowels ■

Short vowels

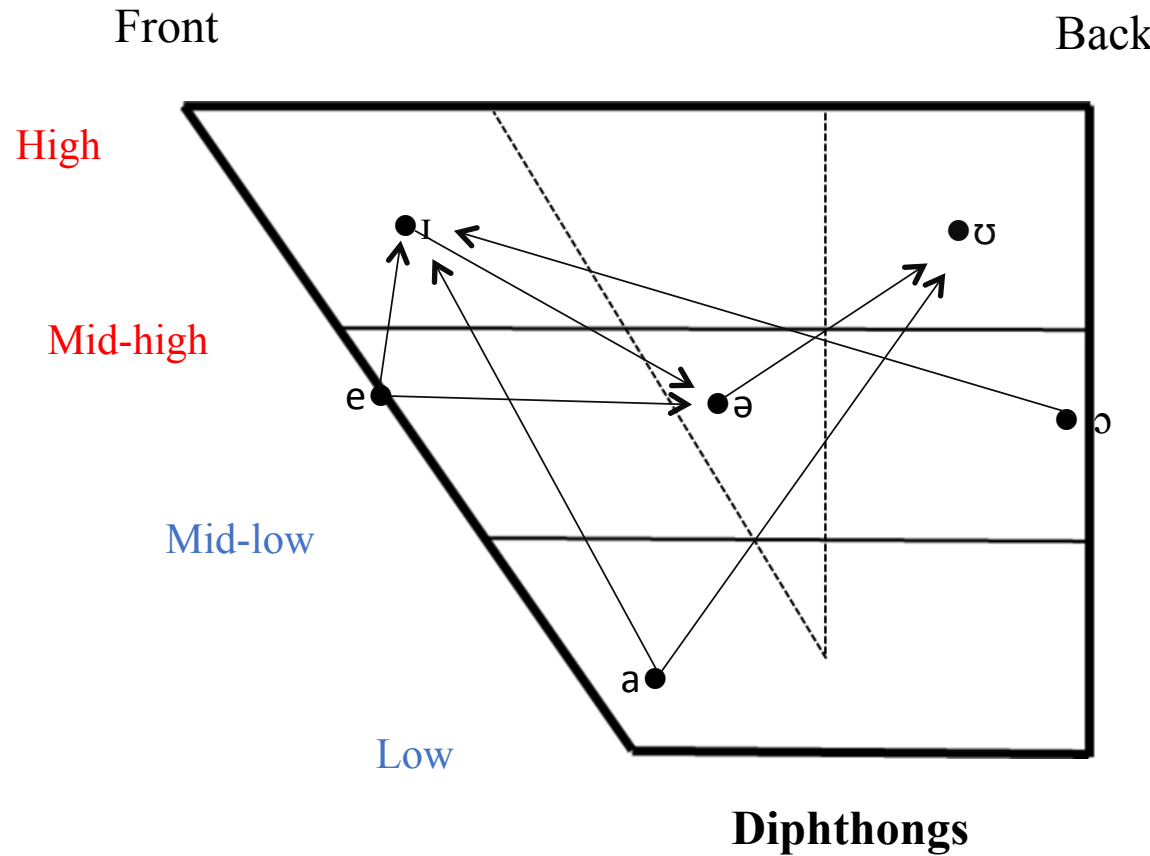
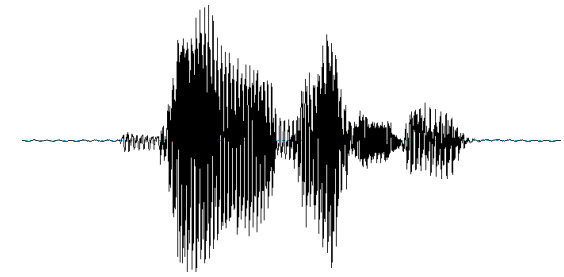
[ɪ] sit, lip
[e] went, ten
[æ] cat, fan
[ʌ] cut, love
[ɒ] top, fox
[ʊ] put, look
[ə] the, alive

