

Stress & Rhythm

LING 450/550

6 November, 2019

Airstream Mechanisms Animations

- Pulmonic Egressive

<http://australianlinguistics.com/airstream-mechanisms/egressive-pulmonic/>

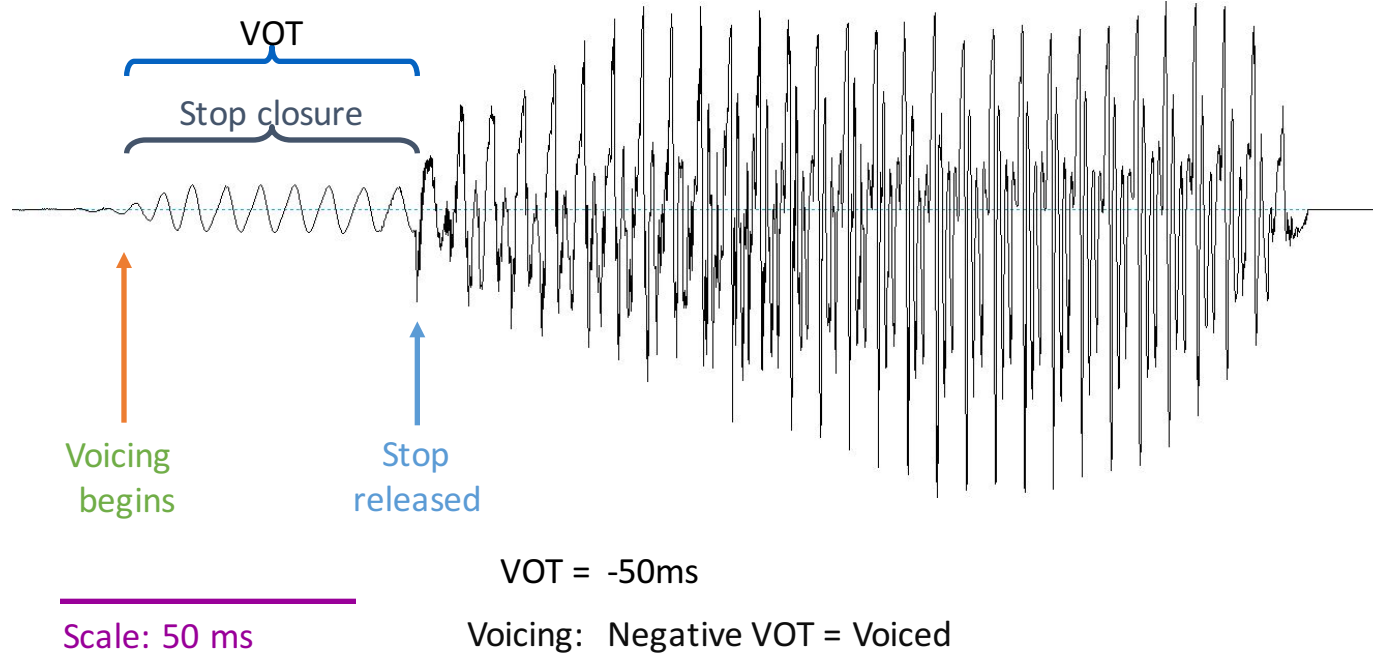
- Glottalic

<http://australianlinguistics.com/airstream-mechanisms/glottalic-airflow/>

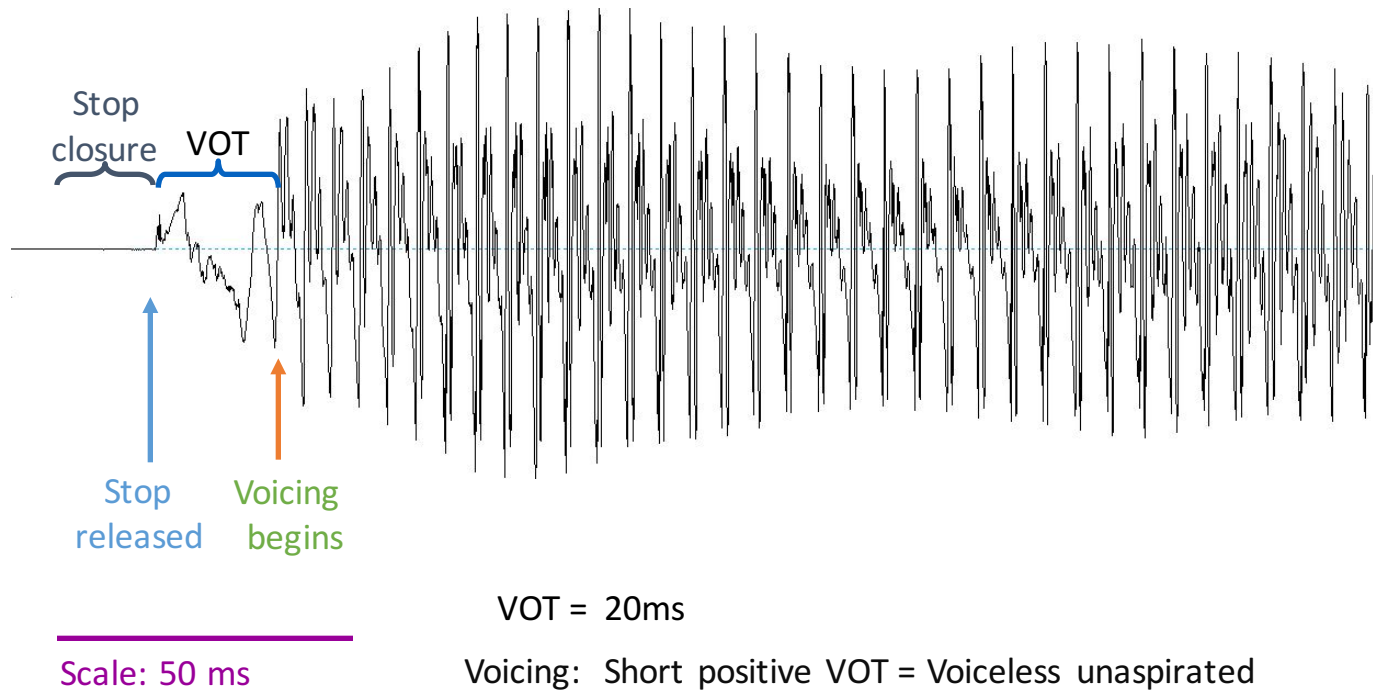
- Velaric Ingressive

<http://australianlinguistics.com/airstream-mechanisms/velaric-airflow/>

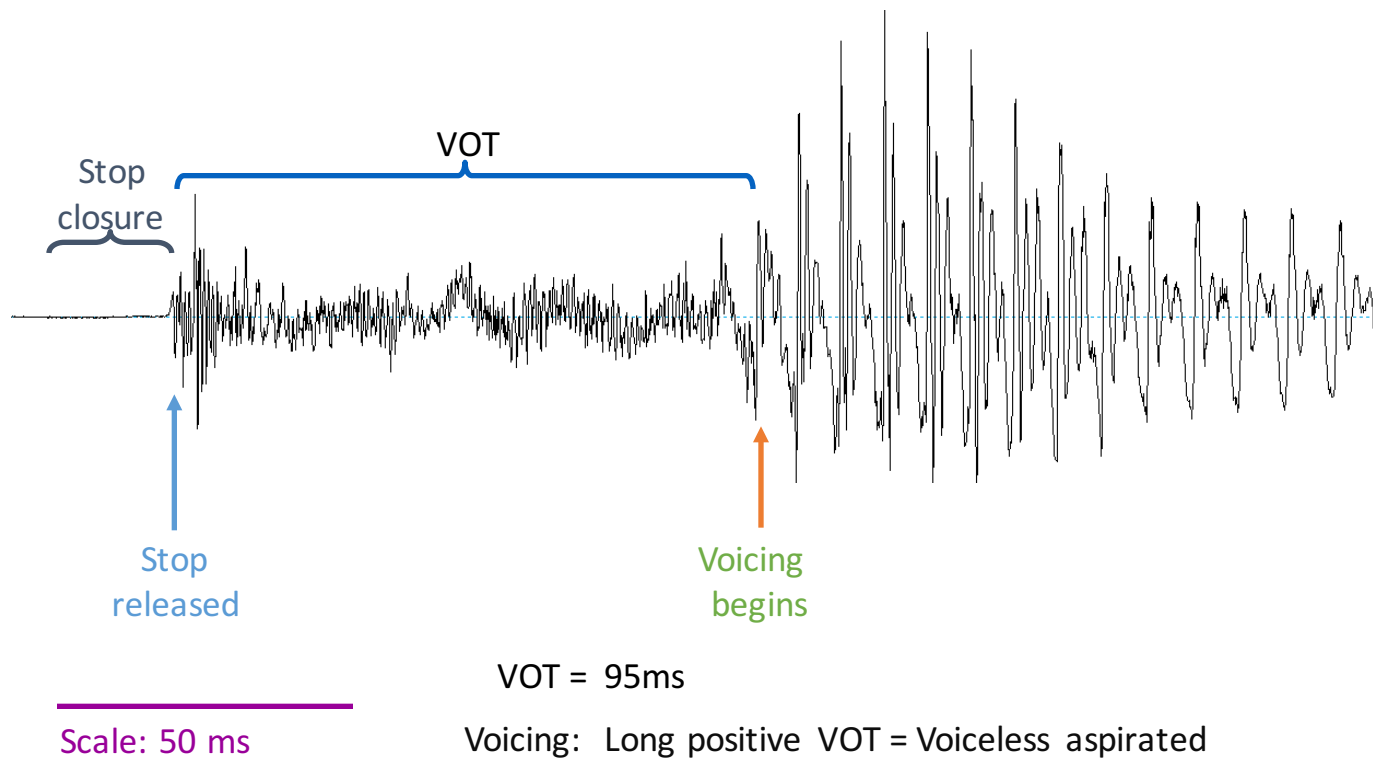
Estimating VOT: Review



Estimating VOT: Review



Estimating VOT from Waveforms



Stress and Rhythm

Words and sentences

Read Ladefoged & Johnson, chapter 5 (pp. 115-126),
chapter 10 (pp. 259-263)

adapted from slides by Richard Wright, Dan McCloy, and Valerie Freeman

Suprasegmental Features

- *Segmental features* describe the characteristics of one sound at a time.
 - Airstream mechanism
 - Phonation type
 - Place of articulation
 - Manner of articulation
 - VOT
 - Formant frequencies
 - etc.
- *Suprasegmental features* generally describe units larger than single segments.

Suprasegmental Features

- There are four main suprasegmental features:
 - *Length*: Segments and syllables can differ in length, creating phonetic, and sometimes phonemic, contrasts.
 - *Stress*: Stressed syllables are pronounced with greater energy.
 - *Tone*: Pitch levels or contours on syllables, or sometimes whole words, can change lexical or grammatical meaning.
 - *Intonation*: Variations in pitch and timing over phrases contributes to grammatical meaning (syntactic boundaries, sentence type, etc.) and paralinguistic meaning (discourse functions, sociolinguistic features, speaker properties, etc.).

