What toneless Dene languages can tell us about tonogenesis in the Dene family

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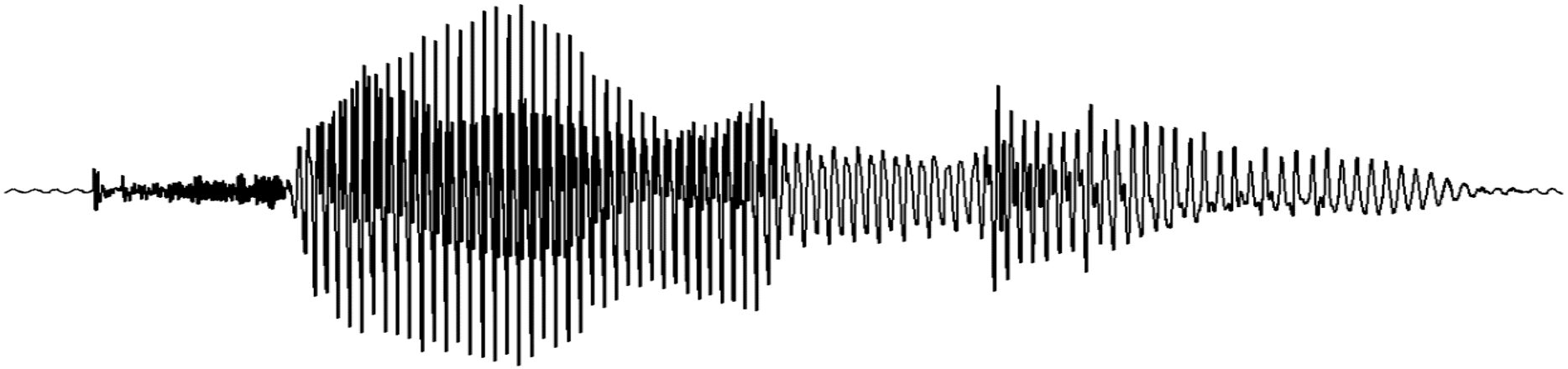
May 24, 2019

Overview

- Phonetic background
- Tone and tonogenesis
- Dene family tonogenesis
- Witsuwit’en
- Deg Xinag
- Conclusions and an outstanding issue

Voicing

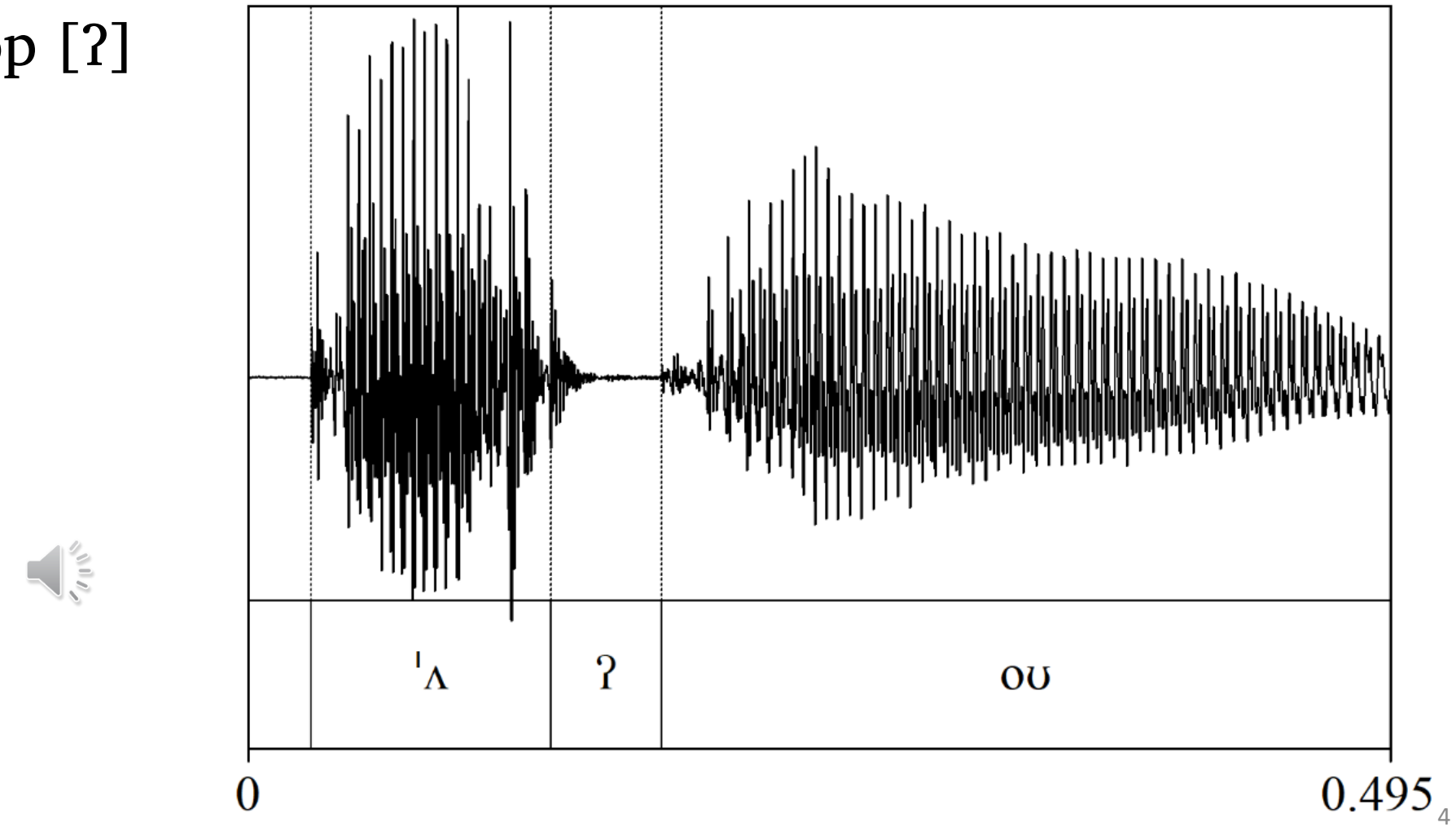
- Vibration of vocal cords in speech



- Some languages contrast sounds differing only in voicing
  - *crappy, crabby*

Glottal stop

- Glottal stop [ʔ]
  - *uh-oh*
  - *Hawai’i*



Tone

- = linguistic use of pitch
- *tone language*

CANTONESE **si**			
Chinese Character	Tone symbol	Tone description	English gloss
詩	˥ 55	high level	'poem'
試	˧ 33	mid level	'to try'
事	˨ 22	low level	'matter'
時	˩ 21	low falling	'time'
使	˧˥ 24	low high	'to cause'
市	˨˧ 23	low mid	'city'

http://linguistics.berkeley.edu/acip/appendix/languages/cantonese/

Tonogenesis

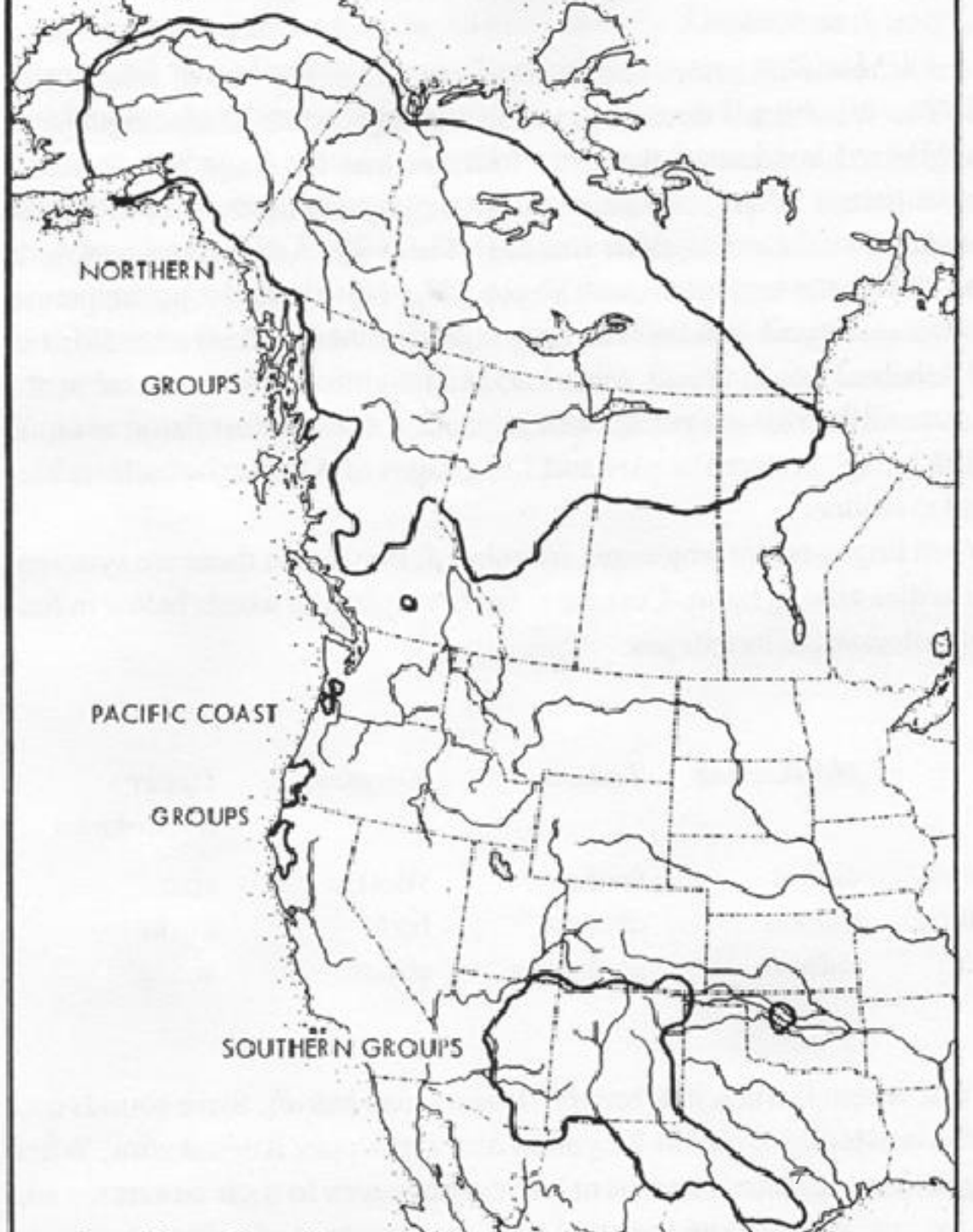
- Historical development of tone
  - on vowel, usually from adjacent consonants
- Development of Vietnamese

Proto-Mon-Khmer	***pa**	***ba**	***pas**	***bas**	***paK**	***baK**
Proto-Viet-Muong (ca. 0 AD)	*pa	*ba	*pah	*bah	*pa?	*ba?
6th century AD	pā	bā	pâ	bâ	pă	bă
12th century AD	pa˧˥	pa˨˩	pa˧˩	pa˨˩˧	pa˧˥	pa˨˩
modern Vietnamese	ma˧˥	ma˨˩	ma˧˩	mạ˨˩˧	ma˧˥	mạ˨˩
	‘ghost’	‘but’	‘tomb’	‘code’	‘cheek’	‘rice seedling’

Haudricort, André-Georges. 1954. 'De l'origine des tons en viêtnamien.' *Journal Asiatique* 242 (68-82).
Kirby, James P. 2011. 'Vietnamese (Hanoi Vietnamese).' *Journal of the International Phonetic Association* 41 (03):381-392.
Matisoff, James. 1970. 'Glottal dissimilation and the Lahu high-rising tone: a tonogenetic case-study.' *Journal of the American Oriental Society* 90 (1):13-44.

Dene (Athabaskan) family

- 38-40 languages
  - some extinct, most moribund or endangered
- 6-8 branches

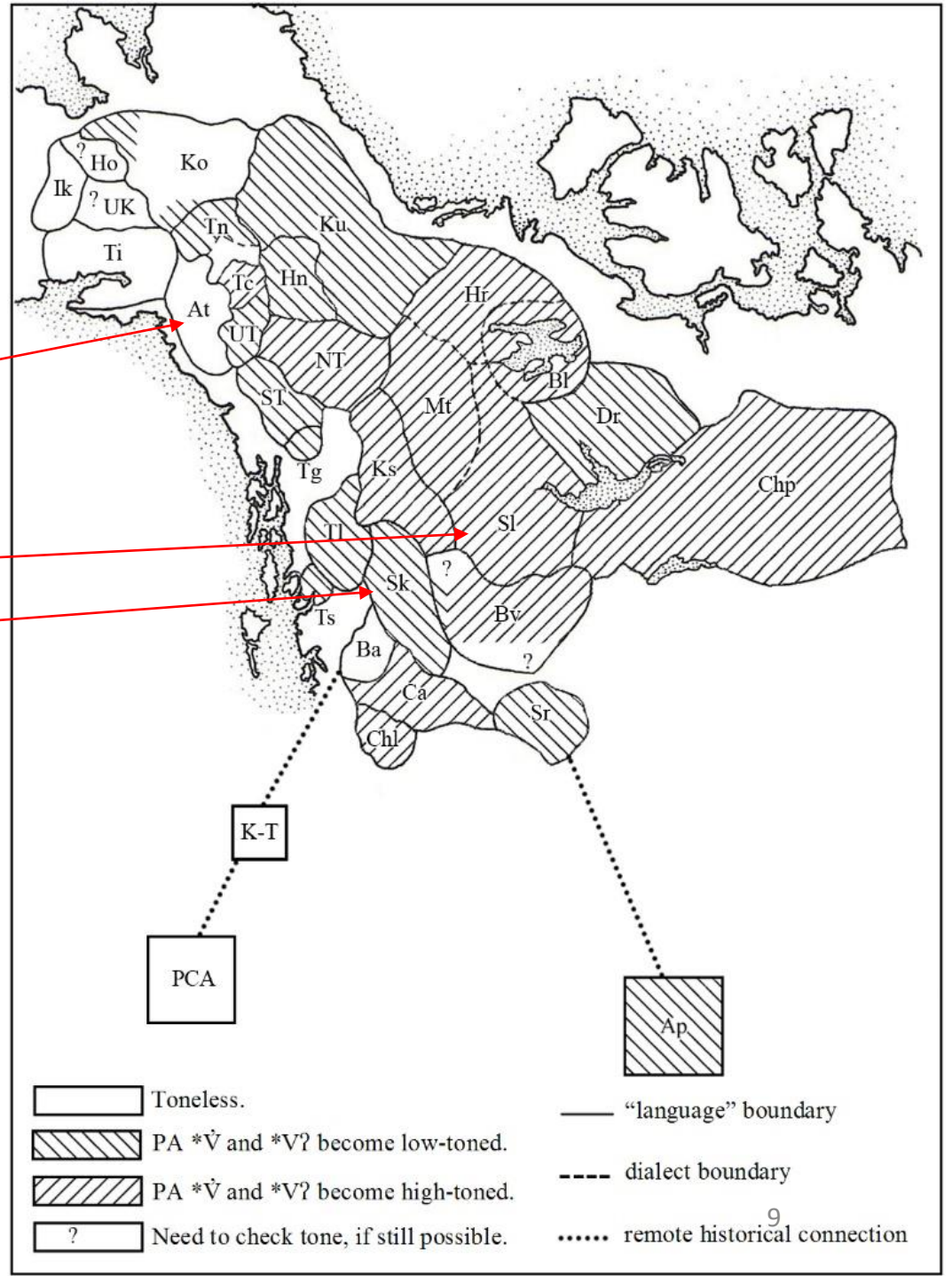


Parr, Richard T. 1974. *A Bibliography of the Athapaskan Languages*. Ottawa: National Museums of Canada/Musées Nationaux du Canada.

