

# Glides + Secondary Articulations

# Approximants

- Approximants = one articulator is close to another, but without producing audible turbulence.
- They come in two flavors:
  1. Glides (English [w], [j])
  2. Liquids (English [ɹ], [l])
- This distinction is also phonological...
  - Glides are essentially high-vowel articulations which are **not** in a syllabic peak.
  - In English, liquids may form syllables (or syllable peaks).

# Glides

- Each glide corresponds to a different high vowel.

<u>Vowel</u>	<u>Glide</u>		<u>Place</u>	
[i]	[j]		palatal	(front, unrounded)
[u]	[w]		labio-velar	(back, rounded)
[y]	[ɥ]		labial-palatal	(front, rounded)
[ɯ]	[ɰ]		velar	(back, unrounded)

# Glide Examples

- French contrasts palatal, labio-palatal and labio-velar glides:



mjɛt

'crumb'



mɥɛt

'mute'



mwɛt

'gull'



lje

'tied'



lyi

'him'



lwi

(name)



ɥit

'eight'



wi

'yes'

- Japanese has velar vowels, but not necessarily velar glides...

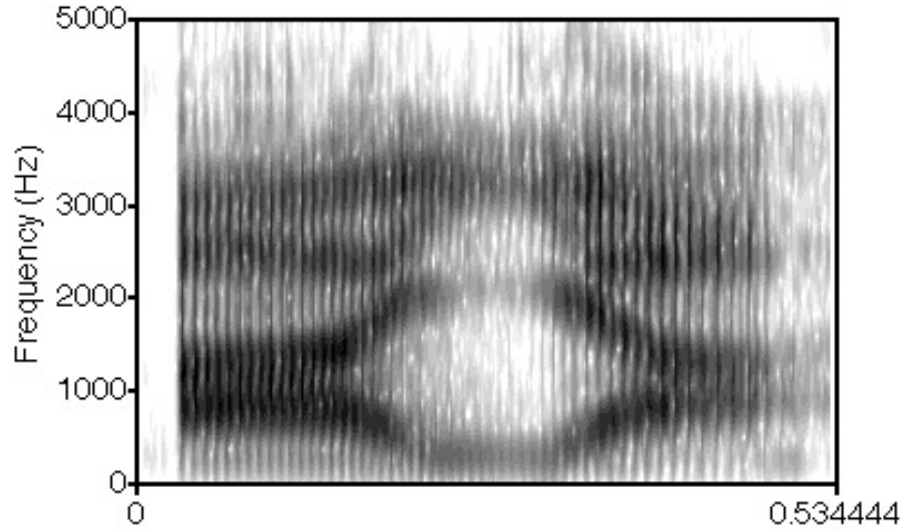


[swi]

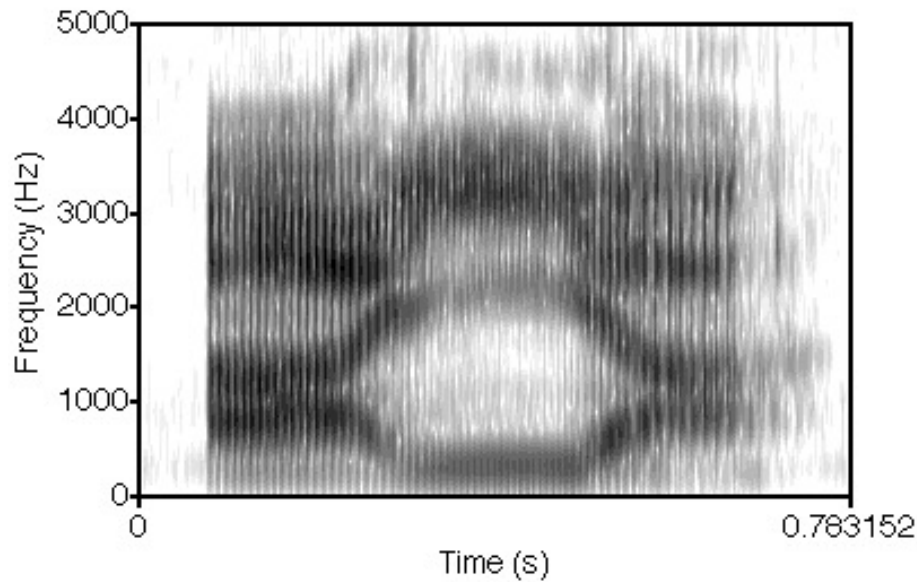
# Glide Acoustics

- Glides are shorter than vowels
- They also tend to lack “steady states”
  - and exhibit rapid transitions into (or from) vowels
  - hence: “glides”
- Also: lower in intensity
  - especially in the higher formants

