

BBN–ANG–242 Phonology

8. Articulation and categorization of consonants;
phonotactics: nasal+plosive clusters and geminates

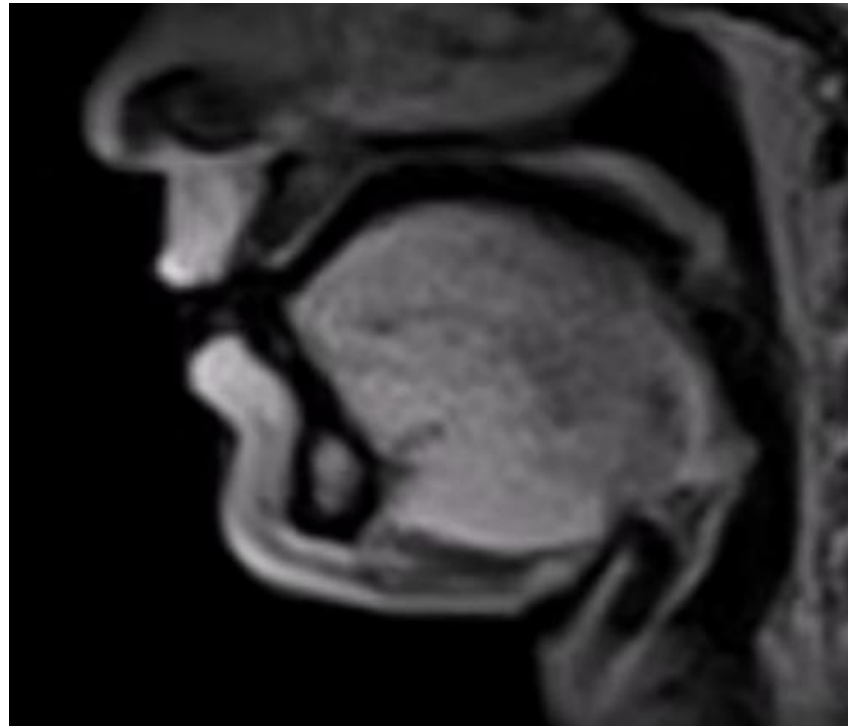
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Articulation and categorization of English consonants

What it looks like...

<https://www.youtube.com/watch?v=uT0hDqhCKQs>



THE INTERNATIONAL PHONETIC ALPHABET (revised to 2015)

CONSONANTS (PULMONIC) © 2015 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			ʀ					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			

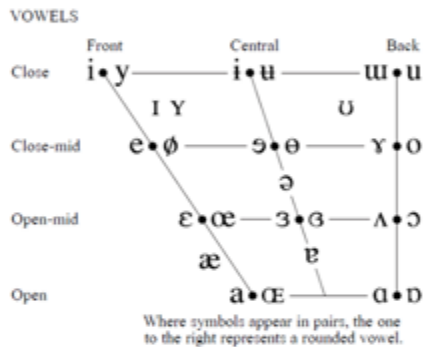
Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

... and the theoretical part

Charts downloadable from:
https://www.internationalphoneticassociation.org/sites/default/files/IPA_Kiel_2015.pdf

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌ Bilabial	ɓ Bilabial	ʼ Examples:
◌ Dental	ɗ Dental/alveolar	pʼ Bilabial
◌ (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
◌ Palatoalveolar	ɠ Velar	kʼ Velar
◌ Alveolar lateral	ɠ 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	ɧ Simultaneous ʃ and X
ħ 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	

ts k̰p

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

With audio recording:
<https://web.uvic.ca/ling/resources/ipa/charts/IPA1ab/IPA1ab.htm>

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

◌ Voiceless	◌ Breathy voiced	◌ Dental
◌ Voiced	◌ Creaky voiced	◌ Apical
◌ Aspirated	◌ Linguolabial	◌ Laminal
◌ 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	
◌ Syllabic	◌ Lowered	
◌ Non-syllabic	◌ Advanced Tongue Root	
◌ Rhoticity	◌ Retracted Tongue Root	

- TONES AND WORD ACCENTS
- | LEVEL | CONTOUR |
|-------------------|------------------|
| ◌ or ◌ Extra high | ◌ or ◌ Rising |
| ◌ High | ◌ Falling |
| ◌ Mid | ◌ High rising |
| ◌ Low | ◌ Low rising |
| ◌ Extra low | ◌ Rising-falling |
| ◌ Downstep | ↗ Global rise |
| ◌ Upstep | ↘ Global fall |

