

LSci 51/CogS 56L: Acquisition of Language

Lecture 7 Phonological acquisition I

Announcements

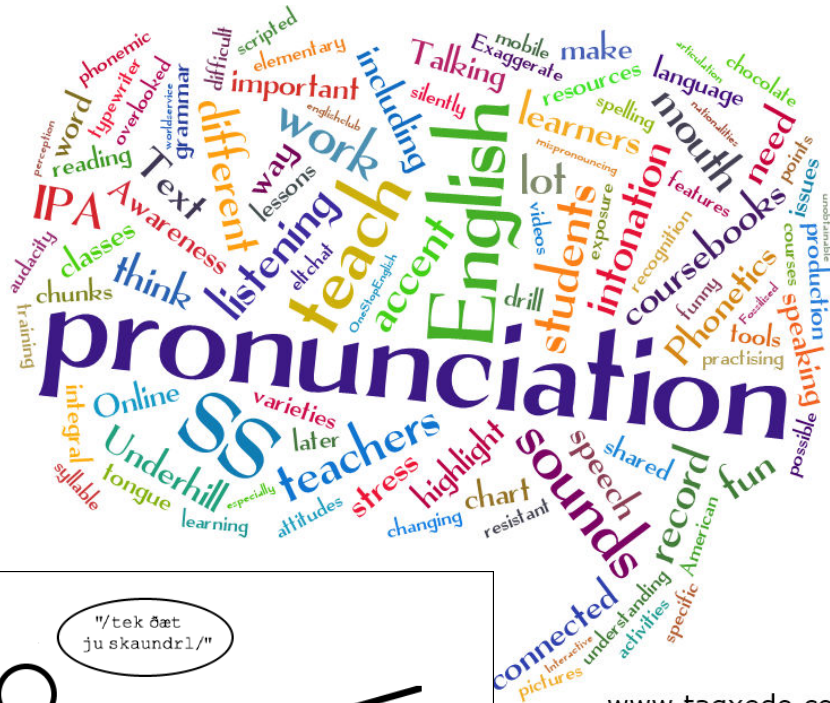
Review questions for phonological development available

HW3 available (due 10/29/25)

All kinds of useful sound charts available (including interactive ones, in case you forget what sound corresponds to what symbol).

Many helpful lingspace video links included in the lecture notes as references.

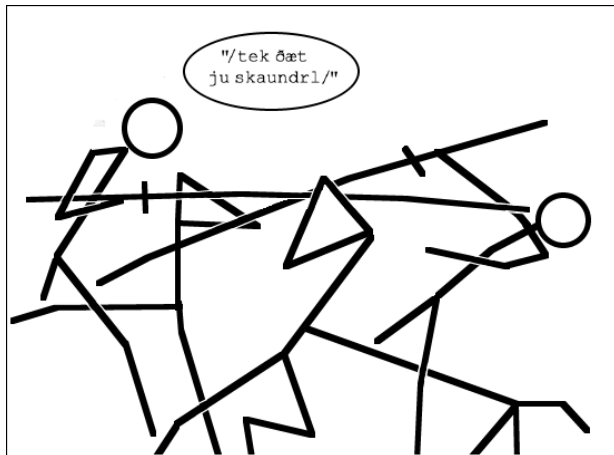
Sounds of Language



www.tagxedo.com

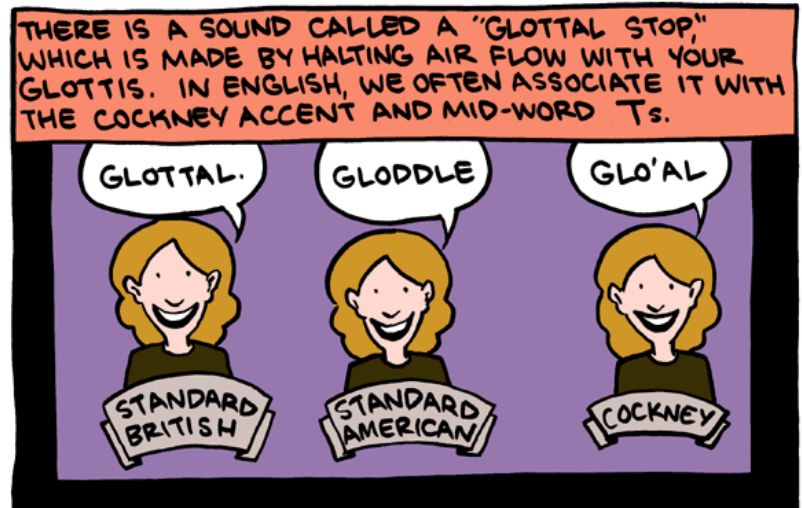


"Why do I have to keep writin' in these K's when they don't make any noise anyway?"

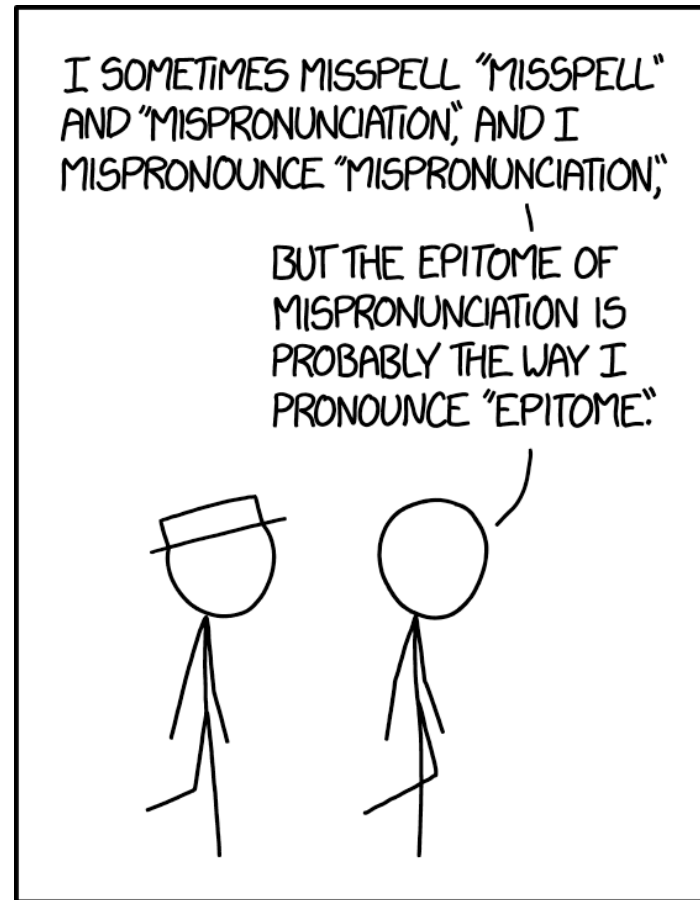


<http://specgram.com/CLIII.1/09.parenchyma.cartoon.e.html>

<http://languagelog.idc.upenn.edu/nll/?p=3946>



Spelling vs. Pronunciation



<https://xkcd.com/1816/>

Forget Spelling!

Sounds ≠ Spelling

[Extra]

Forget spelling

<https://www.youtube.com/watch?v=XTzkT3j9pHI>

<http://www.thelingspace.com/episode-12>

beginning through 2:27



Courtesy of <http://www.spellingsociety.org/news/media/poems.php>

Our Strange Lingo, by Lord Cromer (1902)

When the English tongue we speak.
Why is break not rhymed with freak?
Will you tell me why it's true
We say sew but likewise few?
And the maker of the verse,
Cannot rhyme his horse with worse?
Beard is not the same as heard
Cord is different from word.
Cow is cow but low is low
Shoe is never rhymed with foe.
Think of hose, dose, and lose
And think of goose and yet with choose

...

Courtesy of <http://www.spellingsociety.org/news/media/poems.php>

...

Think of comb, tomb and bomb,
Doll and roll or home and some.

Since pay is rhymed with say

Why not paid with said I pray?

Think of blood, food and good.

Mould is not pronounced like could.

Wherefore done, but gone and lone -

Is there any reason known?

To sum up all, it seems to me

Sound and letters don't agree.

One sound – Many letters

h <u>e</u>	e	s <u>ea</u> s	ea
bel <u>ie</u> ve	ie	am <u>oe</u> ba	oe
C <u>a</u> esar	ae	k <u>ey</u>	ey
s <u>ee</u>	ee	mach <u>i</u> ne	i
p <u>eo</u> ple	eo	s <u>ei</u> ze	ei

International **P**honetic **A**lphabet (**IPA**): [i]

One sound – Many letters

too

oo

threw

ew

to

o

lieu

ieu

clue

ue

shoe

oe

through

ough

beautiful

eau

IPA: [u]

Courtesy of <https://www.dictionariescoop.com/article/9-of-the-Hardest-Tongue-Twisters-in-the-English-Language>

English can be understood through tough thorough thought, though
u ʌf o ɔ o

One sound – Many letters

shoot

either

character

deal

Thomas

physics

rough

∫

ð

k

i

t

f

f

One letter – Many sounds

dame

e

dad

æ

father

ɑ

call

ɔ, ɑ

village

ɪ, ə

many

ɛ

One letter – Not one sound

mnemonic

psychology

resign

ghost

island

whole

debt

= no sound!

[Extra]

One letter – Not one sound: Silent Letter Day



Silent Letter Day

<https://www.youtube.com/watch?v=sOUqHr9tcVY>

One letter – Not one sound

kjuwt

= 2 sounds!

Differences across languages

English: j_udge, j_uvenile, J_esus

d₃

Spanish: j_ugar, J_esus

h

German: J_ugend, j_ubeln, J_esus

j

French: J_ean, j_'accuse, j_ambon

3

[Extra] Why we need the IPA

<https://www.youtube.com/watch?v=XTzkT3j9pHI>

<http://www.thelingspace.com/episode-12>

2:27-5:27, 8:42-9:05



International Phonetic Alphabet

One symbol per sound



THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC)

© 2005 IPA

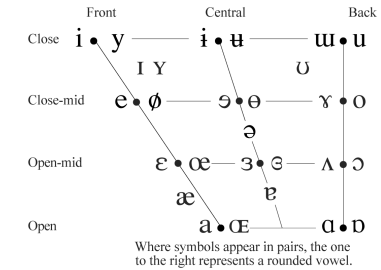
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant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

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

CONSONANTS (NON-PULMONIC)

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

VOWELS



OTHER SYMBOLS

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

kp ts

DIACRITICS

Diacritics may be placed above a symbol with a descender, e.g. ɲ̥

◌̥ Voiceless	◌̤ ◌̦	◌̰ Breathy voiced	◌̱ ◌̲	◌̳ Dental	◌̴ ◌̵
◌̶ Voiced	◌̷ ◌̸	◌̹ Creaky voiced	◌̺ ◌̻	◌̼ Apical	◌̽ ◌̾
◌̿ Aspirated	◌̿̄ ◌̿̆	◌̿̇ Linguolabial	◌̿̈ ◌̿̉	◌̿̊ Laminar	◌̿̋ ◌̿̌
◌̿̍ More rounded	◌̿̎	◌̿̏ Labialized	◌̿̐ ◌̿̑	◌̿̒ Nasalized	◌̿̓
◌̿̔ Less rounded	◌̿̕	◌̖̿ Palatalized	◌̗̿ ◌̘̿	◌̙̿ Nasal release	◌̿̚
◌̛̿ Advanced	◌̜̿	◌̝̿ Velarized	◌̞̿ ◌̟̿	◌̠̿ Lateral release	◌̡̿
◌̣̿ Retracted	◌̤̿	◌̥̿ Pharyngealized	◌̦̿ ◌̧̿	◌̨̿ No audible release	◌̩̿
◌̪̿ Centralized	◌̫̿	◌̬̿ Velarized or pharyngealized	◌̭̿		
◌̮̿ Mid-centralized	◌̯̿	◌̰̿ Raised	◌̱̿ (ɹ̰ = voiced alveolar fricative)		
◌̲̿ Syllabic	◌̳̿	◌̴̿ Lowered	◌̵̿ (β̵ = voiced bilabial approximant)		
◌̶̿ Non-syllabic	◌̷̿	◌̸̿ Advanced Tongue Root	◌̹̿		
◌̺̿ Rhoticity	◌̻̿ ◌̼̿	◌̿̽ Retracted Tongue Root	◌̿̾		

SUPRASEGMENTALS

ˈ Primary stress
ˌ Secondary stress
ː Long
ˑ Half-long
ˑ̌ Extra-short
ˑ̌ Minor (foot) group
ˑ̌ Major (intonation) group
ˑ̌ Syllable break
ˑ̌ Linking (absence of a break)

TONES AND WORD ACCENTS

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

Interactive chart of the International Phonetic Alphabet

<http://www.ipachart.com/>

Click on a symbol to hear the sound it represents.

Pulmonic consonants

	Bi-labial	Labio-dental	Dental	Alveolar	Post alveolar	Retro flex	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				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.
Areas shaded grey indicate articulations judged impossible.

Other symbols

ɱ	Voiceless labial-velar fricative
ʋ	Voiced labial-velar approximant
ɥ	Voiced labial-palatal approximant
ʜ	Voiceless epiglottal fricative
ʢ	Voiced epiglottal fricative
ʡ	Epiglottal plosive
ɕ	Voiceless alveolo-palatal fricative
ʑ	Voiced alveolo-palatal fricative
ɺ	Alveolar lateral flap
ɺ͡ɬ	Simultaneous ɺ and ɬ

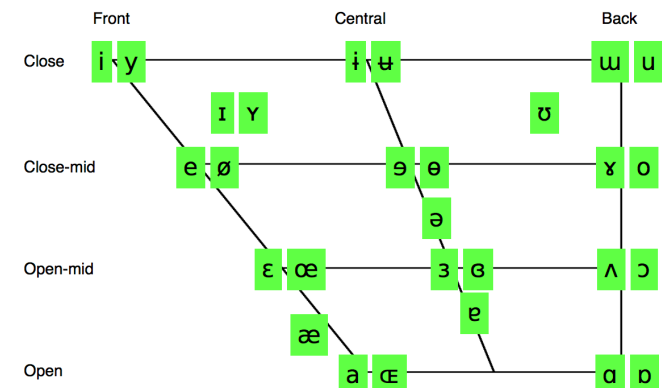
Affricates

ɬ͡ɳ	Voiceless alveolar affricate
ɬ͡ʃ	Voiceless palato-alveolar affricate
ɬ͡ɕ	Voiceless alveolo-palatal affricate
ɬ͡ʂ	Voiceless retroflex affricate
ɖ͡ʒ	Voiced alveolar affricate
ɖ͡ʒ	Voiced post-alveolar affricate
ɖ͡ʑ	Voiced alveolo-palatal affricate
ɖ͡ʐ	Voiceless retroflex affricate

Non-pulmonic consonants

Clicks	Voiced implosives	Ejectives
ɔ Bilabial	ɓ Bilabial	ɸ' Bilabial
ɿ Dental	ɗ Dental/alveolar	ɬ' Dental/alveolar
ɰ (Post)alveolar	ɟ Palatal	ɬ' Velar
ɰ Palatoalveolar	ɠ Velar	ɬ' Alveolar fricative
ɰ Alveolar lateral	ɠ Uvular	' etc...

Vowels

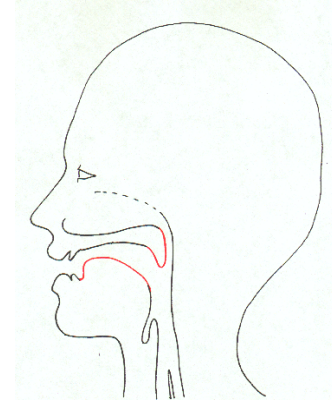


Where symbols appear in pairs, the one to the right represents a rounded vowel.

