Stop and affricate features in Athabaskan (in general) and Deg Xinag (in particular)

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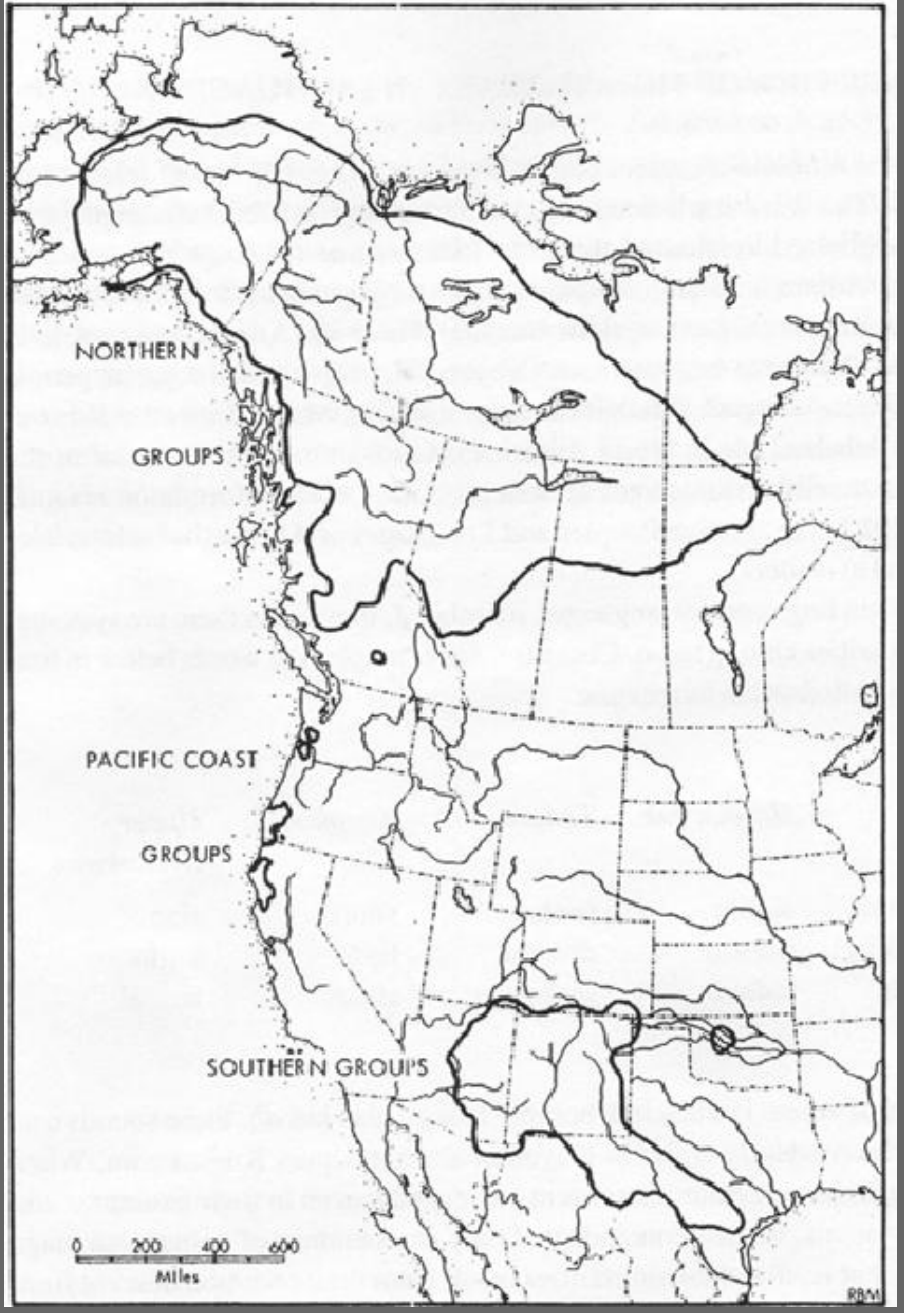


Athabaskan family

Parr 1974

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

Proto-Athabaskan consonants

*t	*tʰ	*t′		
*tɬ	*tɬʰ	*tɬ′	*l	*ɬ
*ts	*tsʰ	*ts′	*z	*s
*ʧ	*ʧʰ	*ʧ′	*ʒ	*ʃ
*tʂ	*tʂʰ	*tʂ′		
*c	*cʰ	*c′		*ç
*q	*qʰ	*q′	*ʁ	*χ
*m	*n	*ŋʲ		
*w	*j			

after Leer 2005: 284

Leer, Jeff. 2005. 'How stress shapes the stem-suffix complex in Athabaskan.' In *Athabaskan Prosody*, ed. by Sharon Hargus and Keren Rice. Amsterdam and Philadelphia: John Benjamins. 278-318.

More inventories

- Upper Tanana (Minoura 1994)

Obstruents								
Stops/Affricates								
Plains	(b)	d	dl	dð	dz	dž	g	ʔ
Aspirated		t	tɬ	tθ	ts	tš	k	
Glottalized		t'	tɬ'	tθ'	ts'	tš'	k'	
Fricatives								
Fortes			ɬ	θ	s	š	x	h
Lenes			ɮ	ð	z	ž^{y}, (š)	ɣ	
Sonorants								
Voiced		m	n	l	ð		y	
Voiceless		h^{w}						[h]

Minoura, Nobukatsu. 1994. 'A Comparative Phonology of the Upper Tanana Athabaskan dialects.' In *Languages of the North Pacific Rim*, ed. by Osahito Miyaoka. Sapporo, Japan: Department of Linguistics, Hokkaido University. 159-196.

- Dëne Sųłiné (Cook 2004)

Stops and	Plain	b	d	dl	ddh/dð	dz	j/dž	g	
Affricates	Aspirated		t	tɬ	tth/tθ	ts	ch/č	k	
	Glottalized		t’	tɬ’	tth’/tθ’	ts’	ch’/č’	k’	ʔ
Fricatives/	Voiceless			ɬ	th/θ	s	sh/š	x	h
Continuants	Voiced	w	(r)	l	dh/ð	z	y	gh/ɣ	
Sonorants	Nasal	m	n						

Cook, Eung-Do. 2004. *A Grammar of Dëne Sųłiné (Chipewyan)*. Winnipeg: Algonquian and Iroquoian Linguistics, Memoir 17 (Special Athabaskan Number).

Navajo (Young and Morgan 1980, McDonough 1990)

	bilabial	alveolo-palatal	palato-velar	glottal
Stops				
unasp	b	d	g, g^w	
aspirat			k, k^w	
glottal		t'	k'	/'/
Spirants				
+voi		z,zh	gh,gh^w	
-voi		s,sh	h,h^w	h
Laterals				
+voi		l		
-voi		ɬ		
Affricates				
unasp		dz,j,dl		
aspir		ts,ch,tɬ		
glottal		ts',ch',tɬ'	t	
Nasals	m	n		
Semi-vowels	w	y		

McDonough, Joyce. 1990. *Topics in the Phonology and Morphology of Navajo verbs*. Ph.D. dissertation, Department of Department of Linguistics, University of Massachusetts Amherst.

Young, Robert W., and William Morgan. 1980. *The Navajo Language: A Grammar and Colloquial Dictionary*. Albuquerque: University of New Mexico Press.

Features for classes of Athabaskan consonants

Rice 1994

	[spread glottis]	[constricted glottis]	[voiced]
t, ts			
t^h, ts^h	+		
t', ts'		+	
s			
z			+

Rice, Keren. 1994. 'Laryngeal features in Athapaskan Languages.' *Phonology* 11:107-147.

Voiceless unaspirated stops pattern with voiceless fricatives

- D-Effect Rule (Slave et al. version)

D + ʔ	→	t’
D + fricative	→	plain stop (of same place of articulation)
		e.g. D + S → dz
		D + Š → j
		D + X → g
		D + L → dl
d + C	→	C

The resultant stop is voiceless unaspirated, as expected, since both underlying fricatives and plain stops have no laryngeal features.