Phonemic Length

- *Phonemic length*: A segment's length is contrastive, or causes a change in meaning. (This type of length is really a *segmental* property.)
 - Many languages have contrastive vowel length.
 - <http://corpus.linguistics.berkeley.edu/acip/course/chapter9/danish/danish.html>
 - Some languages have contrastive consonant length. Long consonants are often called *geminate*s and sometimes called “doubled.”
 - Some have both:
 - <https://corpus.linguistics.berkeley.edu/acip/appendix/languages/finnish/finnish.html>

Phonemic Length

- *Phonemic length*: A segment's length is contrastive, or causes a change in meaning. (This type of length is really a *segmental* property.)
 - Long segments can be transcribed using a length marker after the segment (preferred in this class)
 - [kit:a], [pa:l]
 - You may also see them transcribed by doubling the segment.
 - [kitta], [paal]
 - Or more narrowly for stops, [kitt̪a], to show that the first stop is unreleased.

Phonetic Length

- *Phonetic length*: Segment or syllable length varies due to phonetic or intonational factors (coarticulation, phrase boundaries, stress, etc.).

For example...

- English tense vowels tend to be longer than lax counterparts.
 - “bit” vs. “beet,” “bid” vs. “bead”
- English vowels tend to be longer before voiced consonants than voiceless counterparts.
 - “bait” vs. “bade,” “mutt” vs. “mud,” “bus” vs. “buzz”
 - The vowel’s length can serve as a cue to the consonant identity (especially helpful in noise and/or when stops are not released).

Phonetic Length

- *Phonetic length*: Segment or syllable length varies due to phonetic or intonational factors (coarticulation, phrase boundaries, stress, etc.).