Long vowels

[i:] tea, need
[ɑ:] car, part
[ɜ:] bird, turn
[ɔ:] cord, port
[u:] soon, lose



British English Vowels



Diphthongs: onset gliding → offset

Closing/opening

[eɪ] pay, maid

[aɪ] like, fine

[ɔɪ] toy, noise

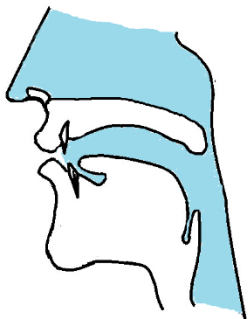
[aʊ] brown, how

[əʊ] road, know

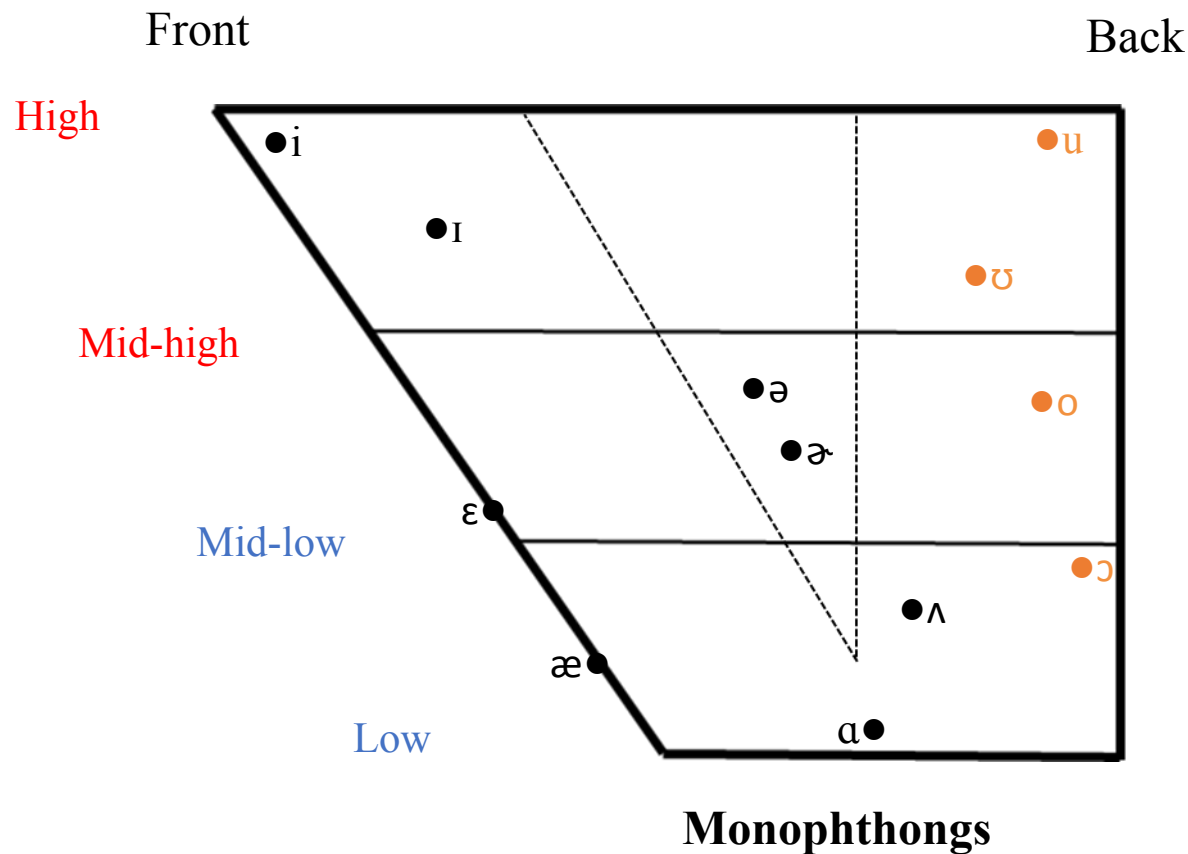
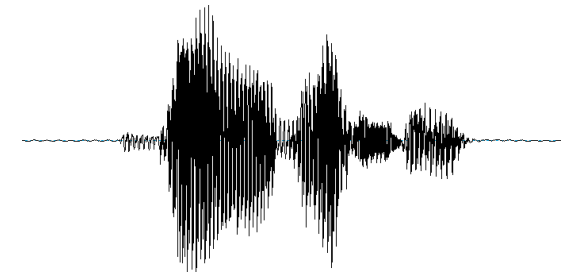
Centering

