Global phonetic diversity

Cơ sở âm vị học và ngữ âm học

Lecture 3

Why phonetic transcription?

- Inconsistent orthography within languages... (*cough, ghost*)
- ...across dialects... (*dán, rán, gián*)
- ...and across languages... (*ax, xôi*)

Solution: the IPA

THE INTERNATIONAL PHONETIC ALPHABET (2005)

CONSONANTS (PULMONIC)

	LABIAL		CORONAL				DORSAL			RADICAL		LARYNGEAL
	Bilabial	Labio-dental	Dental	Alveolar	Palato-alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Epi-glottal	Glottal
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ			
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʡ	ʔ
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	ʜ ʢ	h ɦ
Approximant		ʋ		ɹ		ɻ	j	ɰ				
Trill	ʙ			r					ʀ		ʡ	
Tap, Flap		ⱱ		ɾ		ɽ						
Lateral fricative				ɬ ɮ								
Lateral approximant				l		ɭ	ʎ	ʟ				
Lateral flap				ɺ								

Where symbols appear in pairs, the one to the right represents a modally voiced consonant, except for murmured ɦ.
Shaded areas denote articulations judged to be impossible. Light grey letters are unofficial extensions of the IPA.

IPA Resources

- `http://web.uvic.ca/ling/resources/ipa/charts/IPAlab/IPAlab.htm`
- `http://home.cc/umanitoba.ca/%7Ekrussl/138/practice/prelim.htm`
- `http://www.phon.ucl.ac.uk/home/johnm/flash/flashin.htm`
- `http://www.chass.utoronto.ca/~danhall/phonetics/sammy.html`

Phân loại phụ âm

- **Place** of articulation (*vị trí cấu âm*):
  location of constriction (labial, coronal, dorsal...)
- **Manner** of articulation (*phương thức cấu âm*):
  type of constriction (stop, fricative, lateral...)
- **State of the glottis** (voiced/voiceless)

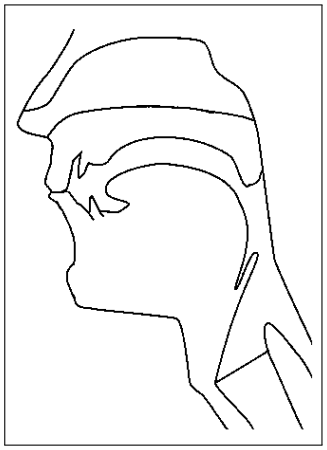
Phân loại phụ âm

- **Airstream**: pulmonic/non-pulmonic
- **Direction of airflow**: ingressive/egressive
- **Path of airflow**: oral/lateral
- **Position of velum**: raised/lowered

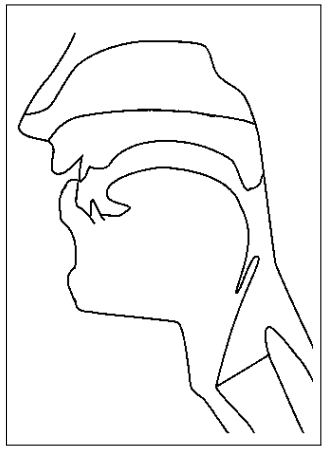
Phân loại phụ âm

- **Nguồn luồng khí**: pulmonic/non-pulmonic
- **Hướng luồng khí**: đi vào/đi ra
- **Đường luồng khí**: ở miệng/ở bên
- **Position of velum**: cao/thấp

Place of articulation: Labial *(đôi môi)*

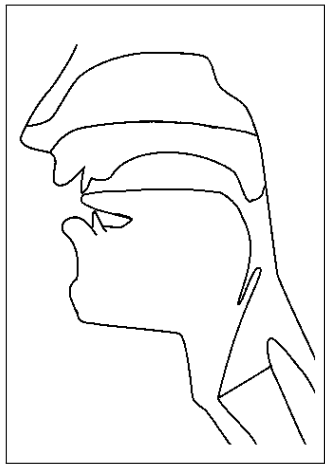


Bilabial: upper and low lips (**m**at)

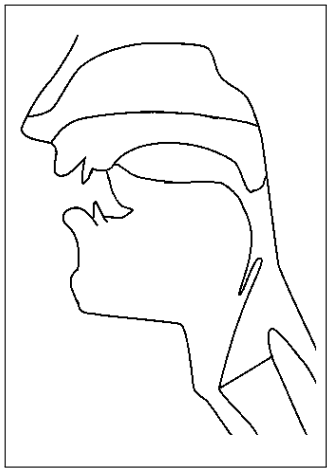


Labiodental: lower lip and upper teeth (**f**at)