- Stem-finals
  - contrasts

	syllable-initial	*syllable-final*
stops	plain/aspirated	plain
fricatives	voiced/voiceless	voiced/voiceless

  - alternations (Koyukon)

stem form	*imperfective*	*perfective*	
/-ʔɔdl/	-ʔɔɬ	-ʔɔdl	'chew'
/-bædz/	-bǽs	-bædz	'cook by boiling'
/-lɔg/	-lɔx̣	-lɔg	'die' PL SUBJECT
/-lud/	-lud	-lud	'scrape'

word-final stops/affricates spirantize (Leer 1979)

suffixed with reflex of *-ŋ perfective, protects from spirantization

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

Affricates and fricatives

- Hare: "Aspirated affricates generally spirantise to voiceless fricatives... Some speakers use affricates in some words." (Rice 1994: 129, 144)

(47)

	Hare	*Bearlake*	
ts → s	[s]á	[ts]á	'beaver'
	-[s]ĩ	-[ts]ĩ	'make'
tɬ → ɬ	[ɬ]ɛ	[tɬ]ɛ	'lard, oil'
	-[ɬ]a	-[tɬ]a	'one, two go by land'
č → š	[š]õ	[č]õ	'rain'
	-[š]u	-[č]u	'handle cloth-like object'

Aspirated stops are unaffected, as in (48):

(48)

[k]ő	[k]ő	'fire'
[t]u	[t]u	'water'

Summary

- Distributional evidence for some classes of Ath consonants
  - stops + affricates (Koy verb stem-final alternations)
  - voiceless unaspirated stops/affricates + voiceless fricatives (DER, Koy verb stem-final alternations)
  - affricates + fricatives (Hare)

"revised Athabaskan inventory"

- McDonough and Wood 2008:446

The revised Athabaskan inventory

	Bi-labial	Alveolar	Alveo-palatal	Velar	Labiovelar	Glottal
Simplex stops	p	t		k		ʕ
Affricates		tx		kx	kw	
		ts ts^h	tʃ $tʃ^h$			
		tɬ $tɬ^h$				
Ejectives		t′		k′		
		ts′	tʃ′			
Fricatives		s z	ʃ ʒ	ɣ x		(h)

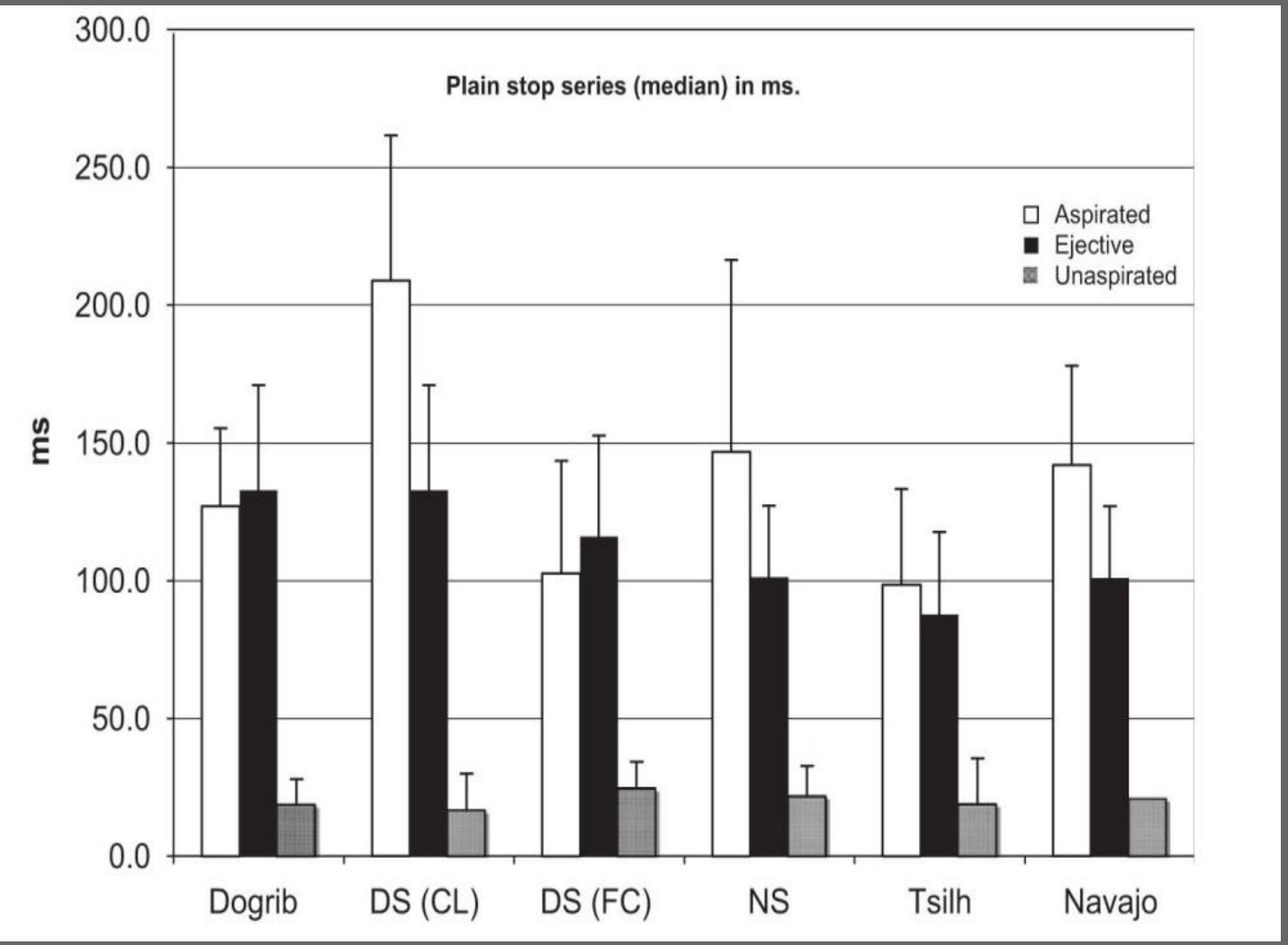
"a sample Athabaskan inventory as we see it...this is likely a more accurate representation of the phonemic contrasts in the Athabaskan languages. In this inventory, there are no aspirated plain stops."

McDonough, Joyce, and Valerie Wood. 2008. 'The stop contrasts of the Athabaskan languages.' *Journal of Phonetics* 36:427-449.

Consonant classes

- "simplex" vs. "complex stops"
  - "the unaspirated plosives (/p t k q/) are simplex segments, whereas the aspirated and ejective stops (/t^h t'/ and /k^h k'/) pattern together and form the class of complex segments with affricates." (McDonough and Wood 2008: 428)
- Why?
  - "aspirated stops are phonemic affricates in Athabaskan, and…these affricates share with ejectives and plain aspirated stops the feature of having long release periods":

VOT, plain stops



"Fig. 5. A bar graph indicating the median duration in milliseconds of the release portions of the plain stop series in the language in the study." (p. 436); i.e. /t^h t' t/ etc.

no inferential statistics provided

Methods of McDonough and Wood 2008

- Speaker- rather than linguist-designed word lists
  - "We did not control for position in word or morpheme category (stem versus prefix)…Using wordlists constructed by the consultants resulted in uneven distributions of the segments in the languages across the study".
  - "We are choosing to report median values here, rather than average, because of the nature of the data in the study." (434)
- Small number of speakers per language
  - 3 Dëne Sųłiné speakers from 2 dialects
  - 1 Dogrib speaker
  - 3 North Slavey speakers
  - 2 Chilcotin speakers

Further points of their model

- Aspirated stops as affricates
  - "'The t and k phonemes are phonemic as well as phonetic heterorganic affricates /tx/ and /kx/. However, it may not be the case that t and k phonemes are affricates in every Athabaskan language."
  - Known counter-examples: Hupa, W. Apache
  - Due to contact? "The production of an Athabaskan phoneme t as an aspirated stop...may well represent a shift away from an Athabaskan type system towards an English type system. Such a change may be due to a reduced speech community and/or contact with English speaking populations and educational practices."

- "classic" Athabaskan ejectives
  - "Complex ejectives are of the classic Athabaskan type, containing a characteristic period of silence after the oral and before the glottal release." (p. 445)
  - "strong [long VOT] or complex ejectives...These are the classic Athabaskan ejectives.' (p. 443)
- Known counter-examples: "weak" (short VOT) ejectives in Witsuwit'en (Wright, Hargus and Davis 2002) and Carrier (Bird 2002)

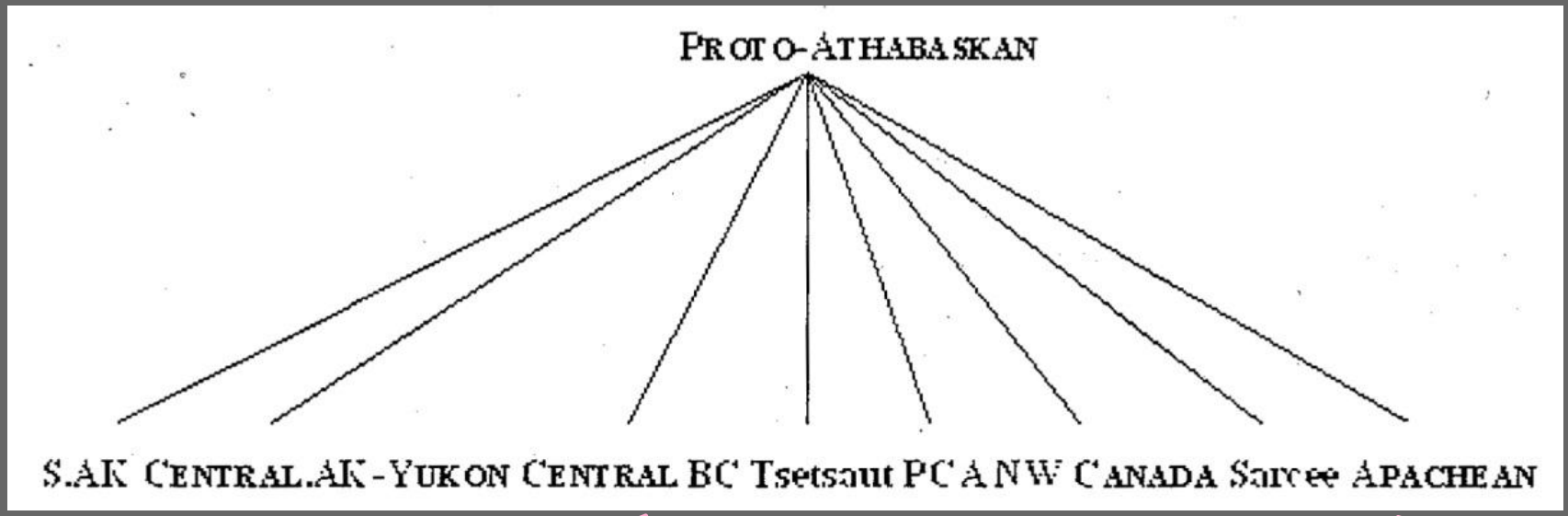
Bird, Sonya. 2002. *The Phonetics and Phonology of Lheidli Intervocalic Consonants*. PhD dissertation, Department of Linguistics, University of Arizona.
Wright, Richard, Sharon Hargus, and Katherine Davis. 2002. 'On the categorization of ejectives: data from Witsuwit'en.' *Journal of the International Phonetic Association* 32:43-77.