# [j] vs. [i]



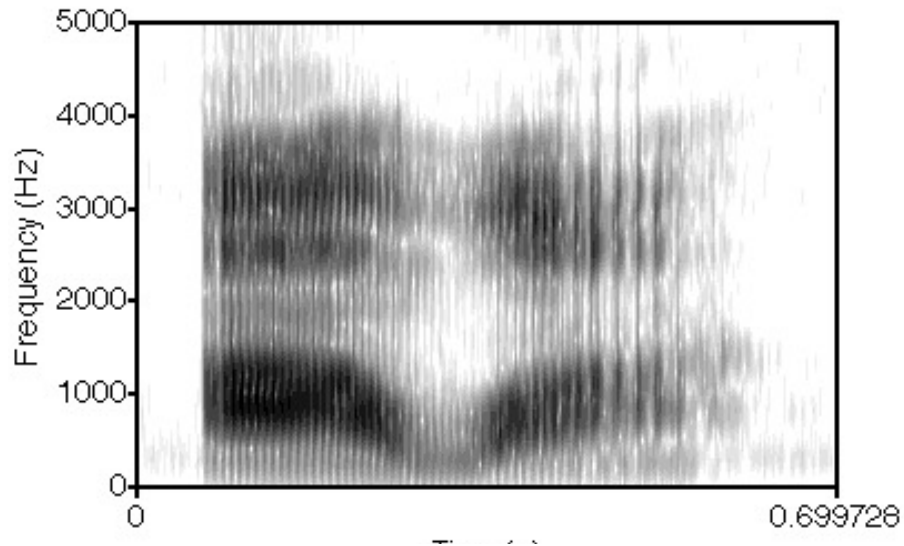
[aja]



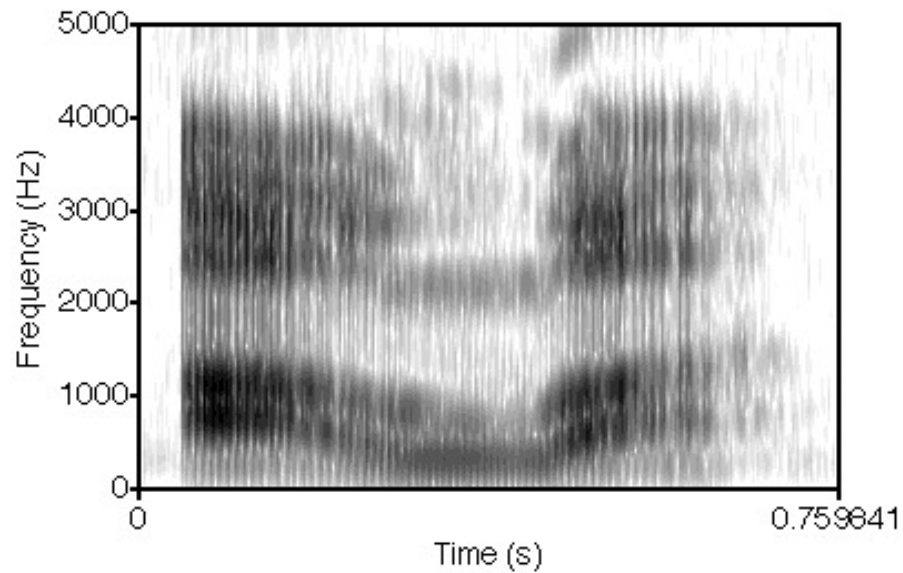
[aia]



# [w] vs. [u]



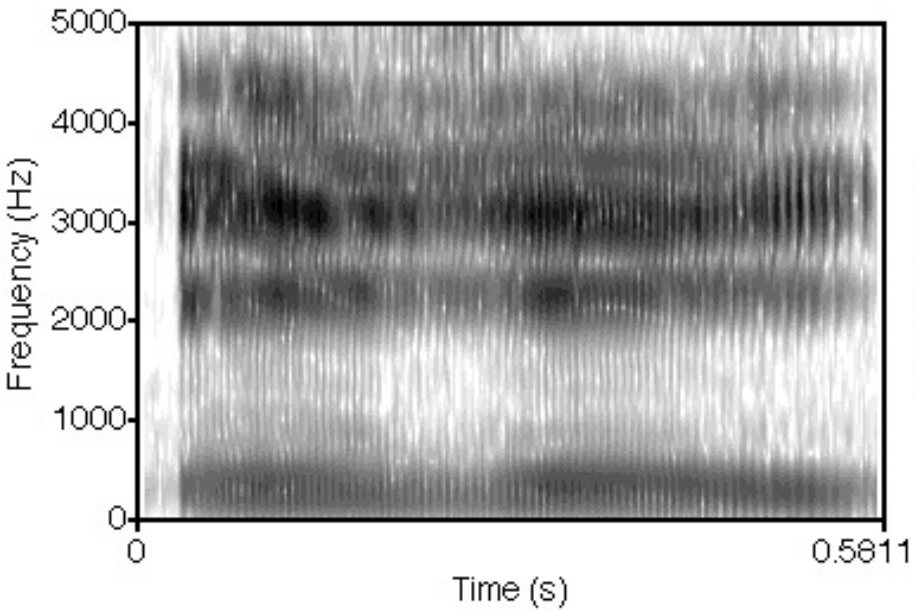
[awa]



