



Sounds of Standard Chinese

09/08/2016

Components of a Grammar

- Phonetics
 - articulatory, acoustic
- Phonology
- Morphology
 - inflectional, derivational
- Syntax
- Semantics

Phonetics

- Sound classes
 - Consonants, Vowels
- Voicing
- Supra-segmentals
 - Pitch (tone and intonation), Length, Stress
- Phonetic transcription

Sound Classes

- Consonants
 - Places of articulation
 - Manners of articulation
 - Voicing
- Vowels
 - Height
 - Backness
 - Roundness
 - Tenseness

Voicing

- Voiceless sounds
 - no vocal fold vibration
 - /p, f, θ, t, s, ʃ, tʃ, k, h/
- Voiced sounds
 - vocal fold vibration
 - /b, v, ð, d, z, ʒ, dʒ, g, m, n, ŋ, l, ɹ, j, w/

Phonetic Transcription

- International Phonetic Alphabet (IPA): represents each sound of human speech with a single symbol.
- English:
 - shape [ʃ]; sing [ŋ]
 - book [ʊ]; bread [ɛ]; beat [i]
- Chinese:
 - shi [ʂ] ‘poem’ (Tone 1); he [χ] ‘river’ (2)
 - yu [y] ‘rain’ (3); si [t̪] ‘four’ (4)

IPA Consonant Chart

THE INTERNATIONAL PHONETIC ALPHABET (2005)

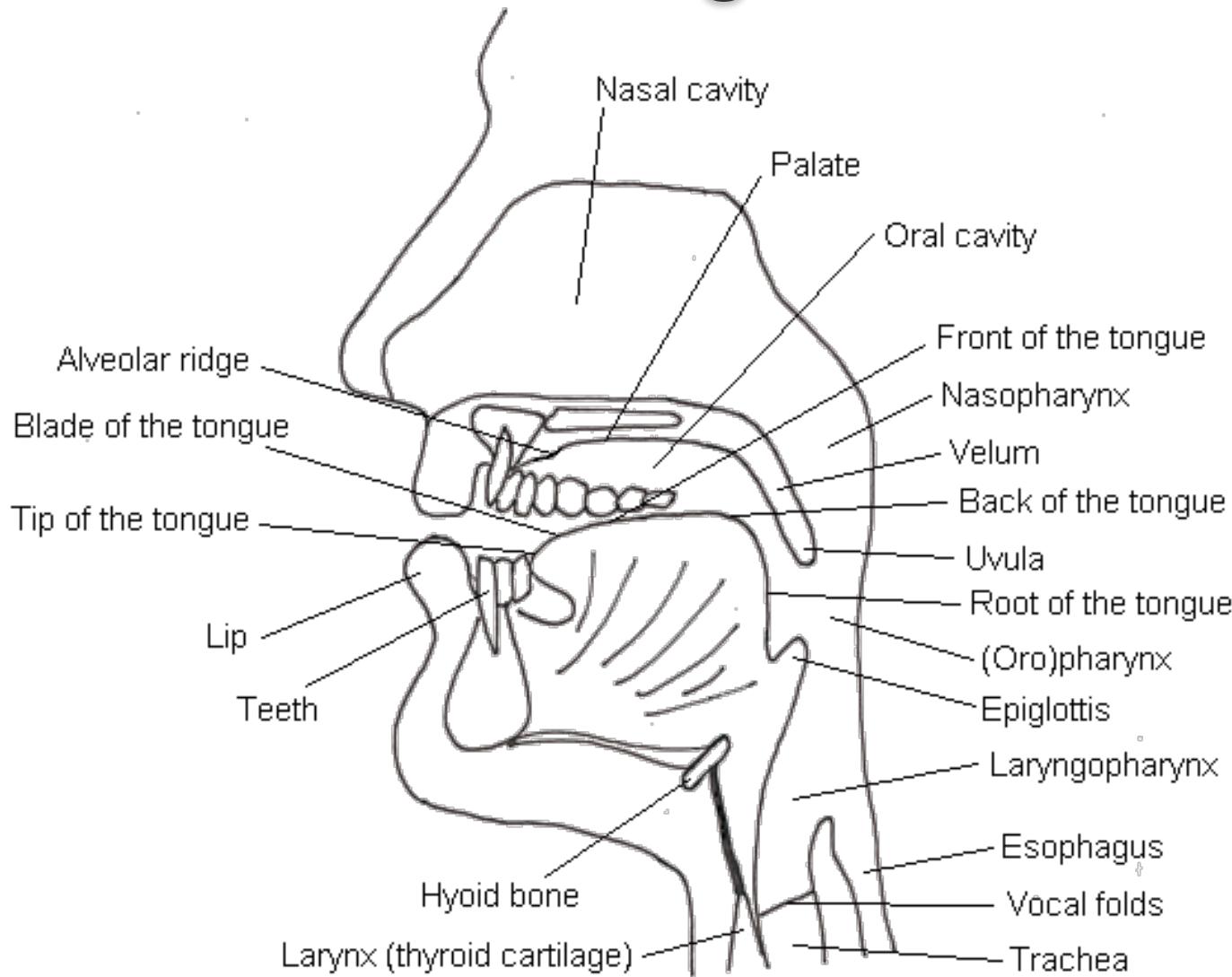
CONSONANTS (PULMONIC)

