

Ch 5: Consonants



1. Descriptive system & Voicing
2. Place
3. Manner
4. Practice & Resources

Consonants vs Vowels

- Articulatory
 - Vowels: air flows freely
 - **Consonants: airflow constriction**
- Acoustic
 - Vowels: longer, louder
 - Consonants: quieter (generally)
- Syllables
 - Vowels form the nucleus of syllables
 - Most consonants don't (but [l] [ɹ] [m] [n])

Indicates
syllabicity



Articulatory Description

For consonants, three-part classification system:

- 1) Voicing
- 2) Place (of articulation)
- 3) Manner (of articulation)

Sufficient for *most* consonants.
Exceptions will be noted.

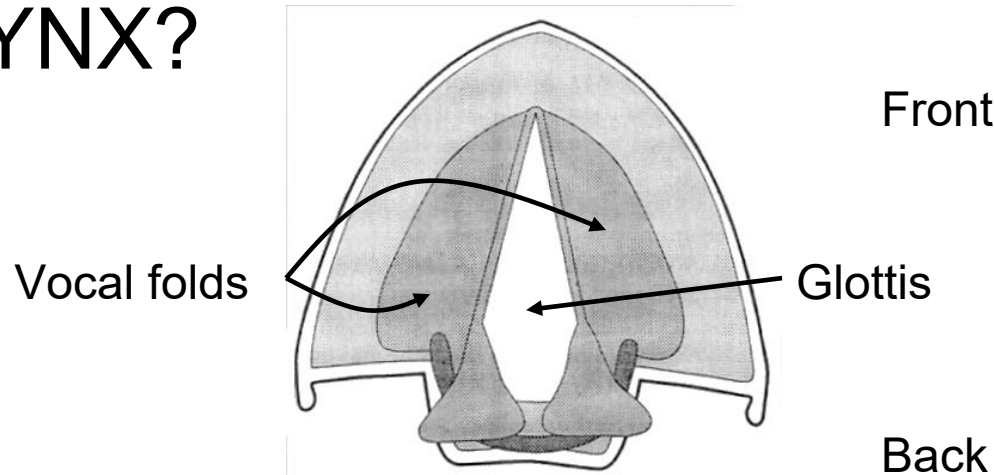
e.g., *voiced labiodental fricative* = [v]



VOICING

1) Voicing

- Voicing: what is happening at the **LARYNX**?



- Are the vocal folds spread apart (voiceless), or are they close together and vibrating (voiced)?

1) Voicing



voiced

voiceless



<http://voicemedicine.com/normal-voice-function/>

Voiceless

Voiced

[p] pat

[b] bat

[t] tie

[d] die

[k] kill

[g] gill

[f] fat

[v] vat

[s] sip

[z] zip

[θ] θigh

[ð] ðigh

[ʃ] dilution

[ʒ] delusion

[tʃ] etch

[dʒ] edge

Main IPA Consonant Chart

	Bilabial		Labiodental		Dental		Alveolar		Postalveolar		Retroflex		Palatal		Velar		Uvular		Pharyngeal		Glottal		
Plosive	p	b					t	d			ʈ	ɖ	c	ɟ	k	g	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							

