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An Animated and Narrated Glossary of
Terms used in Linguistics
presents

Voice Onset Time (VOT)

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Basic Idea

- Voice Onset Time (VOT) is refers to the time interval between the release of a stop and the beginning of vocal fold vibration.
- The possible existence of this interval is caused by the fact that the voicing and closure mechanisms are distinct.

Creation of closure

- The production of oral stops involves a complete closure of the articulators so that airflow is completely obstructed.

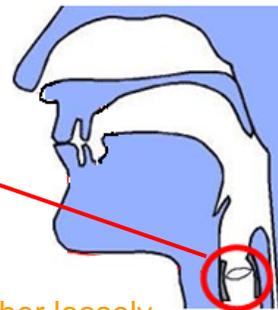The oral closures occur at the region which is above the larynx
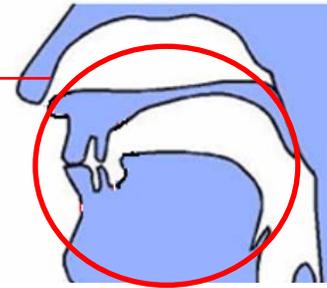
Slide 3

Vibration of vocal folds

Where does voicing take place ?

Voicing occurs at the larynx which houses the vocal folds

Voiced: The vocal folds are close together loosely so they can vibrate

Voiceless: The vocal folds are wide apart so that air passes freely.

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Closing and Voicing

- As the closing and voicing mechanisms are distinct, so their operations may have a temporal mismatch, measured in milliseconds (ms) or seconds (s).

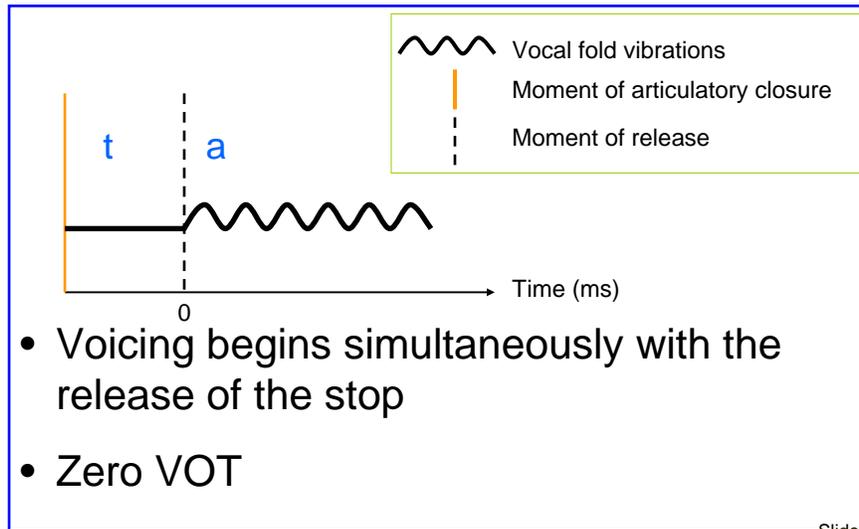- VOT only concerns stops that are followed by voiced segments.

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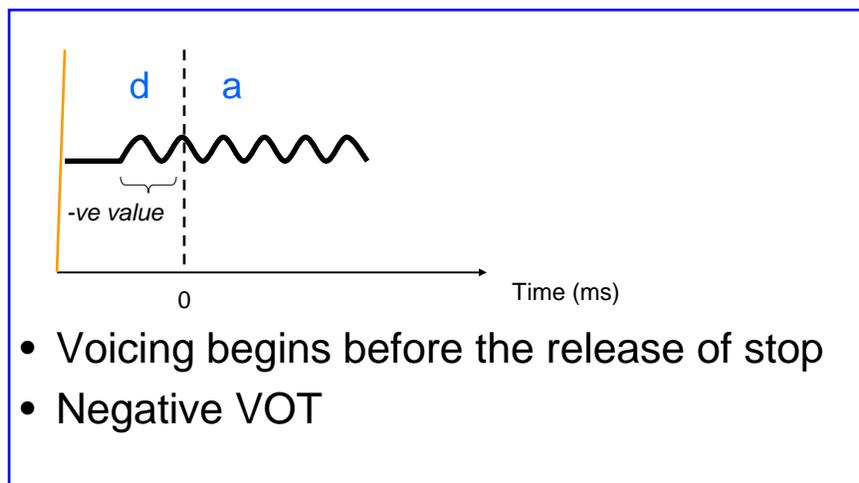The following slides illustrate three possible voice onset times:

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First possibility

t   a
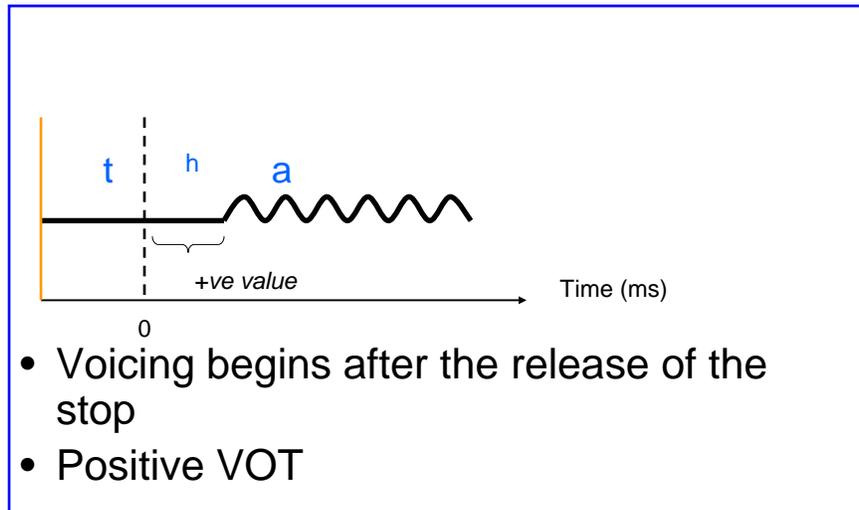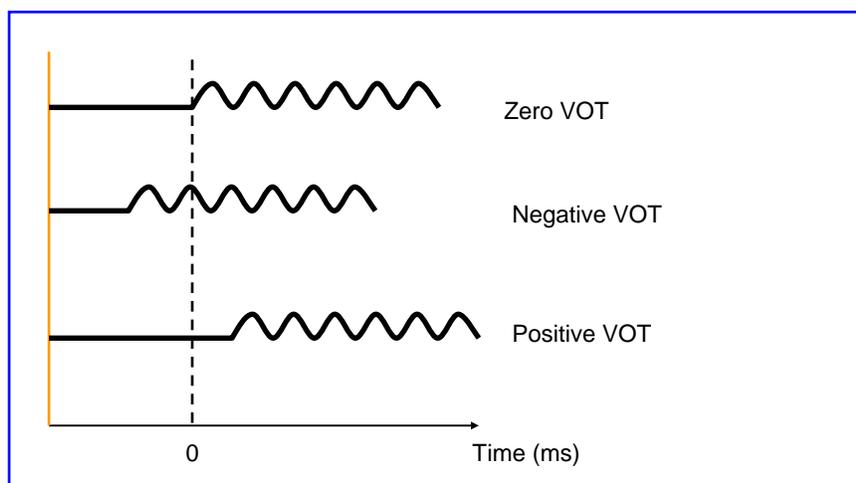
~~~ Vocal fold vibrations

| Moment of articulatory closure

┆ Moment of release

Time (ms)

0

- Voicing begins simultaneously with the release of the stop
- Zero VOT

Second possibility

d   a

-ve value

Time (ms)

0

- Voicing begins before the release of stop
- Negative VOT

Third possibility

t   h   a

+*ve value*

0

Time (ms)

- Voicing begins after the release of the stop
- Positive VOT

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Interim summary

Zero VOT

Negative VOT

Positive VOT

0   Time (ms)

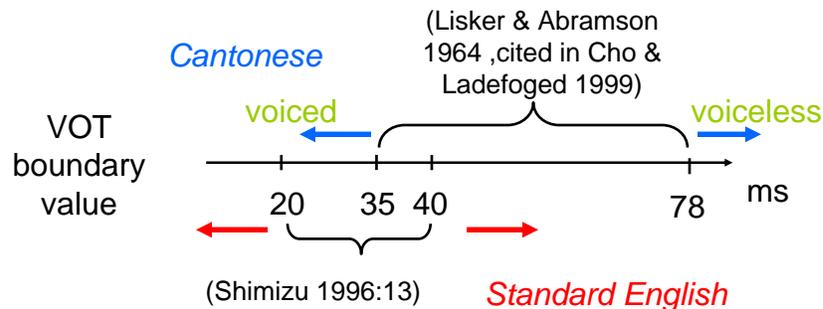Slide 10

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VOT & Glottal Stops

- Glottal stops are formed by closure of vocal folds.
- Glottal stops can have VOT values too, but the value is never negative.
- Voicing (vibration of vocal folds) can coincide with release of that closure, or lag after it; but never precede it.
  - "egg" in English is sometimes pronounced with a glottal stop onset.
  - Coughing is essentially glottal stop with a positive VOT, accompanied by large outburst of air.

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Language Specificity

Different languages have different VOTs along the VOT continuum in forming contrasts among plosives.

Cantonese

(Lisker & Abramson 1964 ,cited in Cho & Ladefoged 1999)

VOT boundary value

voiced   voiceless

20   35 40   78   ms

(Shimizu 1996:13)   *Standard English*

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Categorical Perception

- Cantonese and English make a two-way voicing distinction for plosives along the continuum with very different VOT boundary values.
  - ⇒ Cantonese and English speakers perceive discrete categories of voicing, though VOT itself is measured along a temporal continuum.
- This phenomenon is referred to as categorical perception.

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Endnote

- Other languages may make more than a two-way distinction in terms of VOT
  - E.g. Hindi, Korean, etc
- Voicing distinction of plosives can also come about from phonetic cues other than VOT.
  - E.g. Malay, where there is some evidence that voicing distinction comes from the onset frequency of F1 (first formant) of the following vowel.

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Further reading

Cho, Taehong & Peter Ladefoged (1999) Universals and variation in VOT: Evidence from 18 Languages. *Journal of Phonetics* 27. 207-229.

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Ladefoged, Peter (2001) *A Course in Phonetics*, 4th edition, Chapter 6. Fort Worth: Harcourt College Publishers.

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Lisker, L. and Abramson, A.S (1964) A cross-language study of voicing in initial stops: acoustical measurements. *Word* 20. 384-422.

Shimizu, Katsumasa (1996) *A cross-language study of voicing contrasts of stop consonants in Asian languages.* Seibido, Japan.

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The End

Wee, Lian-Hee and Winnie H.Y. Cheung (2009)
An animated and narrated glossary of terms used in Linguistics.
Hong Kong Baptist University.