Place of articulation: Coronal (*lưỡi trước*)

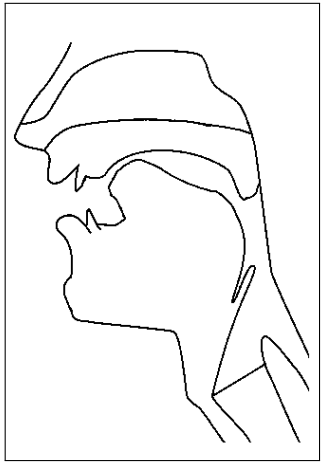


(Inter)dental: tongue tip and upper teeth (**th**e)

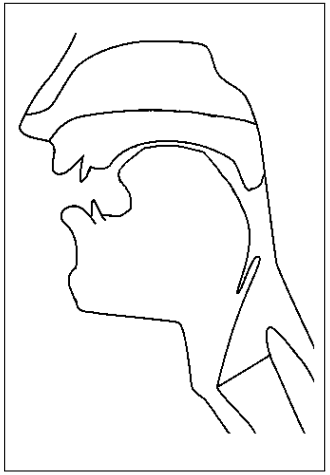


Alveolar: tongue tip and alveolar ridge (**t**ap)

Place of articulation: Coronal (*lưỡi trước*)



(Post)alveolar: tongue blade and back of alveolar ridge/front of palate (**sh**eep)

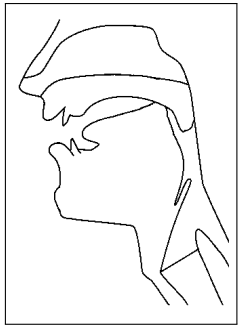


Palatal: front of tongue and hard palate (i**ch**)

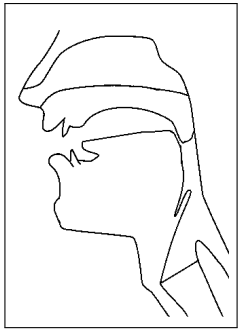
Place of articulation: Coronal (*lưỡi trước*)

Retroflex: tongue tip (curled back) and back of alveolar ridge or front of palate (**r**ed [ɹɛd)]

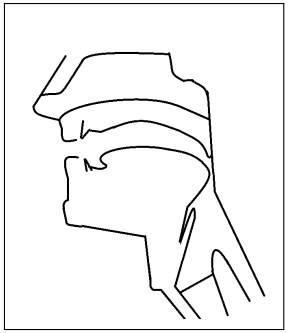
Place of articulation: Dorsal (*lưỡi giữa*)



Velar: back of tongue against velum (**c**at)



Uvular: tongue root & uvula (French **r**oue [ʁu] ‘wheel’



Pharyngeal: tongue root and pharyngeal wall (Arabic عالم) [ʕaalam] ‘world’

Manner of articulation

- **Obstruents** include stops, fricatives, and affricates
- All involve an obstruction of airflow resulting in increased supralaryngeal vocal tract pressure
- **Sonorants** include vowels, nasals, and liquids
- These sounds are produced with an unobstructed vocal tract, i.e. w/out turbulent airflow

Obstruents I: Stops (*âm tắc*)

English initial stops

bilabial:	[p]	[b]	*pat*	*bat*
alveolar:	[t]	[d]	*tin*	*din*
velar:	[k]	[g]	*cap*	*gap*

Obstruents I: Stops (*âm tắc*)

Aleut (Eskimo-Aleut)

DENTAL	VELAR	UVULAR
tiistax̂	***kiikax̂***	***qiighax̂***
tiːstaχ	kiːkaχ	qiːʏaχ
'dough'	'cranberry bush'	'grass'
taangax̂	***kaangux̂***	***qaadan***
taːŋaχ	kaːŋuχ	qaːðan
'water'	'healthy'	'dolly varden' (fish)

Obstruents I: Stops (*âm tắc*)