Sounds: Speech production

“Speech is a river of breath, bent into hisses and hums by the soft flesh of the mouth and throat.”

- Pinker, *The Language Instinct*



“Speech production is an invisible ballet that requires precise and rapid coordination of the many muscle groups that control the lips, tongue, jaw, larynx, and respiration.”

- Myers 2017

Wind Instruments

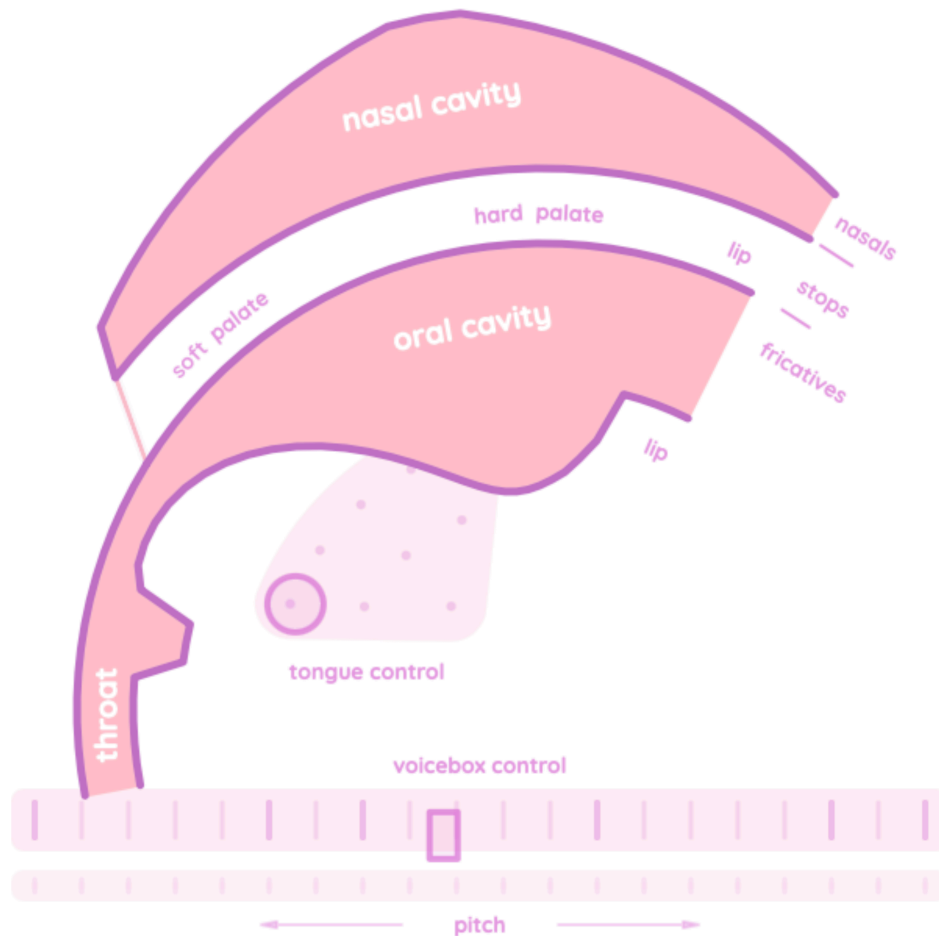


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Sounds: The vocal tract as an instrument

[Demo if time]

<https://www.imaginary.org/program/pink-trombone>



[Extra]

Sounds: Vocal tract overview

<https://www.youtube.com/watch?v=dtf8zGQj9GY>

<http://www.thelingspace.com/episode-4>

0:38 through 1:17

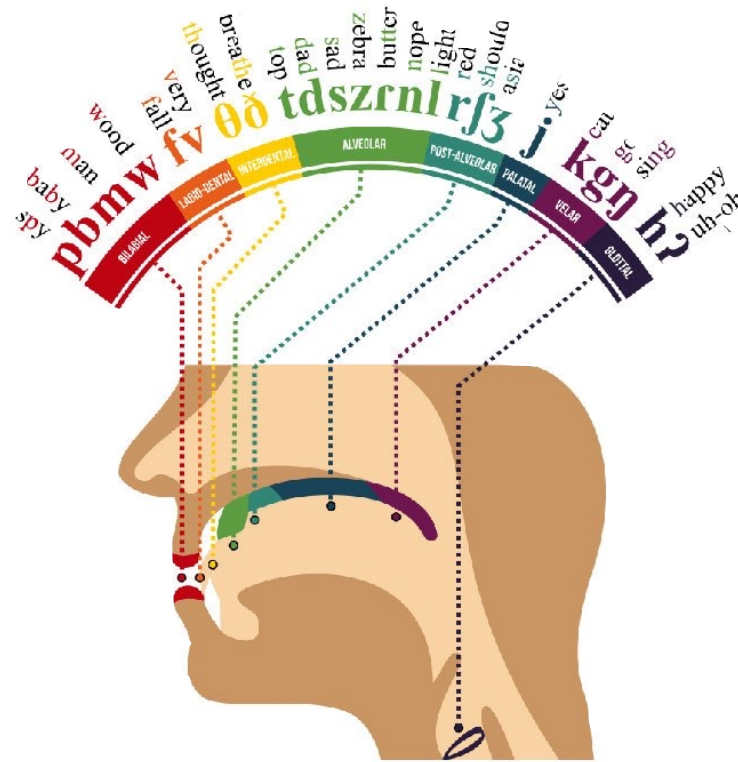


Major division: consonants vs vowels

Consonantal sounds: narrow or complete closure somewhere in the vocal tract.

Vowels: very little obstruction in the vocal tract. Can form the basis of syllables (also possible for some consonants).

Consonants



On a handy chart

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

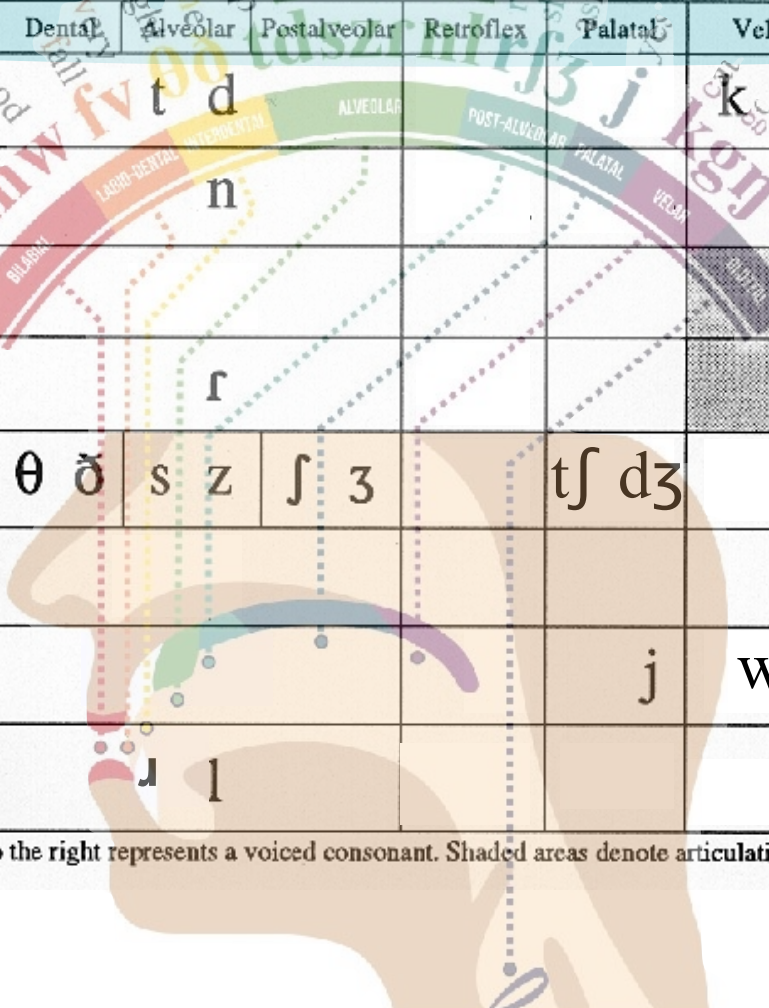
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b		t d					k g			
Nasal	m		n					ŋ			
Trill											
Tap or Flap			ɾ								
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid			ɹ ɻ								

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

Place of articulation: Where the airflow is blocked

Front to back

CONSONANTS (PULMONIC)



	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b			t d				k g			
Nasal		m		n				ŋ			
Trill											
Tap or Flap				ɾ							
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid				ɹ l							

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

Place of articulation: Where the airflow is blocked

Front to back

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b		t d					k g			
Nasal	m		n					ŋ			
Trill											
Tap or Flap			ɾ								
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid			ɹ ɻ								

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

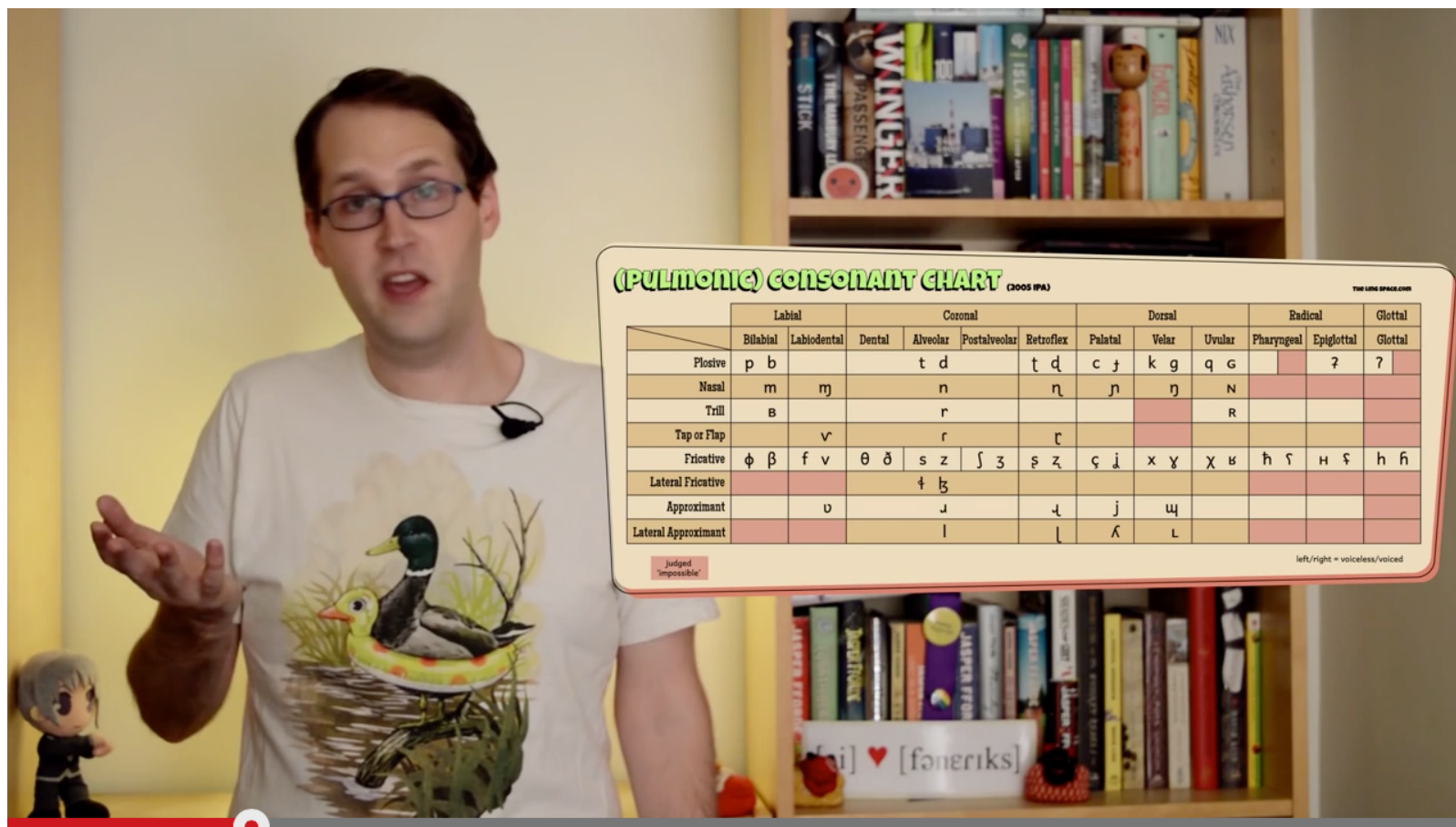
Place of articulation: Where the airflow is blocked

[Extra]

<https://www.youtube.com/watch?v=zEaPQP3pXQc>

<http://www.thelingspace.com/episode-20>

beginning through 5:53



The image shows a man with glasses and a white t-shirt featuring a duck illustration, speaking and gesturing. A bookshelf is visible in the background. Overlaid on the right is a (PULMONIC) CONSONANT CHART (2005 IPA) table. The chart is organized by place of articulation (Labial, Coronal, Dorsal, Radical, Glottal) and manner of articulation (Plosive, Nasal, Trill, Tap or Flap, Fricative, Lateral Fricative, Approximant, Lateral Approximant). The chart includes phonetic symbols for each category, with some cells marked as 'judged impossible' or 'left/right = voiceless/voiced'.

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

judged "impossible"

left/right = voiceless/voiced

Manner of articulation: How the airflow is blocked

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b		t d					k g			
Nasal	m		n					ŋ			
Trill											
Tap or Flap			ɾ								
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid			ɹ ɻ								

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

Manner of articulation: How the airflow is blocked

[Extra]

<https://www.youtube.com/watch?v=zEaPQP3pXQc>

<http://www.thelingspace.com/episode-20>

5:54 - 9:19



Nasals

Nasal	m	ɱ	n	ɳ	ɲ	ɳ	ɴ			
-------	---	---	---	---	---	---	---	--	--	--

[ai] ♥ [føneriks]

Manner: How the air is flowing

Stops (sometimes called plosives)

[p] [t] [k] [b] [d] [g] [m] [n] [ŋ]

Fricatives

[f] [v] [θ] [ð] [s] [z] [ʃ] [ʒ]

Approximants/Glides

[w] [j] (Like in “water” and “you”)

Liquids

[ɹ] [l]

Tap/Flap

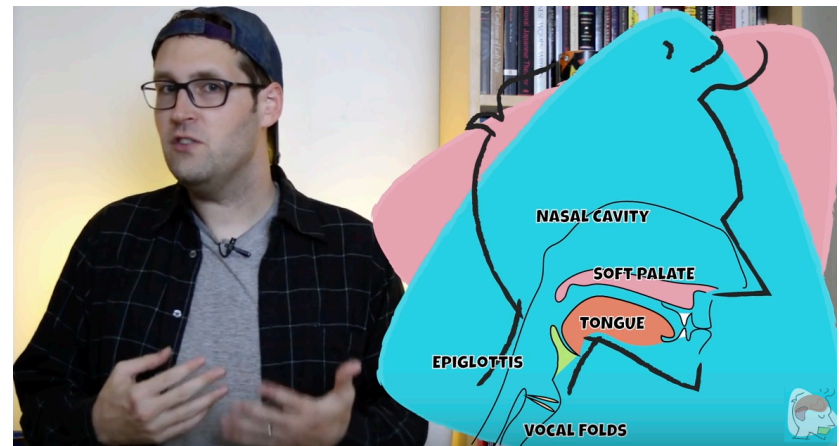
[ɾ] (Like in “water” and “butter”)

[Extra] The acoustics of sonorants

<https://www.youtube.com/watch?v=g8BgfHEDbFY&feature=youtu.be>

especially 1:11 - 1:46 (intro to sonorants)

2:34 - 3:37 (producing nasals)



Fricatives & Affricates

Postalveolar sounds [ʒ] [ʃ]
(fricatives)

Palatal sounds [dʒ] [tʃ]
(affricates)

Affricates - combination of stop + fricative - [dʒ] [tʃ],
as in *judge*, *church*

Ex: affricates in fast speech:

“What should...?”