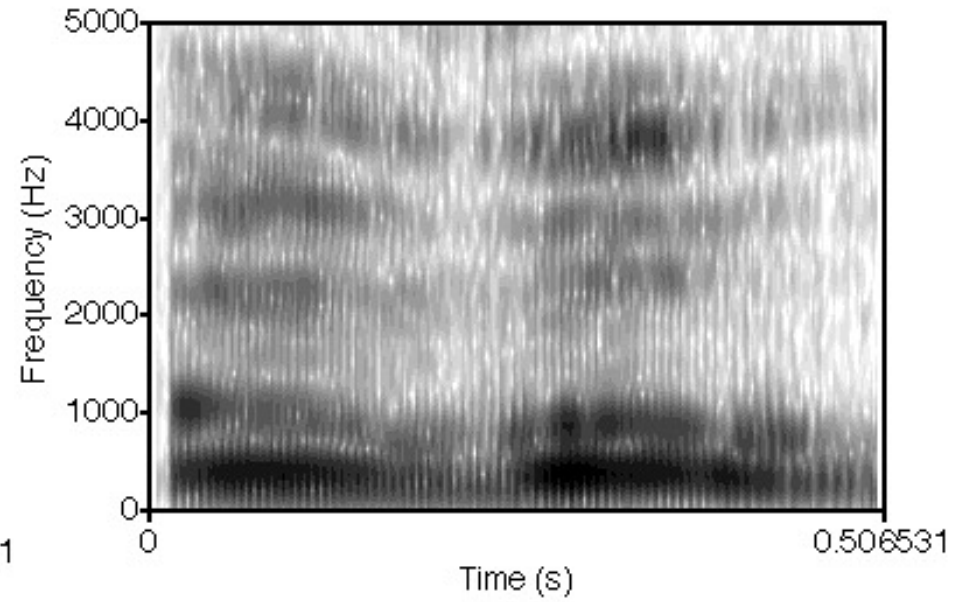
[aua]



# Vowel-Glide-Vowel



[iji]

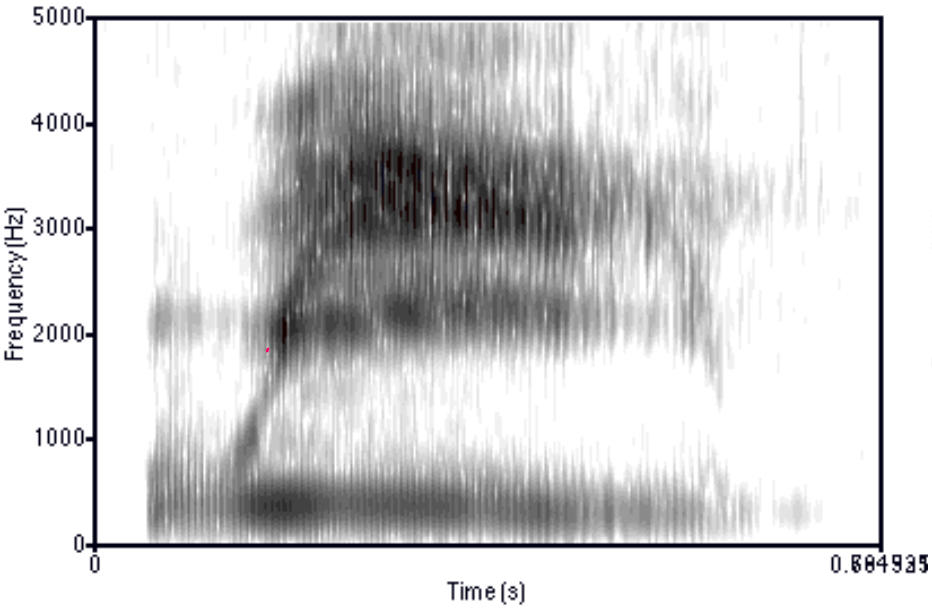


[uwu]

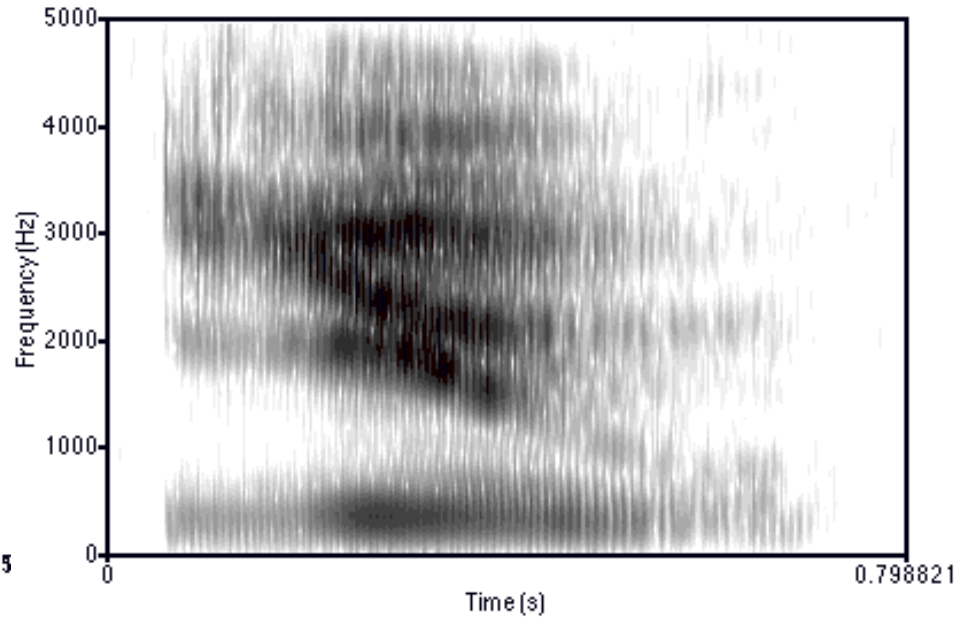




# More Glides



[wi:]