Questions about McDonough-Wood model

1. Are affricate-like voiceless aspirated stops distributed across different branches of the family?
2. Do aspirated affricates pattern with aspirated stops and/or unaspirated affricates (all "complex segments") ? How is aspiration realized in affricates?
3. Are long VOT ejectives found in all branches of Ath?

Classifications of Athabaskan languages

Goddard 1996

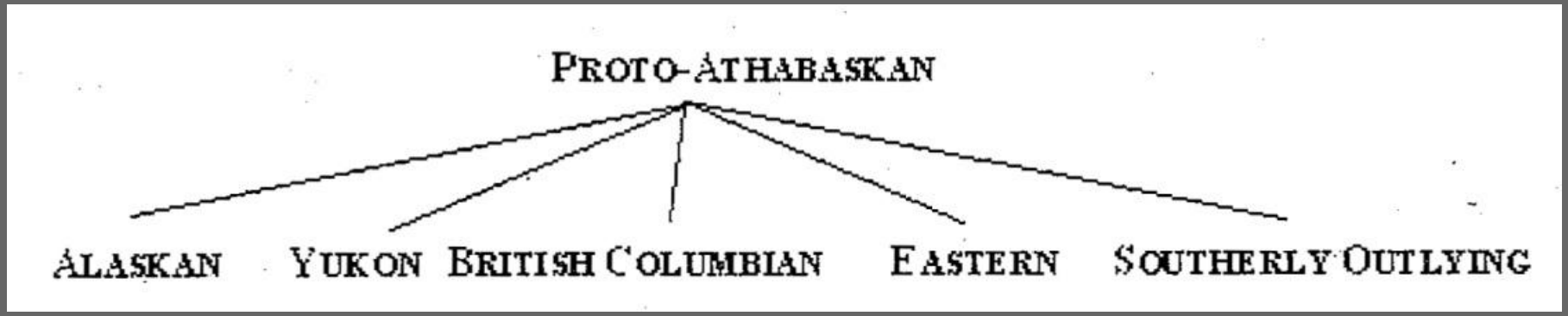


McDonough and Wood 2008 languages

Goddard, Ives. 1996. 'Introduction.' In *Languages*, ed. by Ives Goddard. Washington D.C.: Smithsonian Institution. 1-16.

McDonough, Joyce. 2003. *The Navajo Sound System*. Dordrecht: Kluwer.

- Leer 2006-2010



McDonough Wood 2008 languages

Leer, Jeff. 2006-2010. Comparative Athabaskan Lexicon, Fairbanks, Alaska, Ms.

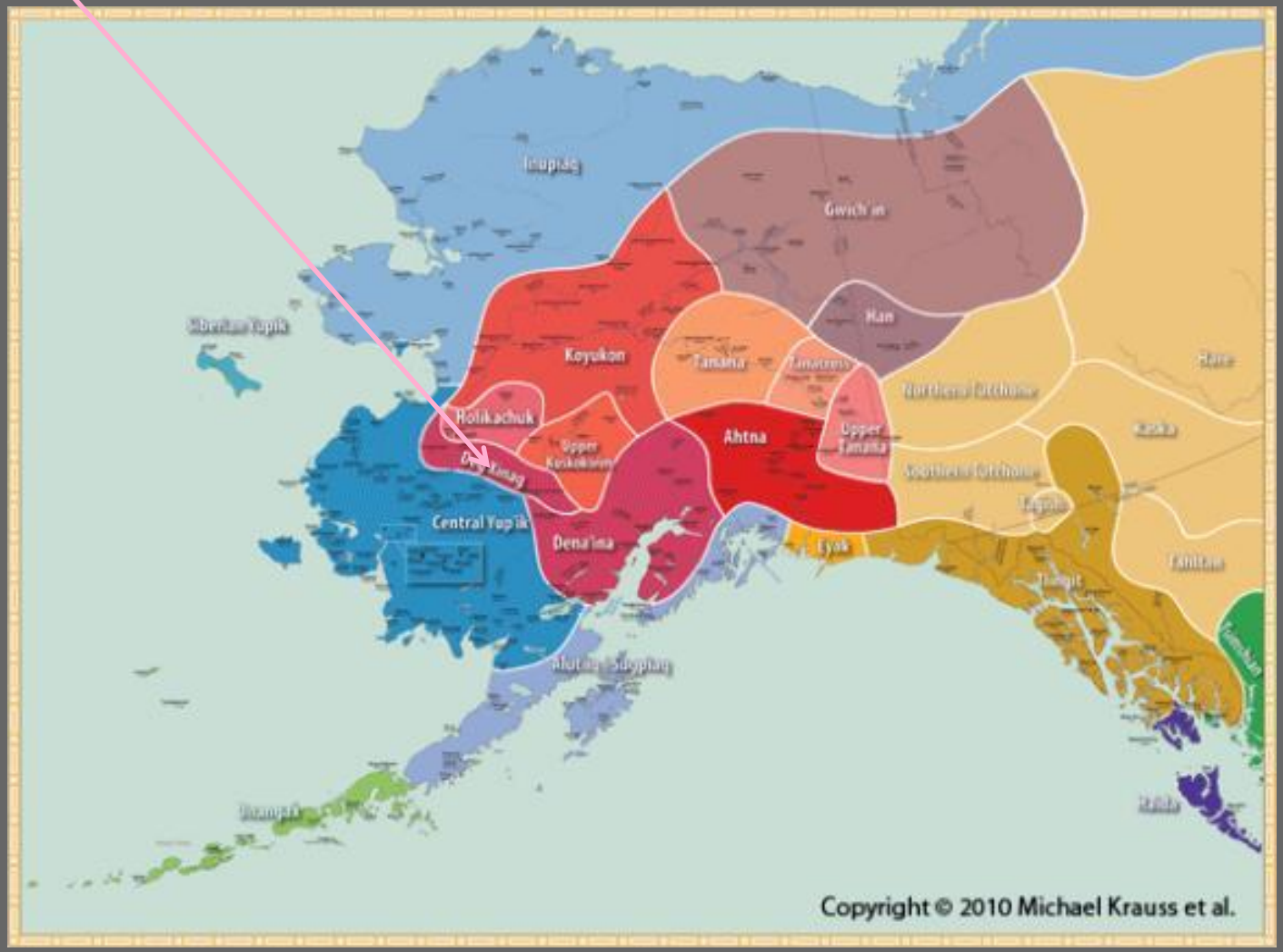
Remainder of this presentation

- Test aspects of McDonough-Wood model against new phonetic data, Deg Xinag stops and affricates
- Integration of Deg Xinag findings with those from other Ath languages

Deg Xinag (ing)

a.k.a. Ingalik, Deg Hit'an

Central AK-Yukon branch (Goddard-Rice classification), Alaska branch (Leer classification)



Krauss, Michael. 2011. Indigenous Peoples and Languages of Alaska. Fairbanks and Anchorage: UAF Alaska Native Language Center and UAA Institute of Social and Economic Research.