Hargus, Sharon. 2013. 'Dene.' In *Working Papers in Athabaskan (Dene) Languages 2012: Bellingham, Washington August 15-17, 2012*, ed. by Daniel W. Hieber Sharon Hargus, and Edward Vajda. Fairbanks: Alaska Native Language Center. 13-23.

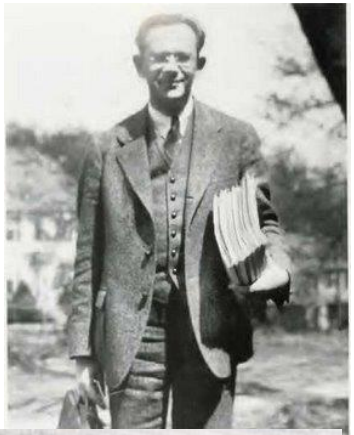
Tonal status of Dene languages

- ‘beaver’
- Ahtna tsʰaʔ
- Slave tsʰáʔ
- Tsek’ene tsʰàʔ



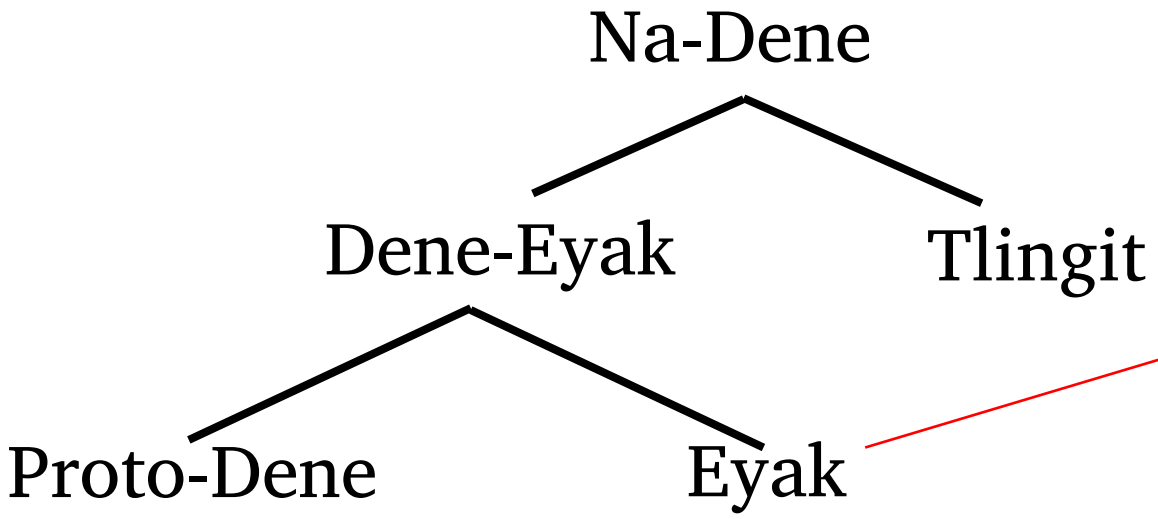
Krauss, Michael. 2005. 'Athabaskan tone.' In *Athabaskan Prosody*, ed. by Sharon Hargus and Keren Rice. Amsterdam and Philadelphia: John Benjamins. 55-136. [Revision of 1978-79 ms.]

20th century studies of Dene tone



- Sapir: Proto-Dene "is a tone language", with tone like Tsek'ene
- Li: tone connected to syllable-final [ʔ]
- Reichard: Proto-Dene did not have "pitch accent"
- Krauss: Proto-Dene not tonal, tone developed from glottal stop, other glottalized sounds

Sapir, Edward. 1922. 'Athabaskan Tone.' *American Anthropologist* 24:390-391.
Li, Fang-Kuei. 1933. 'Chipewyan Consonants.' *Bulletin of the Institute of History and Philology of the Academica Sinica* Supplementary Volume I: Ts'ai Yuan Pe'i Anniversary Volume:429-467.
Reichard, Gladys A. 1951. *Navaho Grammar*. New York: J.J. Augustin.
Krauss, Michael. 1964. 'Proto-Athapaskan-Eyak and the Problem of Na-Dene I: The Phonology.' *International Journal of American Linguistics* 30:118-131.



Proto-Dene	Eyak	Tlingit	
		Tongass	northern
*-qʰɑ̃jʔ	-qʰaʔ	qʰaʔ	qʰá
‘husband’	‘husband’	‘man (male)’	

Kari, James. 2008. Distribution of Na-Dene Languages. Fairbanks: Dena’inaq’ Titaztunt.
Williams, Frank, and Emma Williams. 1978. Tongass texts, edited by transcribed and edited with an introduction by Jeff Leer. Fairbanks: Alaska Native Language Center, University of Alaska.

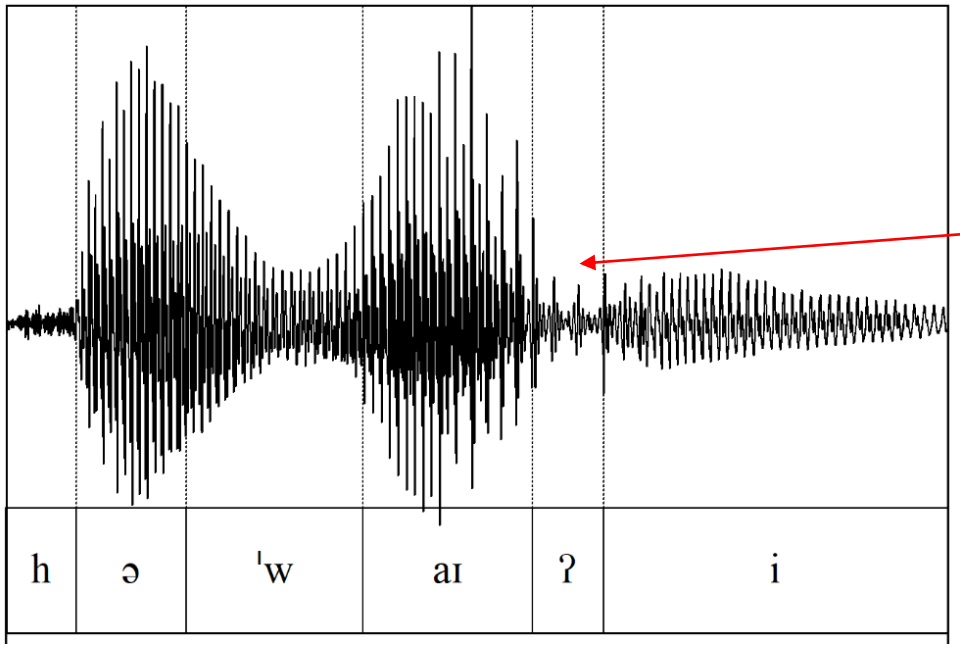
Dene sound correspondences

- Glottalized sounds
- Tone arose via “constriction”

	Proto-Dene	Ahtna	Slave	Tsek’ene
‘water’	*tʰuː	tʰuː	tʰù	tʰú
‘ice’	*tʰən	tʰen	tʰɛ̀	tʰɛ́n
‘foot’	*-qʰeʔ	-qʰeʔ	-kʰɛ́	-kʰèʔ
‘mouth, tongue’	*-zą̃ːt	-zaː	-ðáɾɛ́	-zàʔ
‘leaf’	*-t’aːn̨	-t’aːn̨	-t’ő	-t’ɔ̀ʔ
‘abdomen’	*-wət’	-peʔt	-pɛ́ɾɛ́	-pɛ̀t
‘pl. go’ PFV	*teːtɬ’	-teːtɬ’	-tɛ̀	-tétɬ
		toneless	“high-marked”	“low-marked”

Leer, Jeff. 1979. *Proto-Athabaskan Verb Stem Variation: I. Phonology*. Fairbanks: Alaska Native Language Center, University of Alaska Fairbanks.

“Constriction” as *voice quality*

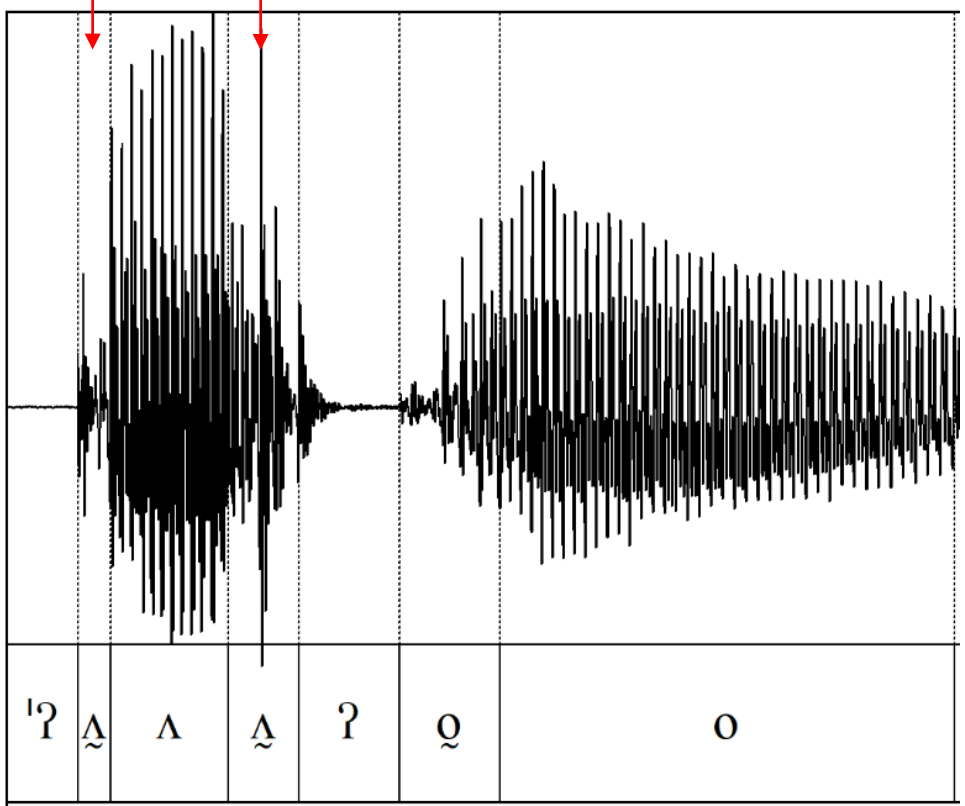


- “quality [of the voice] deriving…from laryngeal activity”
- creaky voice
  - slow, irregular vibration

Laver, John. 1980. *The Phonetic Description of Voice Quality*. Cambridge: Cambridge University Press.

Getting “constriction” from glottalized consonants

- Coarticulation
  - V? is really [V̰?] or [VV̰?]

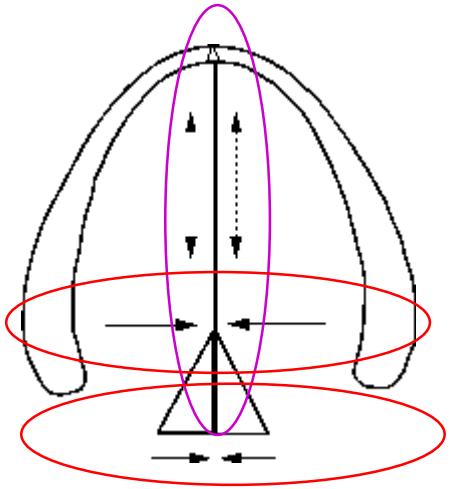


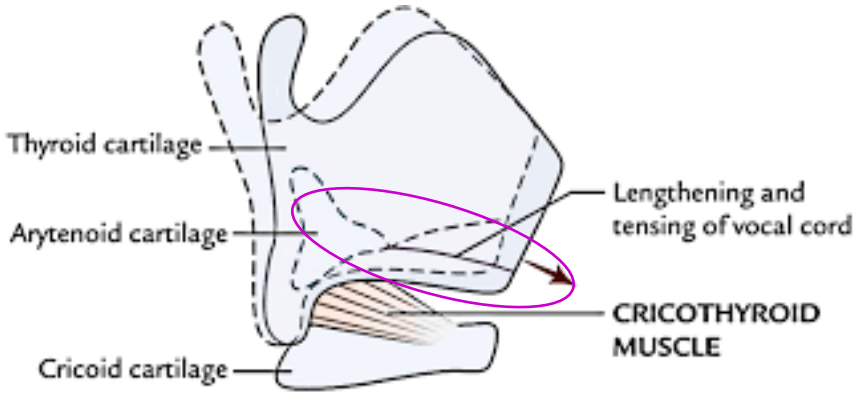
	Proto-Dene
‘mouth, tongue’	*-za̰ːt
‘foot’	*-qʰeʔ [qʰḛʔ]
‘leaf’	*-tʼaːn̰ [tʼa̰ːn̰]
‘abdomen’	*-wət’ [wə̰ʔt]

- Vn̰ is really [V̰n̰] or [VV̰n̰]
- VC’ can be [vʔC], thus [V̰ʔC]

Getting high or low tone from "constriction"

- Two ways of articulating glottal closure
- Medial, posterior compression
  - shortens vocal folds
  - creaky voice
  - e.g. Danish *stød*
  - > low tone
- Longitudinal tension as well
  - stiffens and stretches vocal folds
  - faster vibration
  - tense voice
  - e.g. Korean tense stops
  - > high tone





Kingston, John. 2005. 'The Phonetics of Athabaskan Tonogenesis.' In *Athabaskan Prosody*, ed. by Sharon Hargus and Keren Rice. Amsterdam: John Benjamins. 137-184.