[ju:]

# Secondary Articulations

- A **secondary articulation** is made by superimposing a glide-like articulation on top of another constriction elsewhere in the vocal tract.
- Note that secondary articulations are different from **double articulations**.
- In double articulations, both constrictions are of equal degree.
  - Ex: labio-velar stops ( $[\widehat{kp}]$ )
- With secondary articulations, there are two constrictions with an unequal degree of closure.
  - primary articulation: more constricted
  - secondary articulation: less constricted

# Primary / Secondary

- One example of a secondary articulation is velarized [l<sup>ʷ</sup>].
  - Also symbolized: [ɫ]
  - Primary articulation: [l]
    - direct contact with tongue tip
  - Secondary articulation: [ʷ]
    - approximation of velum with back of tongue
- The other commonly found secondary articulations are:
  - [w]      labialization
  - [j]      palatalization
  - [ɣ]      pharyngealization

# Labialization Examples

- In labialization, lip rounding (specifically, protrusion) is superimposed on a fricative or stop constriction.
- Examples from Bura (spoken in Nigeria):

 bàrà  
'to want'

 màrà  
'to carve'

 gàm  
'ram'

 b<sup>w</sup>à  
'part'

 m<sup>w</sup>àntà  
'to move'

 g<sup>w</sup>àr  
'poison'

 pàkà  
'to search'

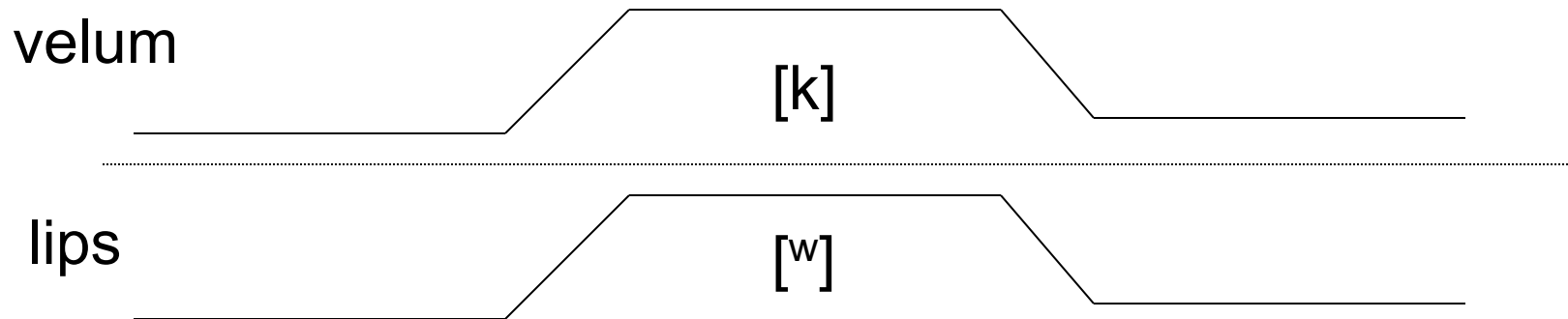
 kálá  
'to bite'

 p<sup>w</sup>àrà  
'to escort'

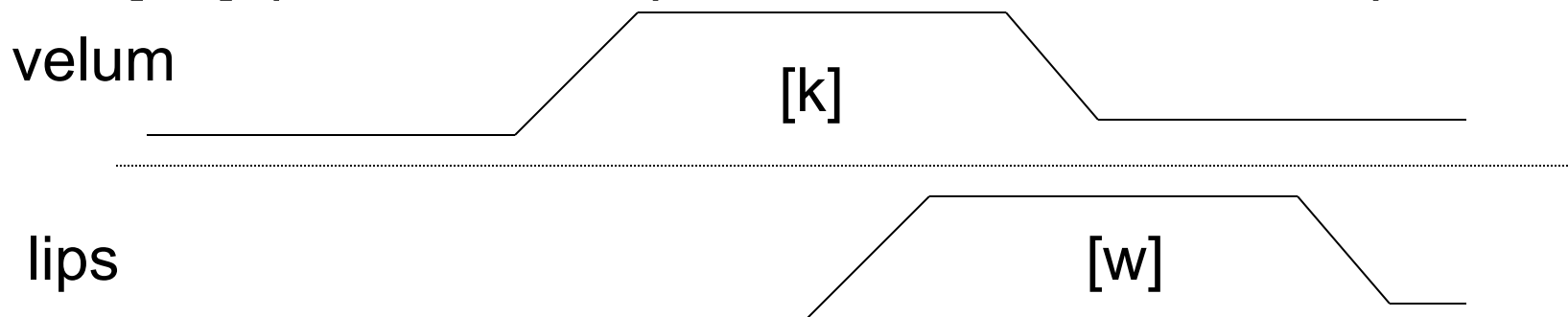
 k<sup>w</sup>àrá  
'donkey'