[t ʃ]

becomes

“Wha should...?”

“What did you...?”

[d j]

becomes

“What did zha...?”

[d ʒ]

becomes

“Wha ja...?”

Voicing: What the vocal folds are doing

[Extra]

<https://www.youtube.com/watch?v=zEaPQP3pXQc>

<http://www.thelingspace.com/episode-20>

9:20 - 9:52

(PULMONIC) CONSONANT CHART (2005 IPA)

	Labial		Coronal					Dorsal			Radical		Glottal
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Epiglottal	Glottal	
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ	ʔ	
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ				
Trill	ʙ			r					ʀ				
Tap or Flap		ɸ		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	h ɦ	
Lateral Fricative				ɬ ɮ									
Approximant		ʋ		ɹ		ɻ	j	ɰ					
Lateral Approximant				l		ɭ	ʎ	ʟ					

Judged "impossible"

left/right = voiceless/voiced

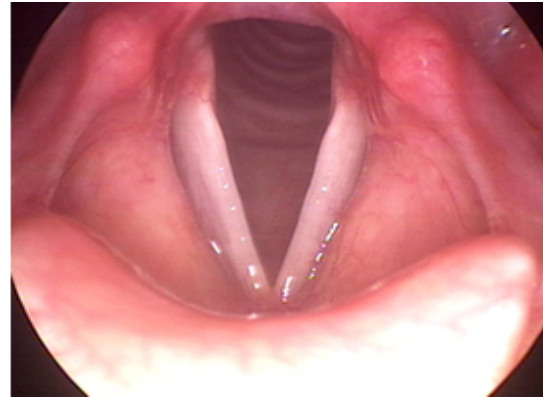
[ai] ♥ [føneriks]

What are the vocal folds doing?

closed
voiced



open
voiceless



“The air leaves the lungs through the trachea (windpipe), which opens into the larynx (the voice-box, visible on the outside as the Adam's apple). The larynx is a valve consisting of an opening (the glottis) covered by two flaps of retractable muscular tissue called the vocal folds...The vocal folds can also be partly stretched over the glottis to produce a buzz as the air rushes past.” - Pinker, *The Language Instinct*

Voiced & Voiceless consonants

Consonants are either **voiced** or **voiceless**.

English pairs:

b **p**

v **f**

d **t**

z **s**

ð **θ**

ʃ **ʒ**

tʃ **dʒ**

Voicing — usually indicated by position in cell

Voiceless voiceless

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b			t d				k g			
Nasal	m			n				ŋ			
Trill											
Tap or Flap				r							
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid				ɹ ɻ							

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

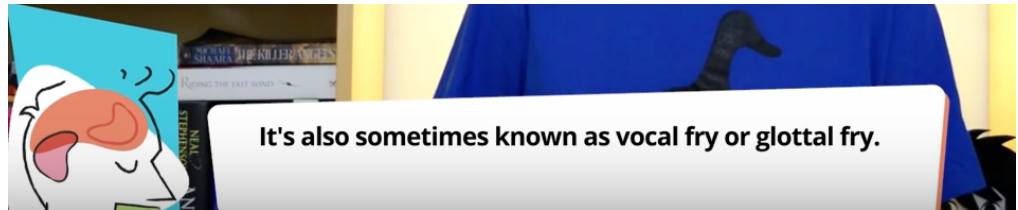
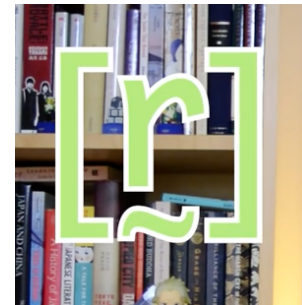
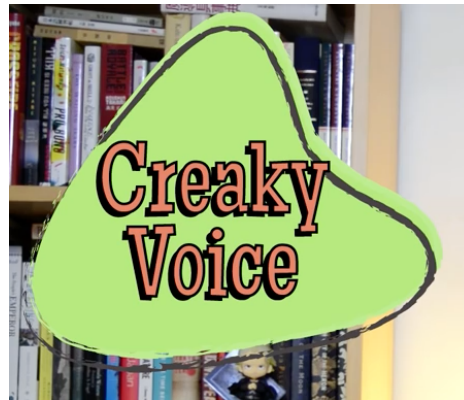
Other Glottal States (besides just +/-voiced)

[Extra]

<http://www.thelingspace.com/episode-53>

<https://www.youtube.com/watch?v=edYLoMRgaFw>

Discusses glottal states like breathy voice & creaky voice



Describing sounds

IPA full(er) chart

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

	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			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 parts we care about for this class

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Stop	p b		t d					k g			
Nasal	m		n					ŋ			
Trill											
Tap or Flap			ɾ								
Fricative		f v	θ ð	s z	ʃ ʒ		tʃ dʒ				h
Lateral fricative											
Glide							j	w			
Liquid			ɹ ɻ								

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

Features

Ways of *describing* sounds

e.g., [t] = voiceless, alveolar, stop



Atoms of Speech

Roman Jakobson, 1896-1982

Describing speech sounds: Recap

Where is the air-flow blocked? (**place** of articulation)
labial, alveolar, palatal, velar etc.

Where/how is the air flowing? (**manner** of articulation)
nasal/oral, stop, fricative, liquid, tap/flap etc.

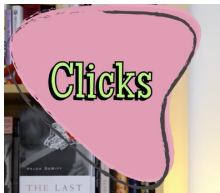
What are the vocal folds doing? (**voicing**)
voiced vs. *voiceless*

Other ways of producing consonants

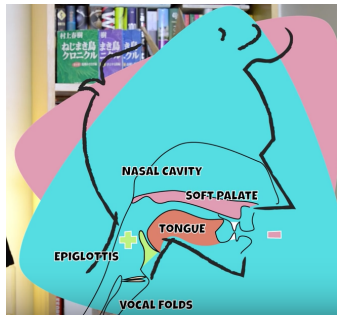
[Extra]

<https://www.youtube.com/watch?v=JKP10ARLnzM&feature=youtu.be>

Discusses clicks, implosives, and ejectives



NON-PULMONIC CONSONANTS		
Clicks	Voiced Implosives	Ejectives
⦿ Bilabial	ɓ Bilabial	p' Bilabial
Dental	ɗ Dental/Alveolar	t' Dental/Alveolar
! Post-Alveolar	ʃ Palatal	k' Velar
‡ Palatoalveolar	ɡ Velar	s' Alveolar Fricative
Alveolar Lateral	ɠ Uvular	' (Ejective Marker)



Vowels

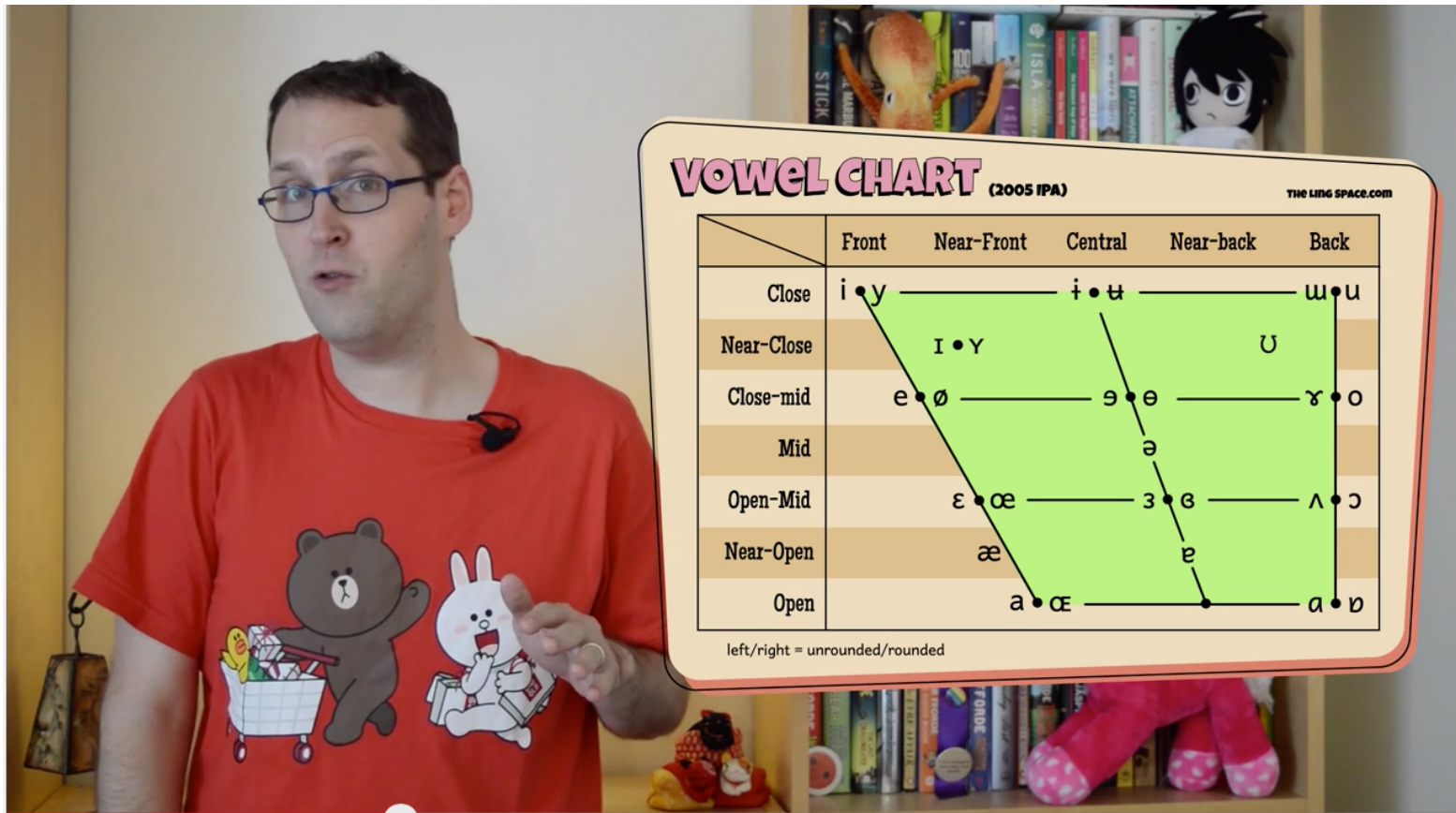
[Extra]

Vowels

<https://www.youtube.com/watch?v=arMntA15A0s>

<http://www.thelingspace.com/episode-27>

beginning through 4:10



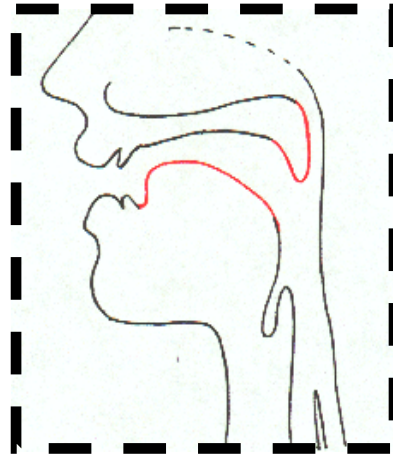
VOWEL CHART (2005 IPA)

THE LING SPACE.COM

	Front	Near-Front	Central	Near-back	Back
Close	i • y		ɨ • ʉ		ɯ • u
Near-Close		ɪ • ʏ			ʊ
Close-mid	e • ø		ə • ɘ		ɤ • o
Mid			ə		
Open-Mid		ɛ • œ		ɜ • ɞ	ʌ • ɔ
Near-Open		æ		ɐ	
Open		ɑ • ɶ			ɑ • ɒ

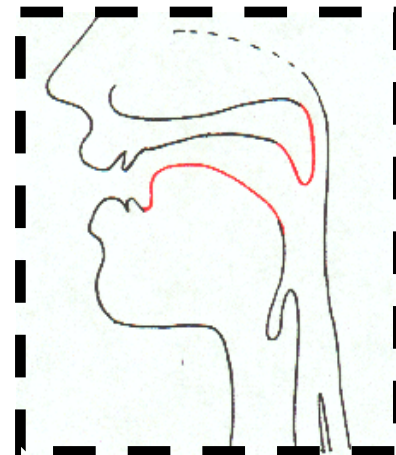
left/right = unrounded/rounded

What can you do to alter the shape of your vocal tract?



You can....

- (1) Raise or lower your tongue
(high, mid, low)
- (2) Advance or retract your tongue
(front, central, back)
- (3) Round or spread your lips
(round, spread)
- (4) Tense or not tense your mouth
(tense, lax)



A quick note about tense/lax

"...by advancing the tongue root....the tongue becomes tense and humped rather than lax and flat, and the hump narrows the air chamber in the mouth above it, changes the resonances."

- Pinker, *The Language Instinct*

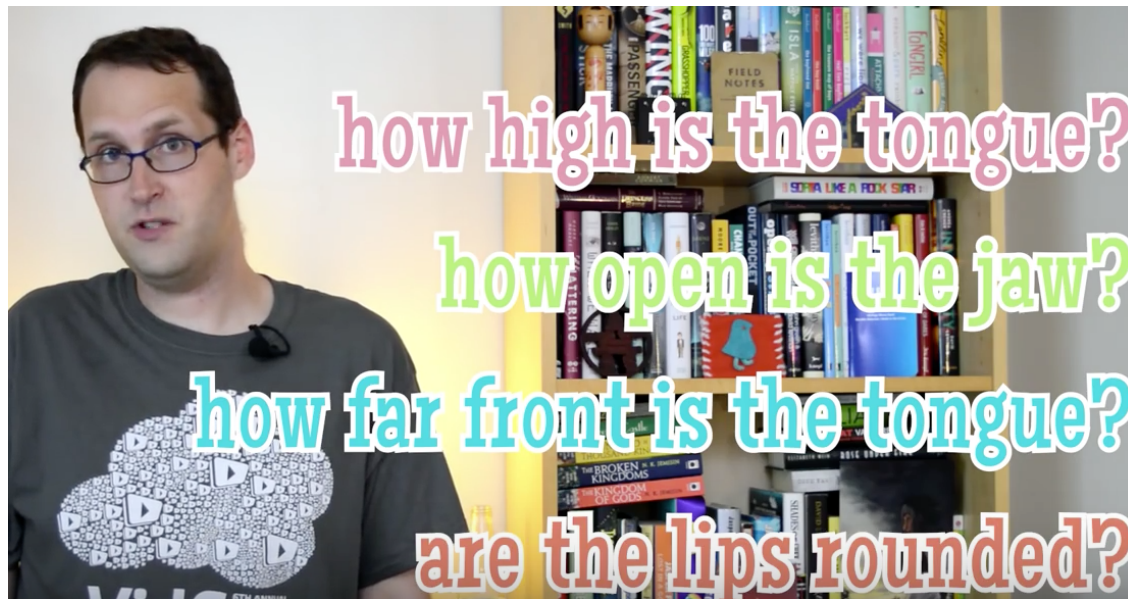
- (4) Tense or not tense your mouth
(tense, lax)

More precision when talking about vowels

[Extra]