↑ ↑

- Voicing: pairs shown in each cell Voiceless Voiced



PLACE

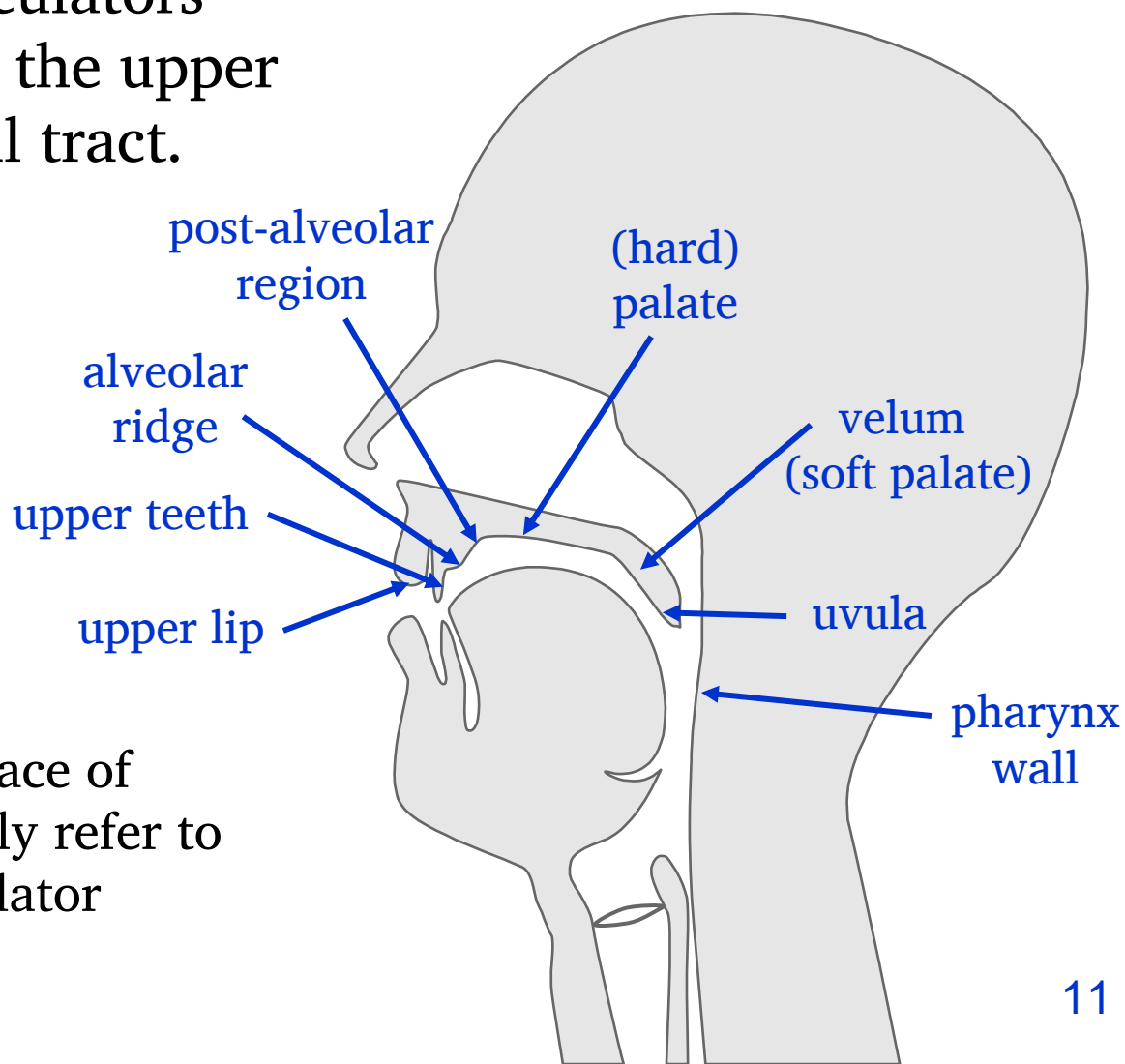


2) Place

- Place (of articulation): WHERE in the vocal tract is the constriction being made, (and with what articulators)?
 - Anterior (front) of mouth
 - Posterior (back) of mouth