# Timing

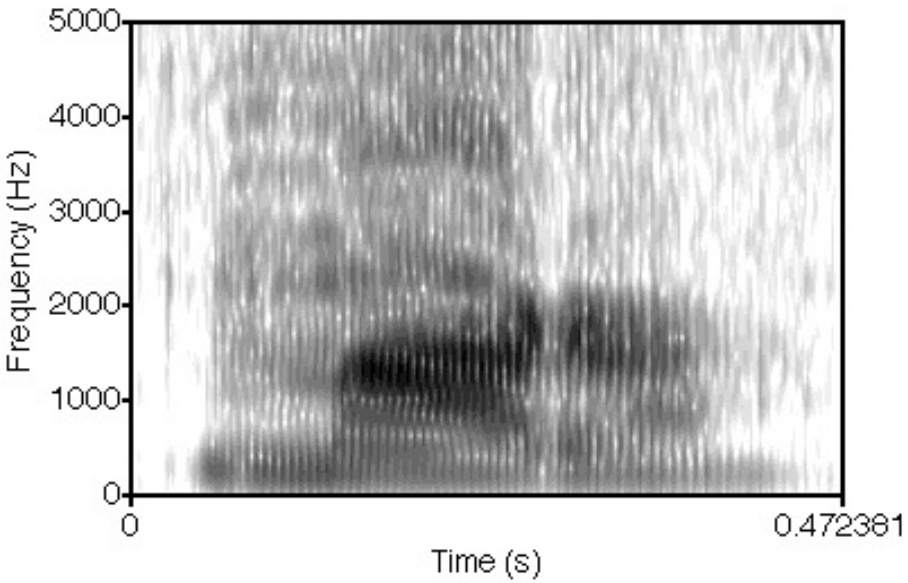
- The reason that [k<sup>w</sup>] is not transcribed as [kw] has to do with timing.
- [k<sup>w</sup>]: peak of labial protrusion occurs **during** stop closure



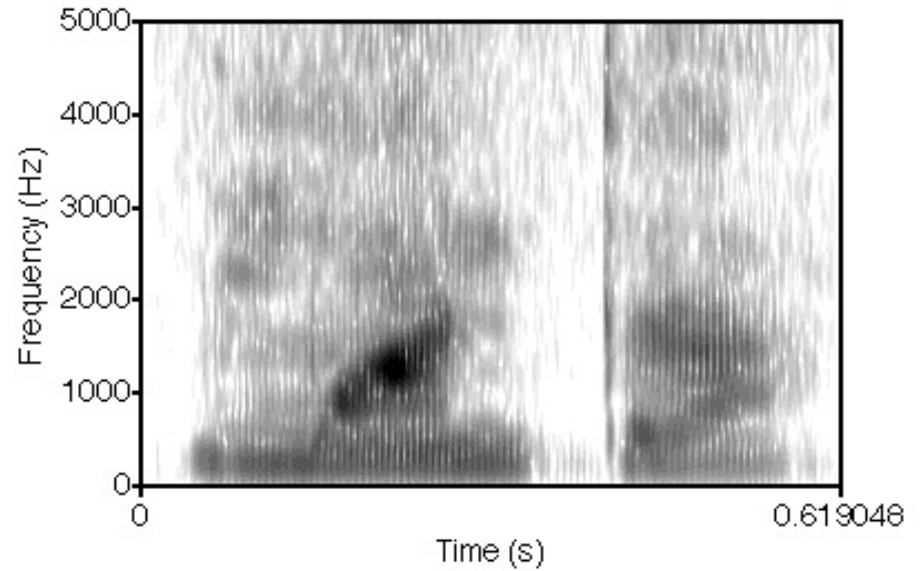
- [kw]: peak of labial protrusion occurs **after** stop closure



# [m] vs. [m<sup>w</sup>]



[mara]



[m<sup>w</sup>anta]









# By the way...

- It is hypothesized that Proto-Indo-European had a series of labialized velar stops:
  - /k<sup>w</sup>/, /k<sup>wh</sup>/, /g<sup>w</sup>/, /g<sup>wh</sup>/
- Over time, some IE languages maintained the velars, while others maintained the labialization.
- \*g<sup>w</sup>ou “cow, bull”
  - Germanic: [ku] → “cow”
  - Latin: [bous] → “bovine”
- \*k<sup>w</sup>ek<sup>w</sup>lo “wheel”
  - Old English: [hweol] → “wheel”
  - Greek: [kuklos] → “cycle”