[ɪə] beer, hear

[eə] care, bear



American English Vowels



[i] police, silly

[ɪ] kick, it

[ɛ] went, ten

[æ] at, apple

[ɑ] arm, father

[ʌ] bus, come

[ɔ] boss, bot

[o] cool, soup

[ʊ] should, cook

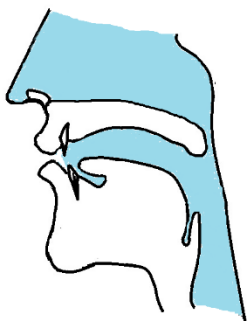
[u] soon, lose

[ə] firm, burst

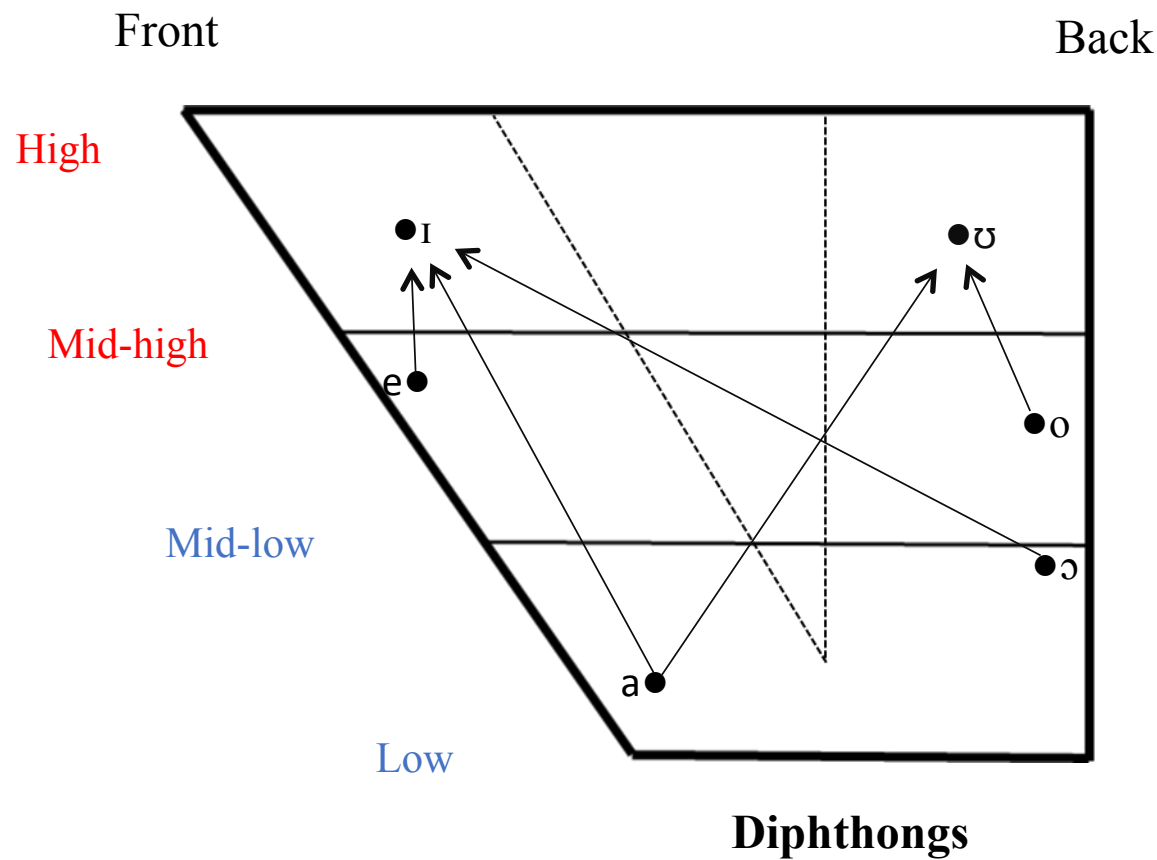
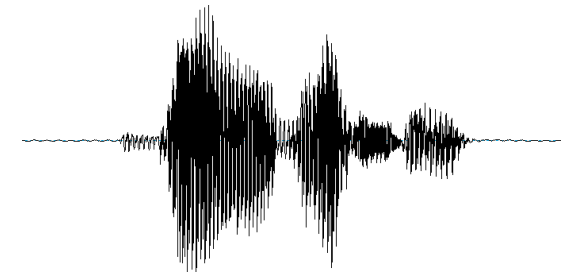
[ə] kingdom, about