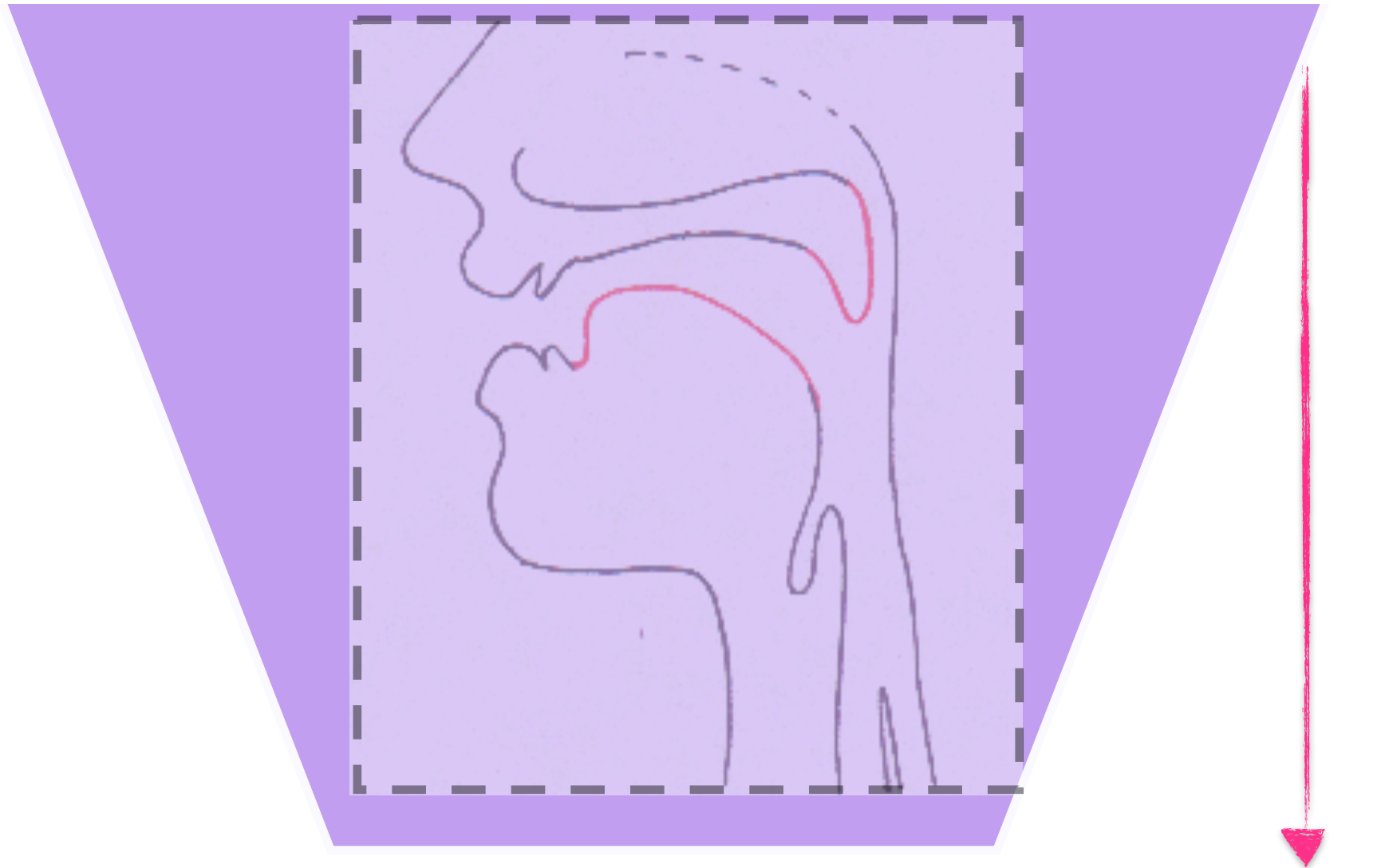
<https://www.youtube.com/watch?v=jl4zGRSYqkE&feature=youtu.be>

Discusses frequency & formants relevant for describing vowels



So what vowels do you have?

Front to back



So what vowels do you have?

Front to back



i

“sheep, sleep”

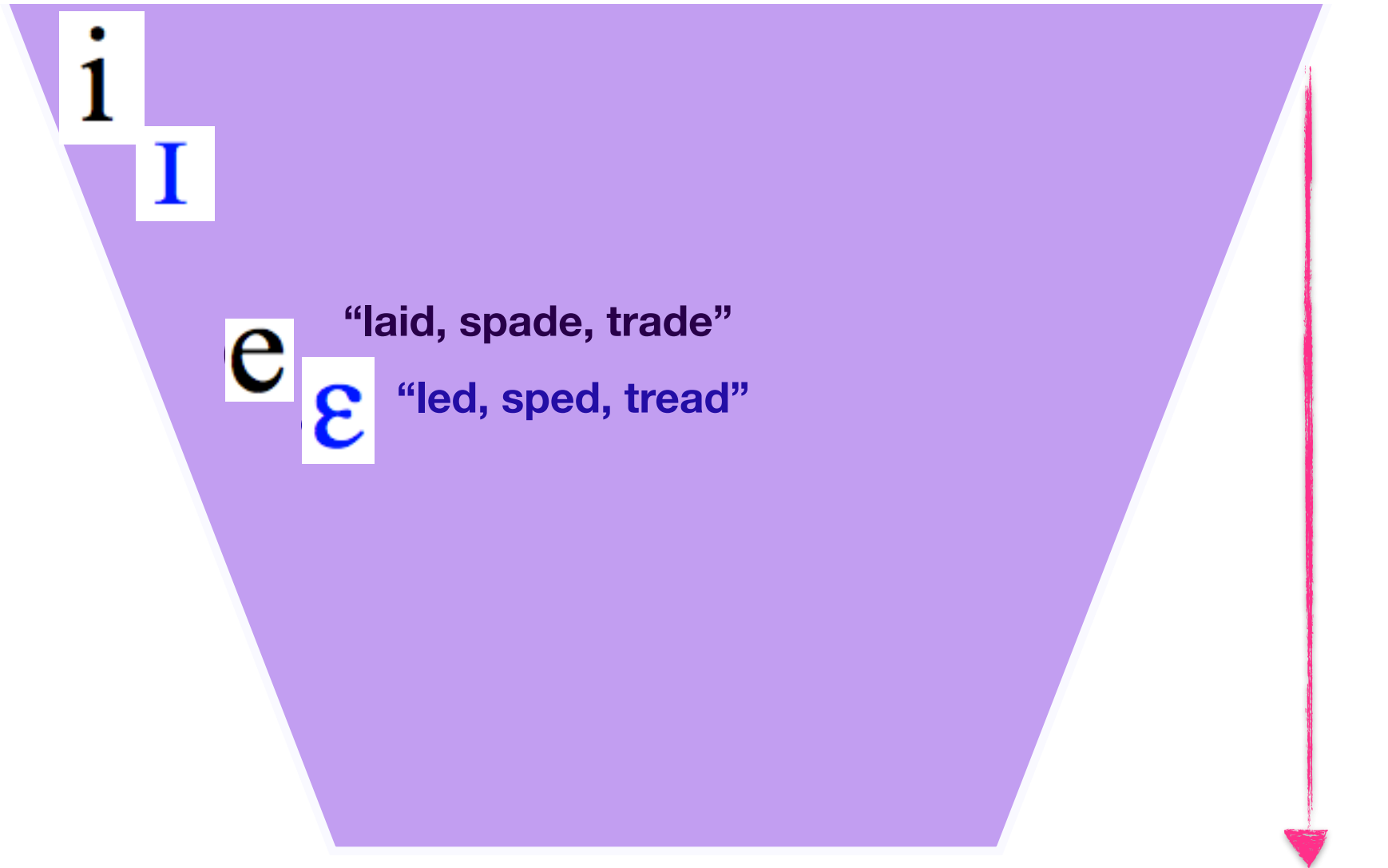
I

“ship, slip”



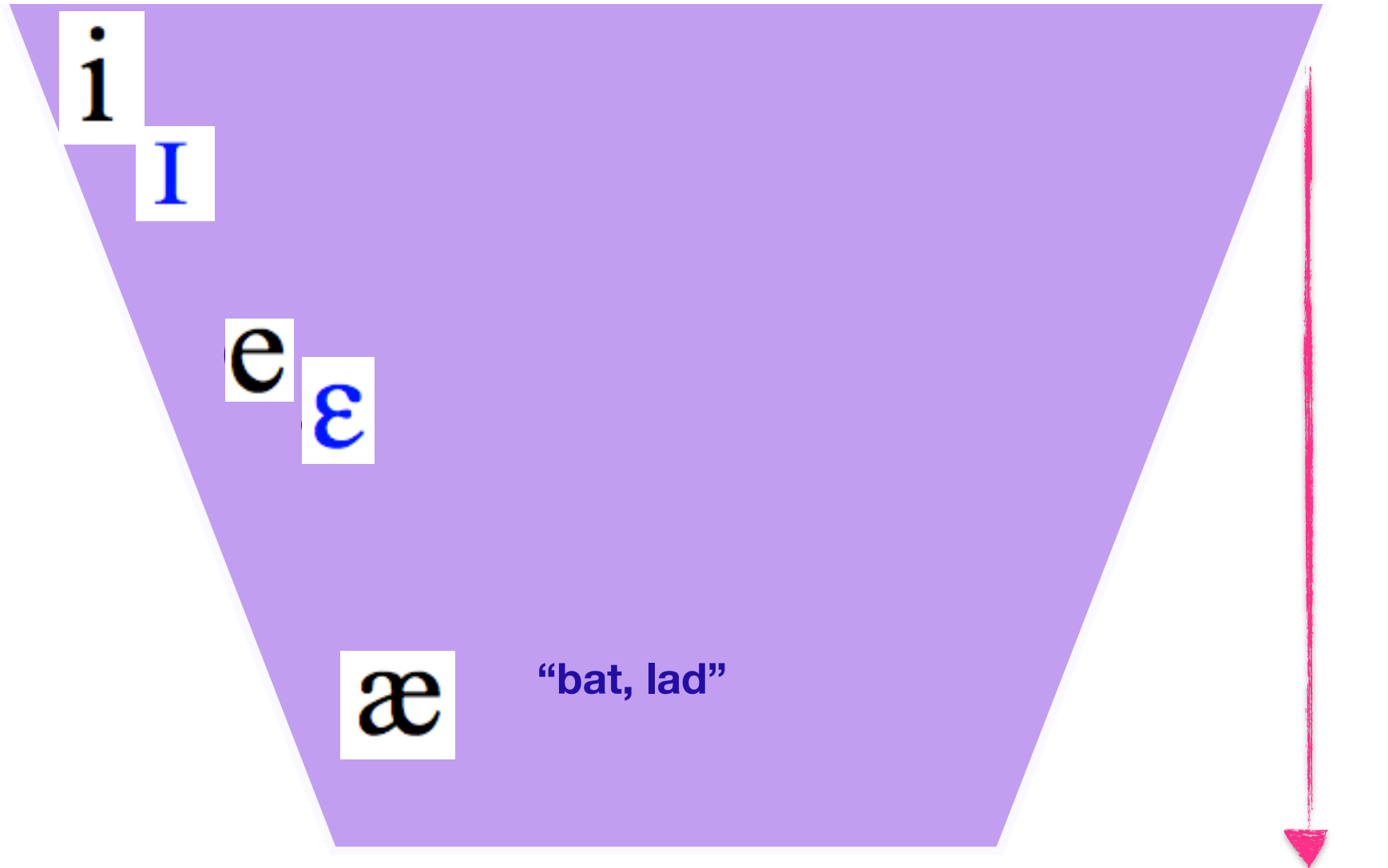
So what vowels do you have?

Front to back



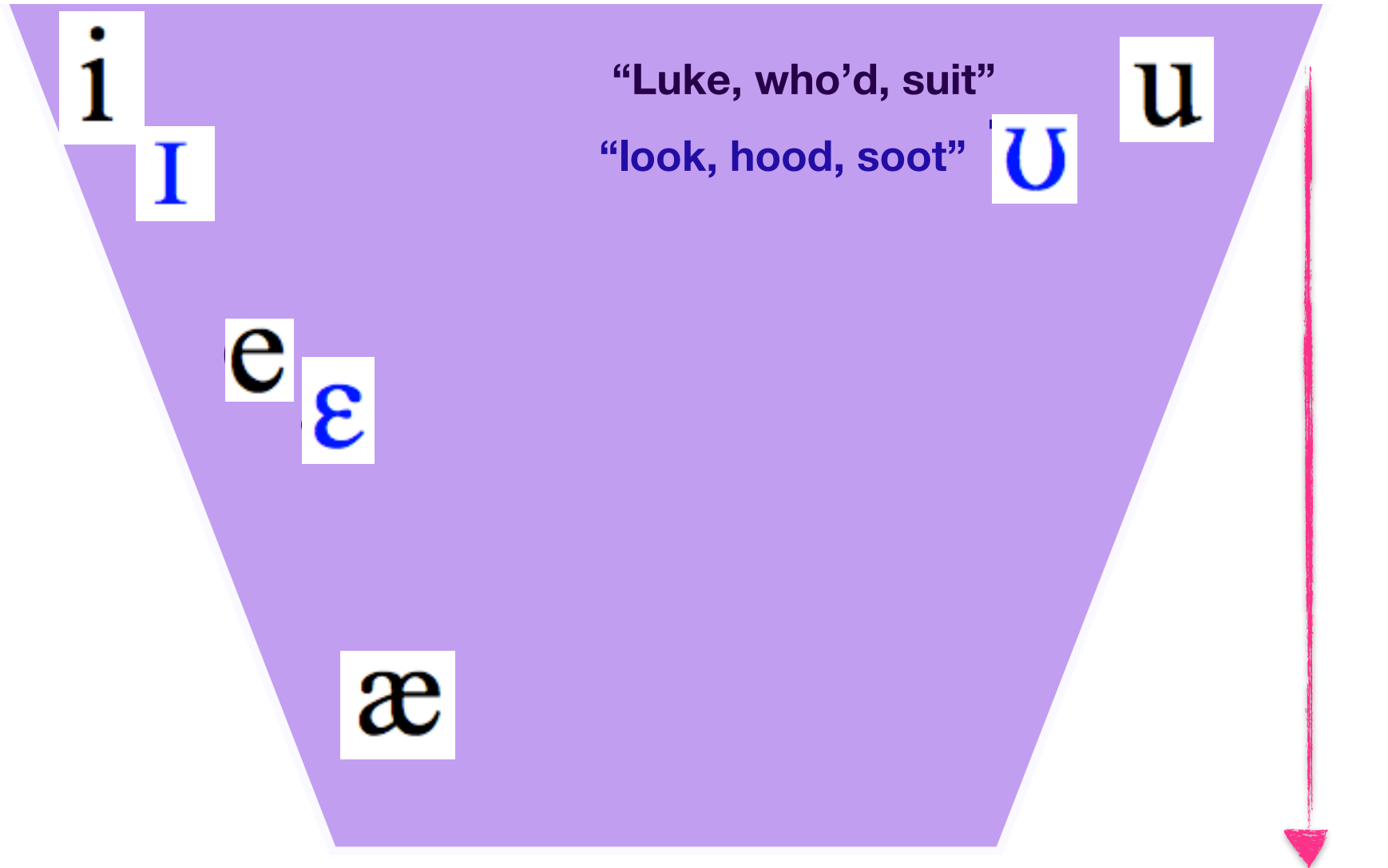
So what vowels do you have?