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Epi-glottal	Glottal
Nasal	m	m̊		n		ɳ	j̊n	ŋ		N		
Plosive	p b			t d		t̊ d̊	c ɟ	k g	q ɣ		ʔ	ʔ
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	s̊ z̊	ç ɟ̊	x ɣ	χ ʁ	h̊ ɦ̊	h̊ ɦ̊	
Approximant		v		ɹ		ɺ̊	j	ẘl̊				
Trill	ʙ			r						R		
Tap, Flap		v̊		t̊		ʈ̊						
Lateral fricative				ɸ̊ ɬ̊								
Lateral approximant				l̊		ɺ̊	ʎ	ʟ̊				
Lateral flap				ɺ̊								

IPA chart for NAE -- Consonants

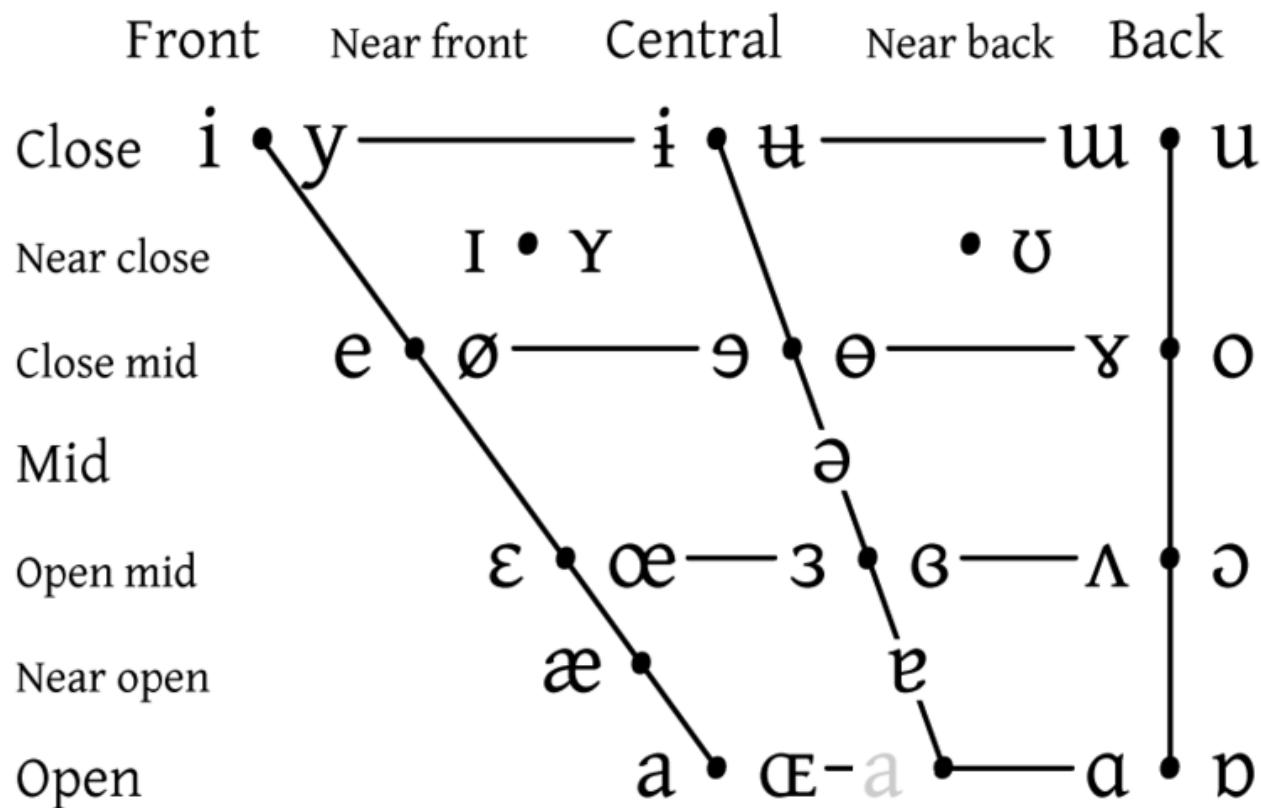
Classification of NAE Consonant Phonemes							
Manner of Articulation	Place of Articulation						
	Bilabial	Labiodental	Dental	Alveolar	Palatal	Velar	Glottal
Stop Voiceless Voiced	p b			t d		k g	
Fricative Voiceless Voiced		f v	θ ð	s z	ʃ ʒ		h
Affricate Voiceless Voiced					tʃ dʒ		
Nasal Voiced	m			n		ŋ	
Liquid Voiced				l	r		
Glide Voiced	w				y		