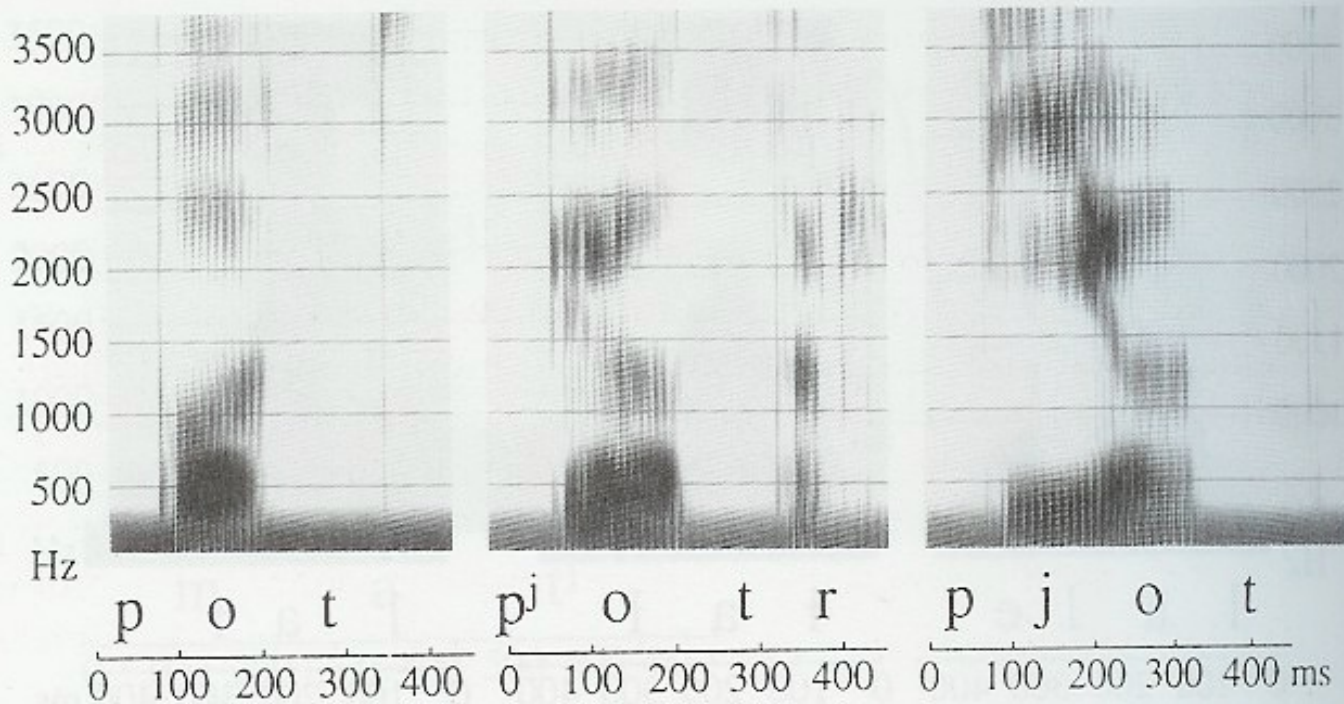
# Palatalization

- Consonants are palatalized by making a secondary [j] constriction.
- Russian has contrastive palatalized consonants.

 sok	'juice'	 sʲok	'he lashed'
 zof	'call'	 zʲof	'yawn'
 pakt	'pact'	 pʲatʲ	'five'
 bɪl	'he was'	 bʲil	'to strike'
 tot	'that'	 tʲotʲə	'aunt'
 domə	'at home'	 dʲomə	(name)



# [p] vs. [pʲ] vs. [pj]



“sweat”



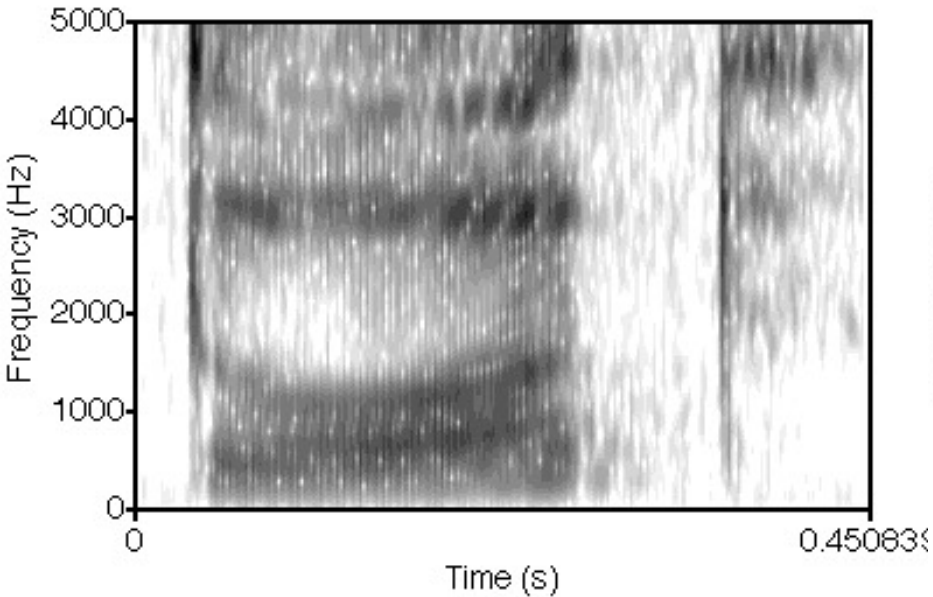
(male name)