Dene migrations

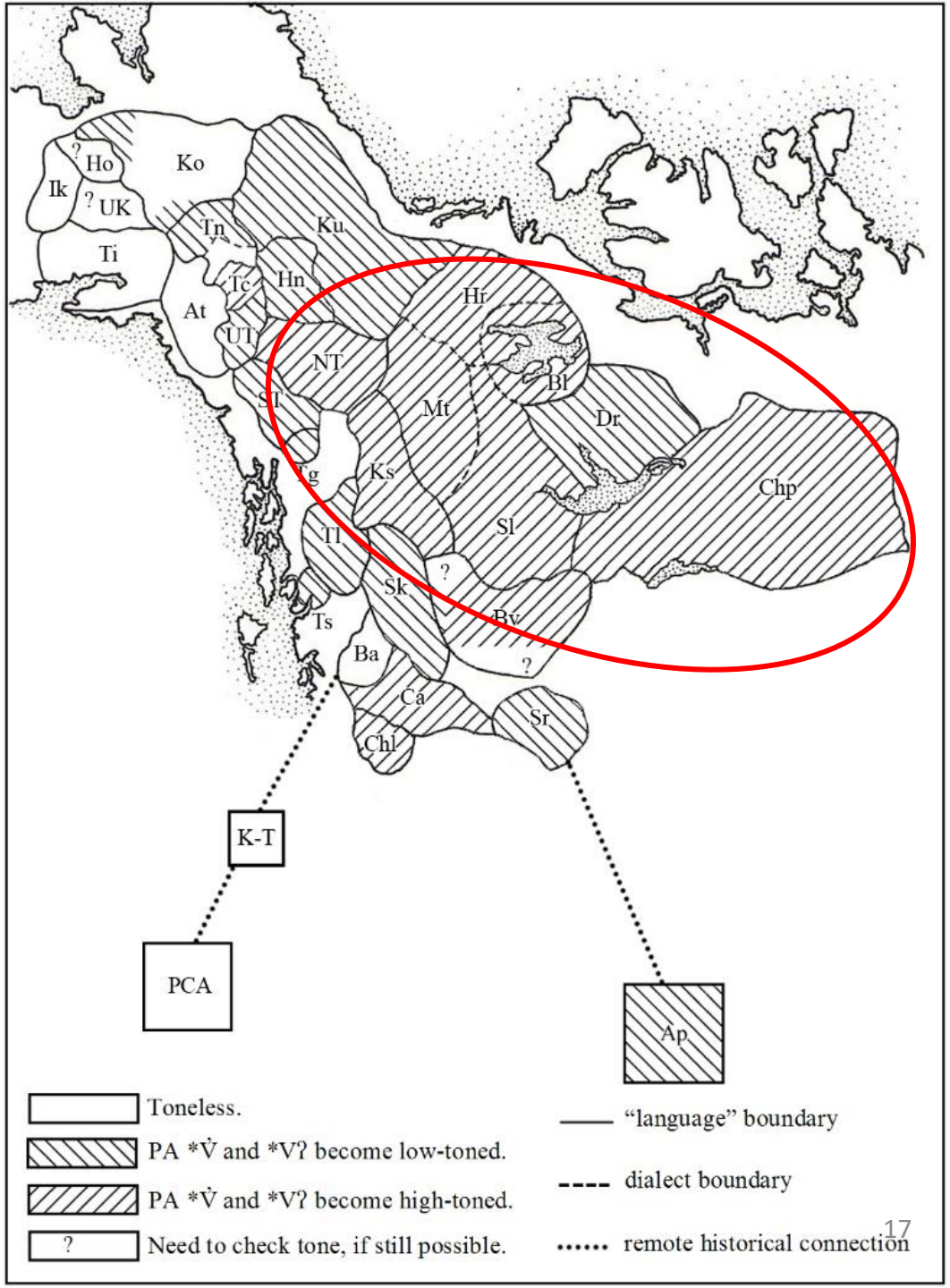
- “down the Pacific coast early on”
- “east and south into Canada and then down the eastern face of the Rockies”
- “north and west into Alaska in the wake of some speakers of the non-tonal protodialect”

Kingston, John. 2005. 'The Phonetics of Athabaskan Tonogenesis.' In *Athabaskan Prosody*, ed. by Sharon Hargus and Keren Rice. Amsterdam: John Benjamins. 137-184.

Krauss, Michael, and Victor Golla. 1981. 'Northern Athapaskan Languages.' In *Handbook of North American Indians, vol. 6. Subarctic*, ed. by June Helm. Washington D.C.: Smithsonian Institution. 67-85.

Low tone more basic?

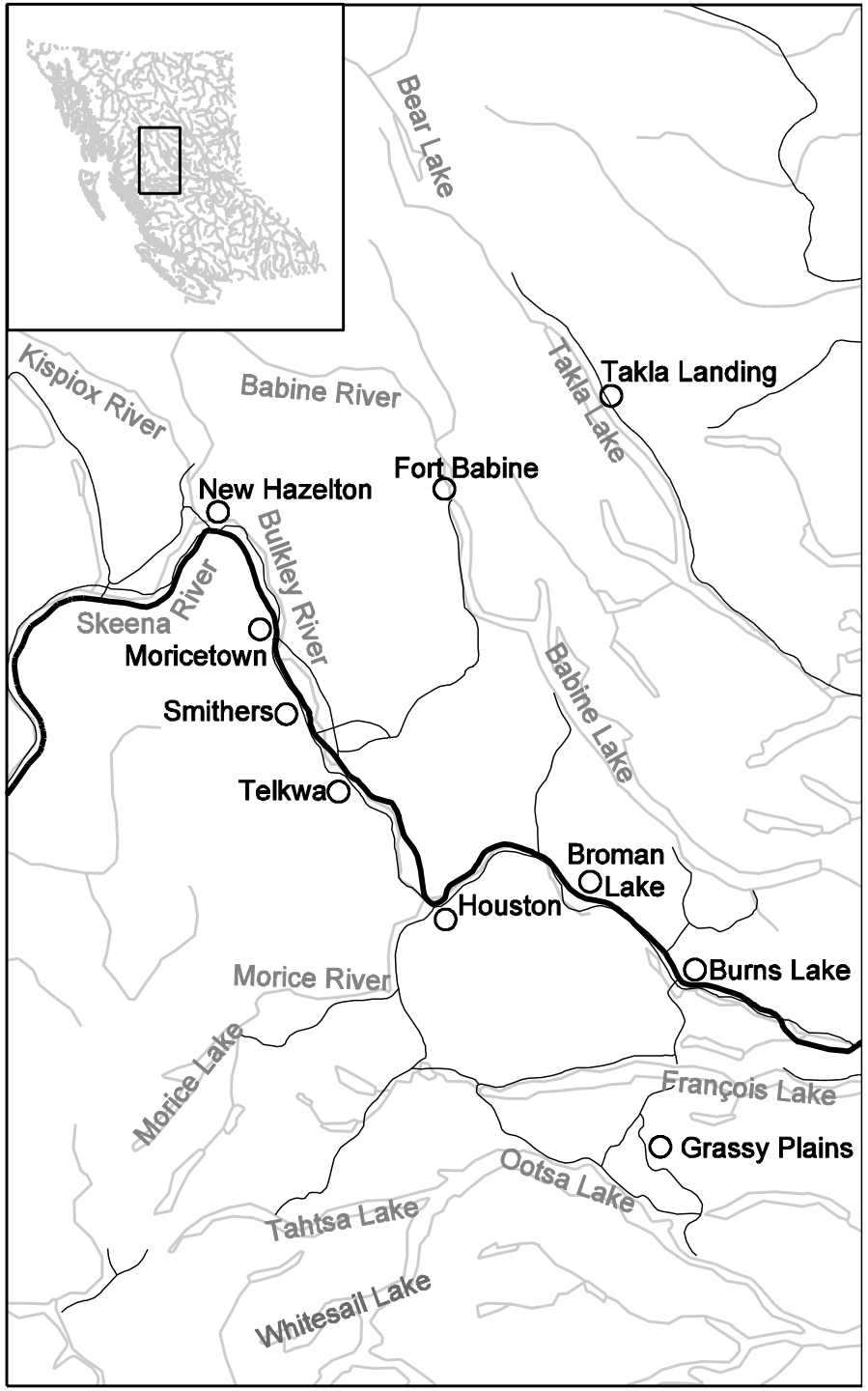
- High-marked lgs mostly contiguous
- High developed once, then spread from language to language?



Leer, Jeff. 1999. 'Tonogenesis in Athabaskan.' In *Cross-Linguistic Studies of Tonal Phenomena: Tonogenesis, Typology, and Related Topics*, ed. by Shigeki Kaji. Tokyo: Institute for the Study of Languages and Cultures of Africa and Asia, Tokyo University of Foreign Studies. 37-66.

Witsuwit’en

- Field research since 1988
  - OPP-9307704, DEL/IPY-0651853
- Dialect of Babine-Witsuwit’en
- Not a tone language
- Closest relatives
  - Carrier vestigially high-marked
  - Chilcotin robustly high-marked

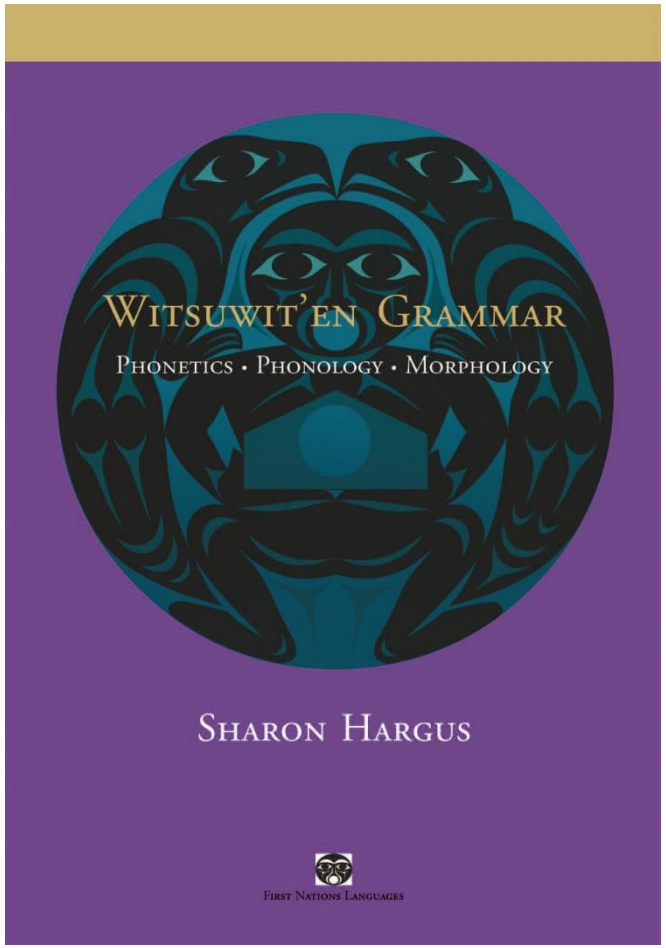


Babine-Witsuwit’en language area

Roy Morris being interviewed by Lillian Morris about environment and climate change, November 2009

Witsuwit’en final glottalization

- *ʧʰaʔ ‘beaver’ > [tsʰa]
- Two types of final glottalized consonant
  - ʔ [peʔ] ‘fully dried fish’
  - nasal
    - [pən̰] ‘morning’
    - [haɬt’əm̰] ‘it’s small’



Hargus, Sharon. 2007. *Witsuwit’en Grammar: Phonetics, Phonology and Morphology*. Vancouver: UBC Press.

Voice quality in Dene languages

- Kaska (Morice 1902-3: 528): the '…voice must also be raised with a sort of constrained effort when one pronounces the words *khon'* "fire", *nehn'* "land", *tze* "gum", etc., though many other monosyllables lack this distinguishing feature'
- Instrumental studies of Hupa and Tanacross only

Morice, Adrien-Gabriel. 1902-03. 'The Nah'ane and their Language.' *Transactions of the Canadian Institute* 7:517-534.
Gordon, Matthew. 1995. 'The Phonetic Structures of Hupa.' In *Fieldwork Studies of Targeted Languages IV (UCLA Working Papers in Phonetics, 93.)*, ed. by Ian Maddieson. Los Angeles: UCLA Department of Linguistics Phonetics Lab. 1-24.
Holton, Gary. 2000. *The Phonology and Morphology of the Tanacross Athabaskan Language*. PhD dissertation, Department of Linguistics, University of California Santa Barbara.

Questions about Witsuwit’en

- Glottalization: How does final glottalization affect the voice quality of the preceding vowel?
- Nasality: Are there differences between glottalized nasals and glottal stop?

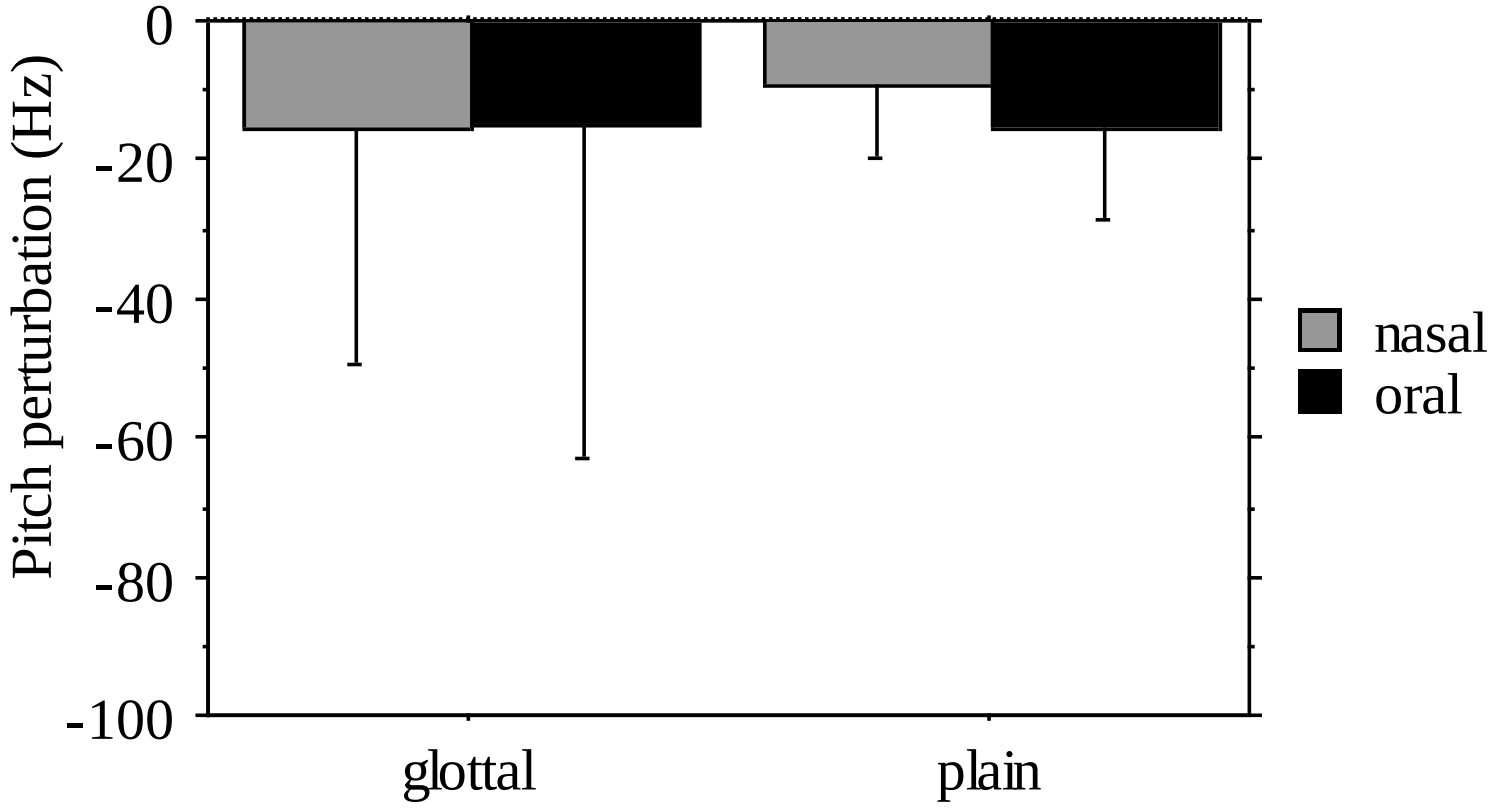
Methods

- Word list recordings. Sample set:
  - je ‘louse’
  - jeʔ ‘boy’ (vocative)
  - njen ‘across’
  - jeɳ ‘bridge’
- 10 speakers (3 male, 7 female)
- 4-6 sets/speaker
- 4 repetitions/token

