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Section 1: Thursdays 3:00–4:00
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Discussion Handout 2

September 16, 2021

Overview

(1) Review for Today:
   a. Aspiration and Voice Onset Time (VOT)
   b. Introduction to Allophony and Language Variation
   c. Vowels:
      (i) Wikipedia's IPA for English provides examples of all English vowels!
      (ii) Be careful though, Wikipedia uses a 'neutral' r (which ends up being confusing, it should all be rhotic vowels)

Aspiration and Voice Onset Time

(2) Aspiration can be considered an extra 'dimension' of phonation:
   a. Aspiration is a strong burst of breath that comes with the release of a consonant
   b. Aspiration is denoted with [^{h}]: not considered its own sound, but a diacritic

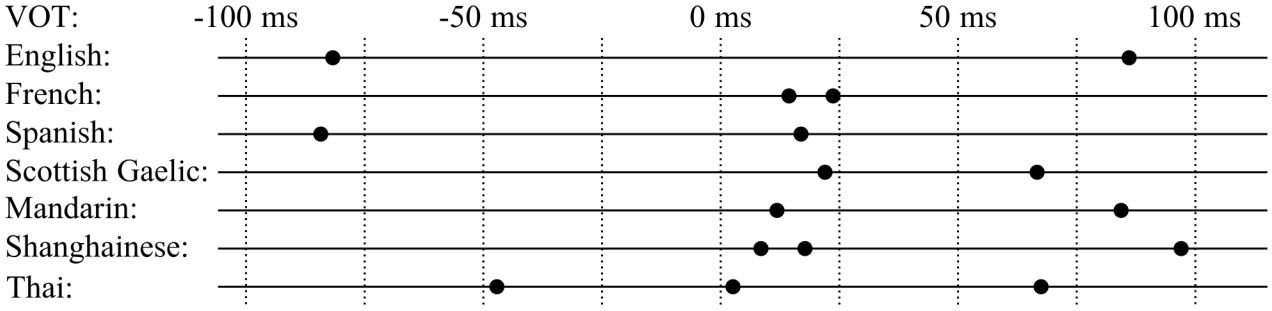
(3) Voice Onset Time (VOT)
   a. (Most of the time) vowels are voiced, so voicing is introduced when a vowel begins
   b. Consonants release (open up) in order to form following vowels
   c. Thus there are two considerations for VOT:
      (i) when the consonant releases, and
      (ii) when the voicing begins
   d. VOT is the difference in time between release and the start of voicing

(4) VOT = Start of Voicing Time − Release Time:
   a. Negative VOT means voicing starts before release (Voiced Unaspirated)
   b. Positive VOT means voicing starts after release (Voiceless Aspirated)
   c. Zero VOT means voicing and release start at the same time (Voiceless Unaspirated)

(5) Ideally:

	Voiced Unaspirated	Voiceless Unaspirated	Voiceless Aspirated
Example	[b], [d], [g]	[p], [t], [k]	[p^h], [t^h], [k^h]
VOT	Negative	(Near) Zero	Positive
Voiced	Yes	No	No
Aspirated	No	No	Yes

(6) In actuality, VOT is more complicated: (based on Chodroff et al. 2019)



Allophony

(7) Phones vs. Phoneme:

a. When we talk about sounds/signals, we want to discuss the actual signal (in the world) and our conception of those signals (in our mind)
b. Phones are representations of the actual signals, while phonemes are representations of our concepts of those signals
c. For instance; pit [p^hɪt] vs. spit [spɪt]. We percieve both as having a /p/ sound, but they are pronounced differently ([p^h] vs [p])

(8) Conventions: Phones vs. Phonemes

a. Phones (real world signals) are represented in [square brackets]
b. Phonemes (signals in the mind) are represented in /forward-slash brackets/

(9) Allophony:

a. Allophones are two phones which represent the same phoneme.
b. What is considered allophones in one language may not be allophones in another!
   (i) In English, both [p^h] and [p] represent /p/, while in Hindi they represent separate phonemes /p^h/ and /p/
   (ii) In English, we distinguish /f/ and /v/, but in Greenlandic, [f] and [v] are allophones of the same phoneme /v/

(10) Complementary Distribution:

a. If two phones are allophones of one another, they will exist in complementary distribution.
b. There are no contexts where both phones can exist.
c. pit [p^hɪt] vs. spit [spɪt], contexts are different:
   (i) Aspiration on the first sound of a stressed syllable or word initially
   (ii) English does not allow allophones in the contexts of the other: *[pɪt], *[sp^{h}ɪt]

