

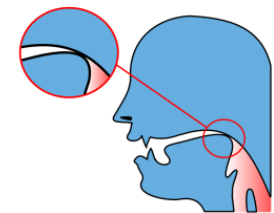
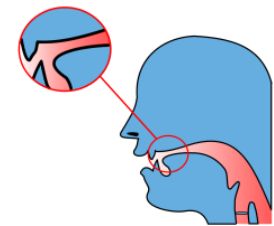
The Sounds of the World's Languages

HSSP Summer 2015 – Class 2

July 19, 2015

Categorizing sounds

- * Last time, we talked about categorizing consonant sounds according to a few of their articulatory properties.
- * For example, /z/ is a...
 - * *voiced* (the vocal cords vibrate during production)
 - * *alveolar* (the tongue tip makes contact with the alveolar ridge)
 - * *fricative* (the airstream is constricted to a narrow stream of air)
- * And /k/ is a...
 - * *voiceless* (the vocal cords do not vibrate during production)
 - * *velar* (the tongue dorsum makes contact with the velum)
 - * *stop* (airflow stops, pressure builds up, and is then released)



Categorizing sounds

- * Being able to categorize sounds in this way makes arranging them into a table quite easy.

	Bilabial	Labiodental	Interdental	Alveolar	Palato-Alveolar	Palatal	Velar	Glottal
Stop								
Fricative								
Affricate								
Nasal								
Lateral Approx.								
Retroflex Approx.								
Glide								








Categorizing sounds

* For example: /z/ is voiced, alveolar, and a fricative...

	Bilabial	Labiodental	Interdental	Alveolar	Palato-Alveolar	Palatal	Velar	Glottal
Stop								
Fricative								
Affricate								
Nasal								
Lateral Approx.								
Retroflex Approx.								
Glide								

Categorizing sounds

* ...and /k/ is voiceless, velar, and a stop.

	Bilabial	Labiodental	Interdental	Alveolar	Palato-Alveolar	Palatal	Velar	Glottal
Stop								
Fricative								
Affricate								
Nasal								
Lateral Approx.								
Retroflex Approx.								
Glide								

Categorizing sounds

* We can follow this practice for the entire consonantal inventory of American English. It looks (more or less) like this:

	Bilabial		Labiodental		interdental		Alveolar		Palato-Alveolar		Palatal		Velar		Glottal	
Stop	p	b					t	d					k	g	ʔ	
Fricative			f	v	θ	ð	s	z	ʃ	ʒ					h	
Affricate									tʃ	dʒ						
Nasal		m						n					ŋ			
Lateral Approx.								l								
Retroflex Approx.								ɻ								
Glide		w										j				

Categorizing sounds

* But you'll notice that there are many blanks.

	Bilabial		Labiodental		Interdental		Alveolar		Palato-Alveolar		Palatal		Velar		Glottal	
Stop	p	b					t	d					k	g	ʔ	
Fricative			f	v	θ	ð	s	z	ʃ	ʒ					h	
Affricate									tʃ	dʒ						
Nasal		m						n					ŋ			
Lateral Approx.								l								
Retroflex Approx.								ɻ								
Glide		w										j				

Categorizing sounds

* For example, what about a *voiceless velar fricative*?

	Bilabial		Labiodental		Interdental		Alveolar		Palato-Alveolar		Palatal		Velar		Glottal	
Stop	p	b					t	d					k	g	ʔ	
Fricative			f	v	θ	ð	s	z	ʃ	ʒ			??		h	
Affricate									tʃ	dʒ						
Nasal		m						n						ŋ		
Lateral Approx.								l								
Retroflex Approx.								ɻ								
Glide		w										j				

Categorizing sounds

* Or a voiced *palatal stop*?