Passive Articulators

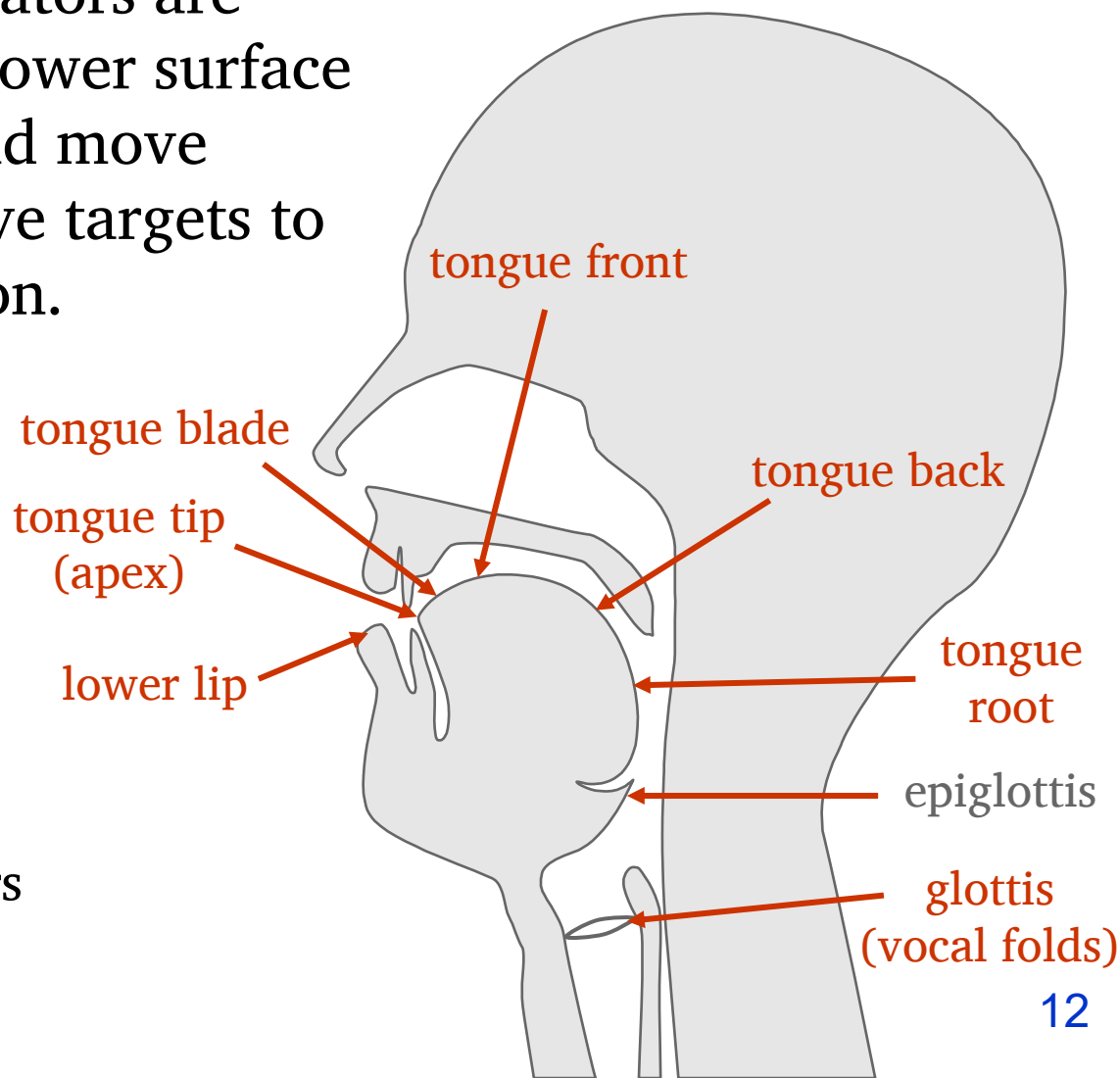
- Most passive articulators are located along the upper surface of the oral tract.



- Descriptions of place of articulation usually refer to the passive articulator

Active Articulators

- Most active articulators are located along the lower surface of the oral tract and move toward their passive targets to create a constriction.
- Some place descriptions refer to both active and passive articulators (e.g., labiodental)
- Epiglottal and glottal sounds are described with active articulators



Major structures

Structure (noun)	Descriptor (adj)	Examples
lips	labial (labio-)	b, p, m, w
teeth	dental	θ, ð
alveolar ridge	alveolar (alveo-)	t, d, n, s, z, l
hard palate	palatal	j
velum (soft palate)	velar	k, g, ŋ
glottis	glottal	h

2) Place (Anterior)

- **Bilabial**: w/ both lips
 - [p], [b], [m], [w] (and [w̥] or [m̥])
- **Labiodental**: w/ lower lip and upper teeth
 - [f], [v]
- **Interdental**: tip of tongue between teeth
 - [θ], [ð]
- **Alveolar**: tongue tip at/near alveolar ridge
 - [t], [d], [n], [s], [z], [l], [ɹ], [r]

2) Place (Posterior)

- **(Alveo-)Palatal**: tongue at/near hard palate
 - Alveopalatal (**post-alveolar**): [ʃ], [ʒ], [tʃ], [dʒ]
 - Palatal: [j]
- **Velar**: back of tongue at/near velum
 - [k], [g], [ŋ]
- **Glottal**: at the larynx, between vocal folds
 - [ʔ], [h]

Main IPA Consonant Chart

- Place of articulation, front  back of mouth

	Bilabial		Labiodental		Dental	Alveolar		Post alveolar	Retroflex		Palatal		Velar		Uvular		Pharyngeal		Glottal			
Plosive	p	b				t	d		ʈ	ɖ	c	ɟ	k	g	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	ɬ	ɮ	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								

↑ ↑

- Voicing: pairs shown in each cell Voiceless Voiced



MANNER

3) Manner

- Manner (of articulation): HOW is the air being modified as it moves through the vocal tract?
 - (aka “manner of production”)

 - Complete obstruction = air stopped
 - Very close constriction = turbulent air flow
 - Looser constriction = air not impeded