Rounded vowels

Unrounded vowels



American English Vowels



Diphthongs: onset gliding → offset

Closing/opening

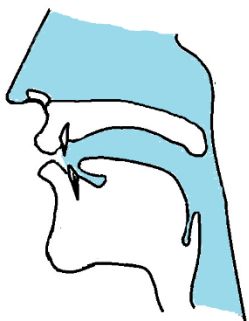
[eɪ] pay, maid

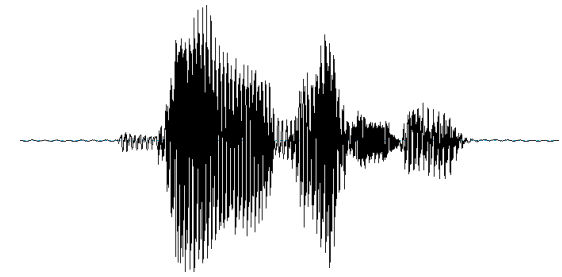
[aɪ] like, fine

[ɔɪ] toy, noise

[aʊ] brown, how

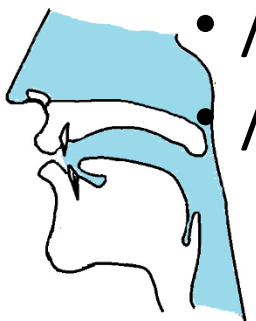
[oʊ] road, know

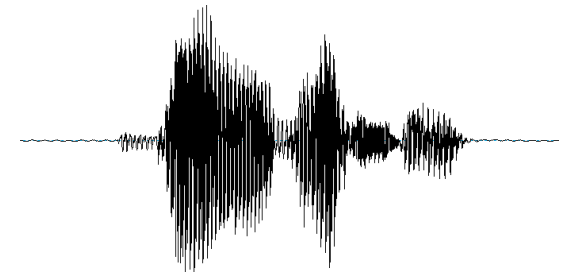




Vowels

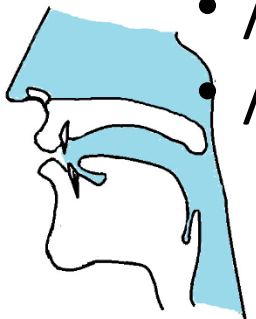
- /i/ as in police, feet, eat, and silly
- /ɪ/ as in it, sit, kick, myth and bitter
- /ɛ/ as in end, bet, less, and letter
- /æ/ as in at, apple, fat, and matter
- /u/ as in cool, tune, soup, and kung fu,
- /ʊ/ as in cook, should, pudding, and foot, rook
- /ʌ/ as in bus, blood, come, and up
- /ə/ as in kingdom, photography, philosophy, ketchup, and hundred
- /ə/ as in butter, collar, flavor, firm, and burst
- /ɔ/ as in all, fought, hot, and bot
- /ɑ/ as in father, walk, arm, heart, wasp, lager, envelope and aardvark