Measures

- 30 ms. window at vowel midpoint and endpoint
  - Pitch
  - Jitter
  - Energy
  - Spectral tilt (h1-h2)
- Normalization
  - $\text{Measure}_{\text{perturbation}} = \text{Measure}_{\text{endpoint}} - \text{Measure}_{\text{midpoint}}$

Results across speakers

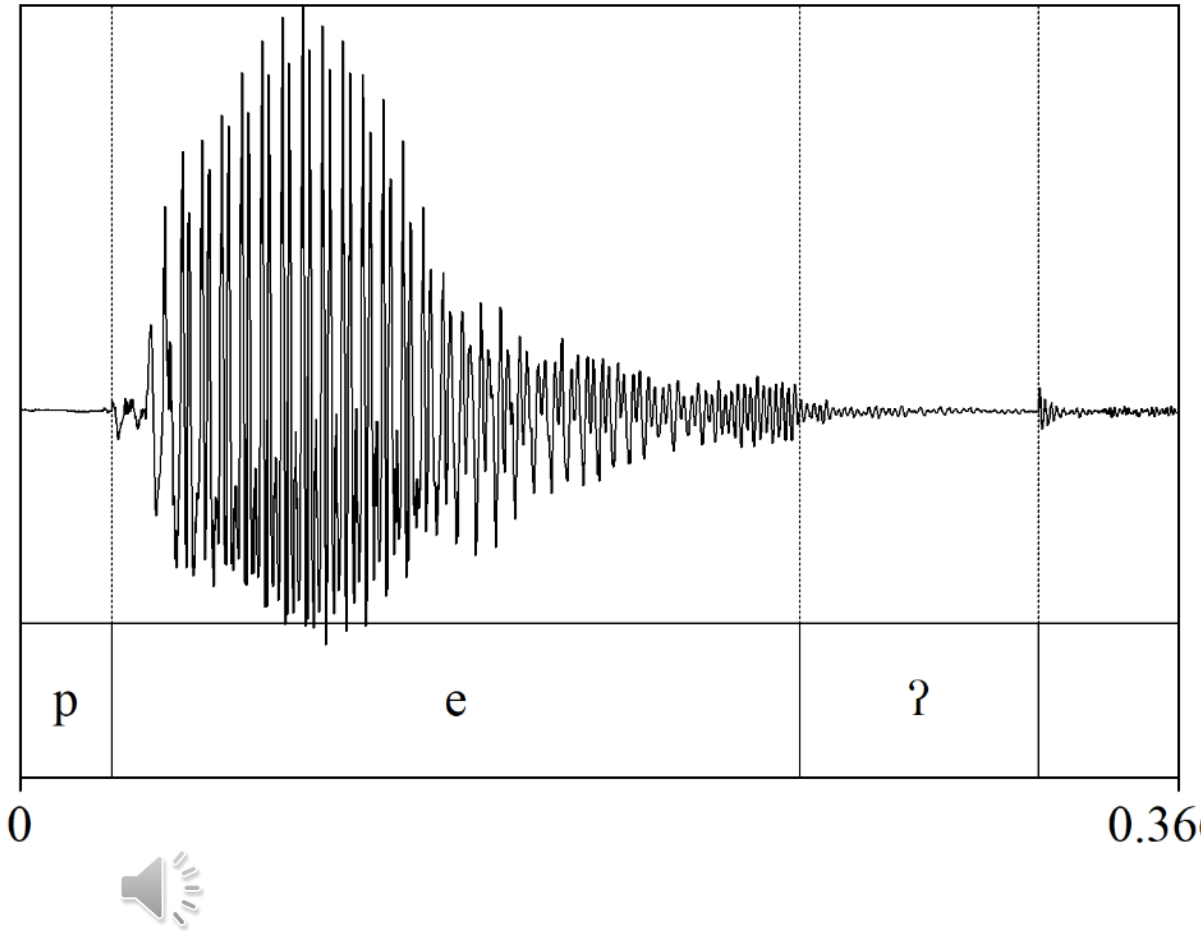


Glottalization	Nasality	Glot x Nas
n.s.	n.s.	n.s.

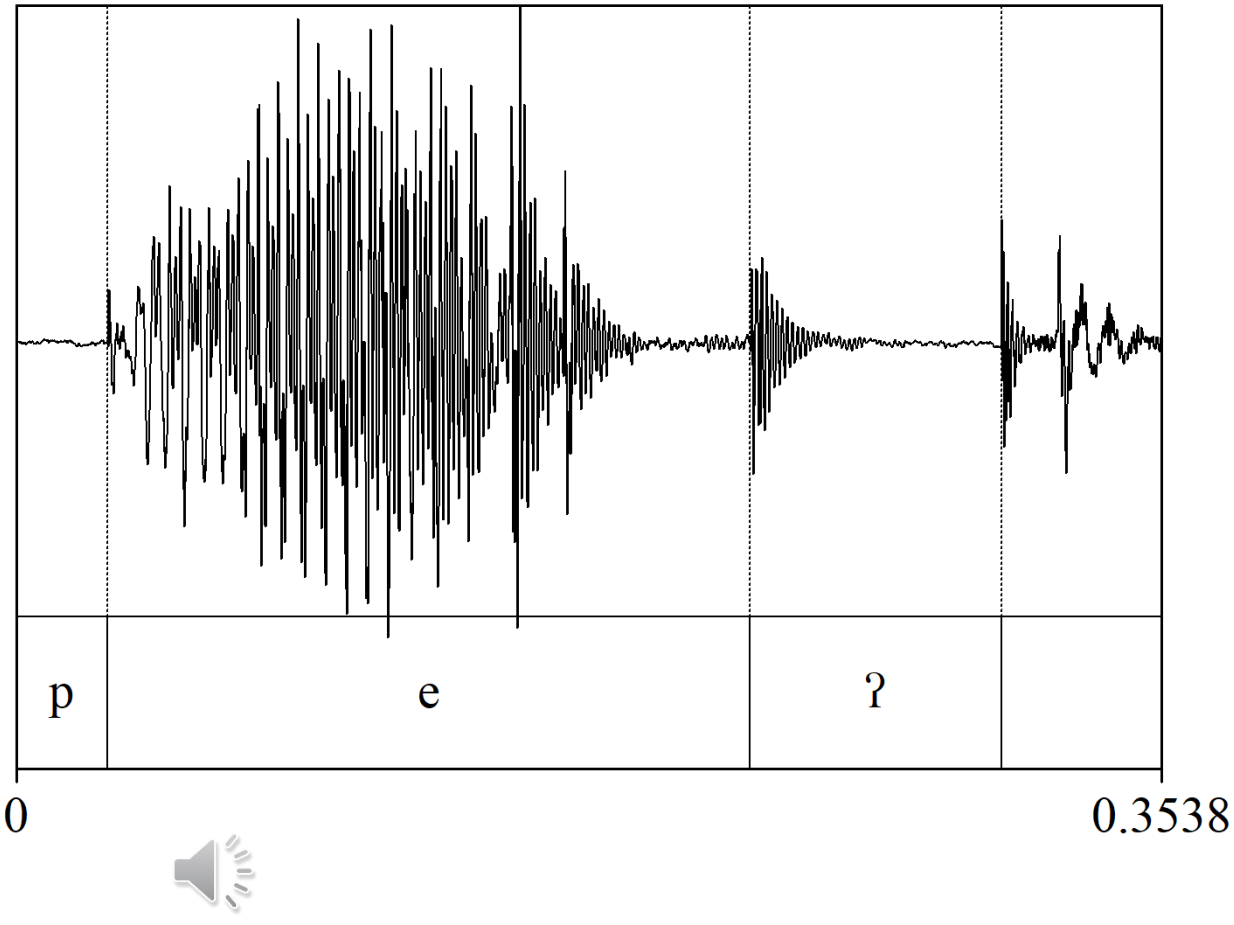
Results for individuals

- Pitch lowerers: CM, HM, LM, MA, MF
- Pitch raisers: AJ, KN, SM
- Mixed: BM

A pitch raiser vs. a pitch lowerer



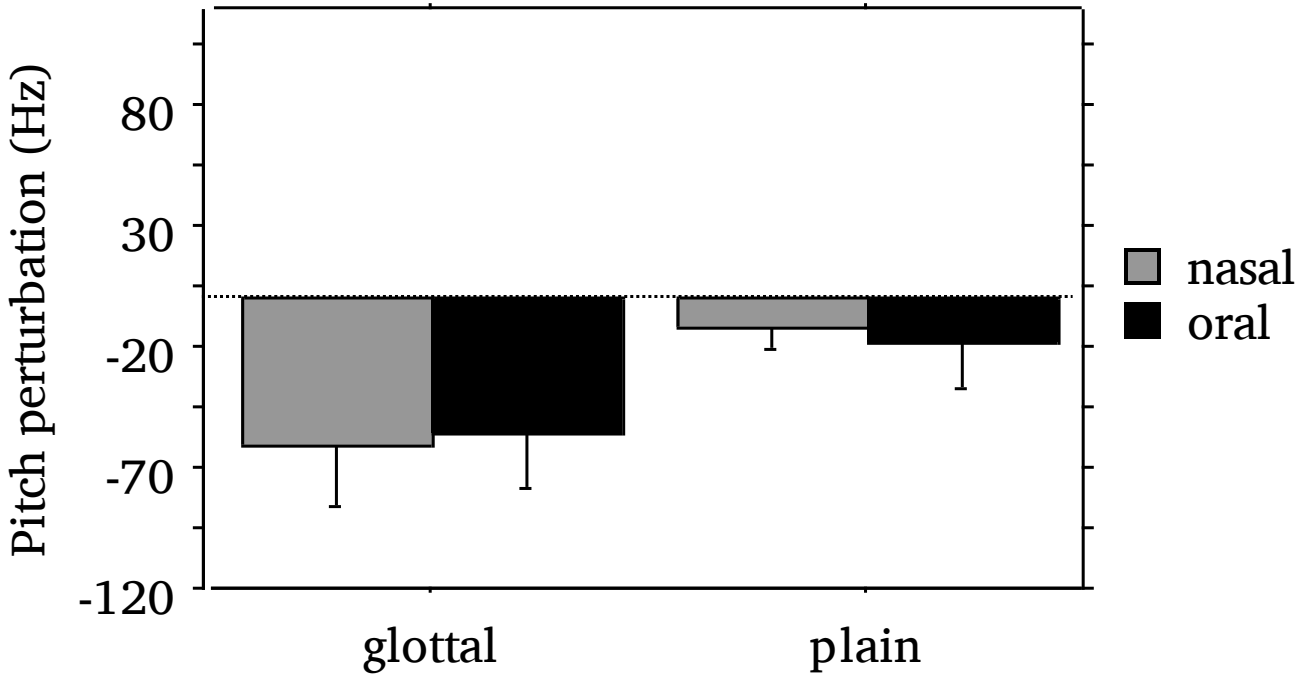
AJ



MA

Pitch lowerers

MA



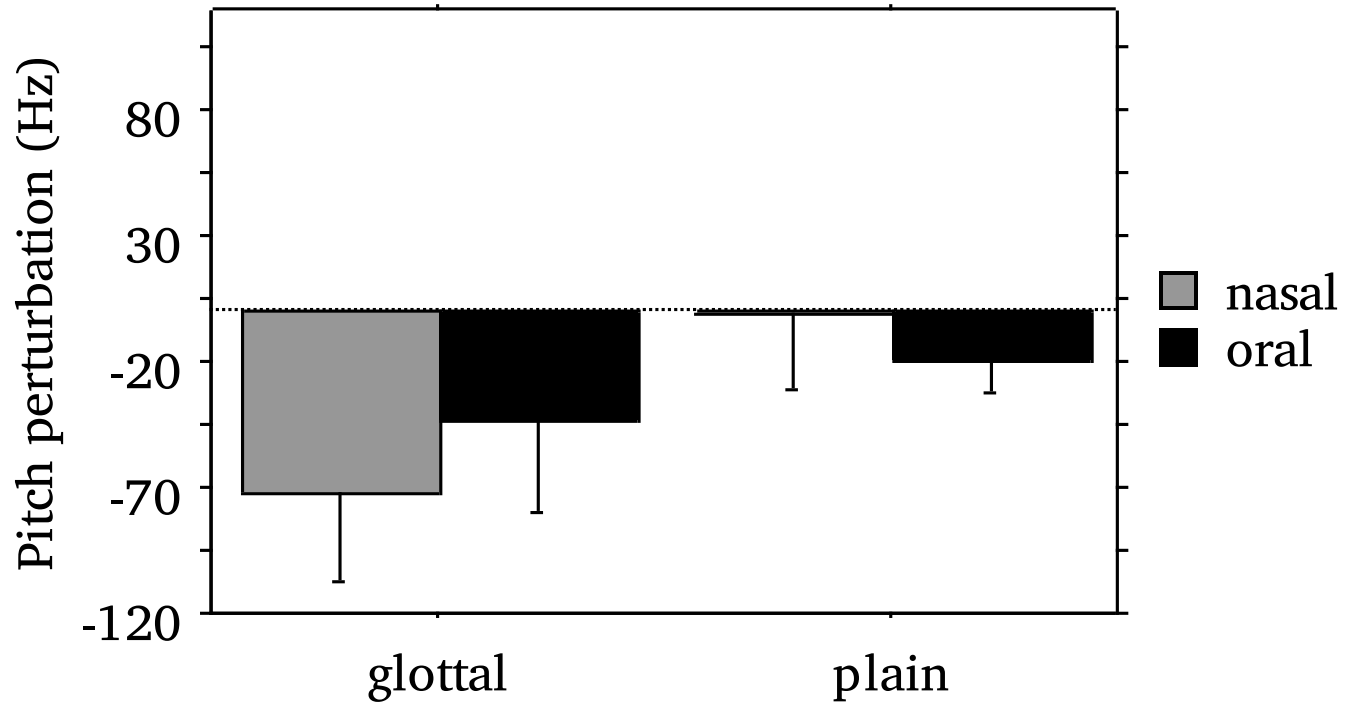
[je?] 'boy' (VOC)

also MF

Glottalization	Nasality	Glot x Nas
$p < .0001$	n.s.	n.s.