3) Manner: Stops

- **(Oral) Stop** (aka **plosive**): full obstruction in oral cavity w/ velum raised/closed
 - Air pressure builds up, then is released
 - [p], [b], [t], [d], [k], [g], [ʔ]
bilabial alveolar velar glottal
 - [ʔ] allophone of /t/ before reduced syllable
 - kitten [kɪʔən, kɪʔn] mountain [maʊʔən, maʊʔn]
 - little [lɪʔəl, lɪʔt, lɪʔo]
 - Variant: glottalized /t/: (near-)simultaneous glottal stop and /t/, usually transcribed [ʔt]



3) Manner: Nasals

- **Nasal (stop)**: full obstruction in oral cavity w/ velum lowered/open (air flows out nose freely)
 - [m], [n], [ŋ] (bilabial, alveolar, velar)
 - Can be **syllabic** (= syllable nucleus)
 - kitten [kɪʔⁿ], prison [prɪzⁿ], prism [prɪz^m]
 - **Nasal plosion** (aka **nasal release**): oral stop released into **homorganic** nasal (at same place of articulation)
 - kitten [kɪtⁿ], kiddin' [kɪdⁿ], prism [prɪz^mm]

3) Manner: Taps

- **Tap/Flap:** rapid constriction and release
 - Alveolar tap [ɾ] = allophone of /t, d/ after stressed syllable, before reduced syllable
 - Buddy [bʌɾi], kiddo [kɪroʊ], writer [raɪrə], bottle [bɑɾt.]

3) Manner: Frication

- **Fricative**: partial obstruction w/ turbulence
(**fricative** noise)



- [f], [v], [θ], [ð], [s], [z], [ʃ], [ʒ], [h]

labiodental, interdental, alveolar, post-alveolar, glottal

- **Affricate**: stop followed by fricative

- [tʃ], [dʒ]

(post-alveolar)



- **Homorganic**: at the same place of articulation (t, d farther back than usual)

3) Manner: Approximants

- **Approximant**: airflow not impeded
 - (Don't let spell check change to “approximate”)
- **Liquid**: constriction but w/ no turbulence
 - [l] = alveolar lateral liquid
 - [ɹ] = alveolar rhotic liquid
- **Glide** (aka **semivowel**): slightly more constriction than vowels, said faster than vowels (not syllabic)
 - [w], [j] (bilabial, palatal; like fast [ʊ, ɪ])

Four-part descriptions

3) Manner: Laterals


- **Lateral** (l-like): tongue makes constriction in middle, air flows freely around one or both sides
 - **Light //:** tongue tip touches alveolar ridge
 - One or both sides is pulled down
 - Occurs in onset (beginning of syllables)
 - **Dark (velarized) //:** tongue back bunches toward velum; tongue tip may touch alveolar ridge or just raise up a little toward it
 - [ɫ] (tilde over the middle)
 - Occurs in coda (end of syllables)

3) Manner: Laterals

□ Light vs dark /l/

■ Feel /fi:l/ [fiɫ] 

■ Leaf /li:f/ [lif] 

■ Lull /lʌ:l/ [lʌɫ] 

□ Played backwards

■ Leaf 

■ Feel 

■ Lull 


3) Manner: Rhotics

- **Rhotic** (r-like): many ways to make English /r/
 - **Retroflex** /r/: tongue tip curls up so bottom of tongue is closest to alveolar ridge
 - English /r/ isn't usually really retroflex but rather “tongue-tip up” alveolar rhotic
 - **Bunched** /r/: tongue body bunches close to palate, w/ tongue tip down
 - Book categorizes (bunched) /r/ as palatal rhotic

Note: In English, nasals and liquids (but not glides) can be **syllabic**, forming a syllable nucleus and acting like vowels: e.g., [n] as in *prison*, [m] as in *prism*, [l] as in *bottle*, and [ɹ] as in *worm*


Main IPA Consonant Chart

- Place of articulation, front  back of mouth

more closed 

less

	Bilabial		Labiodental		Dental		Alveolar		Postalveolar		Retroflex		Palatal		Velar		Uvular		Pharyngeal		Glottal	
Plosive	p	b					t	d			ʈ	ɖ	c	ɟ	k	g	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						



- Manner of articulation
- Voicing: pairs shown in each cell Voiceless Voiced



CONSONANT PRACTICE



Provide the phonetic symbol

- [b] = voiced bilabial stop
- [f] = voiceless labiodental fricative
- [g] = voiced velar stop
- [ɹ] = voiced alveolar rhotic/retroflex liquid