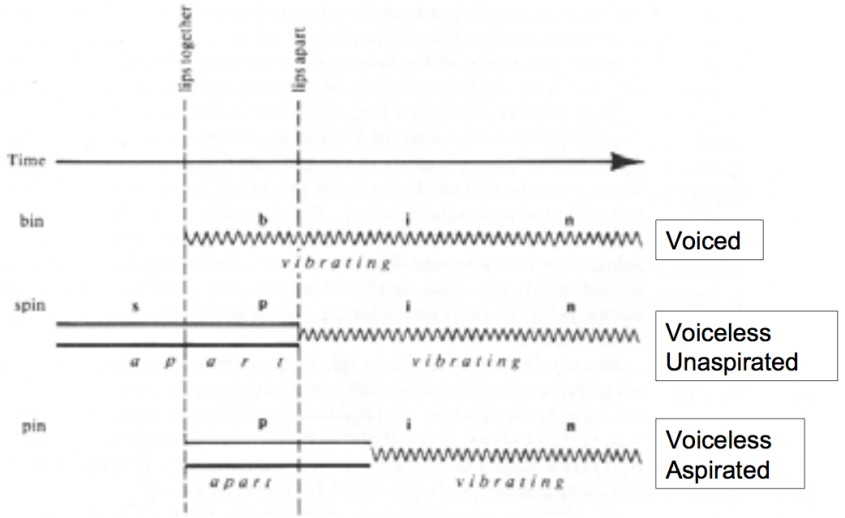
Hungarian (Finno-Ugric)

	VOICELESS STOP	VOICED STOP	NASAL
INITIAL	tyúk	gyújt	nyújt
	cuk	**ɟuit**	**ɲuit**
	'hen'	'he ignites'	'he reaches'

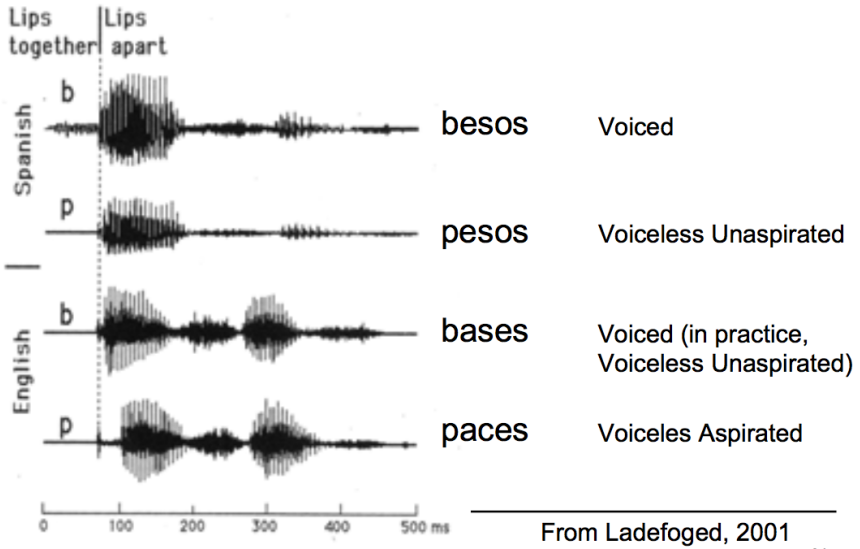
How are stops produced?

- Phase 1: Closure
  - Articulators are brought together so that air is trapped in the oral cavity.
- Phase 2: Release
  - Articulators are pulled apart quickly, and the pressurized air escapes with a puff.
- A further parameter of variation: duration of **aspiration** (*bật hơi*), the time after release before resumption of voicing (VOT)