Front to back



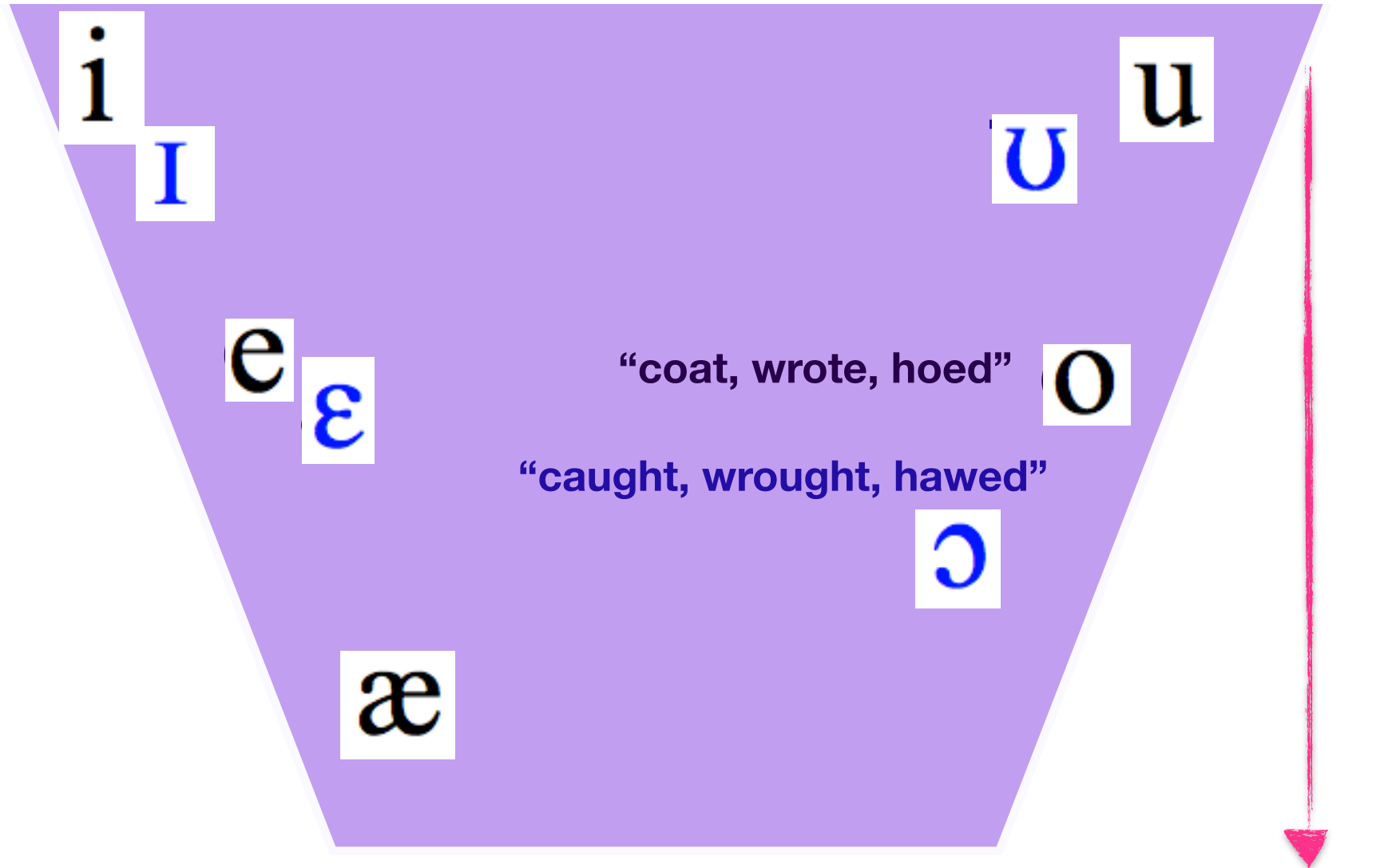
So what vowels do you have?

Front to back



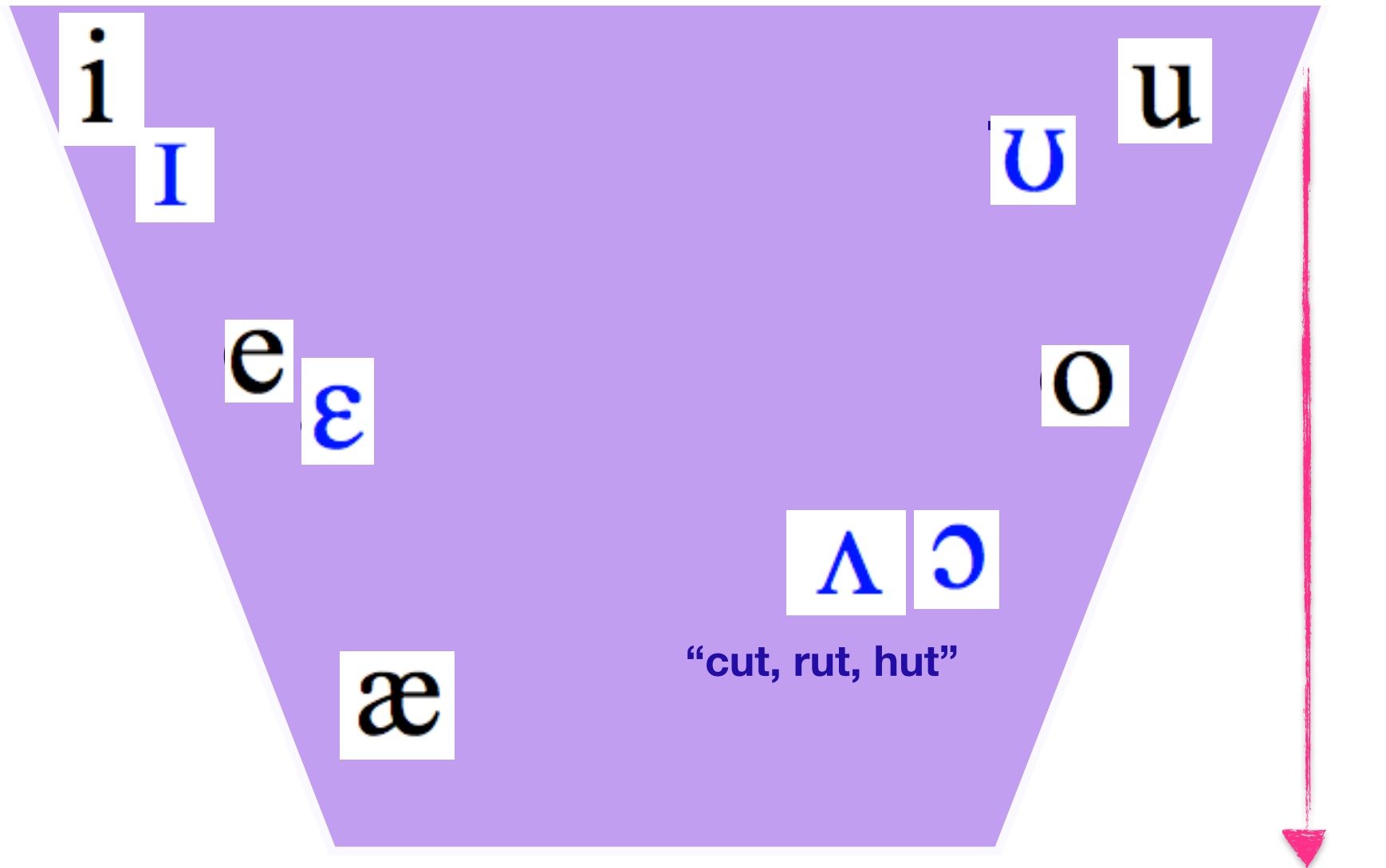
So what vowels do you have?

Front to back



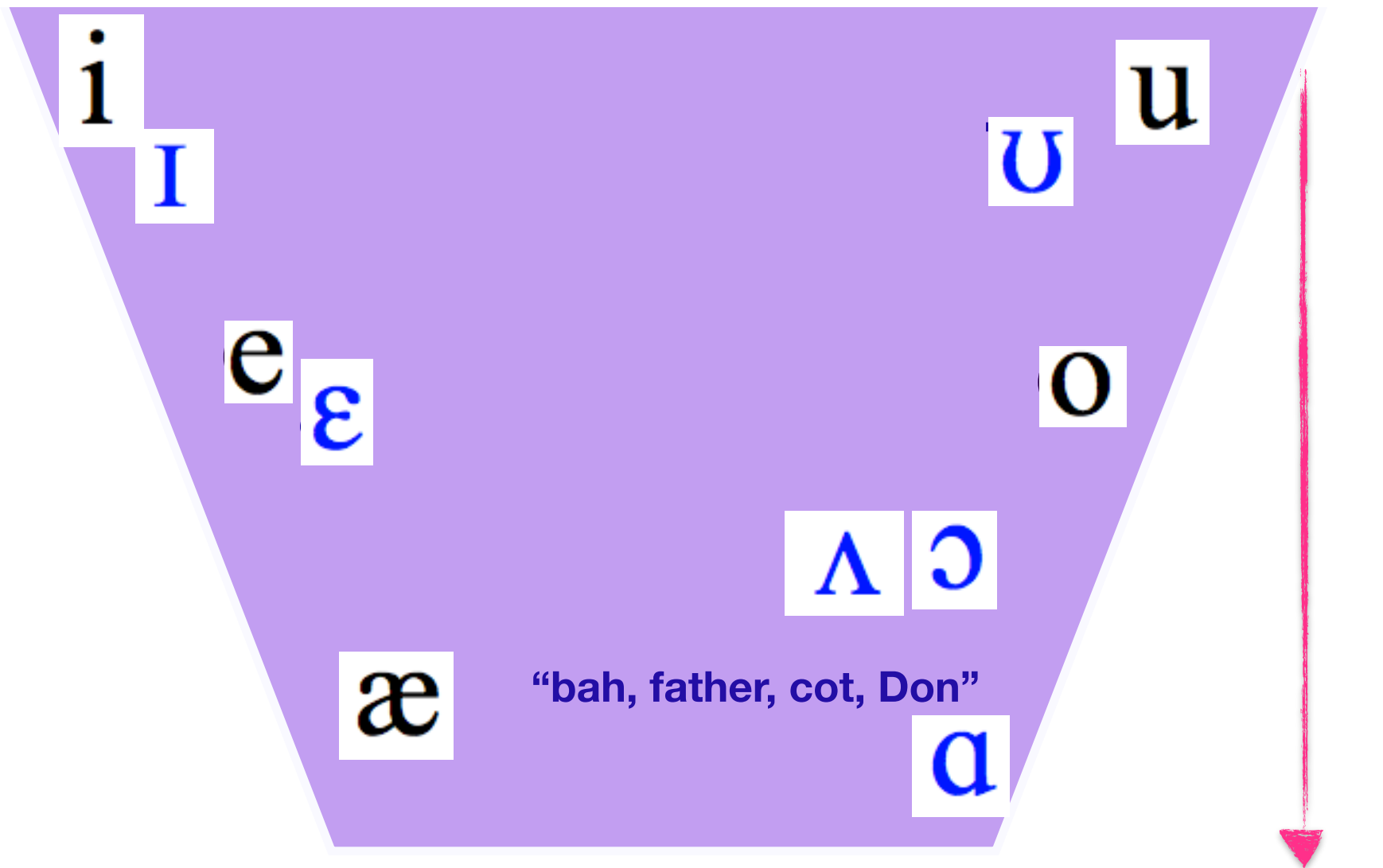
So what vowels do you have?

Front to back



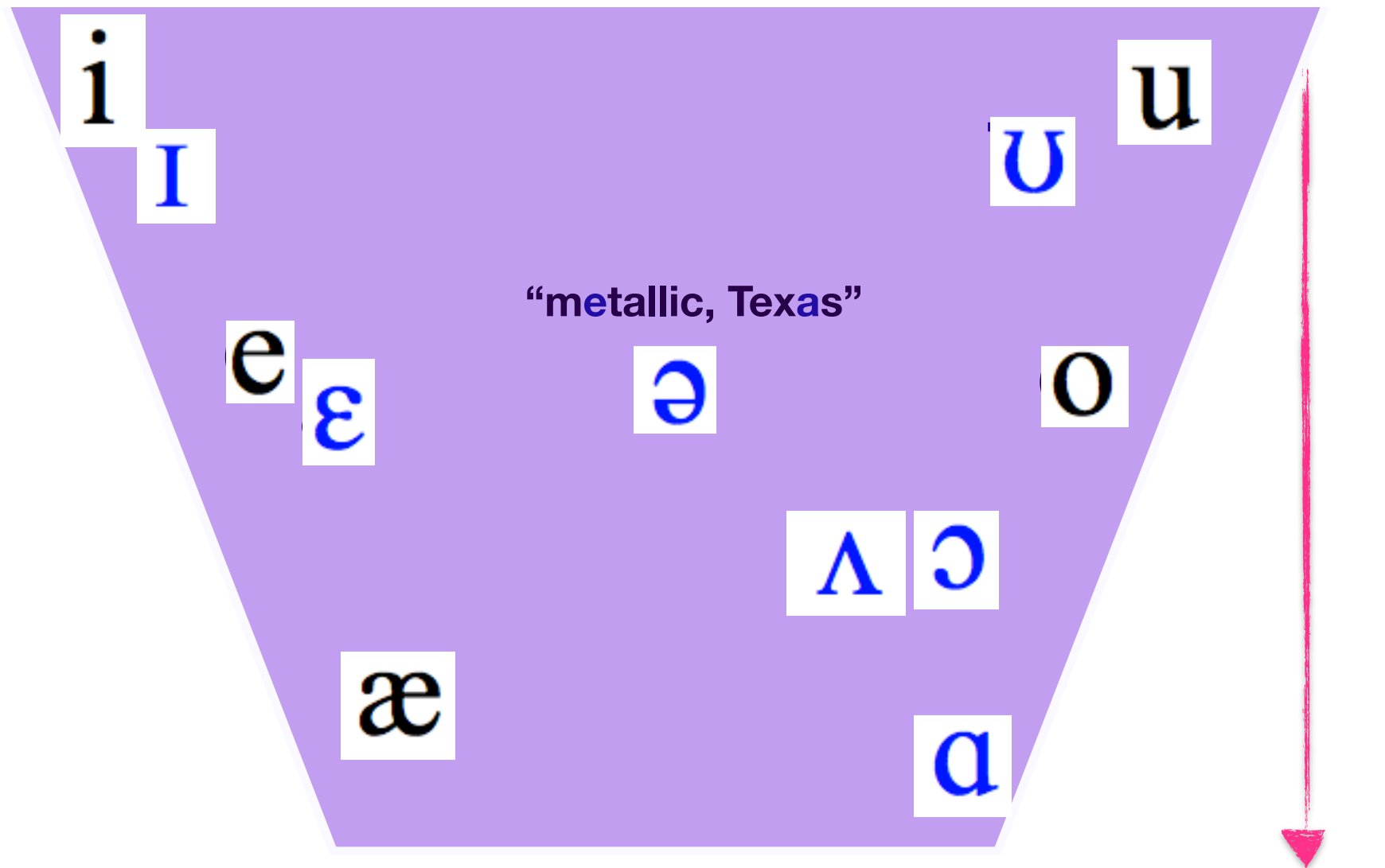
So what vowels do you have?