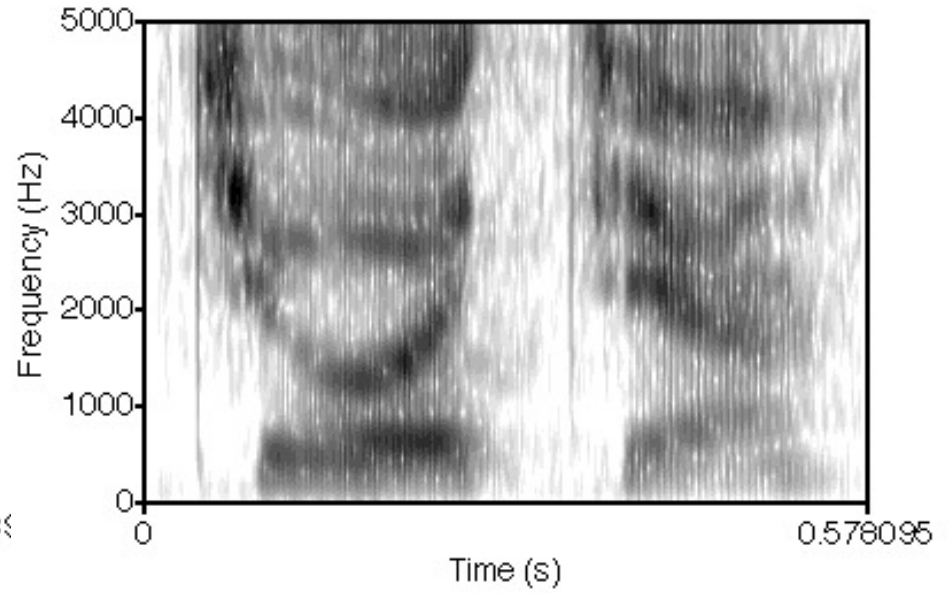
“drink”



# Post-vocalic Position



[totʰ]



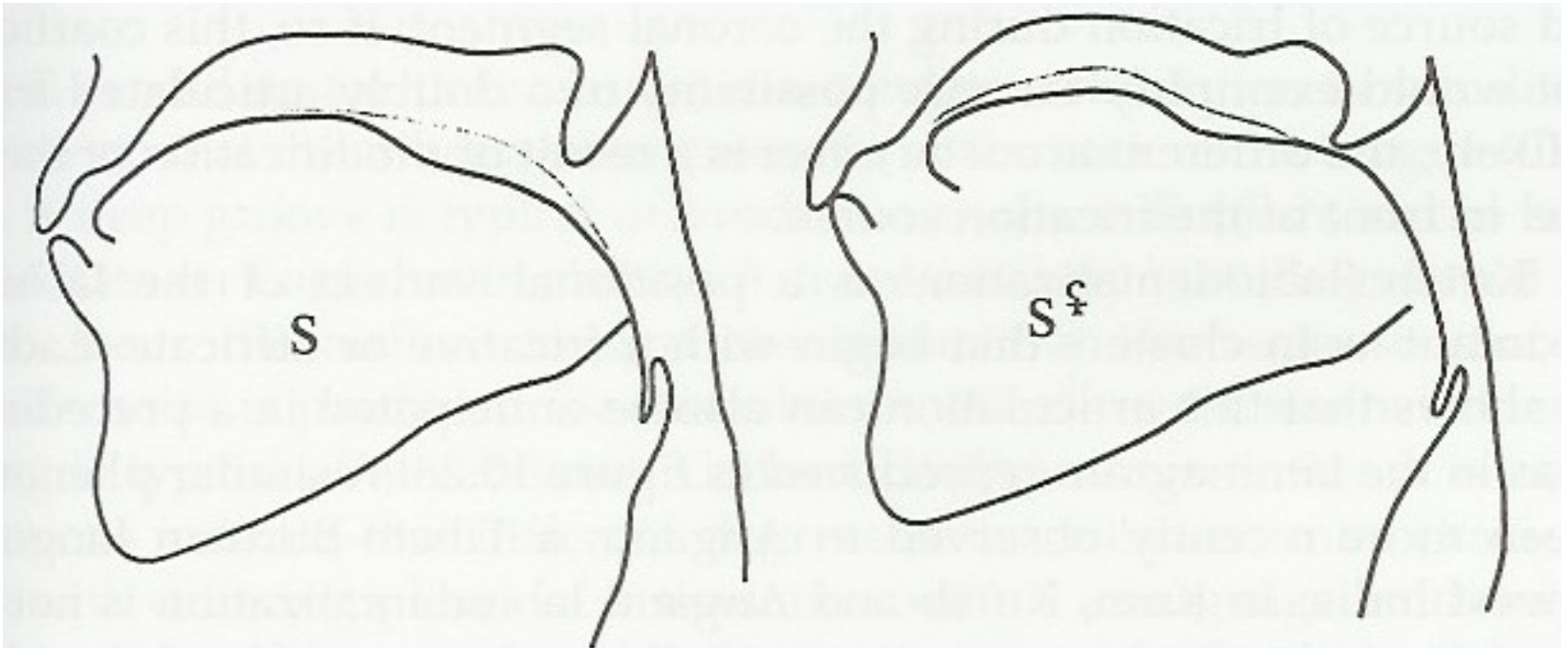
[tʰotʰə]



- The acoustic effects of secondary articulations operate in reverse, when they appear after a vowel.