	Bilabial		Labiodental		interdental		Alveolar		Palato-Alveolar		Palatal	Velar		Glottal	
Stop	p	b					t	d			?	k	g	ʔ	
Fricative			f	v	θ	ð	s	z	ʃ	ʒ		??		h	
Affricate									tʃ	dʒ					
Nasal		m						n					ŋ		
Lateral Approx.								l							
Retroflex Approx.								ɻ							
Glide		w									j				

Categorizing sounds

* Or a voiceless alveolar nasal?

	Bilabial		Labiodental		Interdental		Alveolar		Palato-Alveolar		Palatal	Velar		Glottal	
Stop	p	b					t	d			ʔ	k	g	ʔ	
Fricative			f	v	θ	ð	s	z	ʃ	ʒ		ʔʔ		h	
Affricate									tʃ	dʒ					
Nasal		m					ʔʔ	n					ŋ		
Lateral Approx.								l							
Retroflex Approx.								ɻ							
Glide		w									j				

Segmental typology

- * Perhaps unsurprisingly, the total number of possible (and attested) consonantal sounds is much larger than what's attested in English. (not everything is here.)

	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			

Today...

- * We're going to explore what some of these sounds are, how they're produced, and what they sound like.
- * All of our examples will come from the UCLA Phonetics Lab data (<http://www.phonetics.ucla.edu/index/sounds.html>), which is a wonderful resource you should check out on your own!
- * We'll take a look at sounds that are on the chart I just showed you... as well as sounds that aren't.
- * Our focus will be on consonants (for reasons of time, and my expertise – though feel free to ask about vowels too!).
- * Time permitting, we'll also look at how researchers study the articulatory properties of consonants.

Place of articulation: Labials

- * Bilabial fricatives in Ewe
- * Bilabial trills in Kele and Titan
- * Labiodental approximants in Isoko
- * Labiodental nasals... in English!

	Bilabial	Labiodental
Plosive	p b	
Nasal	m	ɱ
Trill	ʙ	
Tap or Flap		
Fricative	ɸ β	f v
Lateral fricative		
Approximant		ʋ
Lateral approximant		

Places of articulation: Coronals

- * A lot of these sounds are familiar: English has a notably rich inventory of coronals.
- * But there are also many that aren't!
 - * [Trills in Toda](#)
 - * [Lateral fricatives in Zulu](#)
 - * [Retroflex stops in Hindi](#)
 - * [Retroflex fricatives in Ubykh](#)

Dental	Alveolar	Postalveolar	Retroflex
	t d		ʈ ɖ
	n		ɳ
	r		
	ɾ		ɽ
θ ð	s z	ʃ ʒ	ʂ ʐ
	ɬ ɮ		
	ɹ		ɻ
	l		ɭ

Places of articulation: Dorsals

- * Now onto dorsals, an area where English is really quite poor.
- * Palatals in Hungarian
- * Palatal & velar fricatives in Greek
- * Uvular stops in Quechua
- * Guttural fricatives in Hebrew
- * Uvular rhotics (trills?) in French

Palatal	Velar	Uvular	Pharyngeal		Glottal	
c ɟ	k ɡ	q ɢ			ʔ	
ɲ	ŋ	ɴ				
		ʀ				
ç ʝ	x ɣ	χ ʁ	ħ ʕ		h ɦ	
j	ɥ					
ʎ	ʟ					

Extras!

- * There are some places of articulation we haven't yet covered, and some sounds that are articulated at more than one place. Here are some examples:
 - * Linguo-labials in V'enen Taut
 - * Labio-velars in Idoma
- * And there's also some stuff that's just generally cool, but didn't entirely fit into the above presentation:
 - * Voiceless nasals in Burmese
 - * Secondary articulations, i.e. palatalization in Russian

Airstream mechanisms

- * But so far, *all* of the sounds we've talked about have something in common. Any ideas?