Front to back



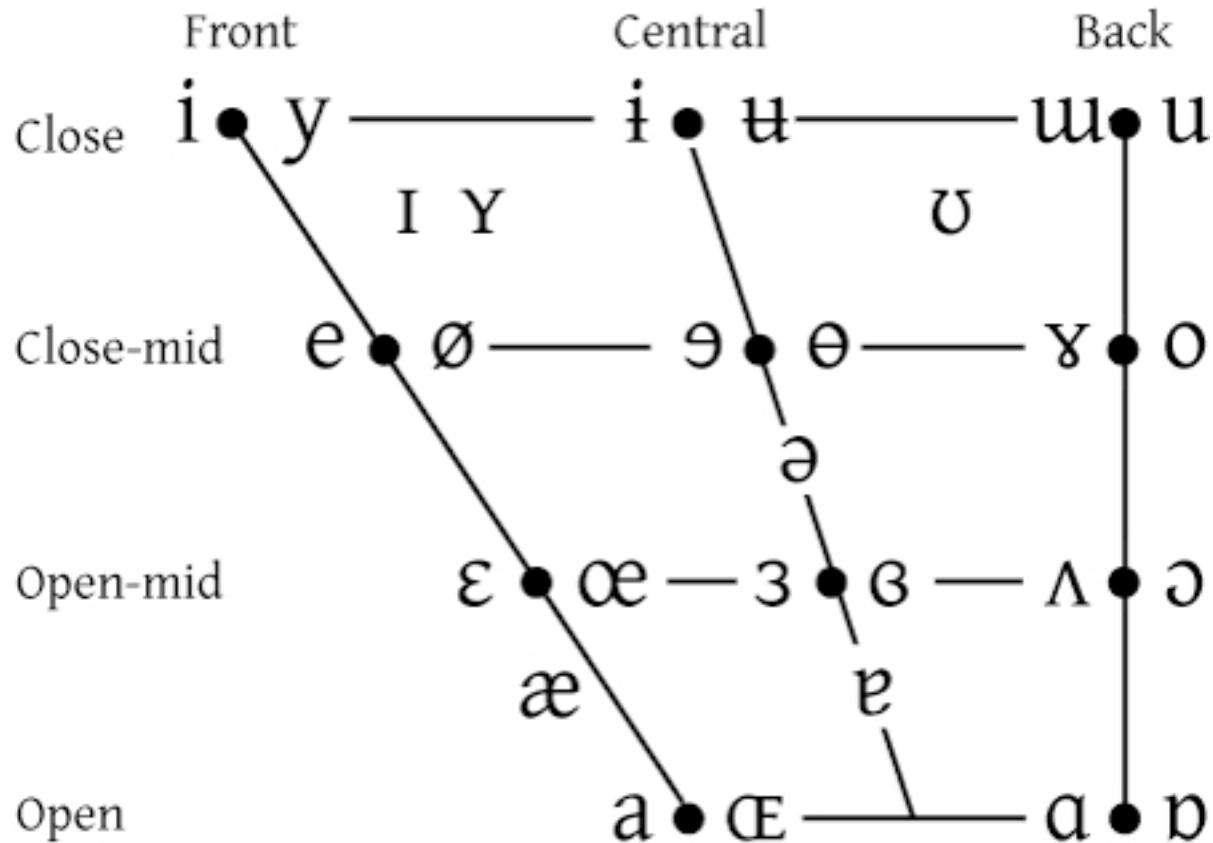
So what vowels do you have?

Front to back



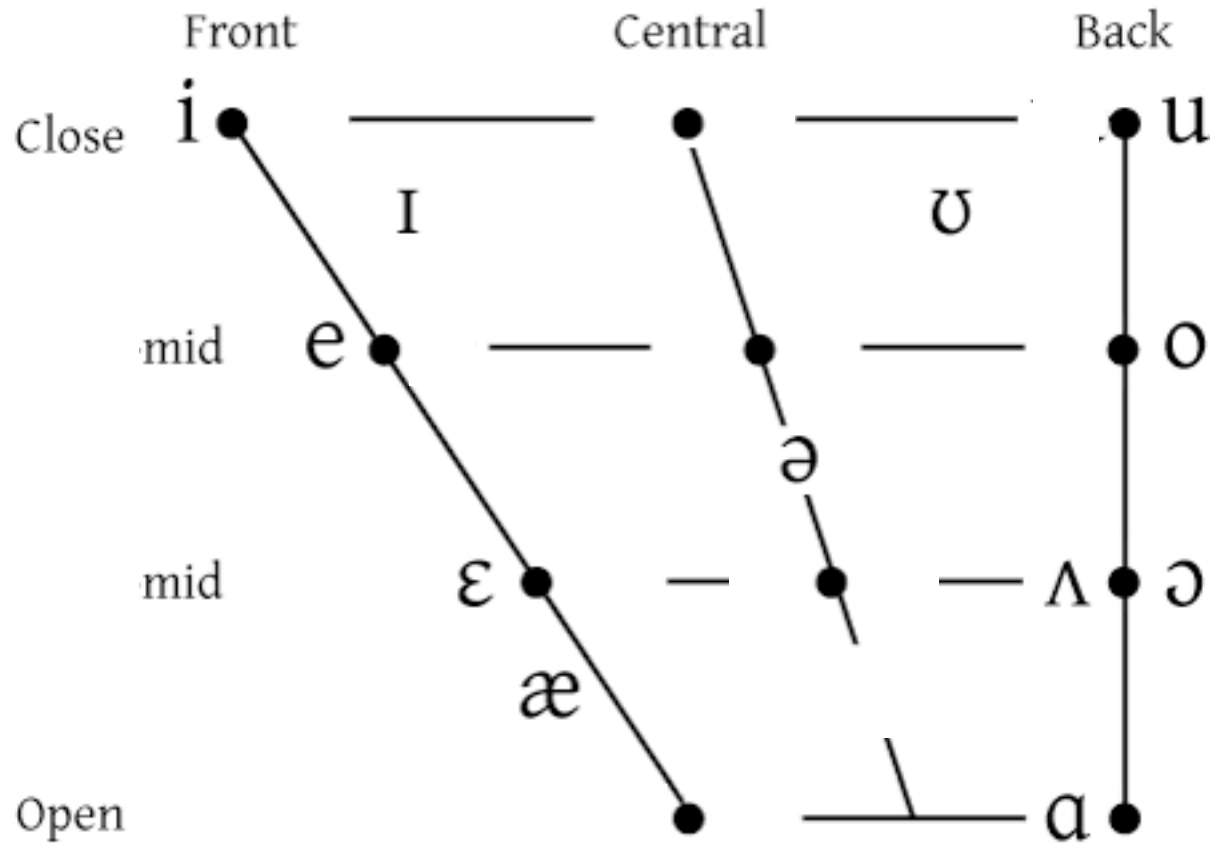
The full(er) vowel chart

VOWELS



The parts we care about for this class

VOWELS



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

[Extra] Diphthongs

<https://www.youtube.com/watch?v=arMntA15A0s>

<http://www.thelingspace.com/episode-27>

7:02 through 7:38



Diphthong

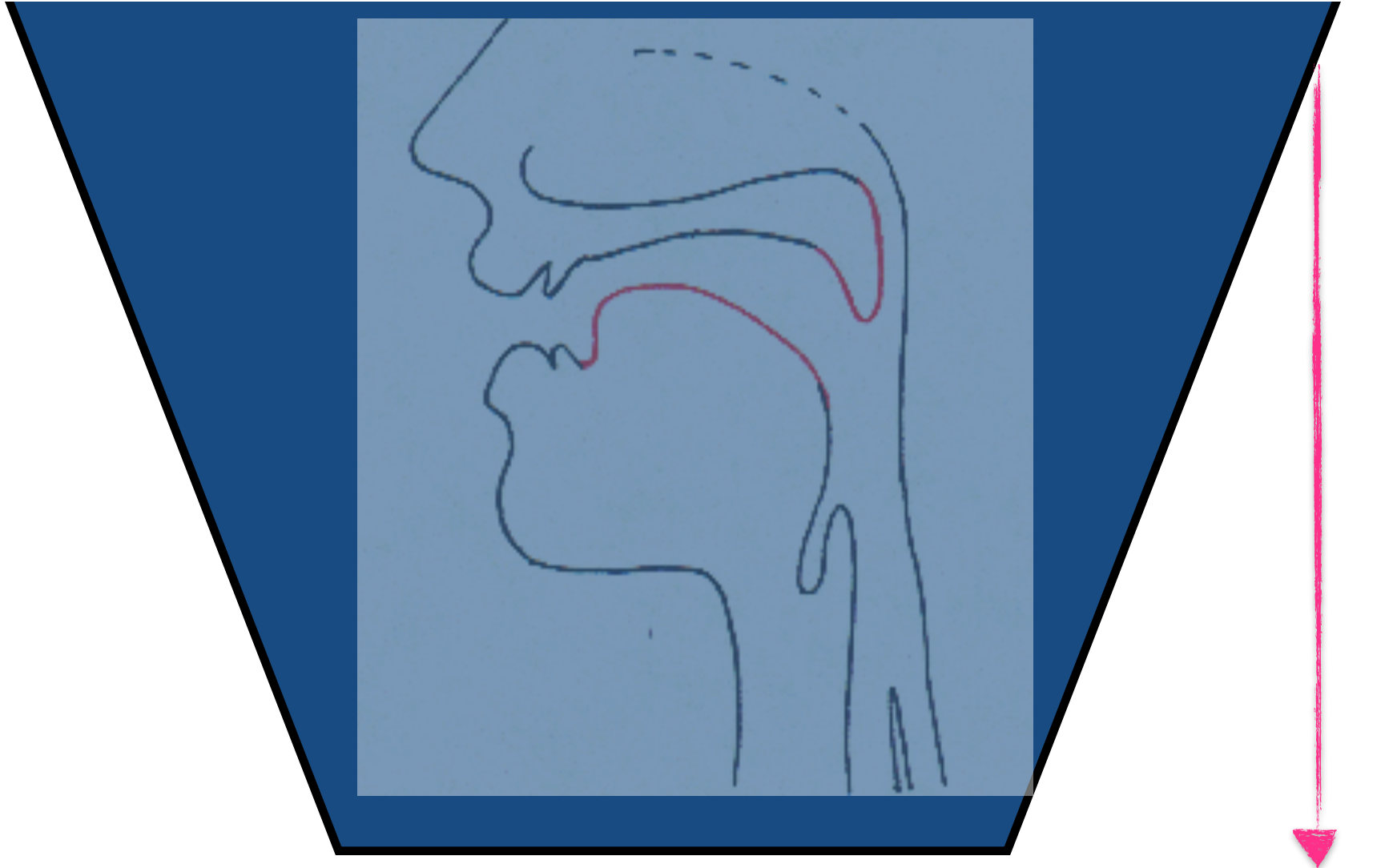
VOWEL CHART (2005 IPA) THE LING SPACE.COM

	Front	Near-Front	Central	Near-back	Back
Close	i • y		ɨ • ʉ		ɯ • u
Near-Close		ɪ • ʏ			ʊ
Close-mid	e • ø		ɘ • ɵ		ɤ • o
Mid			ə		
Open-Mid		ɛ • œ	ɜ • ɞ		ʌ • ɔ
Near-Open		æ		ɶ	
Open		ɑ • ɶ			ɑ • ɒ

left/right = unrounded/rounded

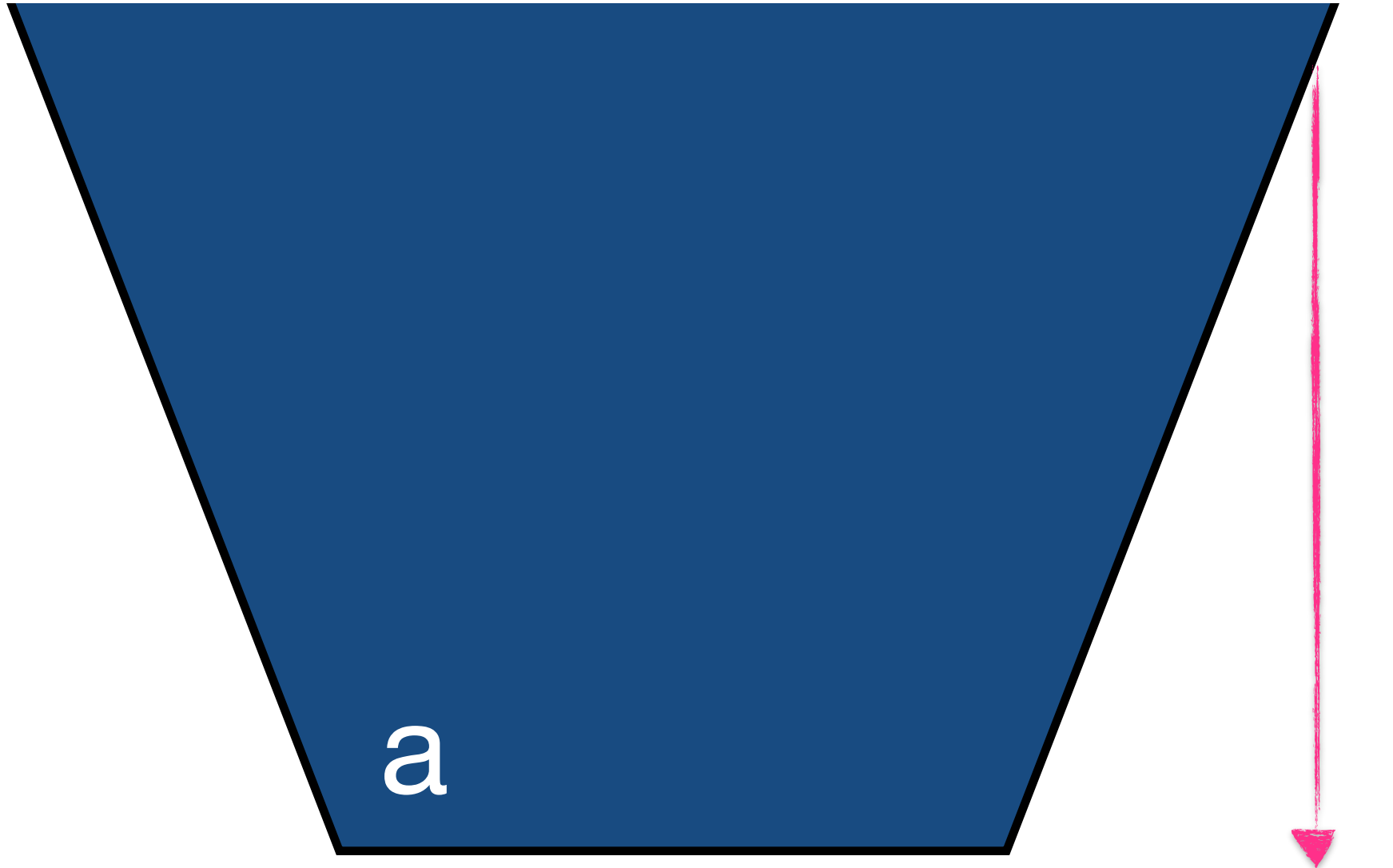
Diphthongs: Two vowel-ish sounds together