The consonants of the IPA used in (Standard Southern British) English

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2015)

CONSONANTS (PULMONIC)

© 2015 IPA

	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			ʀ					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			

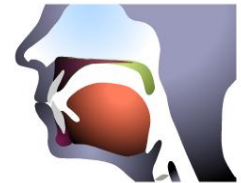
Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

The consonants of SSBE

			Place of articulation								
			bilab.	labio-dent.	dent.	alv.	post-alv.	pal.	vel.	glot.	
Manner of articulation	obstr.	stops/plosives	p b			t d			k g	[ʔ]	
		fricatives		f v	θ ð	s z	ʃ ʒ			h	
		affricates					tʃ dʒ				
son.	nasals	nasals	m			n			ŋ		
		approx.	liquids				l	r			
			glides	w						j	(w)

To see the movements of the speech organs during the articulation of consonants, go to

<http://soundsofspeech.uiowa.edu>



or

<https://www.youtube.com/playlist?list=PLKGCiuMS-nxoyh3I9dFG3kJyP4E9zAyXB>



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		affricates					tʃ dʒ				
	son.	nasals		m			n			ŋ	
		approx.	liquids				l	r			
			glides		w					j	(w)

phonation type: **voiceless**
voiced

The consonants of SSBE

			Place of articulation									
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		affricates					tʃ dʒ					
	son.	nasals		m			n				ŋ	
		approx.	liquids				l	r				
			glides		w					j	(w)	

obstruents

sonorants

The consonants of SSBE

			Place of articulation								
			bilab.	labio-dent.	dent.	alv.	post-alv.	pal.	vel.	glot.	
Manner of articulation	obstr.	stops/plosives	p b			t d			k g	[ʔ]	
		fricatives		f v	θ ð	s z	ʃ ʒ			h	
		affricates					tʃ dʒ				
	son.	nasals		m			n			ŋ	
		approx.	liquids				l	r			
			glides		w					j	(w)

sibilants

The consonants of SSBE

			Place of articulation							
			bilab.	labio-dent.	dent.	alv.	post-alv.	pal.	vel.	glot.
Manner of articulation	obstr.	stops/plosives	p b			t d			k g	[ʔ]
		fricatives		f v	θ ð	s z	ʃ ʒ			h
		affricates					tʃ dʒ			
	son.	nasals	m			n			ŋ	
		approx.	liquids			l	r			
			glides	w					j	(w)

coronals

Phonotactics

Phonotactics

the branch of phonology dealing with how phonemes can be combined to form words in a given language

e.g. How can we combine the phonemes /k/, /t/ and /a/ to form words in English?

1. /**kat**/

2. */**kakt**/

3. */**kta**/

Word 1 is an existent word in English, 2 and 3 are not.

However, there is a difference between cases 2 and 3:

- */**kakt**/ is a possible word, it just does not exist
→ *accidental gap*
- */**kta**/ is both nonexistent and impossible
→ *systematic gap*

English phonotactics

a. Nasal+plosive clusters
in morpheme-medial and morpheme-final position

English phonotactics

Nasal+plosive clusters

Morpheme-medially

	p	t	k	b	d	g
m	company			gamble		
n		winter			agenda	
ŋ			blanket			anger

Morpheme-finally

	p	t	k	b	d	g
m	stamp			bomb		
n		ant			hand	
ŋ			link			long

The members of a nasal+plosive cluster in English must be **homorganic**, i.e. they must share their place of articulation.

As for morpheme-final nasal+voiced plosive clusters, only the coronal cluster is possible (i.e. *mb# and *ŋg#).

English phonotactics

Nasal+plosive clusters

Morpheme-medially

	p	t	k	b	d	g
m	company			gamble		
n		winter			agenda	
ŋ			blanket			anger

Morpheme-finally

	p	t	k	b	d	g
m	stamp			bo mb		
n		ant			hand	
ŋ			li ŋk			lo ŋg

Then what about words like *inbuilt* /in**br**ɪlt/ and *seemed* /s*ij*m**d**/?