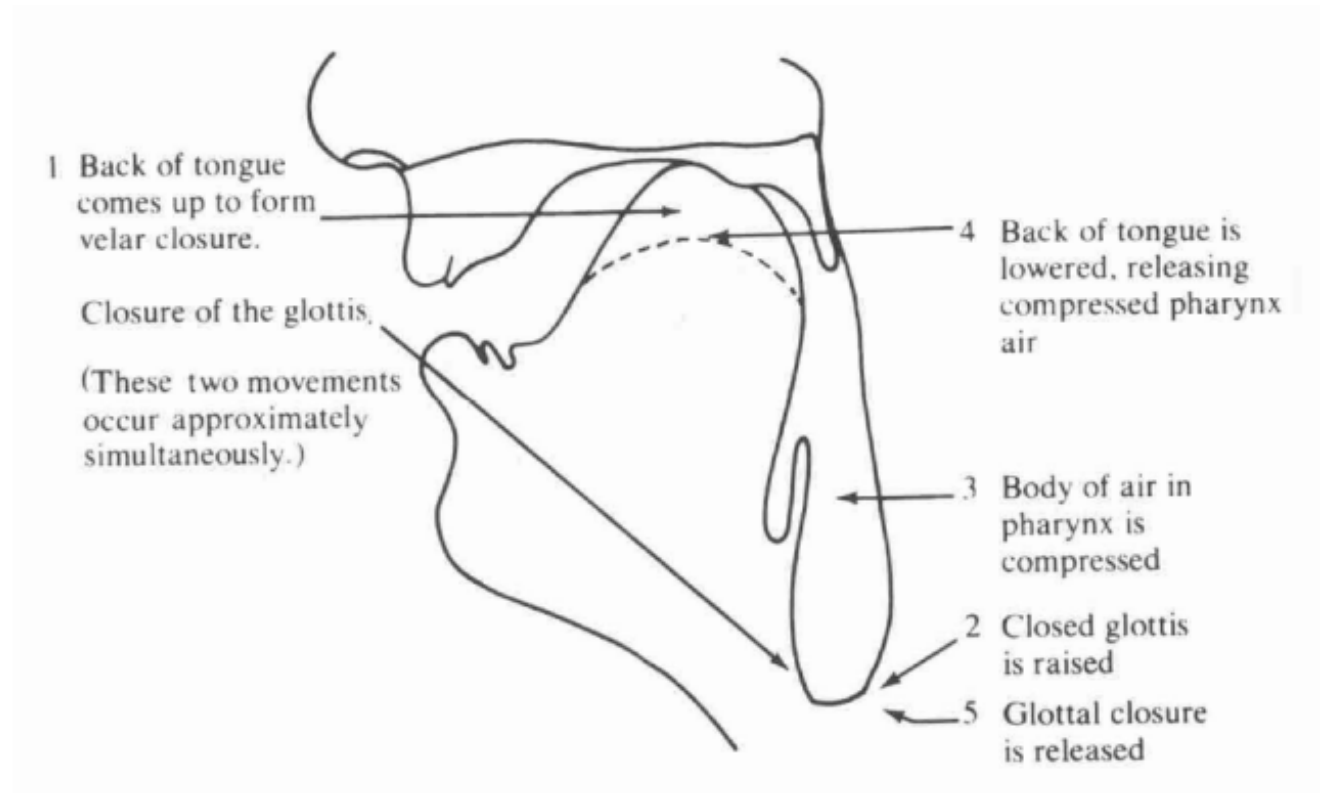
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b		t d			ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ	n			ɳ	ɲ	ŋ	ɴ		
Trill	ʙ		r						ʀ		
Tap or Flap			ɾ			ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative			ɬ ɮ								
Approximant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

Airstream mechanisms

- * Three ways to move air through the vocal tract.*
 - * With the lungs: *pulmonic* airstream mechanism
 - * egressive – the vast majority of sounds, incl. all in English.
 - * ingressive – Swedish for “yes”
 - * With the glottis: *glottalic* airstream mechanism
 - * egressive – **ejective** stops and fricatives
 - * ingressive – **implosive** stops
 - * With the tongue: *velaric* airstream mechanism
 - * egressive – not used in language
 - * ingressive – **click** sounds