Front to back



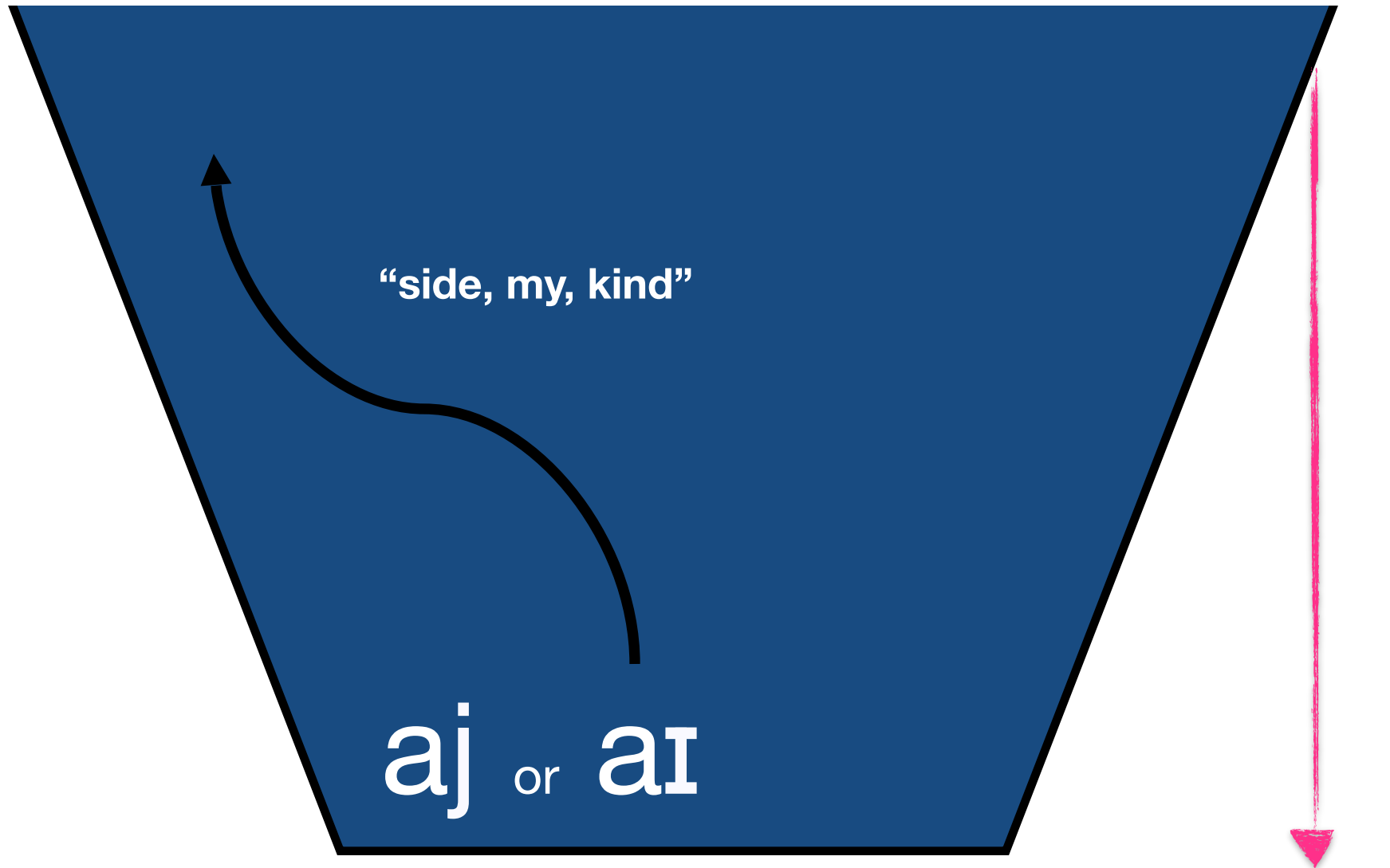
Diphthongs: Two vowel-ish sounds together

Front to back



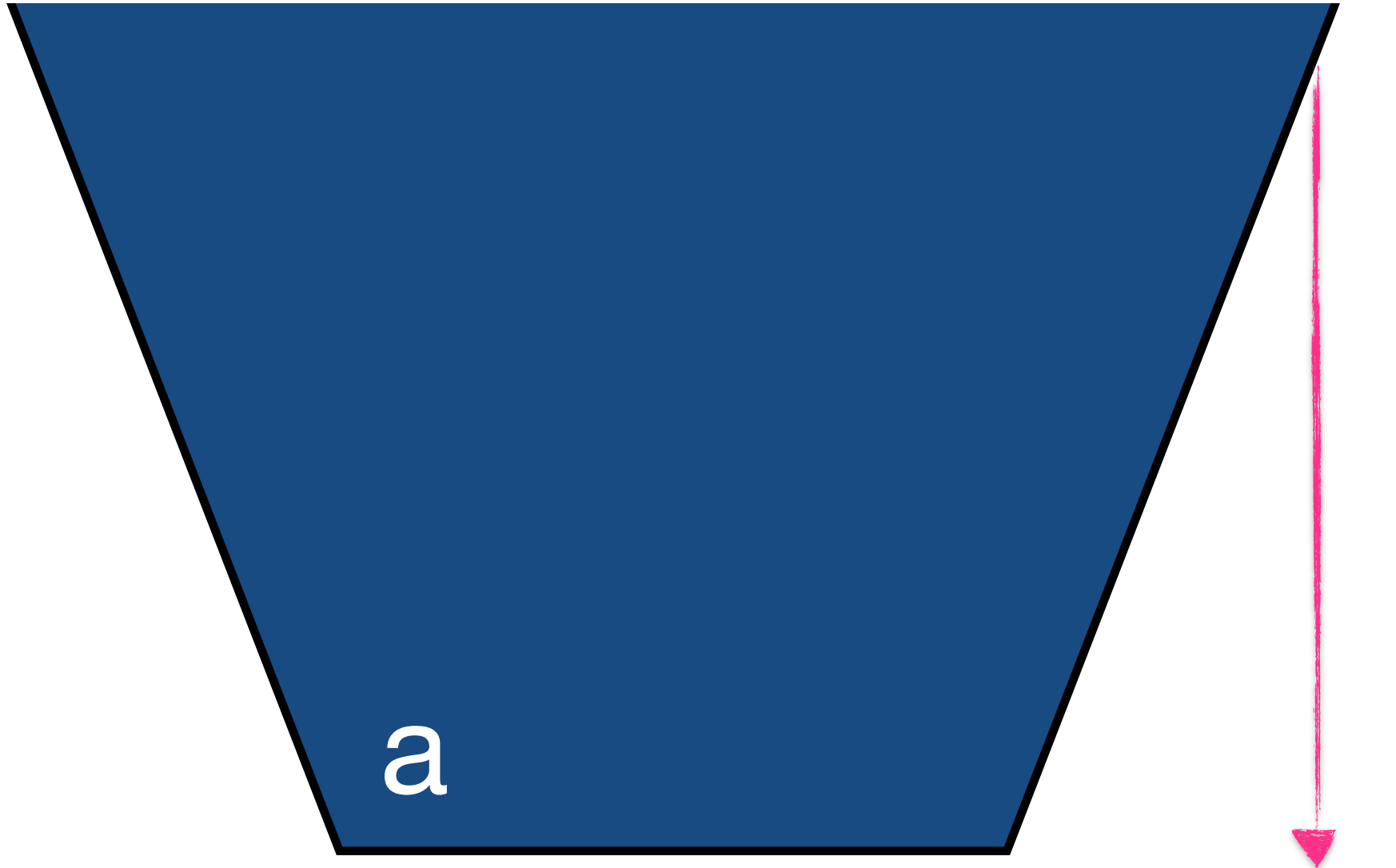
Diphthongs: Two vowel-ish sounds together

Front to back



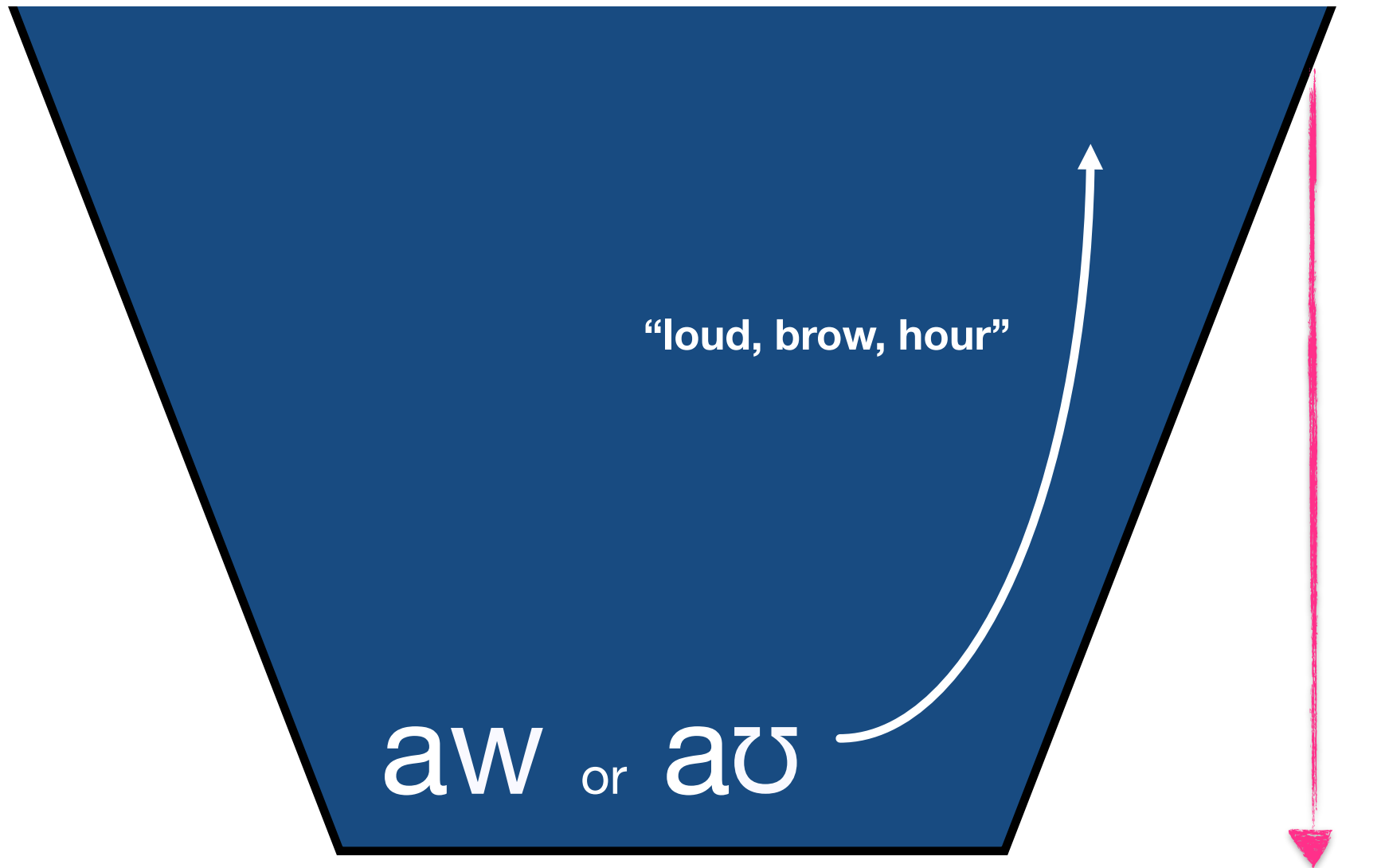
Diphthongs: Two vowel-ish sounds together

Front to back



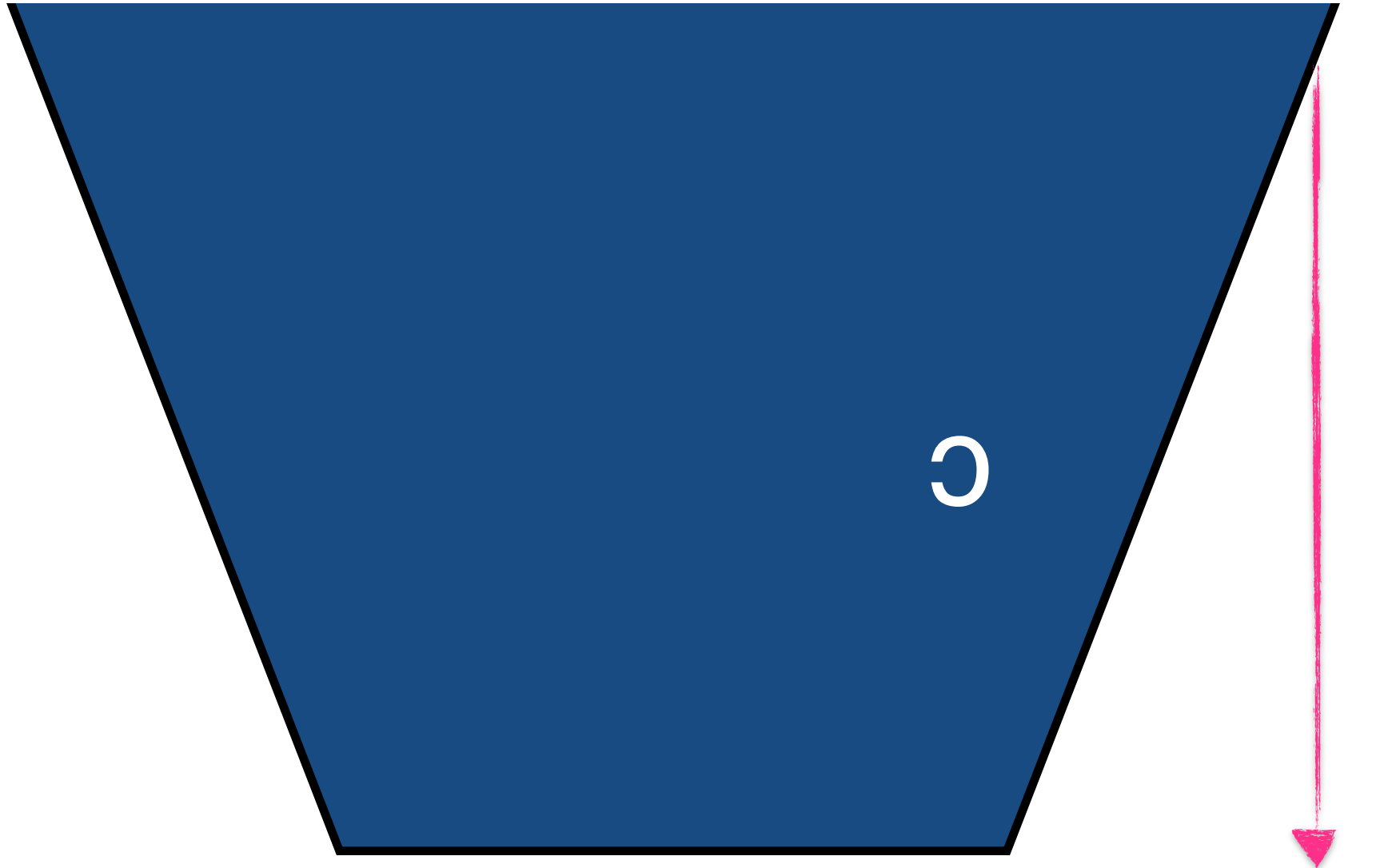
Diphthongs: Two vowel-ish sounds together