Consonant inventory

Syllable-initial consonants:

p pʰ		t tʰ t′			k kʰ k′	q qʰ q′	ʔ
	tθ tθʰ tθ′	ts tsʰ ts′	tʂ tʂʰ tʂ′	ʧ ʧʰ ʧ′			
		tɬ tɬʰ tɬ′					
v	θ ð	s z	ʂ ʐ	ʃ		χ ʁ	h
		ɬ l					
m	n			j			

Syllable-final consonants:

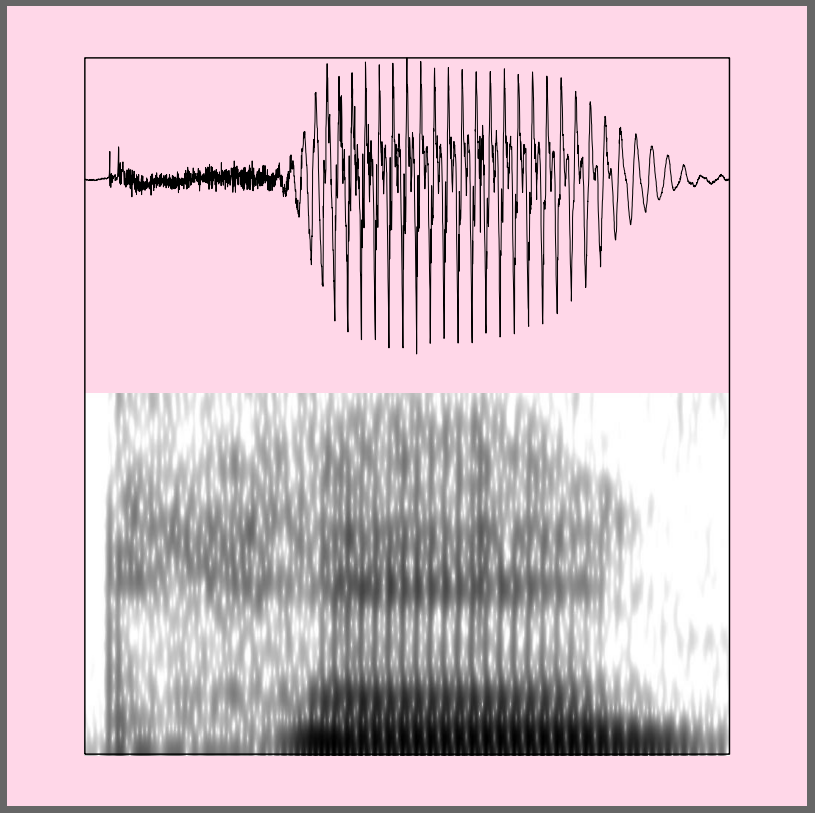
p		d t			g k	G q	ʔ
	dð tθ	dz ts	dʐ tʂ	dʒ ʧ		χ ʁ	
v	θ ð	s z	ʂ ʐ	ʃ			
		dl tɬ					
		ɬ l					
m m’		n ɳ n′		j j’ j̩	ŋ ŋ′ ŋ̩		

DX aspirated stops

- Are not affricates
  - e.g. [tʰəŋ̥] “ice”

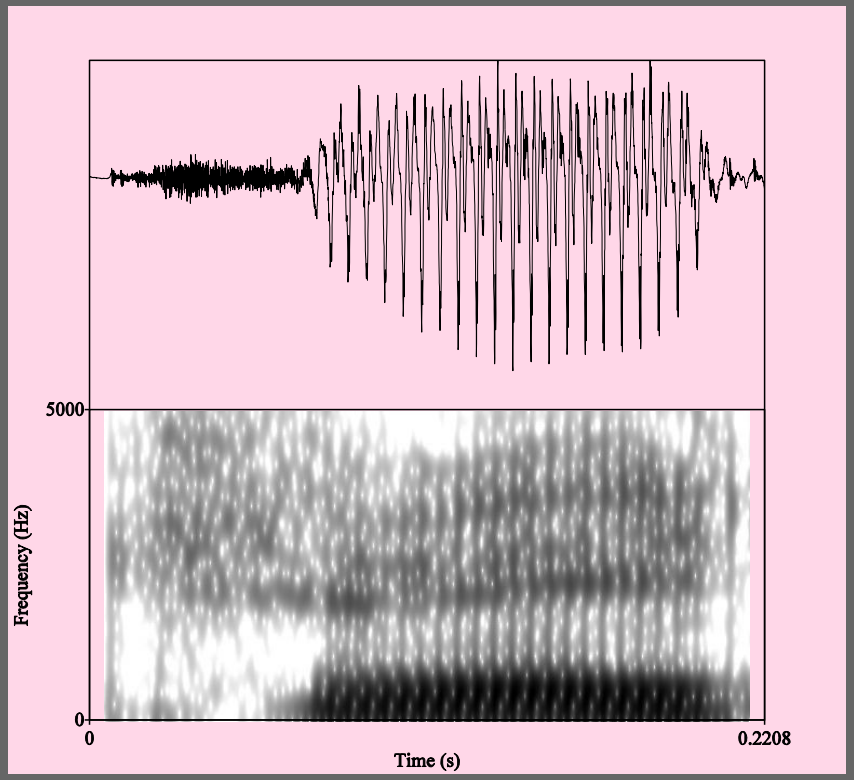
“production...as an aspirated stop...may well represent a shift away from an Athabaskan type system towards an English type system...may be due to a reduced speech community and/or contact with English speaking populations and educational practices.”

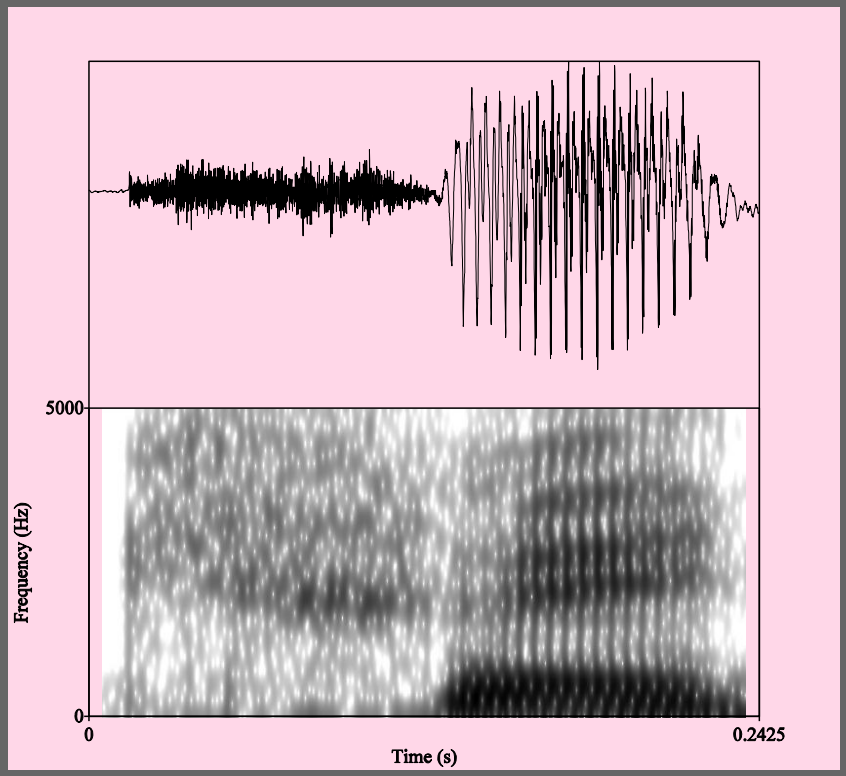
First contact of Deg Xinag was with Russian, ca. 1835 (smallpox did reduce community) (VanStone 1979)



VanStone, James. 1979. 'Ingalik contact Ecology: An Ethnohistory of the Lower-Middle Yukon, 1790-1935.' *Fieldana: Anthropology* 71.

- the aspiration "contrast appears in the offset of the medial phase, at the release of the fricated part of the articulation as a transition into the vowel. It is an audible quality of these sounds." (McDonough and Wood 2008: 446)
- Aspiration contrast in DX affricates
  - [tʂ] [tʂ^{h}], more narrowly [tʂ:]





A phonetic study of the laryngeal contrast among Deg Xinag stops/affricates

- What are effects of Manner, Laryngeal contrast on (each measure)?
  - 2 manners (stops vs. affricates)
- What are effects of Place, Laryngeal contrast on (each measure)
  - for stops?
  - for affricates?

	inter-dent	alv	alv sib	alv lat	retro sib	pal-alv	velar	uvular
stop		X					X	X
affr	X		X	X	X	X		

- Word list recorded with 8 speakers (results for 7 here)
  - postvocalic
  - stem-initial (stressed)
- Measures
  - Consonantal
    - closure duration (Hogan 1976)
    - VOT (Hogan 1976)
  - Vocalic (following V)
    - f0 perturbation (Warner 1996)
    - jitter perturbation (Wright, Hargus and Davis 2002)
    - rise time (energy at $V_{30} - V_{ons}$, $V_{mid} - V_{30}$)

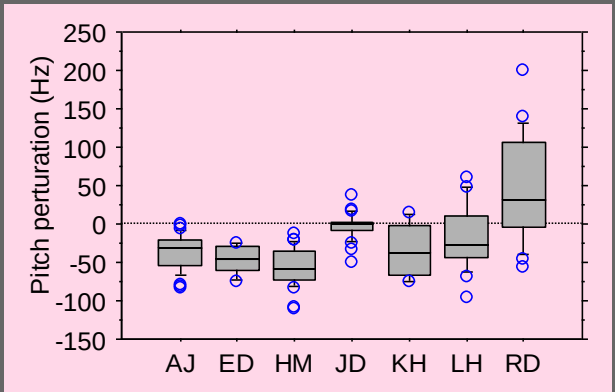
Hogan, John T. 1976. 'An Analysis of the Temporal Features of Ejective Consonants.' *Phonetica* 33:275-284.

Warner, Natasha. 1996. 'Acoustic characteristics of ejectives in Ingush.' In *Proceedings of the International Conference on Spoken Language Processing, Oct. 3-6, 1996, Philadelphia*. New York: Institute of Electrical and Electronics Engineers. 1525-1528.