Pitch lowerers, cont.

CM

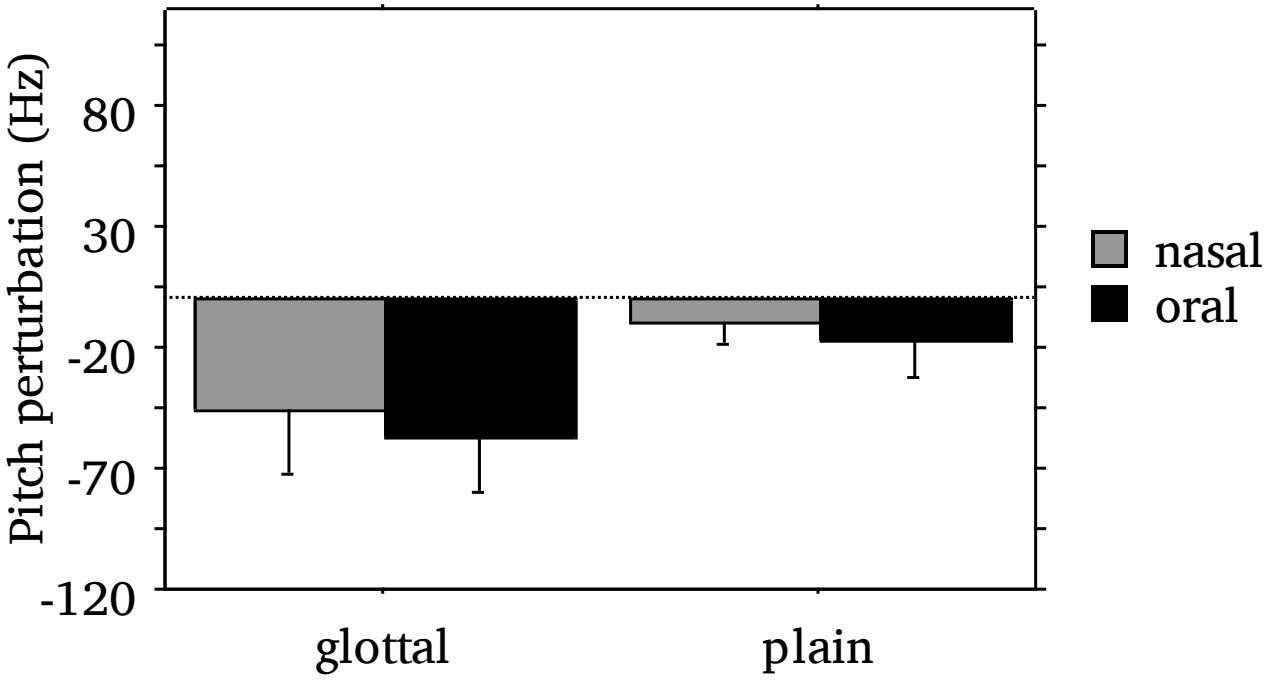


Glottalization	Nasality	Glot x Nas
$p < .0001$	n.s.	$p = .0004$

[jeʔ] 'boy' (VOC)

Pitch lowerers, cont.

HM

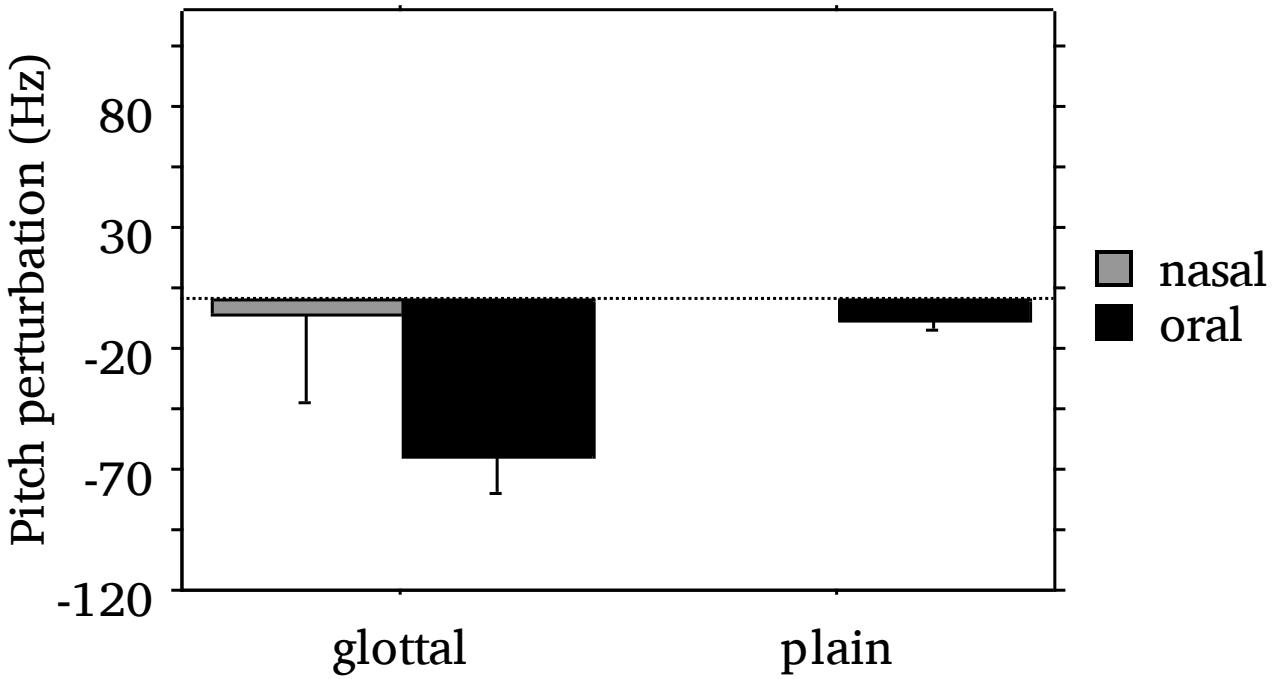


[je?] 'boy' (VOC)

Glottalization	Nasality	Glot x Nas
$p < .0001$	$p = .0392$	n.s.

Pitch lowerers, cont.

LM

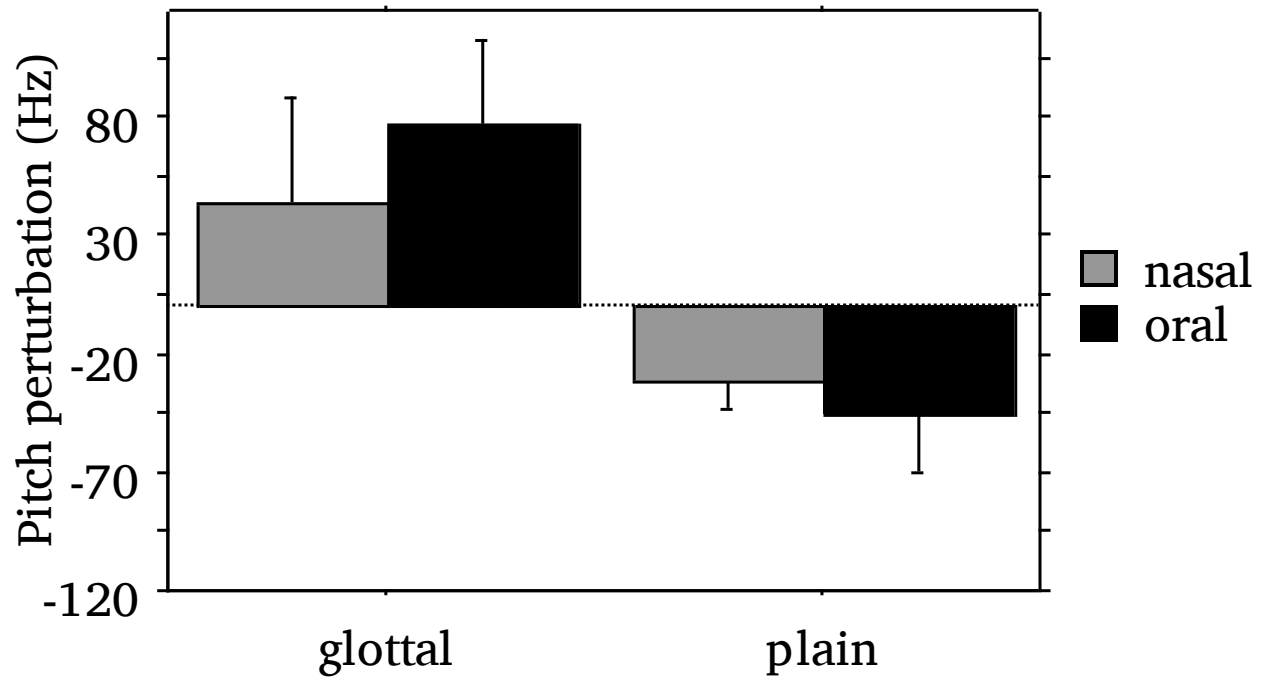


[je?] 'boy' (VOC)

Glottalization	Nasality	Glot x Nas
$p < .0001$	$p < .0001$	$p < .0001$

Pitch raisers

AJ

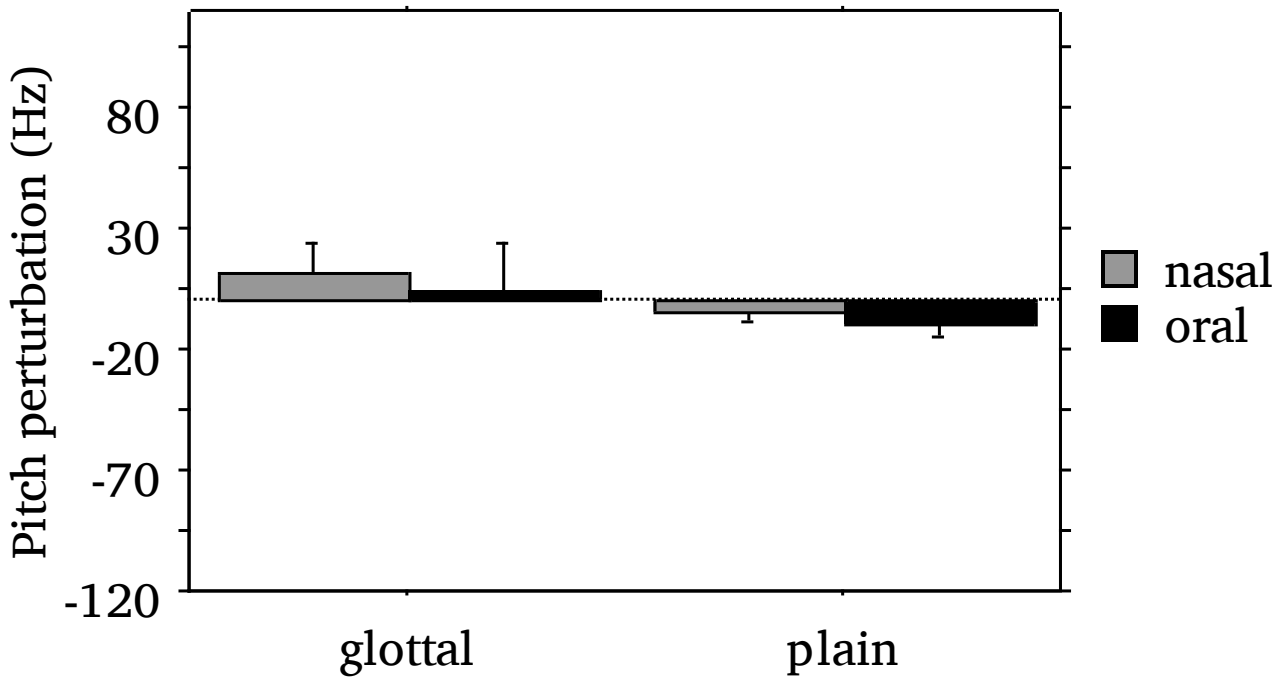


Glottalization	Nasality	Glot x Nas
p < .0001	n.s.	.0035

[je?] 'boy' (VOC)

Pitch raisers, cont.

KN

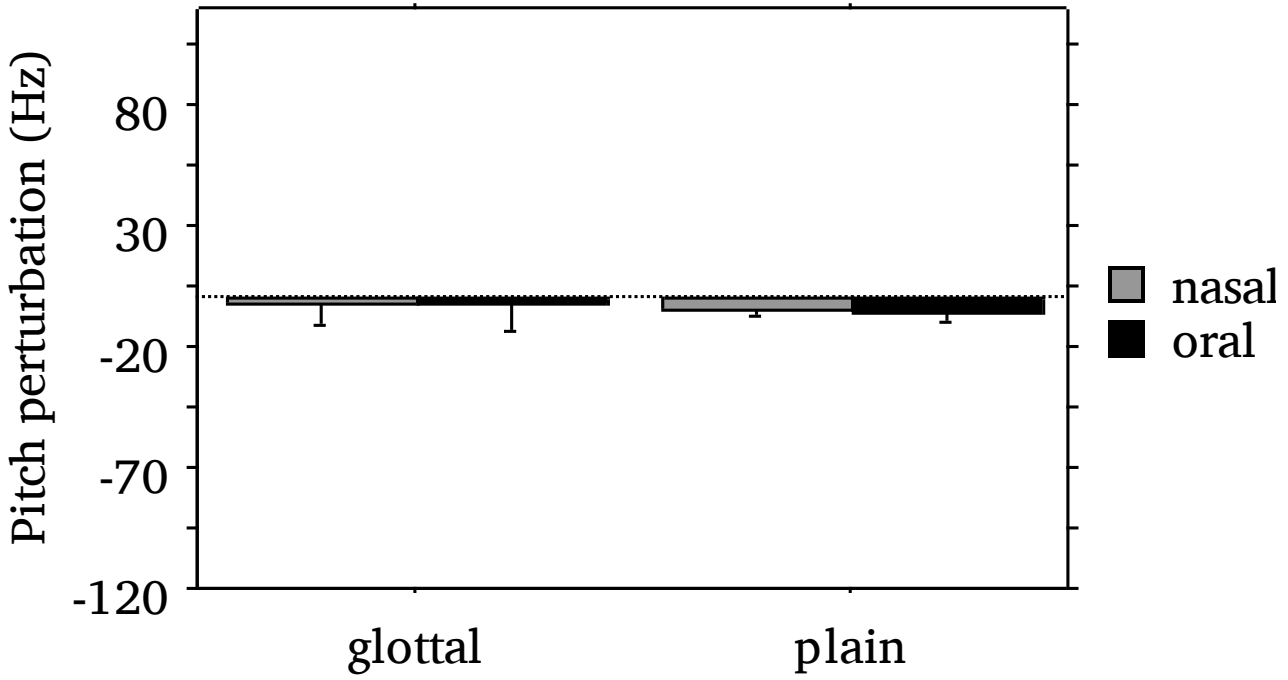


[je?] 'boy' (VOC)

Glottalization	Nasality	Glot x Nas
$p < .0001$	$p = .0399$	n.s.