Glottalic egressive

- * How to produce a velar glottalic egressive sound:

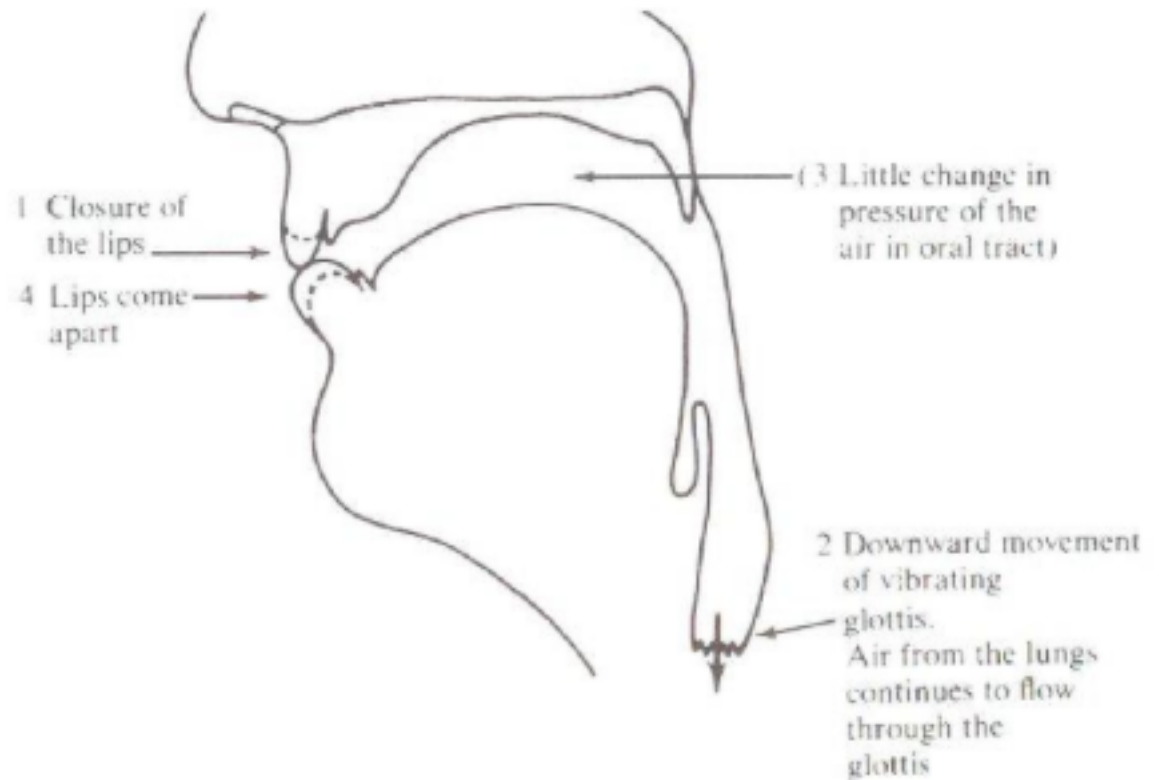


Glottalic egressive

- * Sounds created with this airstream mechanism are called *ejectives*. They include stops, affricates, and fricatives (though I was unable to find the latter).
- * [Ejective stops in Quechua](#)
- * [Ejective stops in Navajo](#)
- * There are also ejectives in English, to a limited extent. See: emphatic “nope”, “yup” (and various others).