Voice onset time

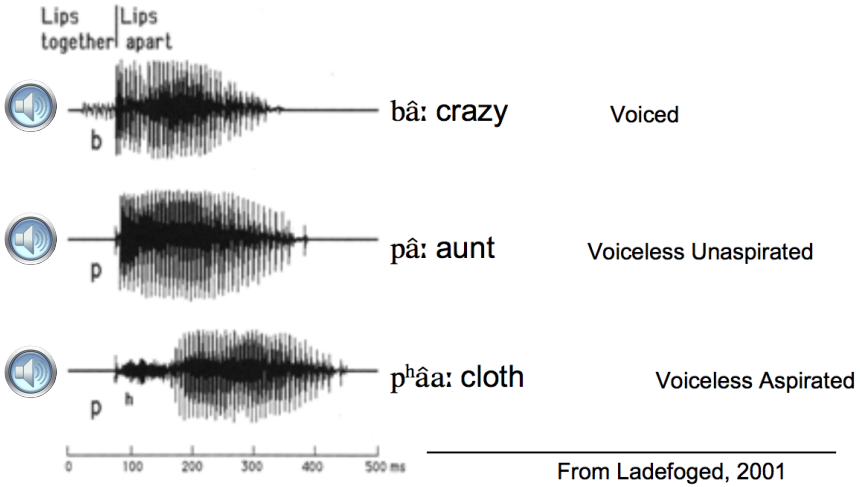


VOT in English and Spanish



From Ladefoged, 2001

VOT in Thai



From Ladefoged, 2001

Final VOT in Armenian

Voiced	ab (a month)	bag 'portion'
Voiceless unaspirated	kap̚ 'bond'	bak 'porch'
		tak 'under'
Voiceless aspirated	kap^{h} 'club'	tak^{h} 'hot'

VOT in Hindi

5 place and 4 manners!

	Bilabial	Dental	Post-alveolar	Palato-alveolar	Velar
Voiced	bal 'hair'	d̪al 'lentil'	ɖal 'branch'	ɖʒal 'net'	gal 'cheek'
Voiceless unaspirated	pal 'take care of'	t̪al 'beat'	ʈal 'postpone'	ʧal 'turn'	kal 'era'
Voiceless aspirated	pʰal 'knife blade'	t̪ʰal 'plate'	ʈʰal 'wood shop'	ʧʰal 'bark'	kʰal 'skin'
Voiced aspirated	bʱal 'forehead'	d̪ʱar 'knife'	ɖʱal 'shield'	ɖʒʱal 'cymbals'	gʱal 'confusion'

Obstruents II: Fricatives (*âm xát*)

English

Labiodental	[f]	[v]	*fine*	*vine*
Dental	[θ]	[ð]	*thigh*	*thy*
Alveolar	[s]	[z]	*sip*	*zip*
Post-alveolar	[ʃ]	[ʒ]	*shape*	*beige*
Glottal	[h]		*heat*	

Obstruents II: Fricatives (*âm xát*)

Toda (Dravidian, S. India)

Labiodental	pɔf	'swelling'
Dental	pɔθ	'roof beam'
Dental sibilant	kɔs̪	'money'
Velarized alveolar sibilant	pɔsˠ	'milk'
Postalveolar sibilant	pɔʃ	'language'
Retroflex sibilant	pɔʂ	(clan name)
Velar	pɔx	'blood'

Sonorants I: Nasals (*âm mũi*)

- Produced with a lowered velum
- English has nasals at **three** places of articulation:

[m]	*mat*
[n]	*gnat*
[ŋ]	*sang*

Sonorants I: Nasals (*âm mũi*)

- Produced with a lowered velum
- English has nasals at **three** places of articulation:

bilabial	[m]	*mat*
alveolar	[n]	*gnat*
velar	[ŋ]	*sang*

- Distribution of [ŋ] (engma) restricted to final position

Sonorants I: Nasals (*âm mũi*)

- Vietnamese has nasals at **four** places of articulation:

[m]	*móm*
[n]	*nón*
[ɲ]	*nhóm*
[ŋ]	*ngon*

- Phân bố là thế nào?

Sonorants I: Nasals (*âm mũi*)

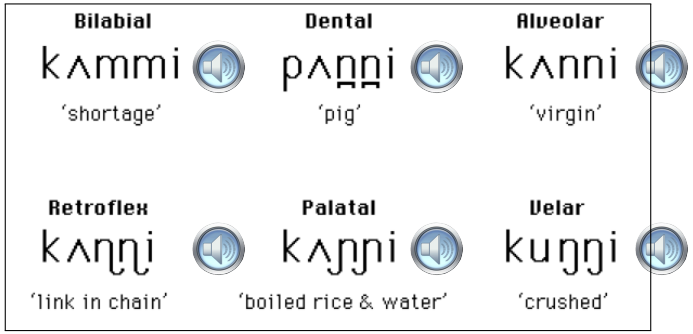
- Vietnamese has nasals at **four** places of articulation:

bilabial	[m]	*móm*
alveolar	[n]	*nón*
palatal	[ɲ]	*nhóm*
velar	[ŋ]	*ngon*

- Phân bố là thế nào?