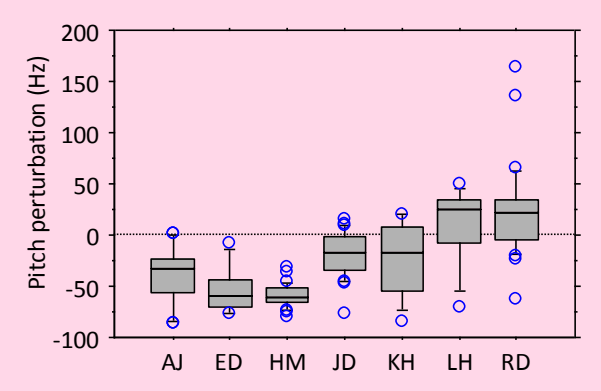
Results

- inferential statistics
  - repeated measures ANOVA, each speaker's mean as dependent variable
- post hoc test: Bonferroni/Dunn
- f0 results handled differently:

- previous voice quality study (Hargus 2011)
  - effect of final [n’] on pitch perturbation of preceding V



  - effect of final [ʔ] on pitch perturbation of preceding V

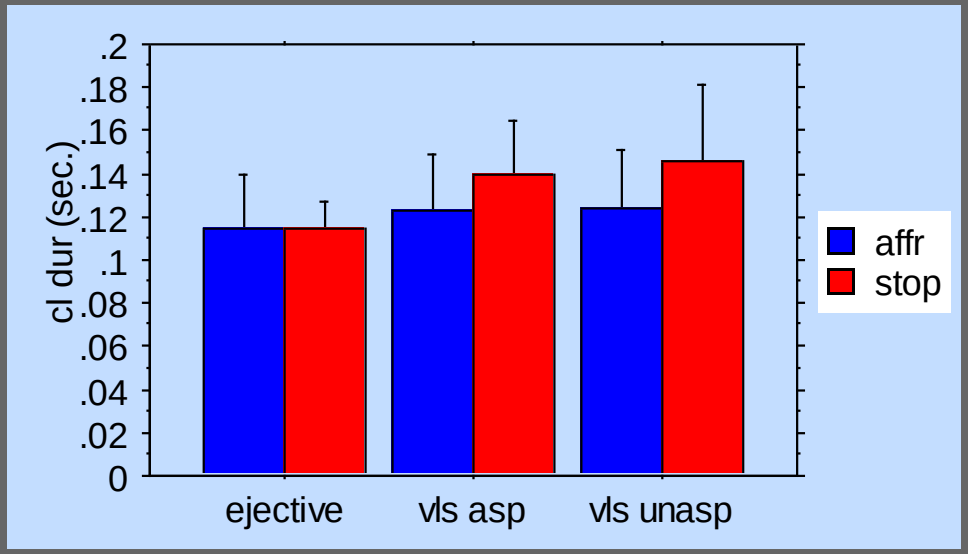


- f0 results, this study
  - factorial ANOVA for each speaker

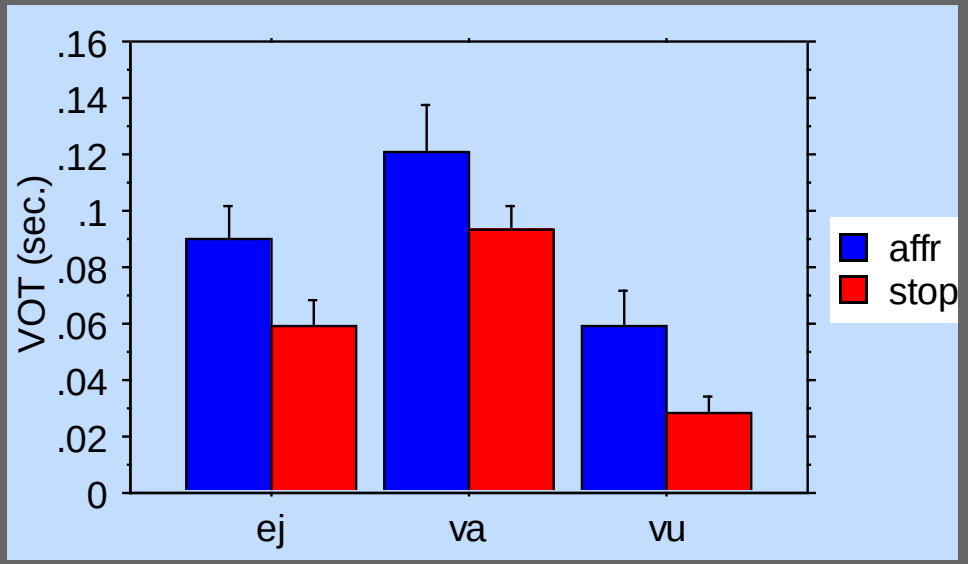
Hargus, Sharon. 2011, under review. 'Deg Xinag Final Laryngealized Consonants and Voice Quality.' In *Laryngeal Features of Native American Languages*: Brill.