Front to back



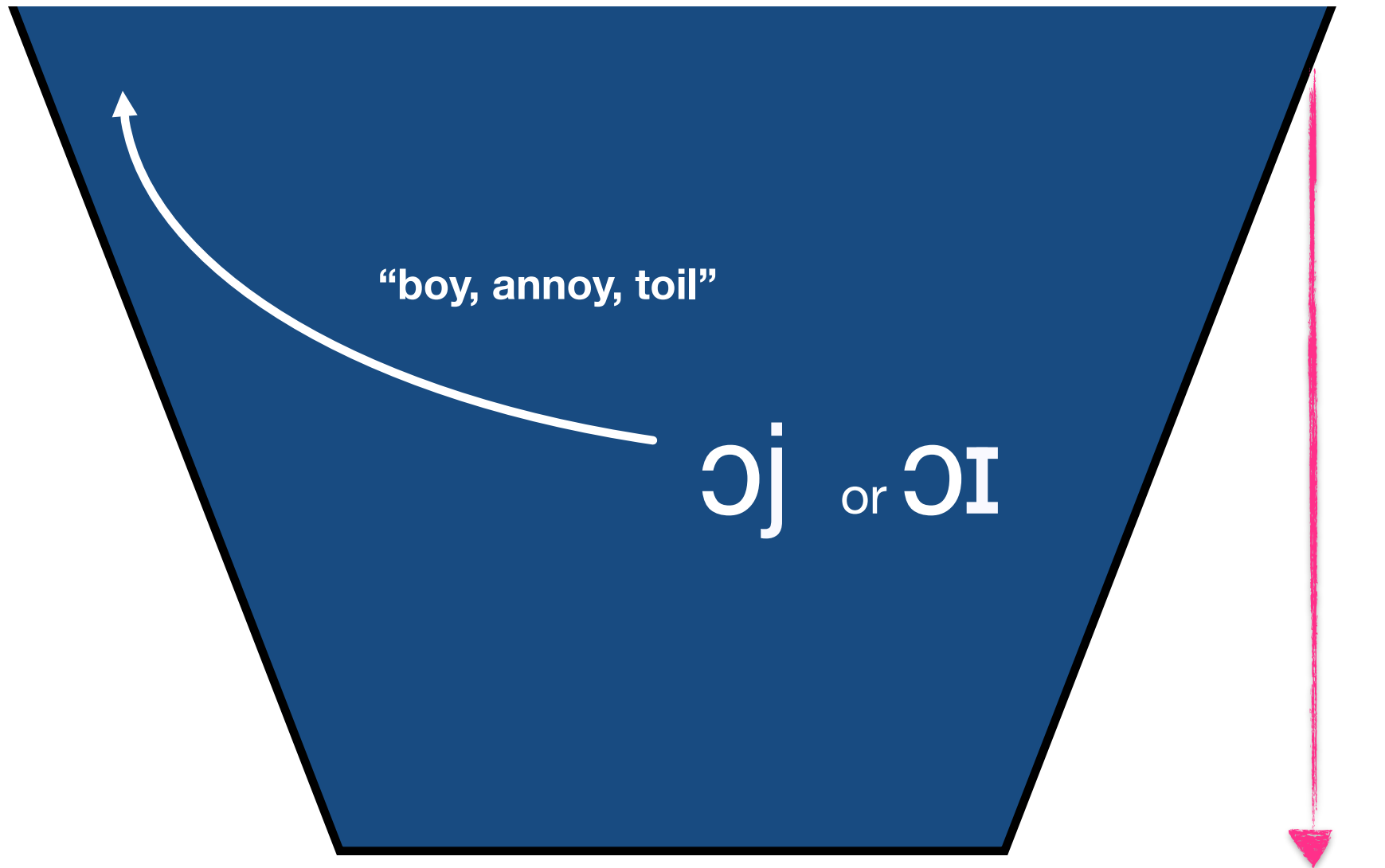
Diphthongs: Two vowel-ish sounds together

Front to back

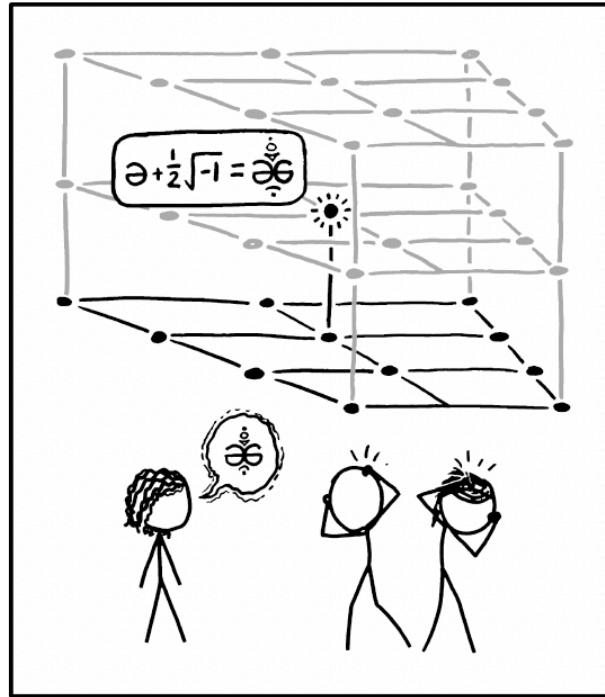


Diphthongs: Two vowel-ish sounds together

Front to back



Humor in the vowel space



LINGUISTICS TIP:

EXTEND THE IPA VOWEL PLANE ALONG
THE IMAGINARY AXIS TO PRODUCE THE
COMPLEX VOWELS, CURSED SOUNDS WHICH
THE HUMAN MIND CANNOT COMPREHEND.

<https://xkcd.com/2657/>

Speech production summary

Airflow set in vibration by vocal folds and modified by vocal tract

Consonants: narrowing or blocking of oral/nasal cavity

Vowels: shaping of oral cavity

Different languages choose different selections of these

Acquisition:

Children have to learn the specific set of sounds their language uses

Cross-linguistic variation in speech sounds

<http://www.ipachart.com/>

Interactive chart of the International Phonetic Alphabet

Click on a symbol to hear the sound it represents.

Pulmonic consonants

	Bi-labial	Labio-dental	Dental	Alveolar	Post alveolar	Retro flex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal		m ɱ		n ɳ		ɳ̐	ɲ	ŋ	ɴ		
Trill		ʙ		r					ʀ		
Tap or Flap				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.
Areas shaded grey indicate articulations judged impossible.

Other symbols

ɱ	Voiceless labial-velar fricative
ʋ	Voiced labial-velar approximant
ɥ	Voiced labial-palatal approximant
ʜ	Voiceless epiglottal fricative
ʕ	Voiced epiglottal fricative
ʡ	Epiglottal plosive
ɕ	Voiceless alveolo-palatal fricative
ʑ	Voiced alveolo-palatal fricative
ɺ	Alveolar lateral flap
ɺ͡ɰ	Simultaneous ɺ and ɰ

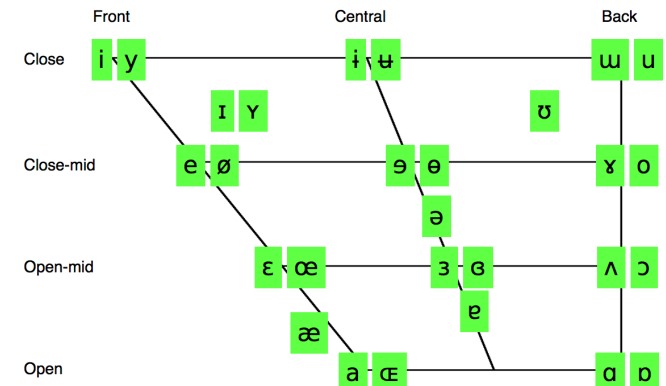
Affricates

ɬɕ	Voiceless alveolar affricate
ɬʃ	Voiceless palato-alveolar affricate
ɬʈ	Voiceless alveolo-palatal affricate
ɬʂ	Voiceless retroflex affricate
ɖʒ	Voiced alveolar affricate
ɖʐ	Voiced post-alveolar affricate
ɖʑ	Voiced alveolo-palatal affricate
ɖʐ̐	Voiceless retroflex affricate

Non-pulmonic consonants

Clicks	Voiced implosives	Ejectives
ɔ Bilabial	ɓ Bilabial	ɸ' Bilabial
ɿ Dental	ɗ Dental/alveolar	ɬ' Dental/alveolar
ɿ! (Post)alveolar	ɟ Palatal	ɬ' Velar
ɸ Palatoalveolar	ɠ Velar	ɬ' Alveolar fricative
ɿ Alveolar lateral	ɠ Uvular	' etc...

Vowels



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

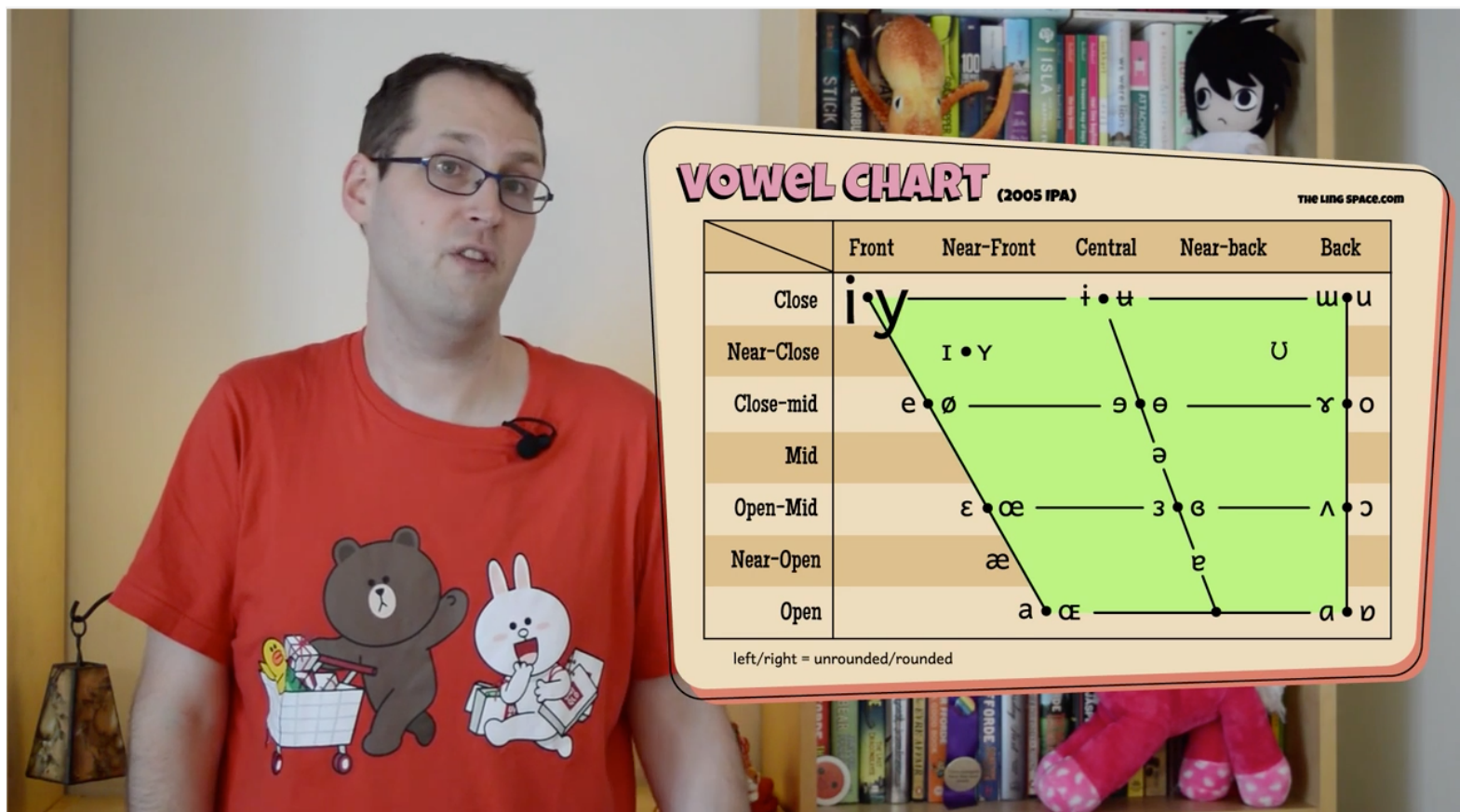
[Extra]

Cross-language differences

<https://www.youtube.com/watch?v=arMntA15A0s>

<http://www.thelingspace.com/episode-27>

4:10 through 5:08, 5:08 through 7:02



The image shows a man with glasses and a red t-shirt featuring a cartoon bear and a rabbit. He is standing next to a large graphic of a vowel chart. The chart is titled "VOWEL CHART (2005 IPA)" and "THE LING SPACE.COM". It is a trapezoidal diagram with a green background, showing the relative positions of various vowel sounds. The horizontal axis represents tongue backness (Front to Back), and the vertical axis represents tongue height (Close to Open). Vowels are plotted as dots, with some having diacritics to indicate rounding. A legend at the bottom states "left/right = unrounded/rounded".

	Front	Near-Front	Central	Near-back	Back
Close	i • y		ɨ • ʉ		ɯ • u
Near-Close		ɪ • ʏ			ʊ
Close-mid	e • ø		ə • ɵ		ɤ • o
Mid			ə		
Open-Mid	ɛ • œ		ɜ • ɞ		ʌ • ɔ
Near-Open		æ		ɐ	
Open		ɑ • ɶ			ɑ • ɒ

left/right = unrounded/rounded

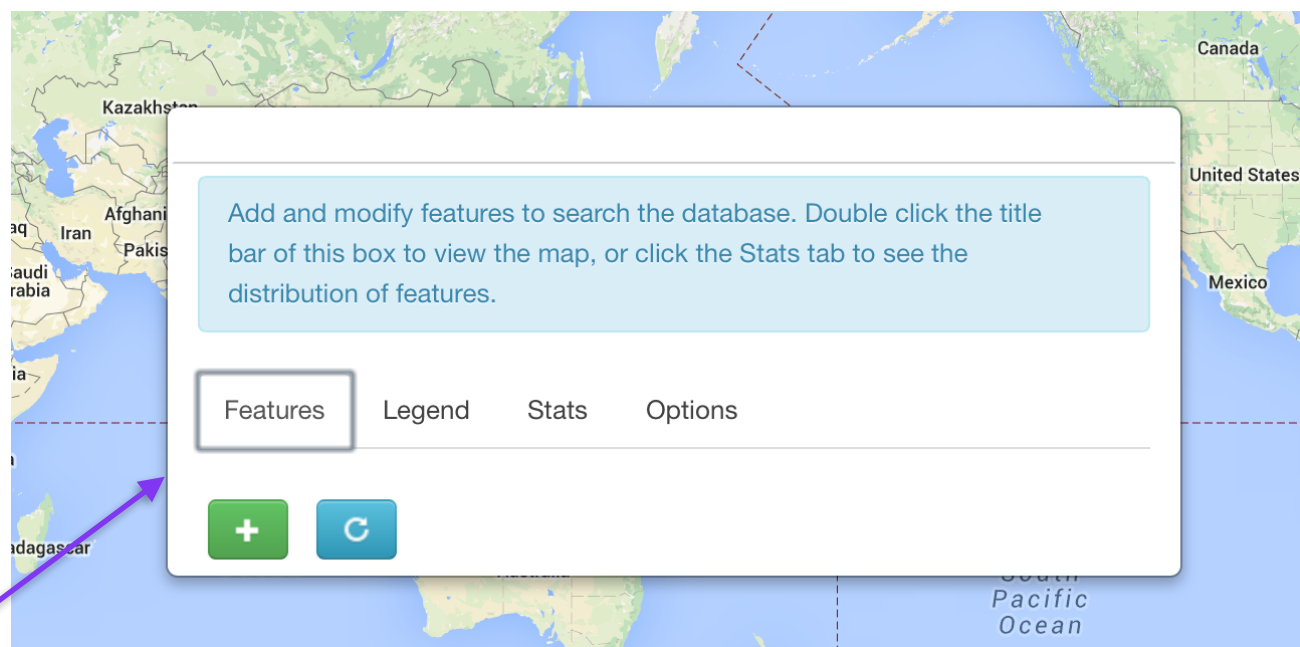
Cross-linguistic variation in sounds (called segments)

<http://phonotactics.anu.edu.au/index.php>

[Extra]

WORLD PHONOTACTICS DATABASE
Home
Introduction to phonotactics
How to use this site
Features
Sample
Contributing
Citing
Downloads
Contact
Launch database

Click on this
to get this



Questions?



You should be able to do question 3 on HW3, and up through question 2 on the phonological review questions.