Provide the articulatory description

[k] = voiceless velar stop

[n] = voiced alveolar nasal

[tʃ] = voiceless (alveo-)palatal (or post-alveolar) affricate

[w] = voiced bilabial glide



Practice: articulatory description

[b] = voiced bilabial stop

[f] = voiceless labiodental fricative

[j] = voiced palatal glide

[dʒ] = voiced post-alveolar/palatal affricate

[ŋ] = voiced velar nasal

[ʃ] = voiceless post-alveolar/palatal fricative

[ɹ] = voiced alveolar rhotic/retroflex liquid

[h] = voiceless glottal fricative

Practice: Provide symbol

- [k] = voiceless velar stop
- [ð] = voiced interdental fricative
- [l] = voiced alveolar lateral liquid
- [tʃ] = voiceless post-alveolar affricate
- [m] = voiced bilabial nasal
- [s] = voiceless alveolar fricative
- [v] = voiced labiodental fricative

Provide the English word

[pɪtʃəz] = peaches

[reɪdʒ] = rage

[smʌðə] = smother

[juːnɪk] = unique

[wɒʃt] = washed

[lʊks] = looks

[dʒæɡəd] = jagged

[pɔːtʃ] = porch



Provide the English word

[ɹuʒ]	=	rouge
[smuð]	=	smooth
[junik]	=	unique
[natʃt]	=	notched
[kuriz]	=	cooties
[dʒagd]	=	jogged
[ʃits]	=	sheets

Provide the Transcription

[fraɪt]	=	fright
[jɛləʊ]	=	yellow
[əvɔɪd]	=	avoid
[dʒʌɡz]	=	jugs
[θrəʊ]	=	throw
[sɪŋɪŋ]	=	singing
[sɪŋɪŋ]		

Provide the Transcription

[rɒbʌst] = robust

[dʒɛləs] = jealous

[lɪkwəd] = liquid

[ʃʊk] = shook

[bʌŋkt] = bonked

[ʃræŋk] = shrank

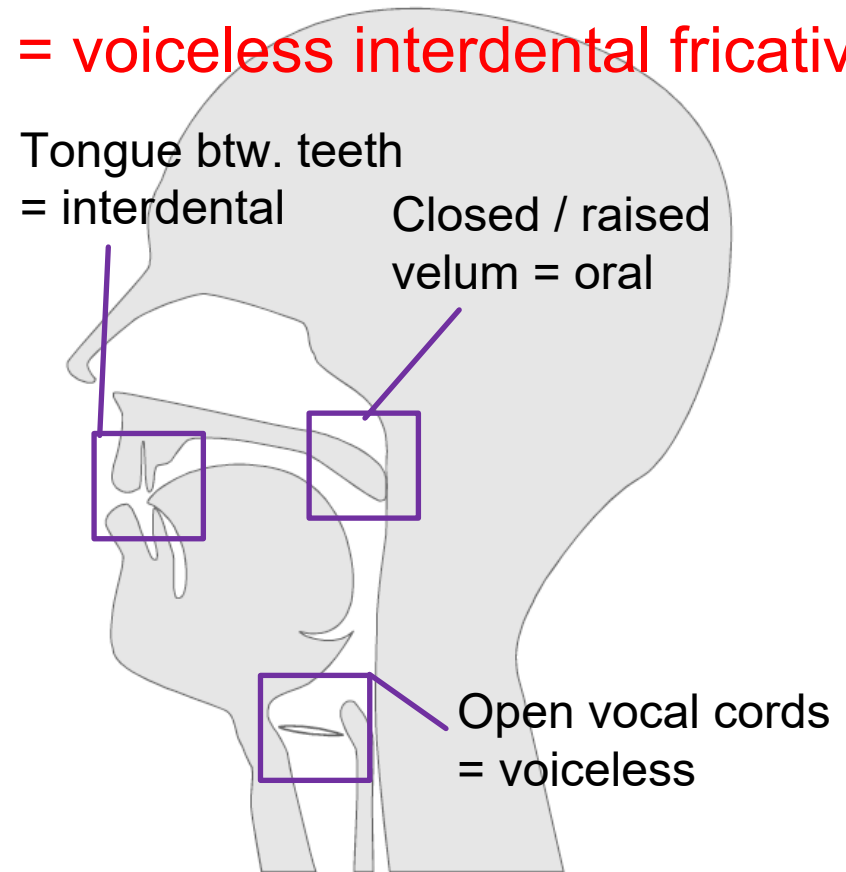
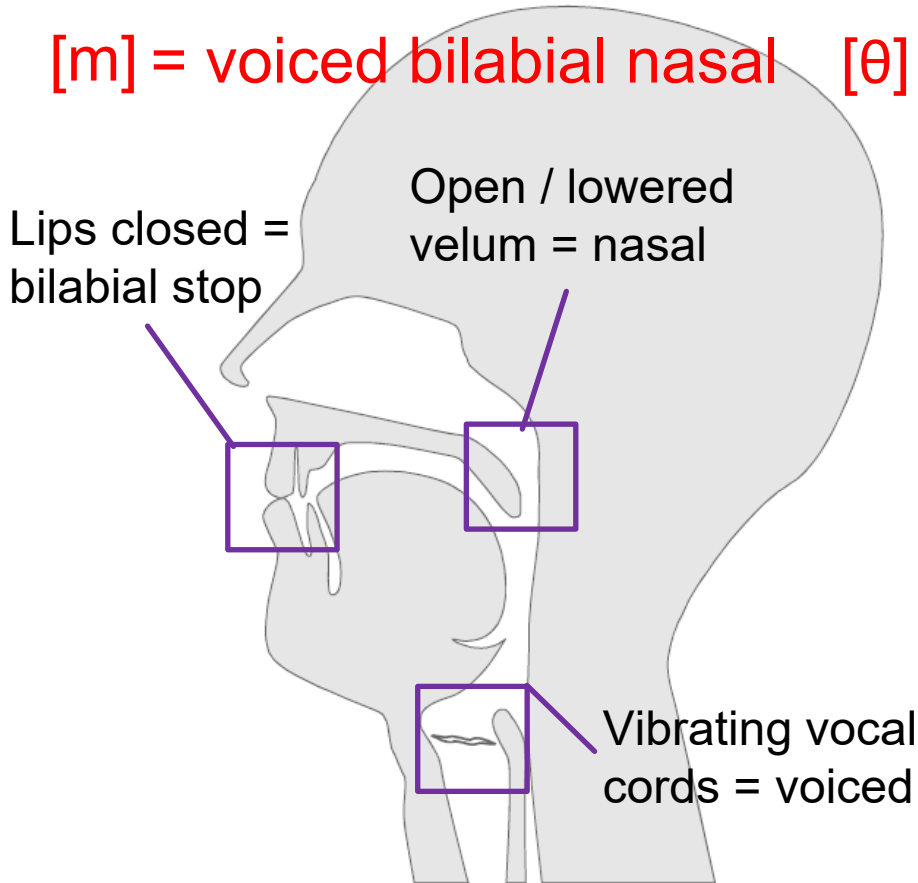
[gəɹɑʒ] = garage