For example...
 - Stressed syllables tend to be longer than unstressed.
 - The more syllables in a word/phrase, the shorter each syllable.
 - “reason” vs. “reasonable”
 - *Phrase-final lengthening*: Ends of phrases (the last syllable or last few syllables) tend to be longer than beginnings.

Strong and Weak Forms

- Many phones occur in *strong forms* and *weak forms*, meaning that their pronunciation varies depending on context.
 - *Citation form*: The way a word or syllable is pronounced in isolation. This is the form used to teach new words (often referred to as “careful pronunciation”).
 - *Strong form*: The pronunciation of a word when it has emphasis or main sentential stress.
 - *Weak form*: The pronunciation of a word in a sentence without emphasis or stress.

Assimilation

- *Assimilation*: When one sound changes to become more like another sound, usually as a result of coarticulation between adjacent segments.
 - *Anticipatory assimilation*: One sound is affected by anticipating the gesture for the next sound.
 - Handbag: [hændbæg] -> [hæmbæg]
 - *Perseverative assimilation*: The gesture for one sound perseveres into the gesture for the next sound.
 - French Elision: [le: lak] (les lacs) but [le:z ami] (les amis)
- Sometimes this is codified in the spelling:
 - in- negating suffix:
 - in+tolerable, in+probable -> improbable

Stress

- *Stress* is rhythmic emphasis that (usually) makes a syllable louder than other syllables of its type. More energy is expended on the production of stressed syllables.
- Examples:
 - I said ***bit***, not ***beet***.
 - I said ***bead***, not ***beet***.