Actually, they are /in**#br**ɪlt/ and /s*ij*m**#d**/, i.e. the nasal+consonant cluster is *heteromorphemic* (= separated by a morpheme boundary), and the constraint that they must be homorganic holds only within the morpheme.

English phonotactics

b. Geminates

English phonotactics

Geminates

geminate = long consonant

e.g. Hun. *Anna* /ɒn:ɔ/ or *világgazdaság* ‘world economy’ /vila:ggɔzdɔsa:g/

geminate in English:

e.g. *Anna* /ánnə/

better /béttə/

unnatural /ánnátʃərəl/

keenness /kíjnnəs/

English phonotactics

Geminates

geminate = long consonant

e.g. Hun. *Anna* /ɒn:ɔ/ or *világgazdaság* ‘world economy’ /vila:ggɔzdɔsa:g/

geminate in English:

e.g. *Anna* /ánə/

better /bétə/

→ no true geminates

unnatural /ln#nátʃərəl/

keenness /kijn#nəs/

→ only *fake geminates*

English phonotactics

Geminates

BUT:

unnatural /ʌn + nátʃərəl → ʌnnátʃərəl/

vs.

illegal /ɪl + líjgəl → ɪllíjgəl/

immoral /ɪm + móərəl → ɪmmóərəl/

explanation: different boundary types:

un#natural → strong boundary (#)

il+legal, im+moral → weak boundary (+)

So, whenever there is a geminate in English,
there is always a strong boundary between the two consonants.

Terms to check

consonant (*mássalhangzó*)

place of articulation (*képzés helye*)

lips → **labial** (*ajkak* → *labiális, ajakkerekítéses (hang)*)

bilabial (*bilabiális, két ajakkal képzett (hang)*)

labiodental (*labiodentális, fog-ajak (hang)*)

teeth → **dental** (*fogak* → *dentális, fog-(hang)*)

alveolar ridge → **alveolar** (*fogmeder* → *alveoláris, fogmeder-(hang)*)

postalveolar/palatoalveolar (*posztalveoláris / palatoalveoláris, fogmederentúli-(hang)*)

(hard) palate → **palatal** (*kemény szájpaddlás* → *palatális, elülső szájpaddlás-(hang)*)

velum/soft palate → **velar** (*lágyszájpaddlás* → *veláris, hátsó szájpaddlás-(hang)*)

glottis (the opening between the **vocal folds** in the **larynx** (**Adam's apple**)) → **glottal**
(*hangszalagrés (a gégefőben (ádámcsutka) elhelyezkedő hangszalagok közötti nyílás)* → *glottális, hangszalagrés-(hang)*)

Terms to check

manner of articulation (*képzés módja*)

obstruent (*obstruents, zörejhang*)

sonorant (*szonoráns, zengőhang*)

stop/plosive (*plozíva, zárhang*)

fricative (*frikatíva, réshang*)

affricate (*affrikáta, zár-rés hang*)

oral vs. nasal (*orális, száj-(hang) vs. nazális, orr-(hang)*)

approximant (*approximáns, közelítő hang*)

liquid (*likvida, folyékony hang*)

glide (*siklóhang, félmagánhangzó*)

voiced vs. voiceless (*zöngés vs. zöngétlen*)

sibilant (*szibiláns, sziszegő-susogó hang*)

coronal (*koronális, nyelvperemmel képzett (hang)*)

uvula (*uvula, nyelvcsap, ínyvitorla*)

Terms to check

phonotactics (*fonotaktika*)

phonotactic constraints (*fonotaktikai korlátozások*)

accidental gap vs. **systematic gap** (*véletlen hiány* vs. *szisztematikus/rendszeres hiány*)

consonant cluster (*mássalhangzó-kapcsolat*)

homorganic (*homorganikus, azonos helyen képzett (hang)*)

geminate (*gemináta, kettőzött mássalhangzó*)

morpheme (*morféma, szóelem*)

strong vs. **weak morpheme boundary** (*erős* vs. *gyenge morfémahatár*)

Recommended reading

- **Pronouncing consonants**
(<http://seas3.elte.hu/phono/notes/141-consonants.html>)
- **The consonants of English**
(<http://seas3.elte.hu/phono/notes/141-C-system.html>)
- **Nasal+plosive clusters**
(<http://seas3.elte.hu/phono/notes/nasalplosiveclusters.html>)