Vowels

(11) Dimensions:

a. Height/Closeness
   (i) High/Close: tongue is close to the roof of the mouth
   (ii) Mid: tongue is in intermediate 'resting' position for height
   (iii) Low/Open: tongue is low in the mouth, allowing a wider opening

b. Backness
   (i) Front: body of the tongue is pushing up against hard palate
   (ii) Central: body of the tongue is in intermediate 'resting' position for backness
   (iii) Back: body of tongue is pushing back against soft palate (velum)

c. Rounding
   (i) Rounded: lips are rounded when producing sound
   (ii) Unrounded: lips are unrounded when producing sound

d. Tenseness/Laxness
   (i) Tense: the tongue is 'tense', at the periphery of the 'vowel trapezoid'
   (ii) Lax: the tongue is relatively relaxed, closer to neutral position, middle of the 'vowel trapezoid'

(12) Diphthongs:

a. Minor diphthongs (small movement in vowel space):
   [eɪ], [oʊ]

b. Major diphthongs (large movement in vowel space):
   [oɪ], [aɪ], [aʊ], ([ju])

(13) Off-Glides and On-Glides:

a. On Glides are vowel(-like) sounds that precede the 'nucleus' of a syllable:
   In English: often glides [j] and [w]

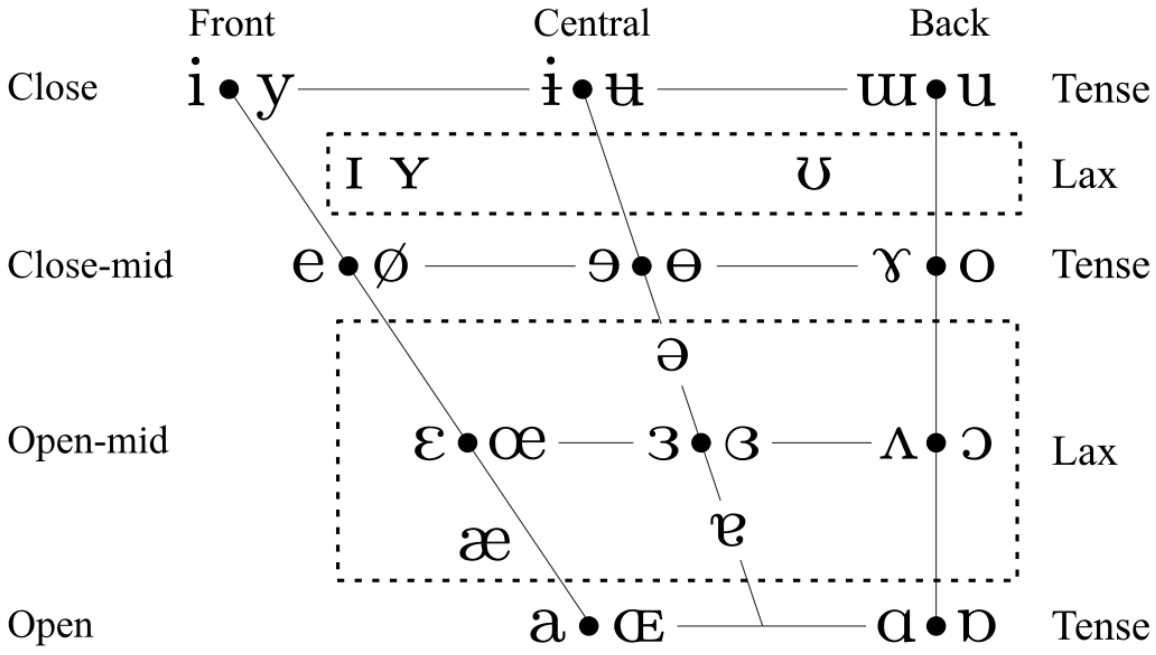
b. Off Glides are vowel(-like) sounds that follow the 'nucleus' of a syllable:
   In English: often lax high vowels [ɪ] and [ʊ]

c. Why do we distinguish in IPA?
   (i) On-glide: consonant to vowel: goes through 'glide' phase
   (ii) Off-glide: closing after nucleus: might not follow through to complete glide
   (iii) Also, it is just convention in English

References

Chodroff, Eleanor, Alessandra Golden, and Colin Wilson. 2019. Covariation of stop voice onset time across languages: Evidence for a universal constraint on phonetic realization. The Journal of the Acoustical Society of America 145:EL109–EL115.

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.