Sonorants I: Nasals (*âm mũi*)

Malayalam (Dravidian, S. India)



Sonorants II: Approximants (*tiếp cận*)

English

lateral	[l]	*lake*
post-alveolar/retroflex	[ɹ]	*red*
palatal	[j]	*year*
voiced labiovelar	[w]	*worry*
voiceless labiovelar	[ʍ]	*whine* (cf. *wine*)

([w j] cũng tên là *bán nguyên âm*)

Airstream mechanisms

CONSONANTS (NON-PULMONIC)

Anterior click releases (require posterior stops)	Voiced implosives	Ejectives
ʘ Bilabial fricated	ɓ Bilabial	’ *Examples:*
ǀ Laminal alveolar fricated (“dental”)	ɗ Dental or alveolar	pʼ Bilabial
ǃ Apical (post)alveolar abrupt (“retroflex”)	ʄ Palatal	tʼ Dental or alveolar
ǂ Laminal postalveolar abrupt (“palatal”)	ɠ Velar	kʼ Velar
ǁ Lateral alveolar fricated (“lateral”)	ʛ Uvular	sʼ Alveolar fricative

Clicks (*mút*)

- Velaric ingressive sounds
- Can be voiced, voiceless, nasal, oral...
- Common in African languages (esp. Bantu) but not found elsewhere?

How To Make A Click

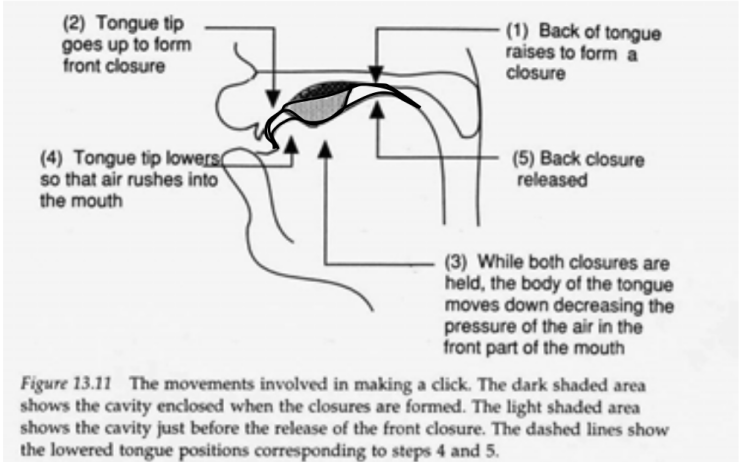


Figure 13.11 The movements involved in making a click. The dark shaded area shows the cavity enclosed when the closures are formed. The light shaded area shows the cavity just before the release of the front closure. The dashed lines show the lowered tongue positions corresponding to steps 4 and 5.

From Ladefoged (2001)

X-ray of a click

Clicks in !Xóõ (Taa)

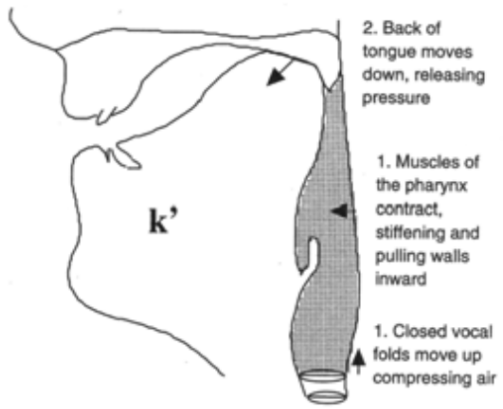
- Khoisan language of Southern Africa
- At least 58 consonants, 31 vowels, 4 tones

Bilabial	Dental	Alveolar	Palatal	Lateral
ʘʔôo	kǀʔâa	k!ʔáã	kǂʔāa	kǁʔàa
'get stuck'	'die'	'be seated'	'shoot you'	'not to be'

Glottalic airstream mechanisms

- Air is trapped between glottis and a supralaryngeal constriction
- Glottalic egressives are **ejectives** (*âm tống ra*)
- Glottalic ingressives are **implosives** (*âm kép*)

How To Make An Ejective



From Ladefoged (2001)

Ejectives in Quechua

	Palato-alveolar	Velar	Uvular
Voiceless	**tʃaka** 'bridge'	**kuɟui** 'to move'	**qaʎu** 'tongue'
Aspirated	**tʃʰaka** 'large ant'	**kʰuɟui** 'to whistle'	**qʰaʎu** 'shawl'
Ejective	**tʃ'aka** 'hoarse'	**k'uɟui** 'to twist'	**q'aʎu** 'tomato sauce'

How To Make An Implosive

- Larynx is raised
- P_0 is decreased so when constriction is released, air rushes in
- Voicing is produced as larynx is lowered, pushing against vocal folds.