Stress

- Segments in stressed syllables become more exaggerated in pronunciation, as in citation form or strong form. Various features increase their *perceptual salience* (how easy it is for listeners to identify the sounds):
 - Stressed syllables tend to have higher pitch and longer vowel duration.
 - There is less assimilation and coarticulation between segments.
 - Length contrasts (including phonetic ones) may be exaggerated.
 - Aspirated stops have longer aspiration.
 - Word-final stops are more likely to be released.
 - Vowels have more peripheral formants.

Stress and Vowel Quality

- Vowels can exhibit a change of quality between stressed and unstressed occurrences.
- Some vowels retain their quality even when unstressed.
 - “exploit” [ək 'splɔɪt]
 - “exploitation” [ˌɛk splɔɪ 'tʰeɪ ʃən]
- However, many unstressed vowels become *centralized*, or *reduced*.
 - “explain” [ək 'spleɪn]
 - “explanation” [ˌɛk splə 'neɪ ʃən]
 - Reduced vowels in English are broadly transcribed with [ə].
- An unreduced vowel is also called a *full vowel*.

Intonation

- *Intonation* is the rhythm and melody of a sentence.
 - Intonation involves variations in pitch and timing (both length and pauses).
 - Without intonation, we sound robotic
- A group of words that has a cohesive intonational pattern is called a *tone group*.
- The *tonic syllable* is the syllable in the tone group that carries the main pitch change, called the *tonic accent*.
 - Tonic syllables are usually the last stressed syllable in the group unless the speaker wants to draw attention to a different word or morpheme.

Tone Groups and Tonic Syllables

- “I like pho*netics.”
 - The whole sentence is a tone group, and the stressed syllable in “phonetics” [nɛ] is the tonic syllable.
- “I *dislike phonetics.”
 - The whole sentence is a tone group, but the emphasis is on “dislike,” so the stressed syllable [dɪs] is the tonic syllable.
- “*Mikey likes phonetics.”
 - The name “Mikey” (contrasting with someone else) is emphasized, so the stressed syllable [maɪ] is the tonic syllable.
- By convention, tonic syllables are usually marked with a preceding asterisk in the orthography (as above).

Primary and Secondary Stress

	exploit		exploitation				explain		explanation			
	ək	'splɔɪt	ˌɛk	sploɪ	'tʰeɪ	ʃən	ək	'splɛɪn	ˌɛk	splə	'neɪ	ʃən
tonic accent	–	+	–	–	+	–	–	+	–	–	+	–
stress	–	+	+	–	+	–	–	+	+	–	+	–
full vowel	–	+	+	+	+	–	–	+	+	–	+	–

- The term *primary stress* refers to the syllable that has both stress and the tonic accent, whereas *secondary stress* refers to a syllable with stress but no tonic accent.
 - Primary stress is transcribed with an upline before the syllable, while secondary stress is transcribed with a downline before the syllable. Example: “independent” [ˌɪn də 'pʰɛn dɛnt]

Rhythm: Syllable-Timed vs. Stress-Timed

- An old system of dividing languages for which there is little quantitative evidence, but it's still referred to, often in ESL or other language-teaching texts.
 - It was thought that in “syllable-timed” languages, each syllable is about the same length. (Turns out, that's not really true.)
 - “Stress-timed” languages were thought to use stress as the major organizing unit of rhythm, e.g., preferring a pattern of stressed-unstressed-stressed-unstressed syllables.
 - Many languages do have a rhythmic preference for keeping stressed syllables apart (and may move stress to maintain the pattern), but there are many interacting factors (it's just not that simple).

Rhythm: Word Stress

- A different system with a similar typological goal of dividing languages based on their rhythmic timing tendencies:
 - *Variable word stress*: The location of word stress is not always predictable from the segmental structure. Word stress can be lexical (a property of each word) or indicate grammatical info, e.g., syntactic category.
 - e.g., English noun/verb pairs: (to) *insult* vs. (an) *insult*
 - *Fixed word stress*: Stress lands on a predictable syllable of a word.
 - (Near)-universally, e.g., Czech: stress on first syllable of a word; Polish, Swahili: on penultimate (second-to-last) syllable of a word
 - For grammatical function, e.g., part of speech (cf. English)
 - Predictable based on syllable structure, e.g., heaviest syllable
 - *Fixed phrase stress*: Stress falls on predictable locations in the phrase.
 - e.g., French: stress comes phrase-finally (at/near end of phrase)