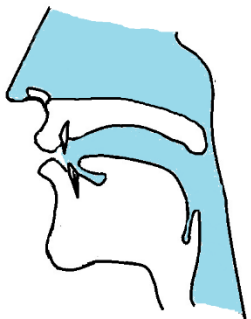
Vowels

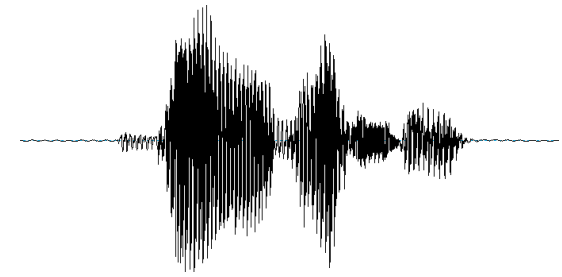
- Diphthongs are a combination of two different vowel sounds, one vowel sound turns into another sound as you say them. If you pronounce the words below slowly, you can hear the two vowel sounds of the diphthongs.
- Common diphthongs in English include:
 - /eɪ/ as in ate, reign, vain, flavor, slay, and convey
 - /oʊ/ as in toe, row, go, boat, mode, and chateau
 - /aɪ/ as in eye, I, pie, cry, cypher, climb, lime, light, kayak, Thai, and height
 - /aʊ/ as in loud, house, cow, about, Daoism, and Macau
 - /ɔɪ/ as in boy, moist, and Freud



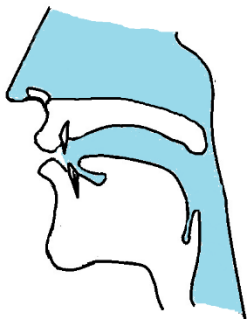


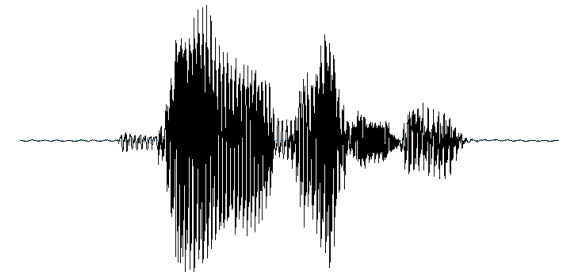
- Front vowels: Produced with the tongue in the front of the mouth.
 - [i, ɪ, e, ε, æ]
- Central vowels: Produced with the tongue in the center of the mouth.
 - [a, aɪ, aʊ]
- Back vowels: Produced with the tongue in the back of the mouth.
 - [o, ɔ, u, ʊ,]





- High vowels: Produced with the tongue high in the mouth.
- [i, ɪ, u, ʊ]
- Mid vowels: Produced with the tongue in the middle of the mouth.
- [e, ε, ʌ, o, ɔ, ɔɪ]
- Low vowels: Produced with the tongue low in the mouth.
- [æ, a, ɑ, aɪ, aʊ]



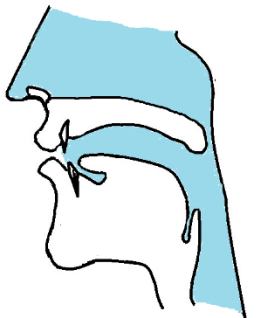


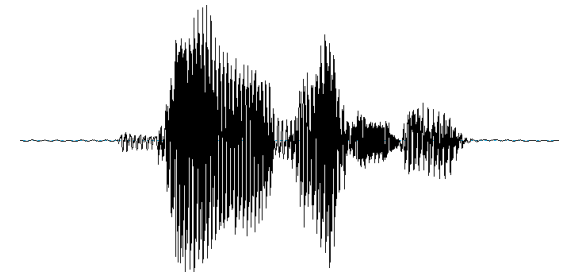
- Rounding

Vowels can be [+rounded] or [-rounded].