Effects of Manner, Laryngeal on…

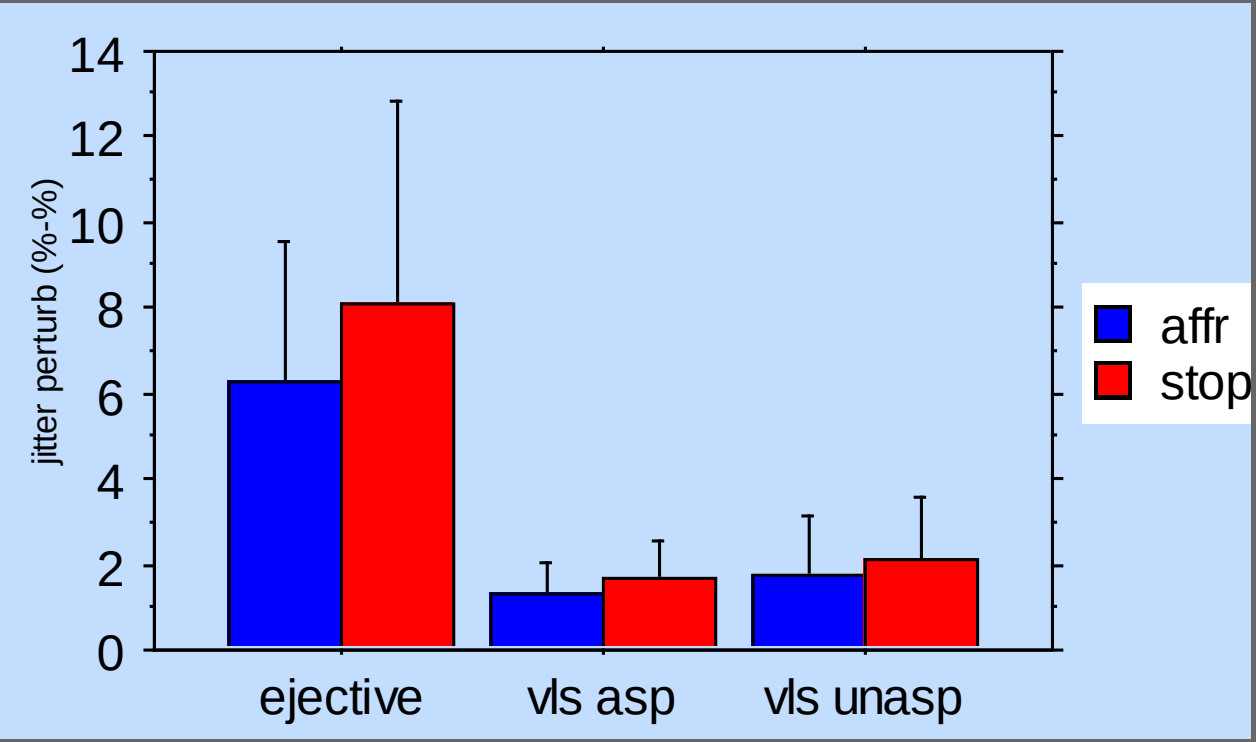
- Closure duration
  - Lar: va < vu



- VOT
  - Manner: affr > stop
  - Lar: vu < ej < va

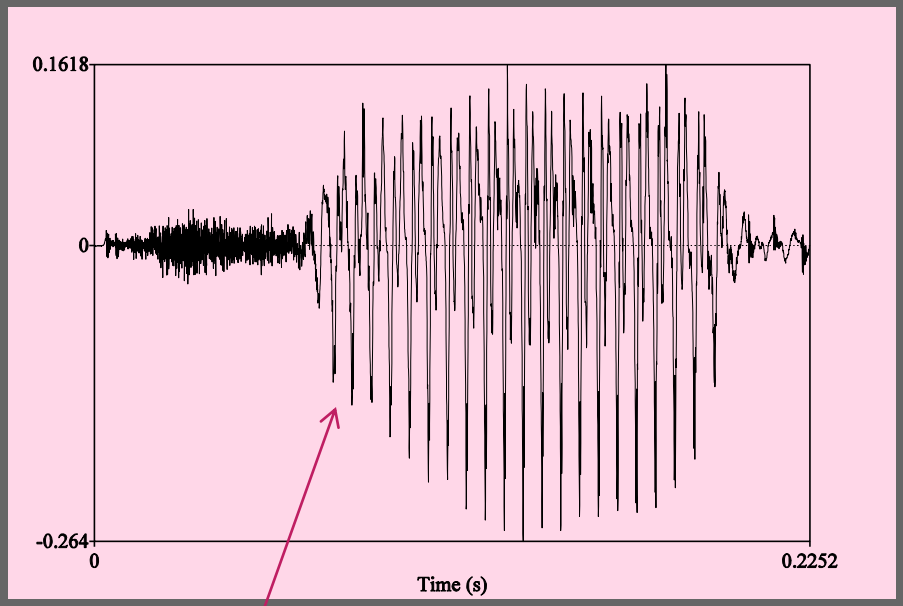


- jitter perturbation

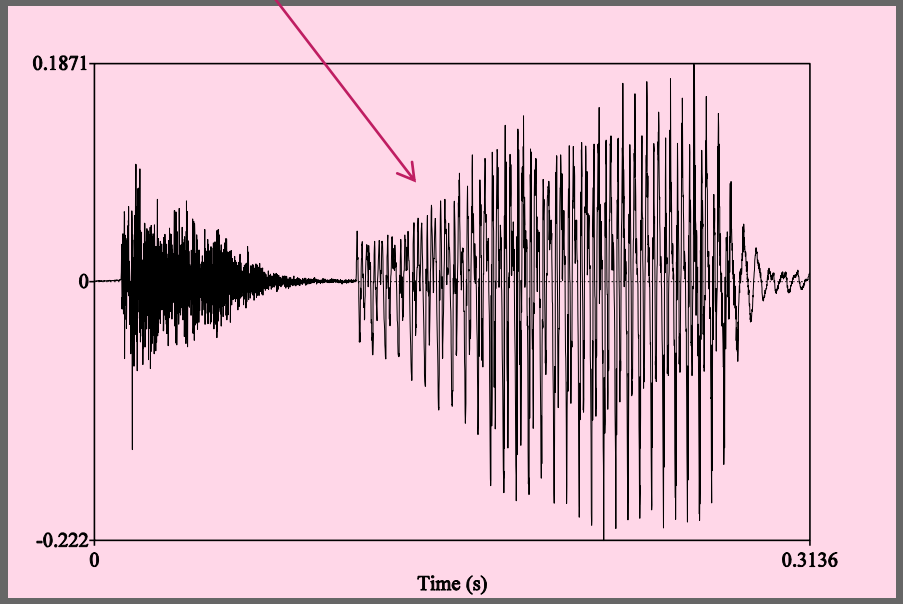


- Lar: ej > va, ej > vu

Typical energy profiles



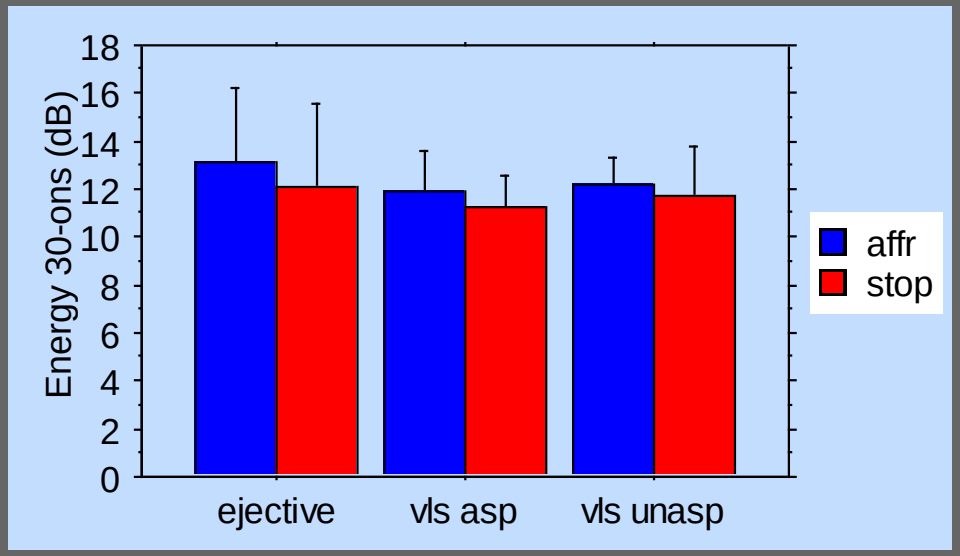
more convex
more concave



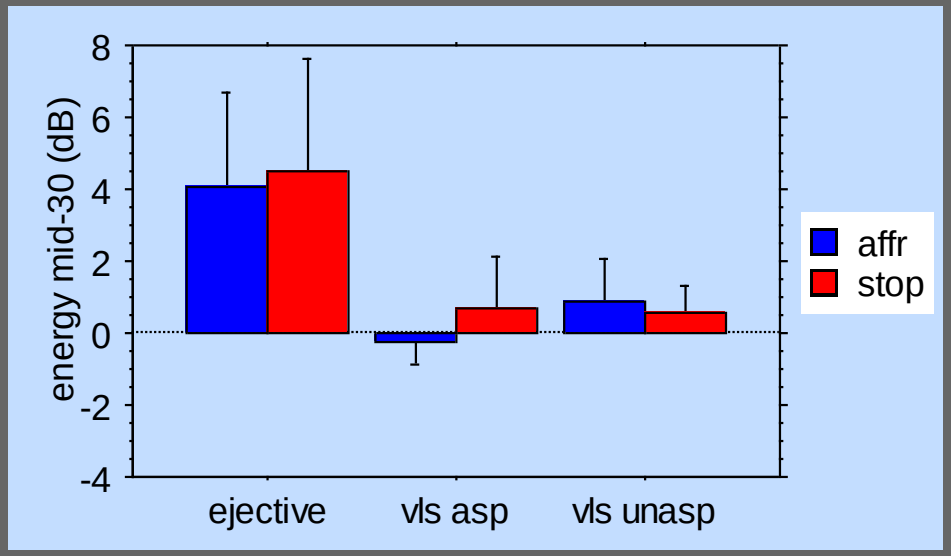
ʈʂə

ʈʂʼə

- Energy
  - 30 ms. – onset

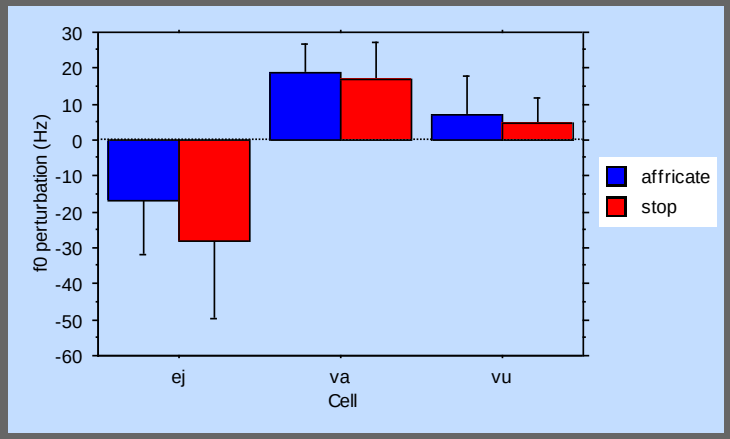


  - midpoint – 30 ms.
    - Lar: ej > va, ej > vu

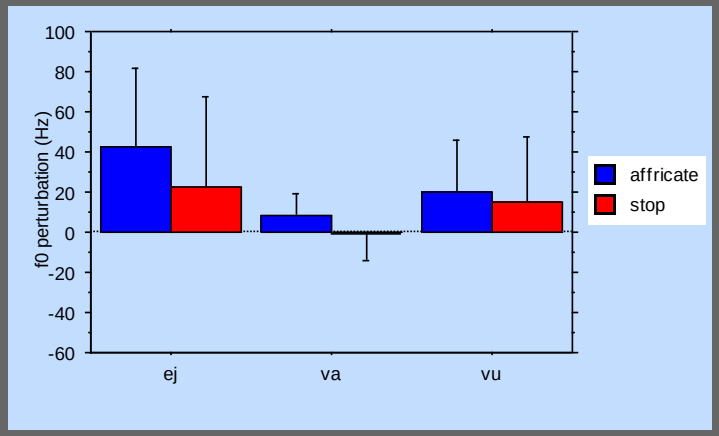


- f0 perturbation
  - pitch lowerers (AJ, ED, HM, LH, PA).