Vocal Tract Diagram



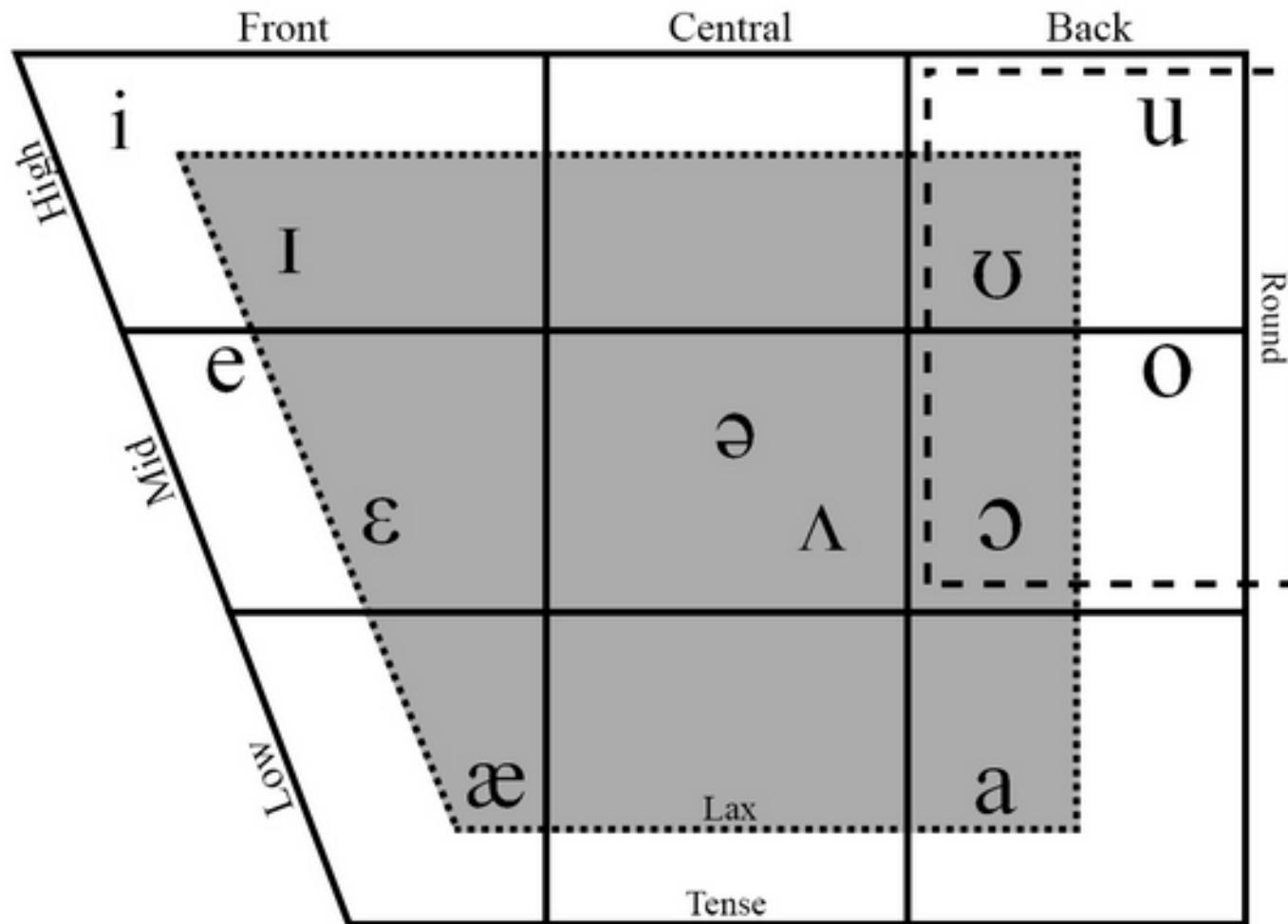
IPA Vowel Chart

VOWELS



Vowels at right & left of bullets are rounded & unrounded.