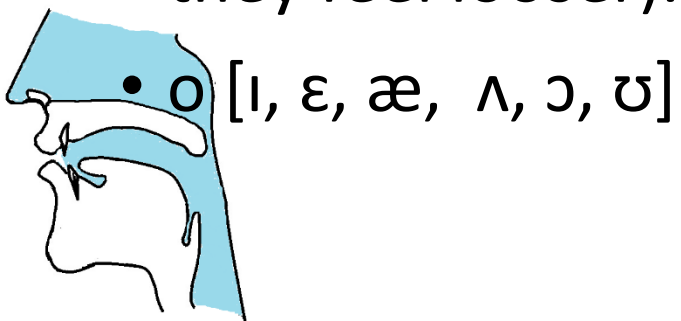
[+rounded] vowels are made with the lips rounded (forming an 'o' shape).

- [o, ɔ, u, ʊ, aʊ, ɔɪ] are [+rounded]
- [-rounded] vowels are made when the lip position is unrounded.
- [i, ɪ, e, ε, æ, a, ʌ, ɑ, aɪ]





- Tense/Lax
- Vowels can be [+tense] or [-tense].
- [+tense] vowels are produced with more tension in the facial muscles (i.e., they feel
- tighter).
- [+tense] simple vowels: [i, e, a, ɑ, o, u, aʊ, ɔɪ, aɪ]
- Note: all diphthongs are [+tense]
- • [-tense] vowels are produced with less tense in the facial muscles (i.e., they feel looser).

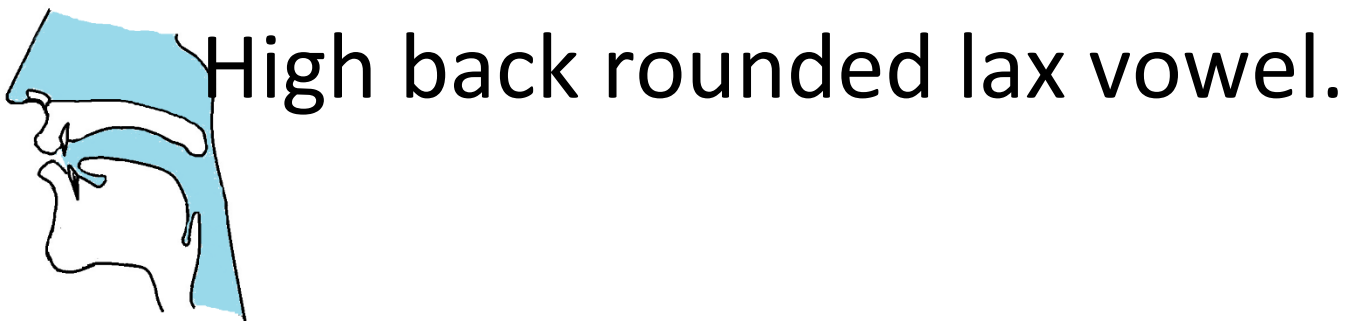




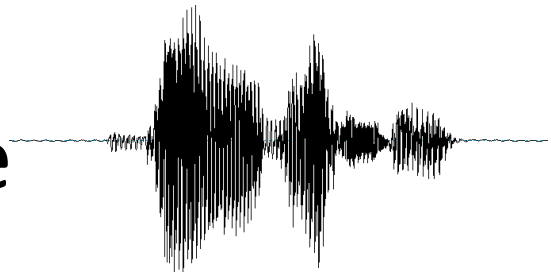
1. What is the articulatory description for the vowel sound represented by the IPA symbol [i]?

High front unrounded tense vowel.

2. What is the articulatory description for the vowel sound represented by the IPA symbol [ʊ]?

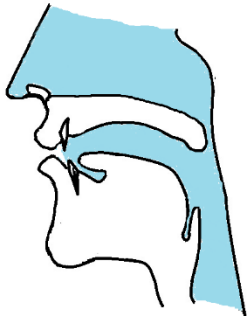


3. What is the articulatory description for the vowel sound represented by the IPA symbol [ɛ]?



Mid front unrounded lax vowel

4. 3. What is the articulatory description for the vowel sound represented by the IPA symbol [e]?



Mid front unrounded tense vowel.