Implosives in Sindhi

ɓani 'field' banu 'forest' daru 'door'

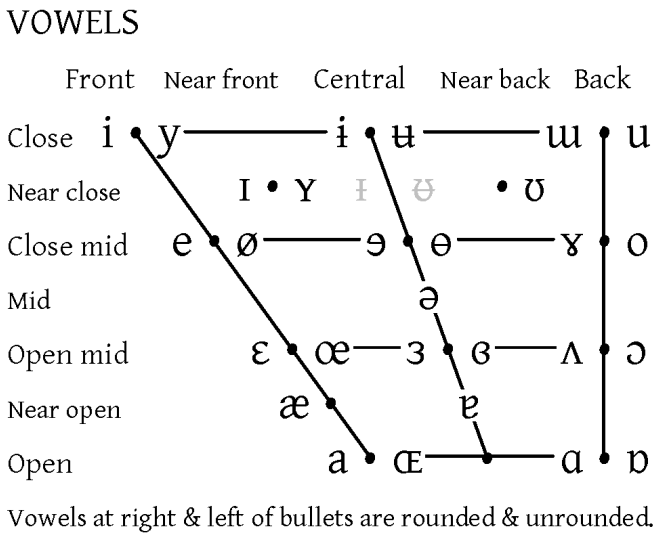
ɗɪnu 'festival' ɟatu 'illiterate' gʃanu 'handle'

ɖoːru 'you run' ɟatu 'illiterate [variant]' guɳu 'quality'

Summary of airstream mechanisms

Airstream / Airflow (*luồng khí*)	Pulmonic	Glottalic	Velaric
Egressive (*đi ra*)	Plain stops [p t k b d g] (*âm tắc*)	Ejectives [p' t' k'] (*âm tống ra*)	None in speech
Ingressive (*đi vào*)	None in speech	Implosives [ɓ ɗ ɠ] (*âm khép*)	Clicks [ʘ | ! ǂ ‖] (*mút*)

Vowels



Rounding and Nasalisation in French

lit 'bed'	*(avoir) lu* 'read (p.p.)'	*loup* 'wolf'	
les 'the (pl.)'	*le* 'the (m. sg.)'	*lot* 'prize'	*long* 'long'
laid 'ugly'	*leur* 'their'	*lin* 'flax'	*lundi* 'Monday'
là 'there'		*las* 'tired'	*lent* 'slow'

Rounding and Nasalisation in French

li 'bed'	ly 'read (p.p.)'	lu 'wolf'	
le 'the (pl.)'	lø 'the (m. sg.)'	lo 'prize'	lõ 'long'
lɛ 'ugly'	lœʁ 'their'	lɛ̃ 'flax'	lœ̃di 'Monday'
la 'there'		lɑ 'tired'	lɑ̃ 'slow'

Back unrounded vowels in Vietnamese

ti ‘company’	tɯ ‘fourth’	tù ‘prison’
te ‘numb’	tɤ ‘silk’	to ‘bowl’
té ‘to fall down’	tɐ ‘we, our’	tɔ ‘large’

Vowel length in Khmer

ចប	[cɑ:p]	‘spade’		ចប់	[cɑp]	‘to finish’	
កាត	[ka:t]	‘card’		កាត់	[kat]	‘to cut’	
ឆើប	[tə:p]	‘crop (of bird)’		ឥត្	[təp]	‘divine’	
ឯក	[to:k]	‘alone’		តុ	[tok]	‘table’	
ឆ្មក	[tu:k]	‘sampan’		ឆ្មុក	[tuk]	‘to keep’	

Geminate consonants (*phụ âm điệp*) in Polish

pana	[pana]	‘Mr.’
panna	[panːa]	‘young lady’
leki	[lɛki]	‘medicines’
lekki	[lɛkːi]	‘light’
za	[za]	‘of’ (prep.)
zza	[zːa]	‘from behind’

Summary

In addition to place/manner/voicing and height/backness/roundness, languages may use other parameters to define distinctive sound categories:

- Type of airstream (*loại luồng khí*)
- Direction of airflow (*hướng luồng khí*)
- Path of airflow (*đường luồng khí*)
- Position of velum (*vị trí của lưỡi con*)
- Duration of constriction (*thời gian của thắt*)