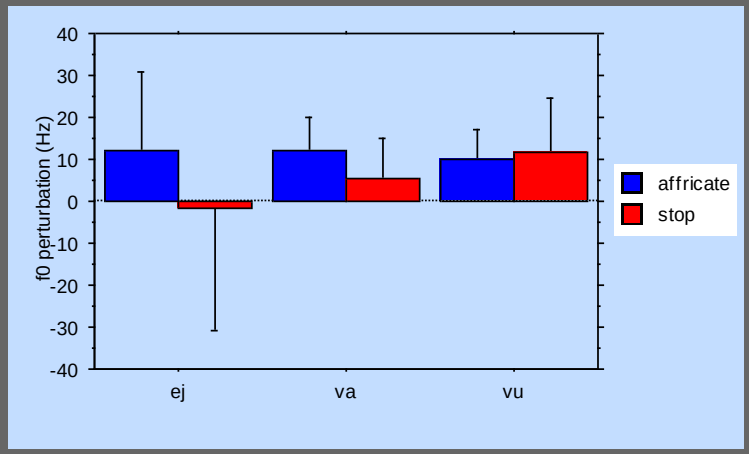
    (ED) Lar: ej < vu < va



  - pitch raiser (RD)
    - Lar: ej > vu, va
    - Manner: affr > stops

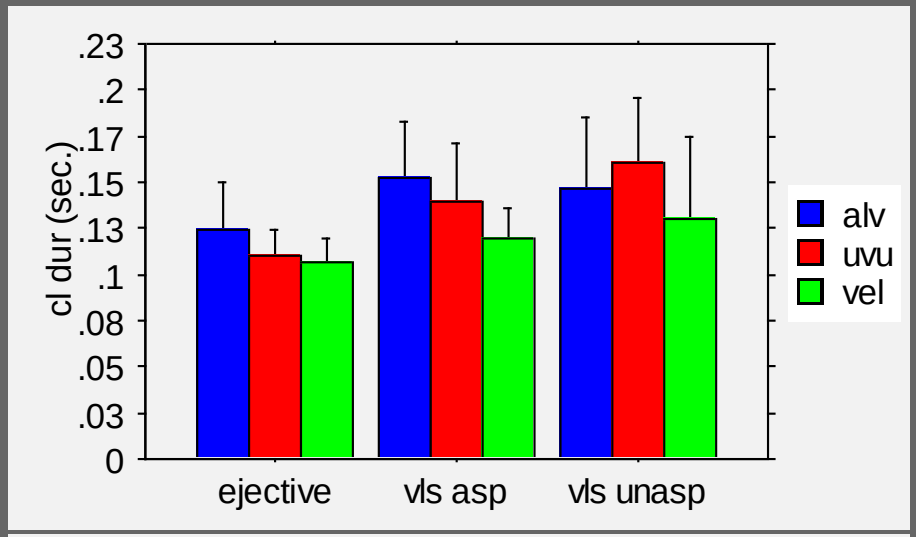


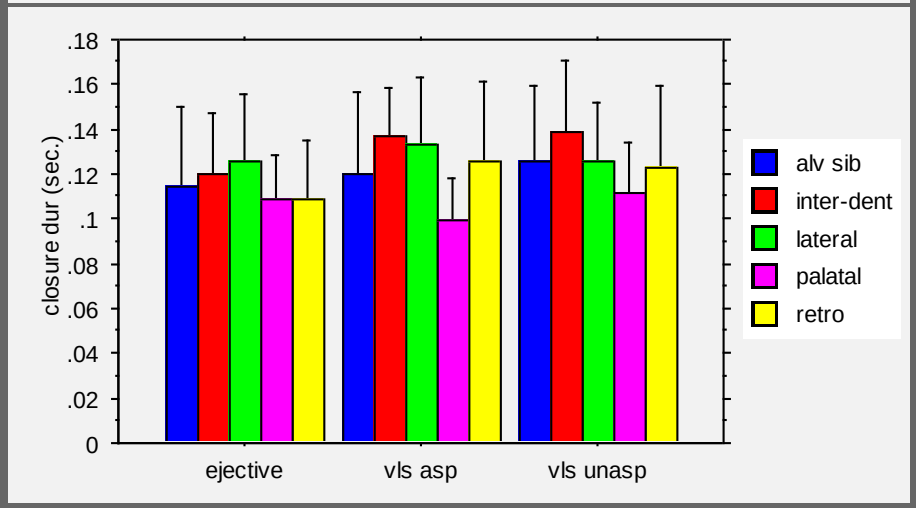
  - equivocal (JD)
    - Manner: affr > stops
    - Lar x Manner, p = .0262



Effects of Place, Laryngeal contrast for each manner

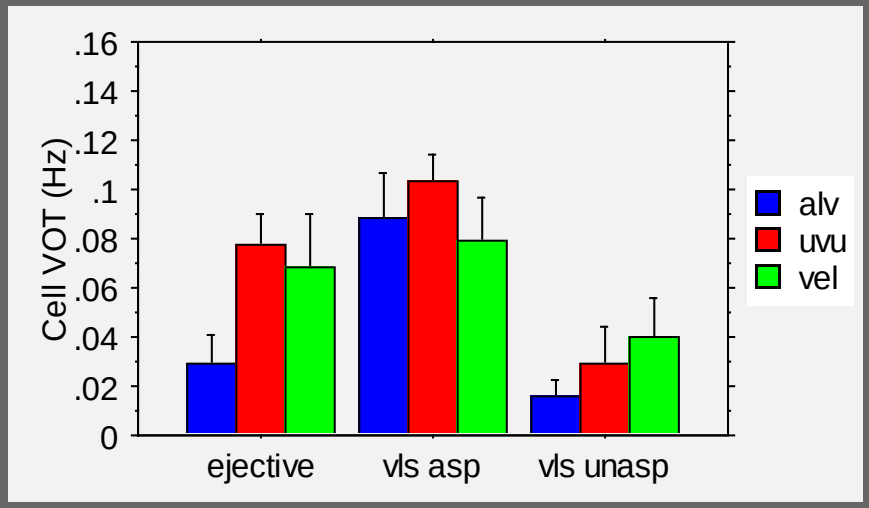
- Closure duration
  - stops
    - Place: alv < vel
    - Laryngeal: ej < va, ej < vu
  - affricates
    - Place: pal < inter-dent, pal < lat



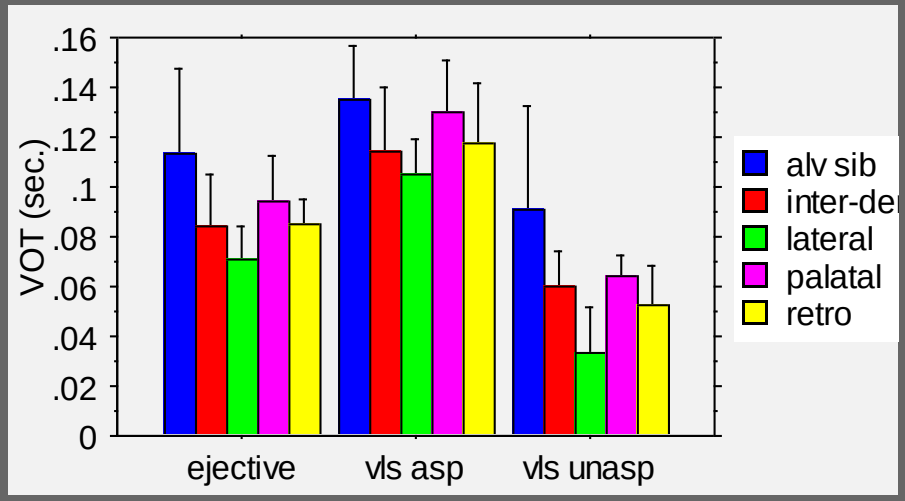


VOT

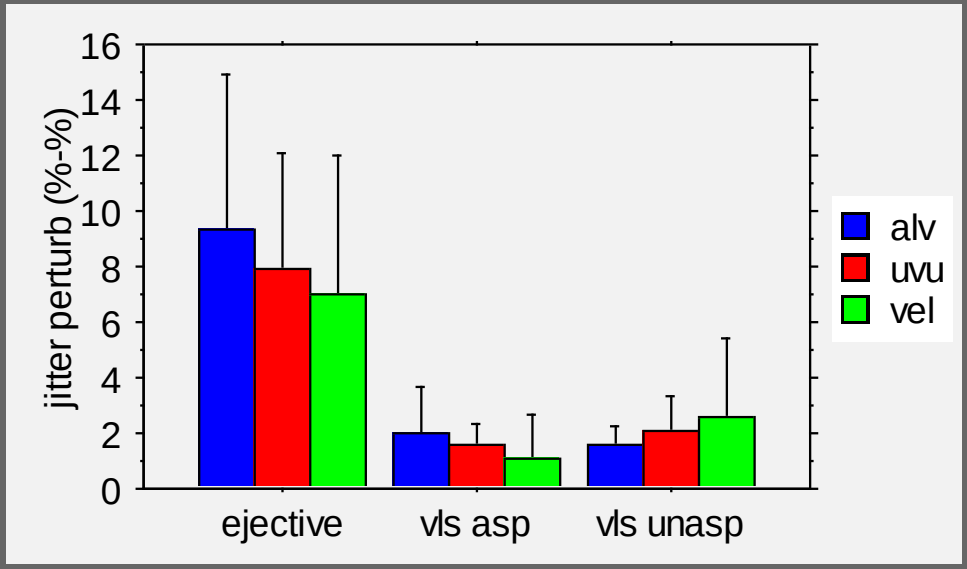
- stops
  - Place: alv < vel, alv < uvu
  - Lar: vu < ej < va
  - Place x Lar, p < .0001