Pitch raisers, cont.

SM

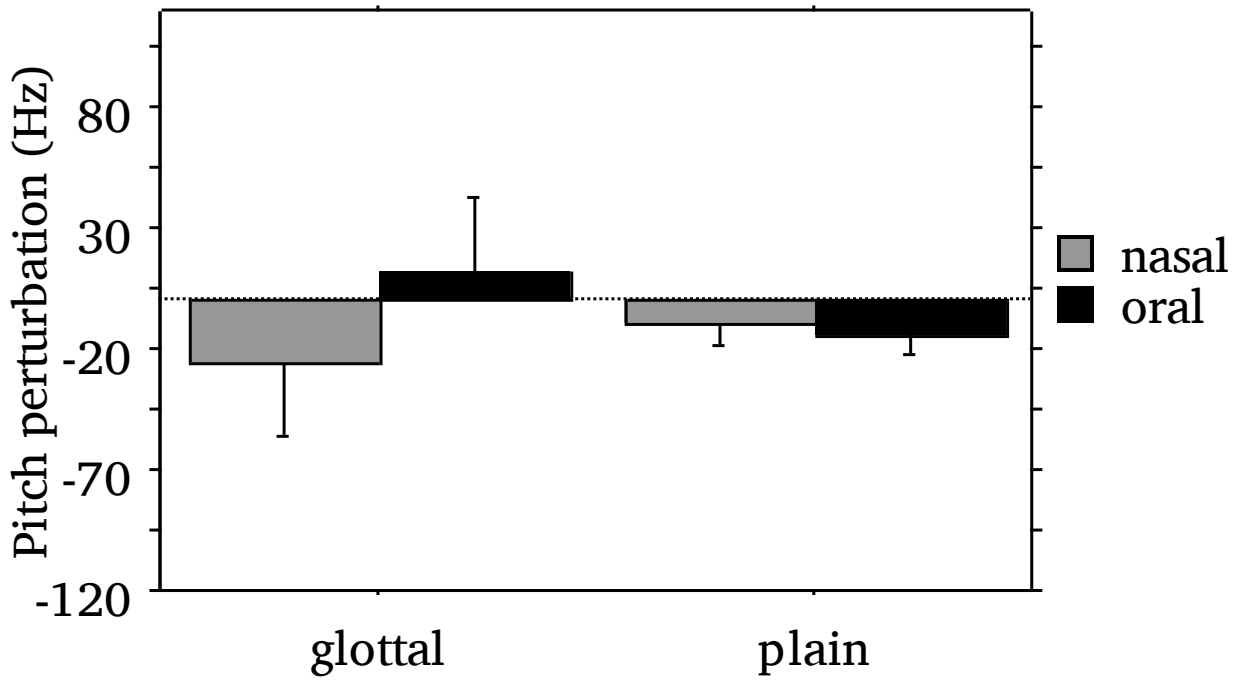


[jeʔ] 'boy' (VOC)

Glottalization	Nasality	Glot x Nas
p = .0498	n.s.	n.s.

Mixed pattern

BM



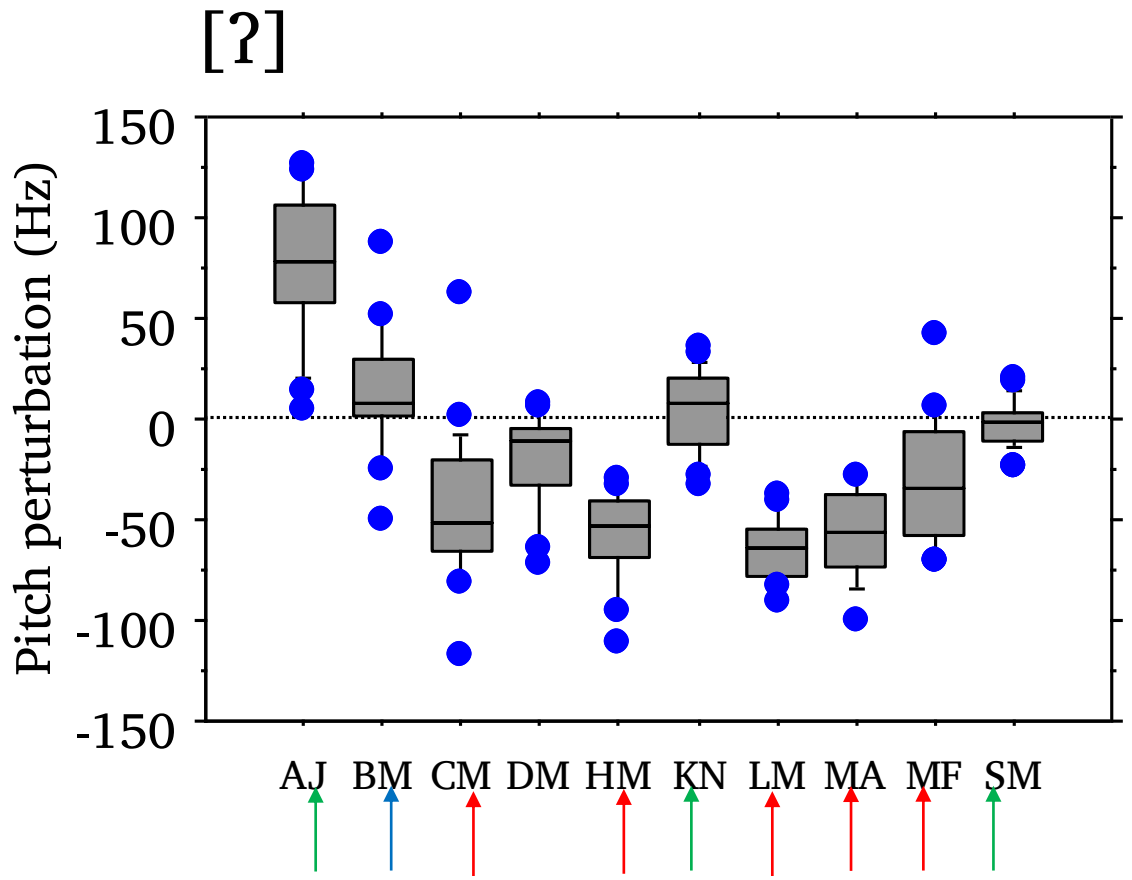
[jeʔ] 'boy' (VOC)

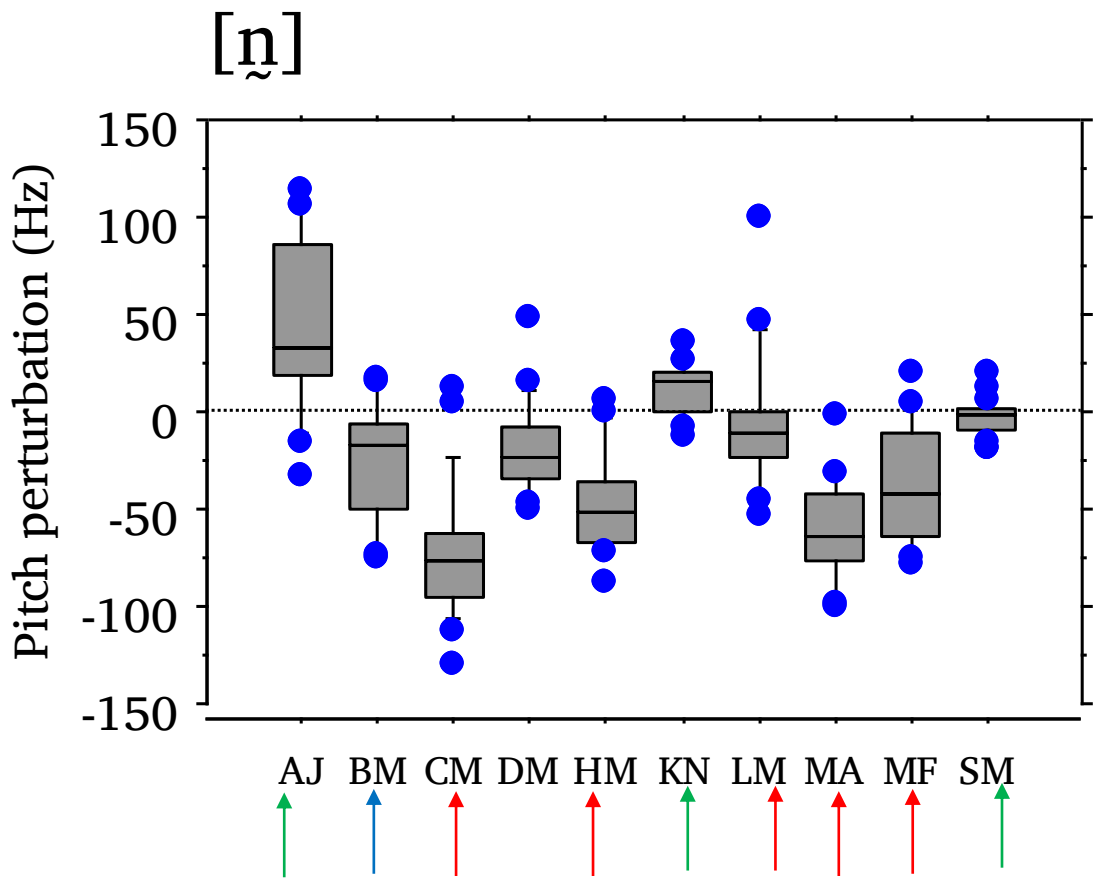
[jeɲ] 'bridge'

Glottalization	Nasality	Glot x Nas
n.s.	p = .0041	p = .0005

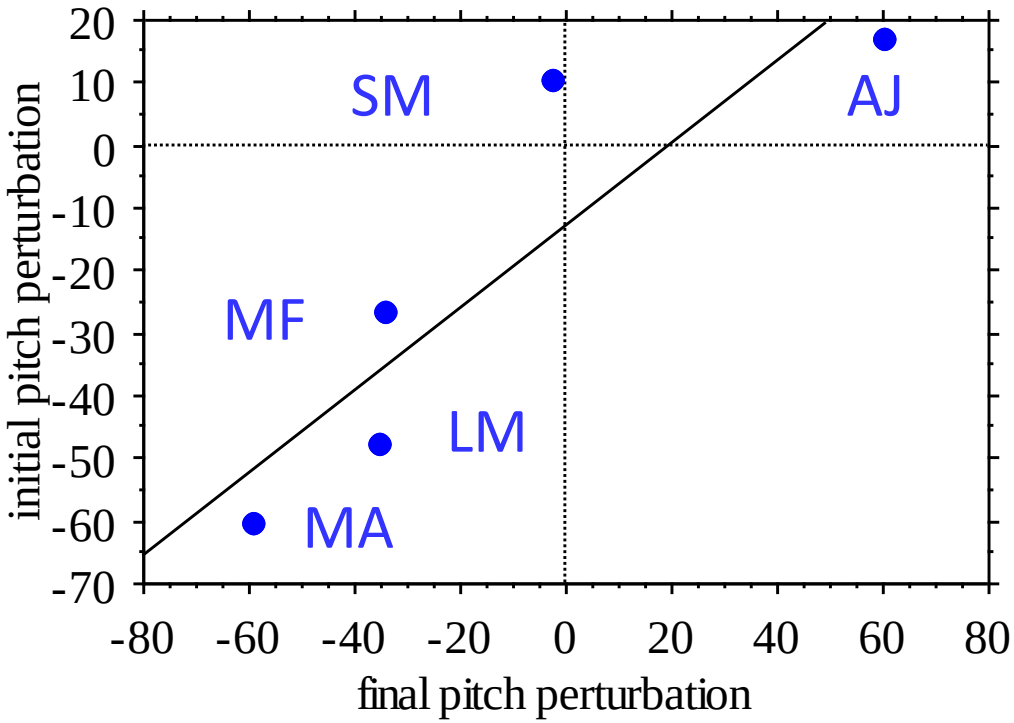
Pitch perturbation before glottalized consonants

pitch lowerers (5)
pitch raisers (3)
mixed (1)





Initial (C') vs. final pitch perturbation



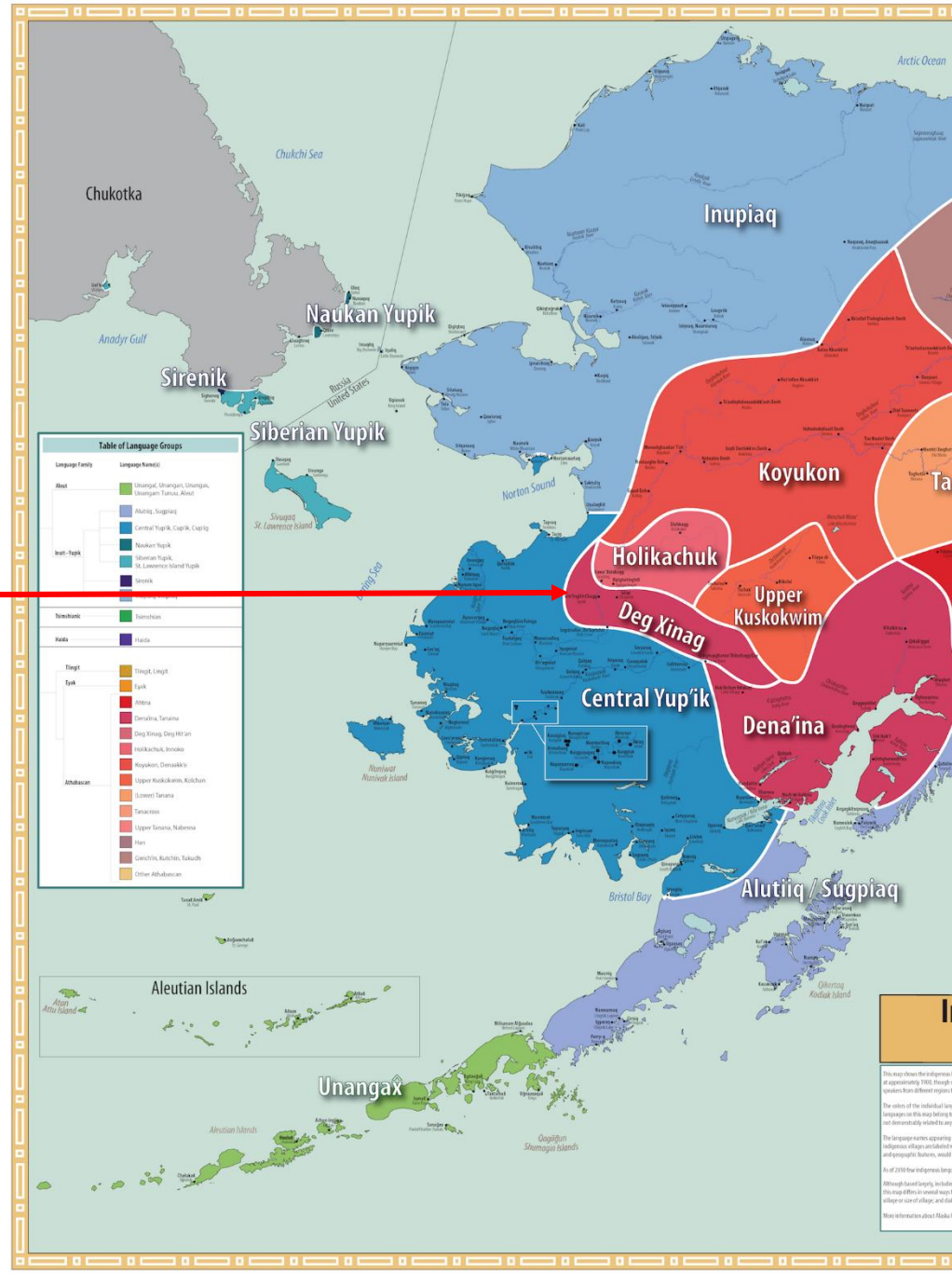
significantly correlated ($r = .888$, $p = .0459$)