Minimal Pair Differences

- What feature(s) (voicing, place, manner) distinguish the contrastive phonemes in these minimal pairs?
 - Ex: sun-sum: /n, m/ differ in place
 - sue-shoe /s, ʃ/ place
 - choke-joke /tʃ, dʒ/ voicing
 - tin-tip /n, p/ place, manner, voicing
 - pass-pad /s, d/ manner, voicing

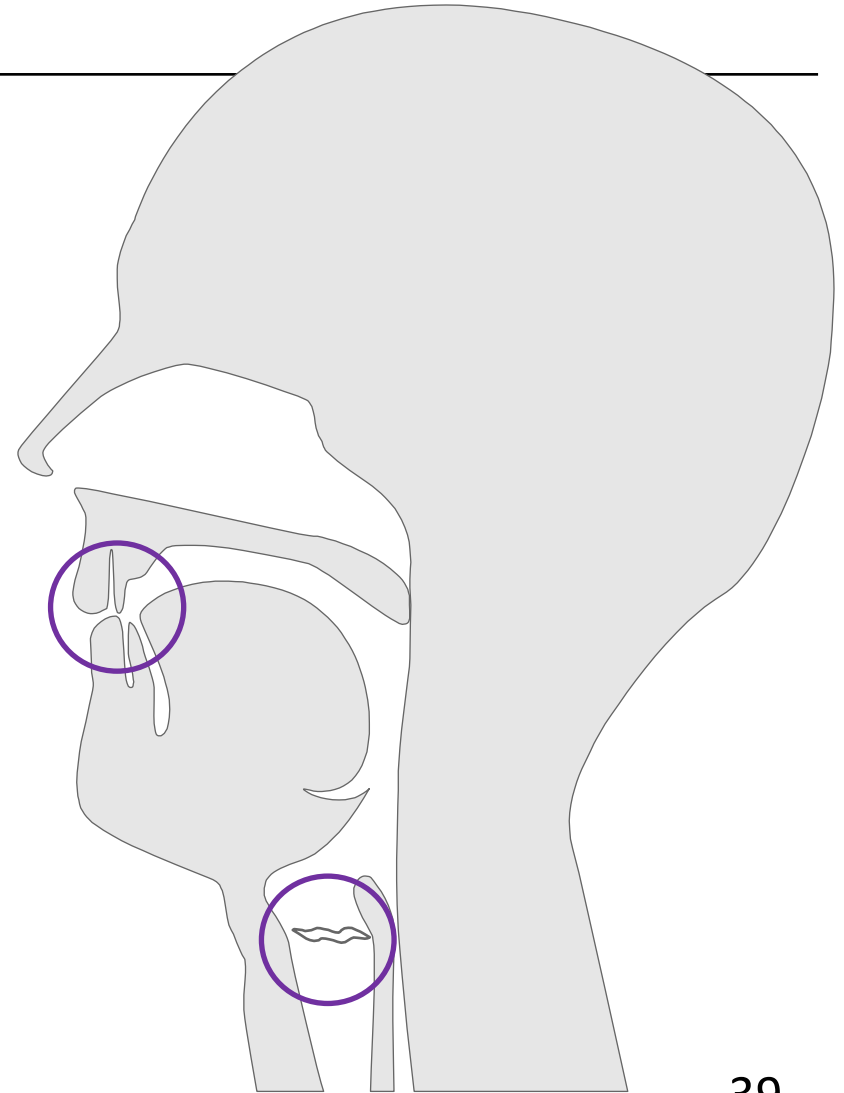
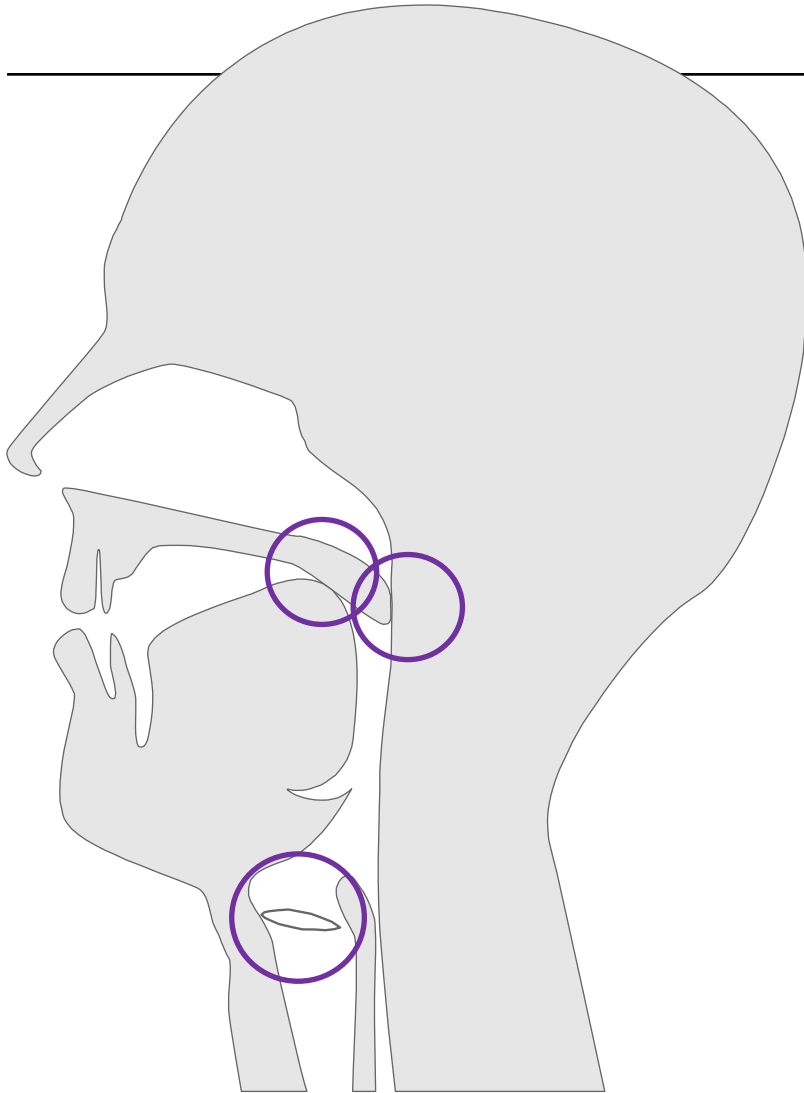
Practice: Articulation ID