# Pharyngealization

- Consonants are pharyngealized by superimposing a pharynx narrowing gesture on the regular consonant articulation.
- Mid-sagittal diagrams from Arabic:

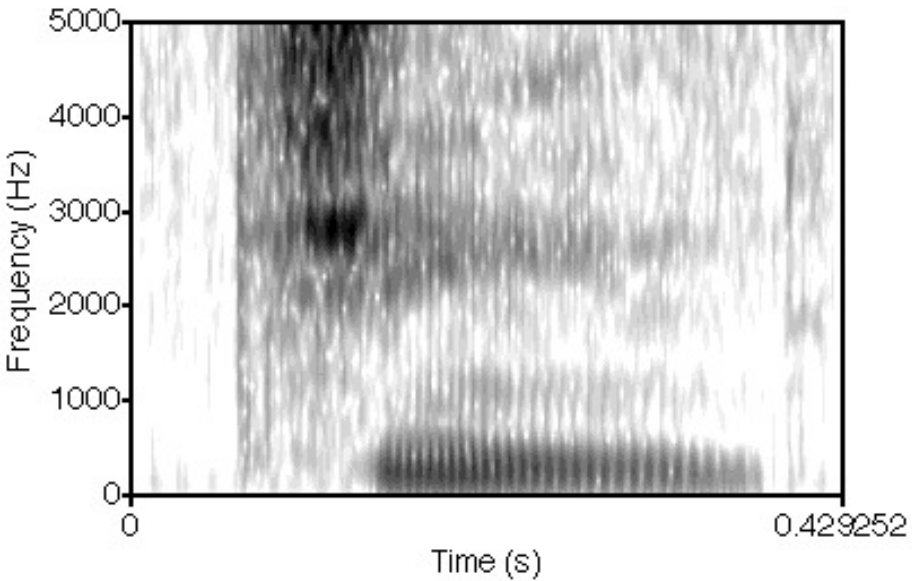


# Arabic Examples

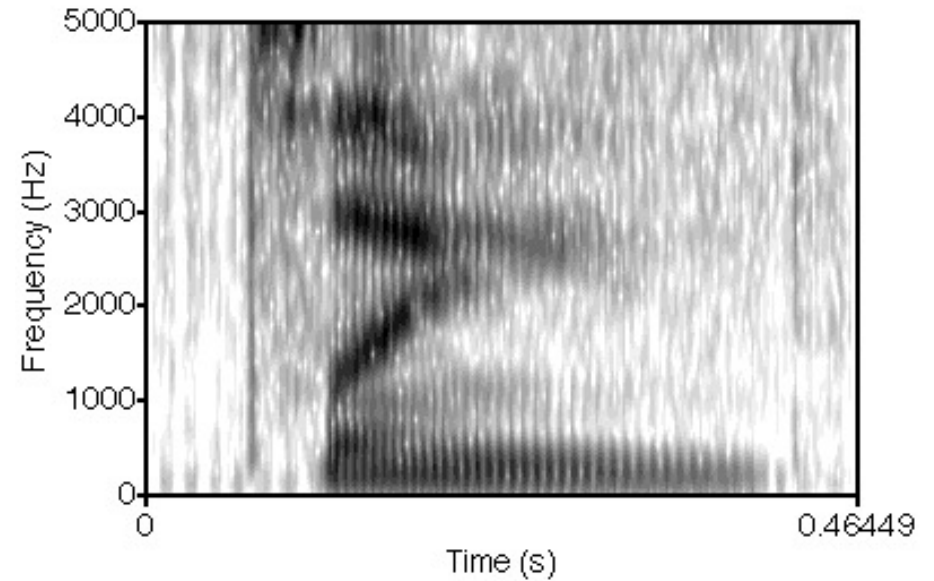
- Arabic contrasts pharyngealized and non-pharyngealized consonants.

 tiːn 'figs'	 ʔatːal 'he massacred'
 tˤiːn 'mud'	 ʔatˤːaf 'he gathered'
 dal 'he pointed'	 madːa 'table cloth'
 dˤal 'he stayed'	 madˤːa 'he wasted'
 suːs 'licorice'	 masːa 'he said "good night"'
 sˤuːsˤ 'chick'	 masˤːa 'he sucked'

# [t] vs. [tʰ]



[ti:n]



[tʰi:n]



- Pharyngeal constrictions raise F1 and lower F2
  - an [ɑ]-like formant pattern