Witsuwit’en summary

- Final glottalized consonants have raising and lowering effects
  - Effects generally uniform for individuals
  - Including across positions
- Witsuwit’en continues Proto-Dene variability?
  - Support for Kingston 2005: two kinds of glottalized consonants

Deg Xinag

- Field research 1991-2012
  - OPP-0137483, DEL/IPY-0651853
- Not a tone language
- Closest relatives
  - Holikachuk (toneless)
  - Koyukon (some low-marked dialects)



working with Jim Dementi in Shageluk AK January 2007

Deg Xinag

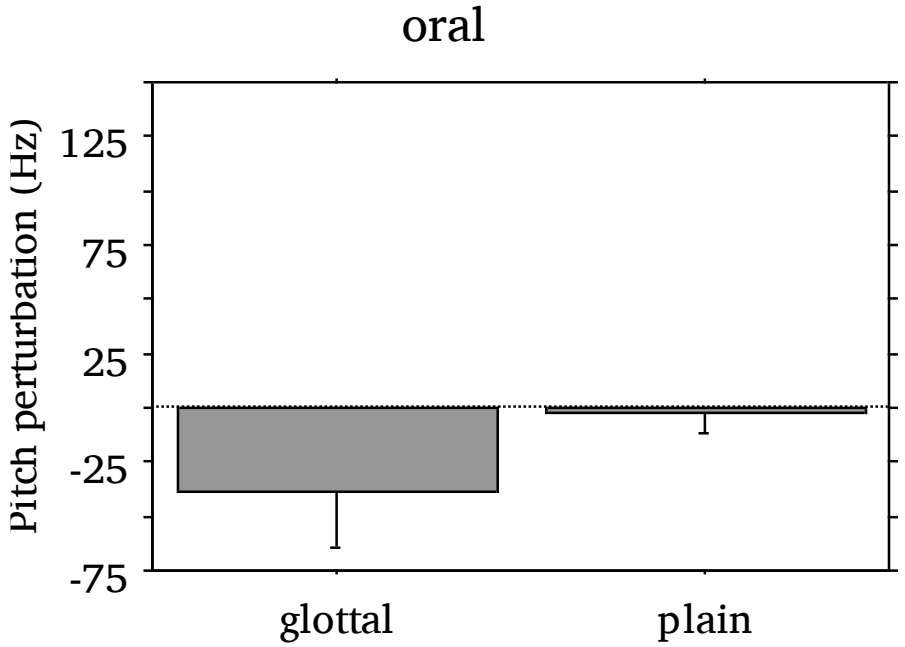
- Repeated voice quality study
  - [tŏʁo̰ŋ] ‘it’s furry’
  - [tŏʁoŋ] ‘fur’
  - [vŏʁõ̰ŋ] ‘half of it’

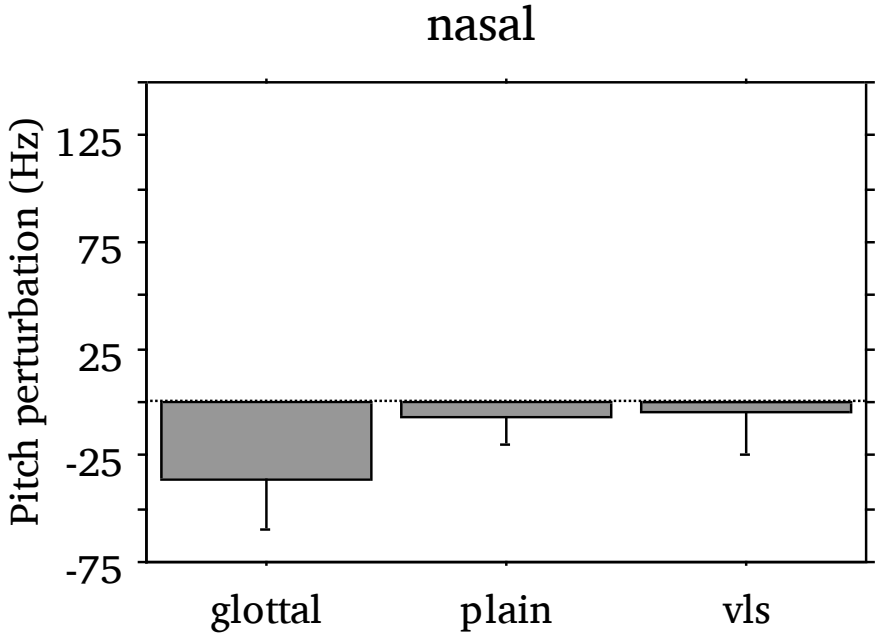
  - [səʁa] ‘my (man’s) sister-in-law’
  - [vəʁaʔ] ‘its grease’

Hargus, Sharon. 2016. 'Deg Xinag Word-Final Consonants and Voice Quality.' In *Laryngeal Features of Native American Languages*, ed. by Matt Coler, Leo Wetzels and Heriberto Avelino. Leiden: Brill. 71-128.

Pitch lowerers

AJ





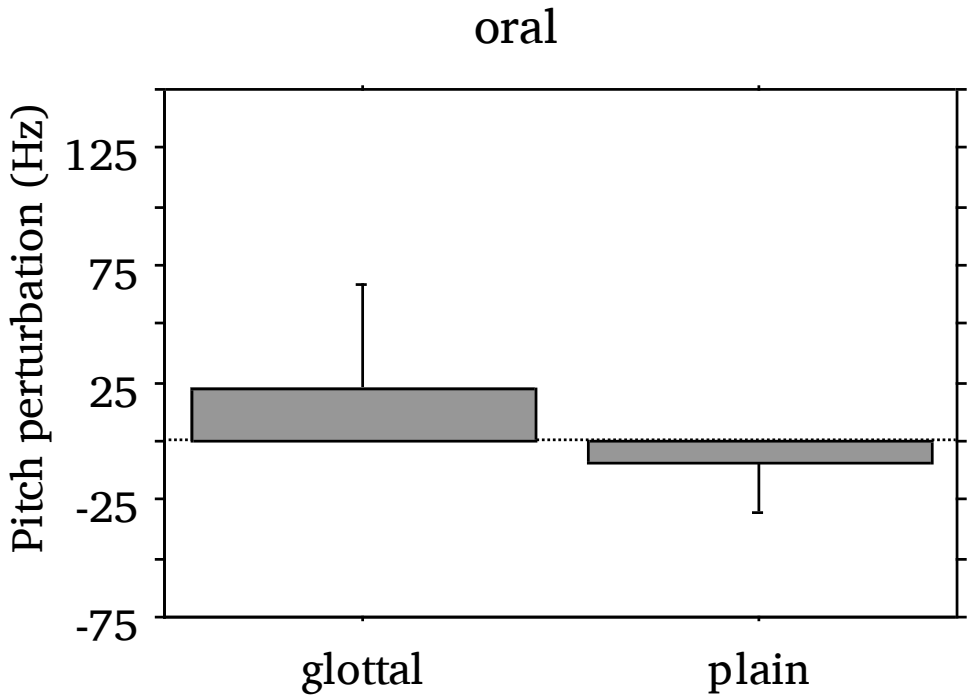
also ED, HM, KH, PA

Glottalization
$p < .0001$

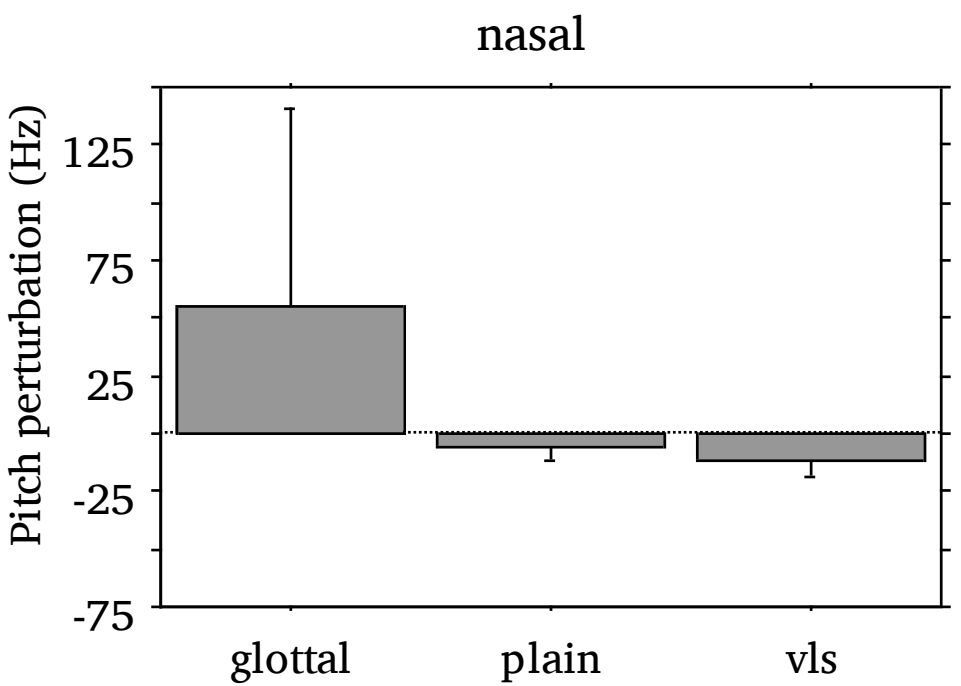
n̰ vs. n	n̰ vs. n̥
$p < .0001$	$p < .0001$

Pitch raiser

RD



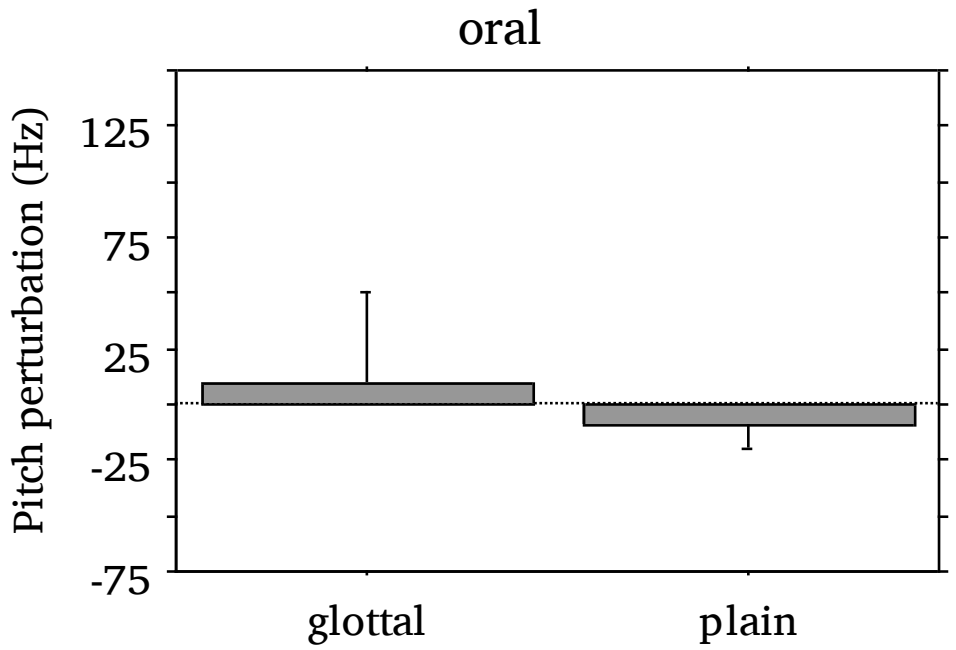
Glottalization
p = .0012



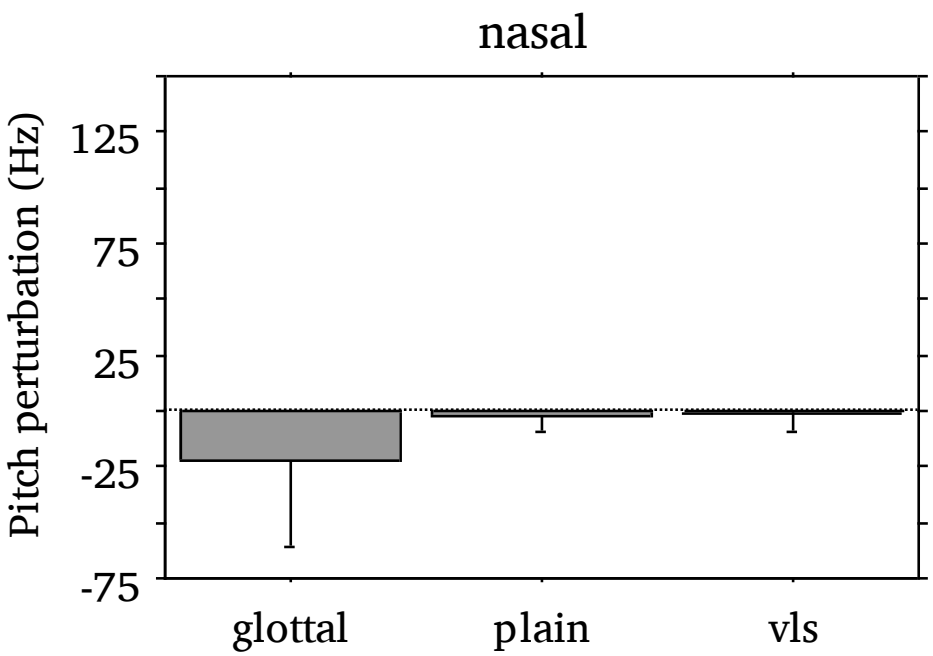
n̰ vs. n	n̰ vs. n̥
p = .0002	p < .0001

Mixed patterns

LH



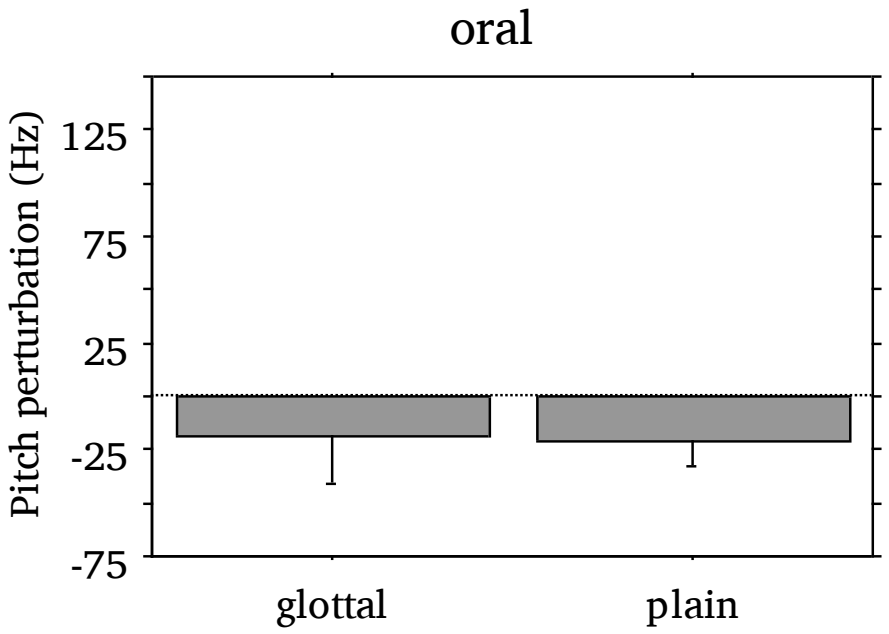
Glottalization
n.s.