[m] = voiced bilabial nasal [θ] = voiceless interdental fricative



[k] = voiceless velar stop

[v] = voiced labiodental fricative





More Practice

- Review Exercises in Ch 5 textbook
 - Esp. C, E, G, H, I
 - Answers in back of book

- #2-3 here: <https://is.gd/y9MJli>
 - Note: this site uses /y, w/ for the offglide in diphthongs instead of /ɪ, ʊ/



RESOURCES

Links – Charts (helpful for learning)

- Interactive IPA charts
 - Paul Meier Dialect Services (uses Flash, user-friendly):
www.paulmeier.com/ipa/charts.html
 - U. of Victoria (includes audio explanations, uses QuickTime):
web.uvic.ca/ling/resources/ipa/charts/IPALab/IPALab.htm
 - U. of Iowa Flash Animation (English, Spanish, German; uses Flash, includes visual aids): <https://soundsofspeech.uiowa.edu/>
 - Ladefoged & Johnson online materials (uses QuickTime, may have to download each aiff file to play):
<http://www.phonetics.ucla.edu/course/chapter1/chapter1.html>

Links – Fonts (needed for HW)

- IPA character-picker sites
 - Select, copy and paste IPA symbols from here to Canvas or other sites/programs that have trouble with IPA fonts
 - Weston Ruter's: <http://westonruter.github.com/ipa-chart/keyboard/>
 - Richard Ishida's: <https://r12a.github.io/pickers/ipa/>
 - TypeIt: <http://ipa.typeit.org/full/>
- Download IPA font Charis SIL: <https://software.sil.org/charis/>

Links – Keyboards (alternative for HW)

- Keyboard layouts configured for IPA Unicode fonts:
 - Google "IPA keyboard layout unicode" plus your operating system
 - How to set your keyboard once you've installed a layout (for Windows 2000 or later): <http://www.rejc2.co.uk/ipakeyboard/>
 - More complete layout for Windows:
<http://www.phon.ucl.ac.uk/resource/phonetics/>
 - Quirk/Tip: uninstall Charis and Doulos fonts before installing the keyboard layout, then reinstall them afterward. If you forget to uninstall them, the keyboard installation process will pop up an error window for each font. Click Ignore. When it finishes installing, go back and reinstall [Charis](#) and [Doulos](#) (or the fonts will cause quirks like permanent Italics in Word).

Articulators in motion: MRI



<http://youtu.be/uTOhDqhCKQs>

IPA English consonants

[p]	sp <u>i</u> t, t <u>i</u> p, ap <u>p</u> ear
[b]	<u>b</u> all, gl <u>o</u> be, am <u>b</u> le
[t]	s <u>t</u> ack, pa <u>t</u> , s <u>t</u> uffed, p <u>t</u> erodactyl
[d]	<u>d</u> ip, ca <u>r</u> d, <u>d</u> rop, lov <u>e</u> d
[k]	s <u>k</u> it, jok <u>e</u> r, att <u>i</u> c, ex <u>c</u> eed
[g]	gu <u>a</u> rd, ba <u>g</u> , lon <u>g</u> er
[ʔ]	uh-oh, Ba <u>t</u> man
[f]	<u>f</u> oot, lau <u>g</u> h, <u>ph</u> ilosoph <u>y</u> , coff <u>e</u> e
[v]	<u>v</u> est, do <u>v</u> e, gra <u>v</u> el
[θ]	<u>th</u> rough, ba <u>th</u> , <u>th</u> istle, e <u>th</u> er, te <u>th</u>
[ð]	<u>th</u> e, <u>th</u> eir, mo <u>th</u> er, e <u>th</u> er, te <u>th</u> e

IPA English consonants

- [s] soap, psychology, nice
- [z] zip, roads, kisses, xerox, design
- [ʃ] shy, mission, nation, glacial, sure
- [ʒ] measure, vision, azure, casualty
- [h] who, hat, reheat
- [tʃ] choke, match, church
- [dʒ] judge, george, jelly, region, residual
- [m] moose, lamb, smack
- [n] nap, snow, cann, know
- [ŋ] lung, thing, think, finger, singer, ankle

IPA English consonants

- [l] leaf, feel, mild, sleep
- [ɹ] reef, fear, prune, carry
- [r] writer, rider, latter, ladder, pretty
- [w] with, swim, mowing, queen, twin
- [j] you, beautiful, feud, use, yell
- [n] button, lesson, thousand
- [m] prism, chasm, bottomless
- [ŋ] table, hopeful, bottle
- [ɹ] bird, worm, percent