Glottalic ingressive

- * How to produce a bilabial glottalic ingressive sound:

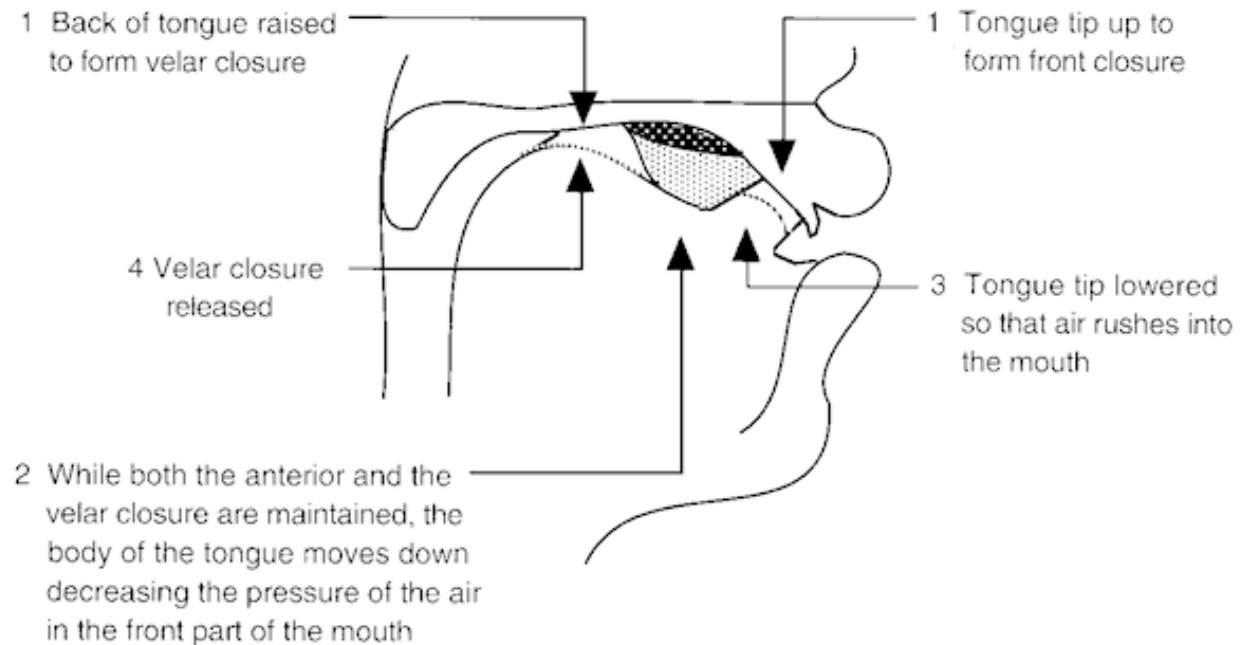


Glottalic ingressive

- * Sounds created with this airstream mechanism are called *implosives*. Implosives are largely limited to voiced stops, though there are reports of voiceless ones.
- * [Voiced implosives in Sindhi](#)
- * [Voiced & voiceless implosives in Igbo](#)
- * Apparently some speakers of Southern American English also produce these occasionally.

Velaric ingressive

- * How to produce a dental velaric egressive sound:



Velaric ingressive

- * Sounds created with this airstream mechanism are called *clicks*. Clicks are mainly attested in languages of Africa.
 - * [Clicks in Nama](#)
 - * [Clicks in Zulu](#)
 - * Also attested in American English “tsk, tsk”, and other metalinguistic phenomena.

Articulatory studies

- * We've talked about a lot of different sounds, and about ways to classify them. But how do researchers know such detailed information about place of articulation, manner of articulation, etc?
 - * One approach: stick your fingers in your mouth.
 - * Another (better) approach: study this instrumentally.

Studying articulation

- * One way to study articulatory properties of language is to use various kinds of imaging: for example, with MRI, you can observe the tongue in fascinating detail.
- * There's also electropalatography, where a device containing many electrodes measures where the tongue makes contact with the roof of the mouth.
- * When these kinds of studies are unavailable (i.e. if you're doing fieldwork in a really remote area), there's always just plain palatography...