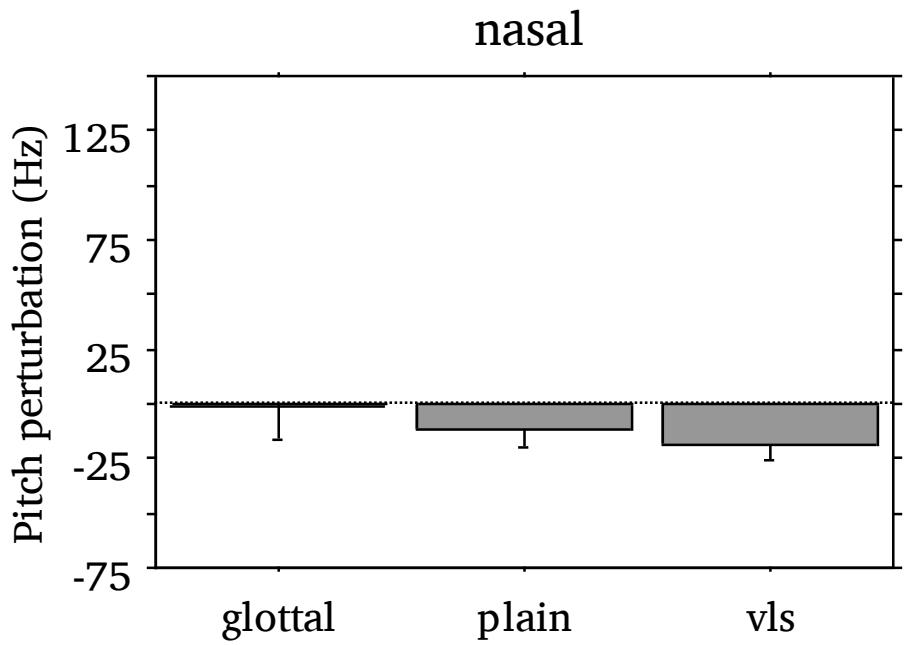


n̰ vs. n	n̰ vs. n̥
p = .0079	p = .0038

Mixed patterns, cont.

JD



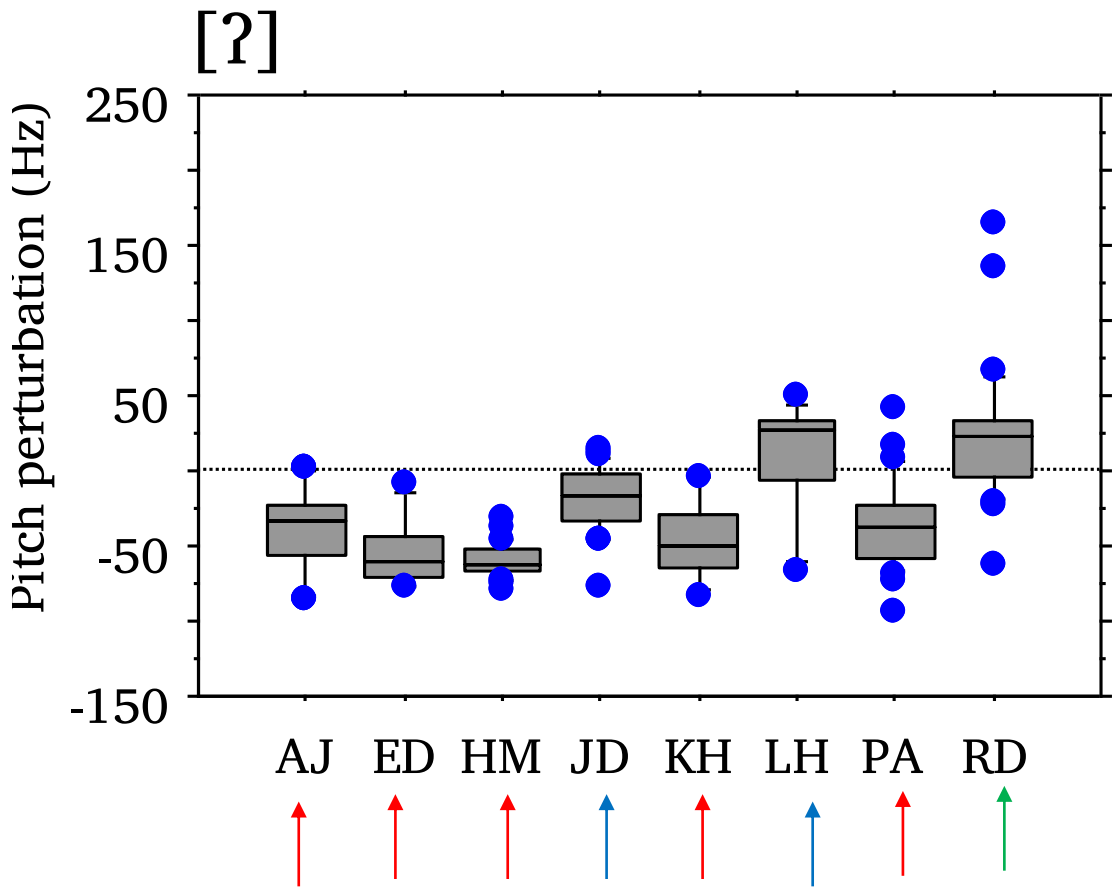


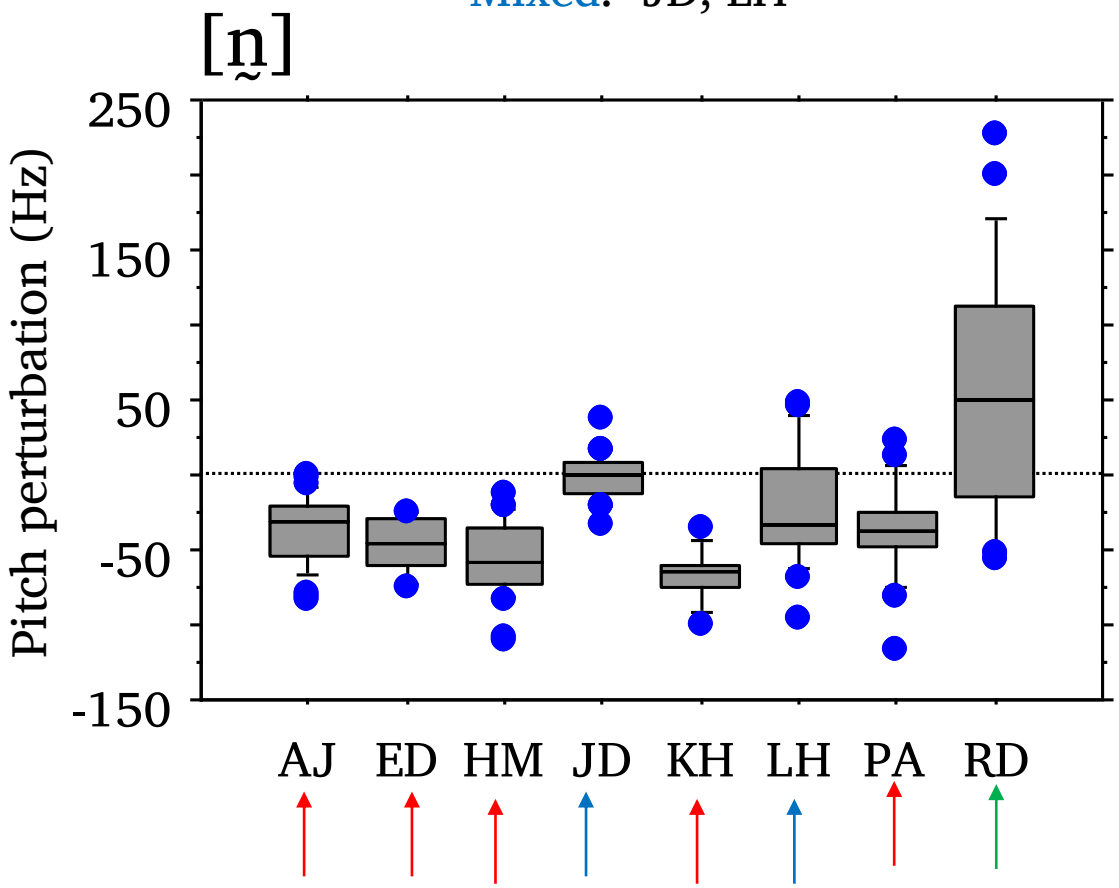
Glottalization
n.s.

n̰ vs. n	n̰ vs. n̥
p = .0007	p < .0001

Pitch perturbation before glottalized consonants

Pitch lowerers: AJ, ED, HM, KH, PA
Pitch raiser: RD
Mixed: JD, LH





Deg Xinag summary

- Five consistent pitch lowerers
- One consistent pitch raiser
- Two mixed patterns
  - Pitch lowering before [n̰] only, no effect of [ʔ]
  - Pitch raising before [n̰] only, no effect of [ʔ]

Conclusions

- Variability of pitch before glottalized consonants in both toneless languages

	Witsuwit'en	Deg Xinag
	pəʁeʔ 'its little fur'	vəʁaʔ 'its grease'
pitch raisers		
pitch lowerers		

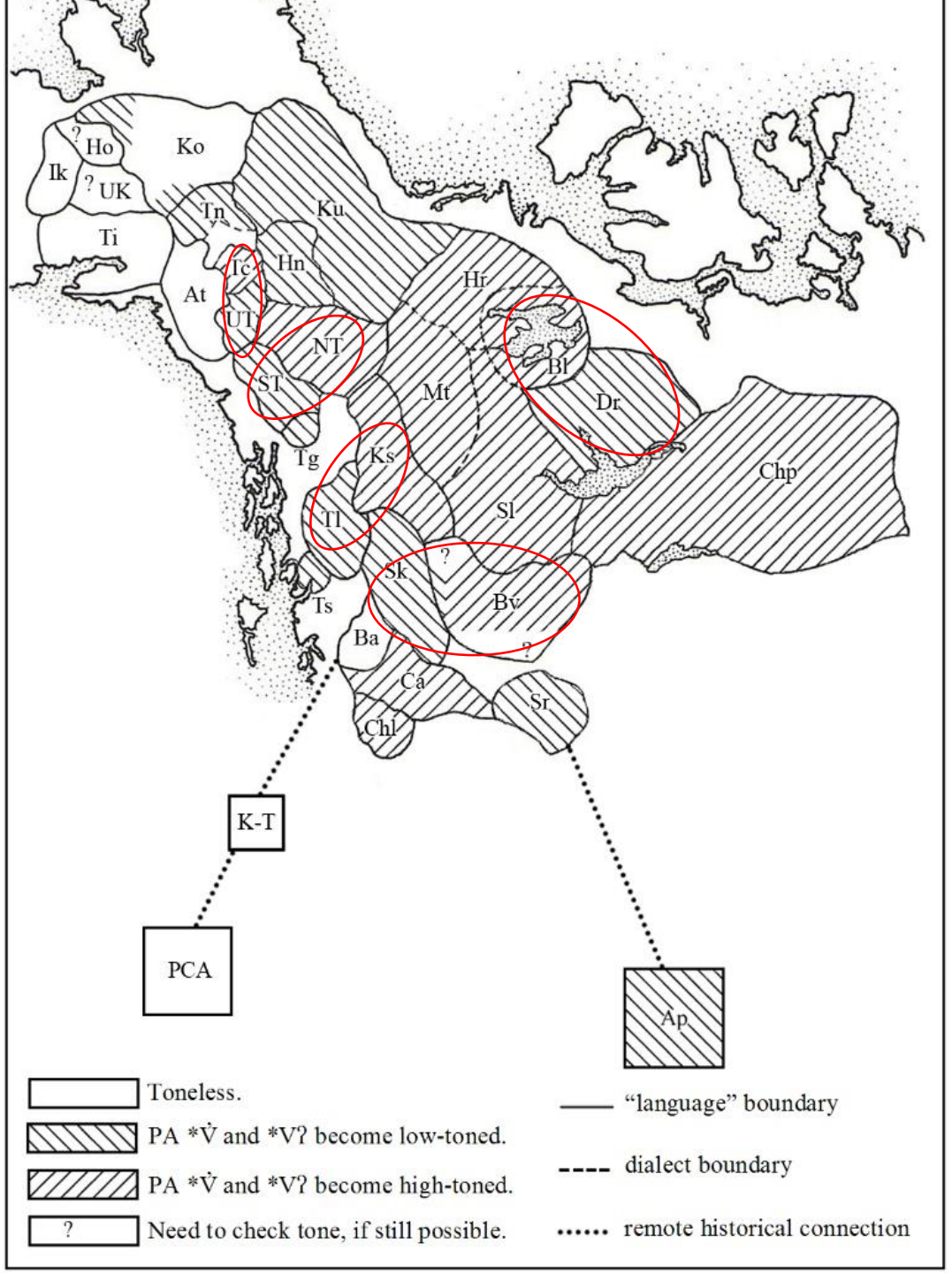
  - Supports Kingston 2005: 2 kinds of glottalized stops in Proto-Dene

Conclusions, cont.

- Pitch raisers a minority in both languages
  - ➢Supports Leer 1999: pitch lowering the default
- Methodological
  - Speaker sample needed
  - 5 of 10 Witsuwit'en speakers, 4 of 8 Deg Xinag speakers no longer with us

An outstanding issue

- Tone differences between closely related languages
  - Beaver vs. Tsek'ene
  - Dogrib vs. Bearlake Slave
  - Tanacross vs. Upper Tanana
  - Tahltan vs. Kaska
  - Northern vs. Southern Tutchone



Thanks to Witsuwit’en speakers

Thanks to Deg Xinag speakers