IPA chart for NAE -- Vowels



Try some English!

- /fɛd/

- /siŋ/

- /paʊt/

- /stjudənt/

- /maɪnd/

- /tʃeɪndʒ/

- /juʒuəli/

- /im'pəuz/

C: Places of Articulation

- Bilabial: b, p, m, w
- Labiodental: f, v
- Interdental: θ, ð
- Alveolar: t, d, s, z, n, l, ɿ, **ts**
- Retroflex: **ʂ**, **tʂ**, **ɻ**
- Alveopalatal: ʃ, ʒ, tʃ, dʒ, **ç**, **tç**
- Palatal: j, **ɥ**
- Velar: k, g, ɳ, **x**
- Uvular
- Pharyngeal
- Glottal: ?, h

C: Manners of Articulation

- Stops: p, b, t, d, k, g, ?
- Fricatives: f, v, s, z, ſ, ʃ, ʒ, ç, x, h
- Affricates: ts, tſ, tʃ, dʒ, tç
- Laterals: l
- Retroflex: ḡ, ḣ
- Nasals: m, n, ñ
- Approximants: j, w

Aspiration

- Voice lag after the release of voiceless stops and before the voicing of the following vowel
- Transcribed as [h]

Aspirated	Unaspirated
[p ^h æt] 'pat'	[spæt] 'spat'
[t ^h ʌb] 'tub'	[stʌb] 'stub'
[k ^h oʊp] 'cope'	[skoʊp] 'scope'

Phonemes vs Allophones

- English: [k] and [k^h] are allophones
 - [sk^houp] sounds weird, but the meaning does not change
- SC: [k] and [k^h] are separate phonemes
 - 狗 [kou] ‘dog’ (3)
 - 口 [k^hou] ‘mouth’ (3)
- Phonemic pairs
 - [p, p^h], [t, t^h], [k, k^h], [ts, ts^h], [tʂ, tʂ^h], [tɕ, tɕ^h],

[ts] and [ts^h]

- Voiceless alveolar affricate
- Unaspirated: [ts]
 - 早 [tsau] ‘morning’ (3)
- Aspirated: [ts^h]
 - 草 [ts^haʊ] ‘grass’ (3)
- 早餐 [tsau ts^han] ‘breakfast’ (3 + 1)

[ts] and [ts^h]

- Voiceless retroflex affricate
- Unaspirated: [ts]
 - 找 [tsau] ‘to find’ (3)
- Aspirated: [ts^h]
 - 炒 [ts^hau] ‘to fry’ (3)
- 智齿 [tsɿ ts^hɿ] ‘wisdom teeth’ (4 + 3)

[ʂ]

- Voiceless retroflex fricative
- [ʂ] and [ʂ] contrast in place of articulation
 - 四 [ʂɻ] ‘four’ (4)
 - 十 [ʂɻ] ‘ten’ (2)
 - 十四 [ʂɻ ʂɻ] ‘fourteen’ (2 + 4)
 - 四十 [ʂɻ ʂɻ] ‘forty’ (4 + 2)
 - Guess what ‘forty-four’ is?

[ɻ] 

- Voiced retroflex approximant
- Articulated with the tip of the tongue curled up
- 日 [ɻi] ‘sun’ (4)
- 日子 [ɻi tsɻi] ‘day’ (4 + 0)

Learn them in Pairs

Retroflex	Plain
tʂ̪t̪	ts̪t̪
tʂ̪h̪t̪	ts̪h̪t̪
ʂ̪t̪	s̪t̪

[ç]

- Voiceless alveopalatal fricative
 - Alveolar: the tongue blade contacts the roof of the mouth in the area behind the alveolar ridge
 - Palatal: the middle of the tongue is bowed and raised towards the hard palate
- 西 [çɪ] ‘west’ (1)
- 笑 [çiaʊ̯] ‘laugh’ (4)