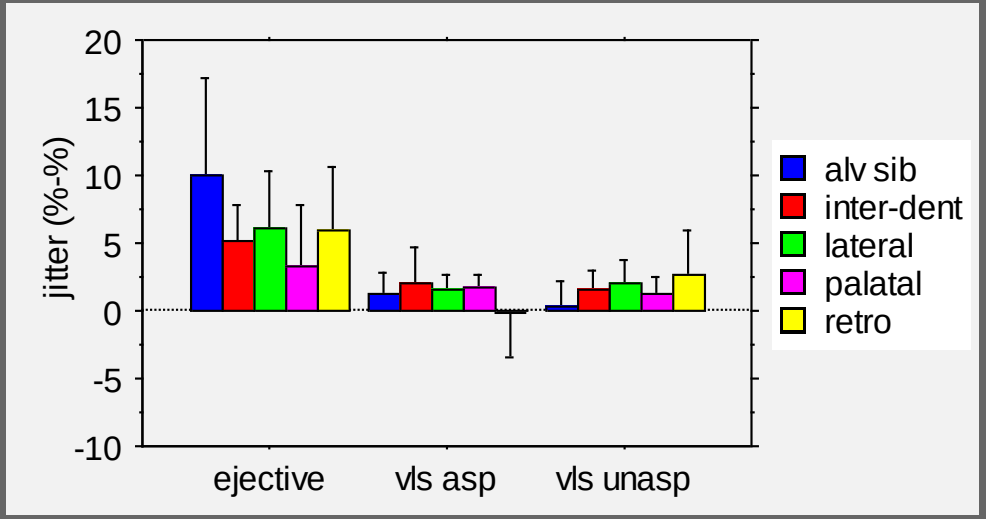
- affricates
  - Place: alv sib > inter-dent, alv sib > lat, alv sib > retro, pal > lat
  - Lar: vu < ej < va



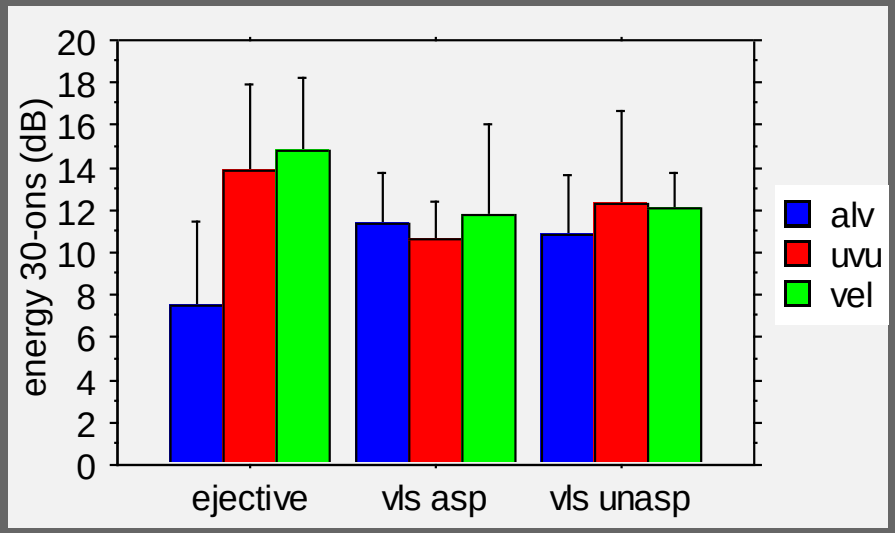
- Jitter perturbation
  - stops
    - Lar: ej > va, ej > vu



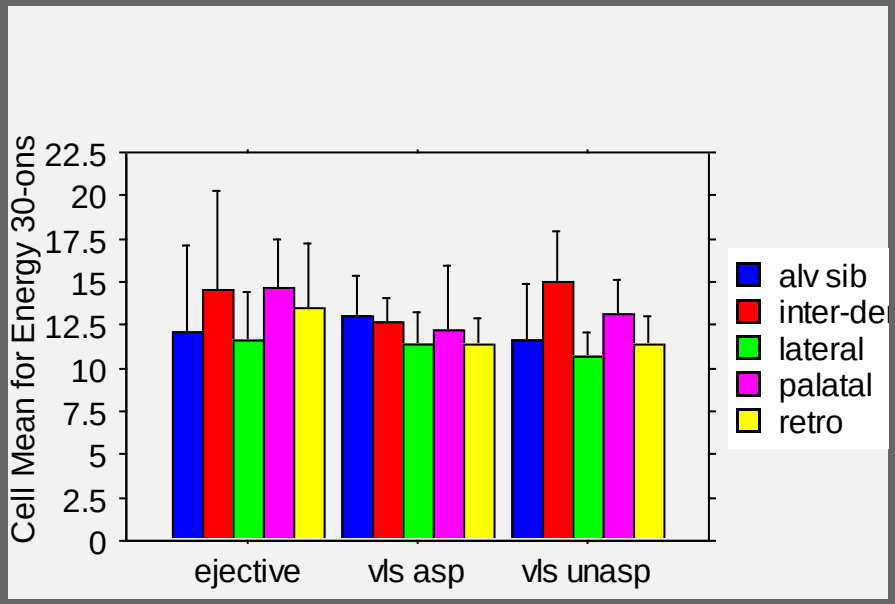
  - affricates
    - Lar: ej > va, ej > vu



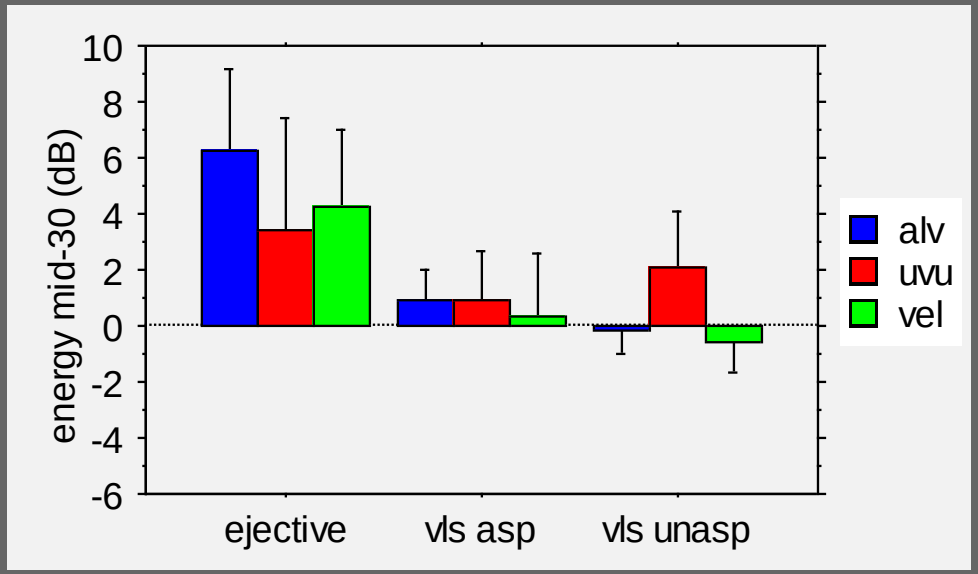
- Energy, 30 ms. – onset
  - stops
    - Place: alv < vel, alv < uvu
    - Place x Lar: p = .0146



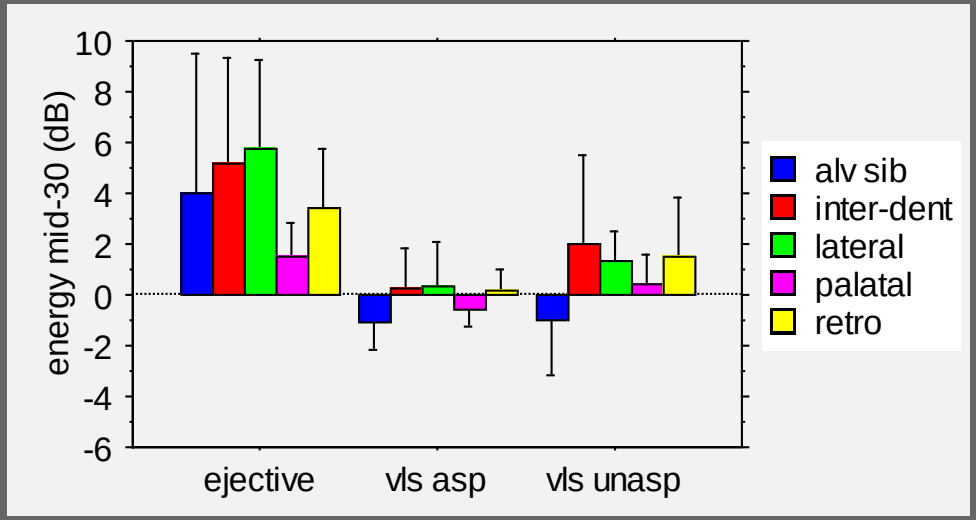
  - affricates
    - Place: lat < inter-dent



- Energy, midpoint -30 ms.
  - stops
    - Lar: ej > vu, ej > va
    - Place x Lar: p = .0005

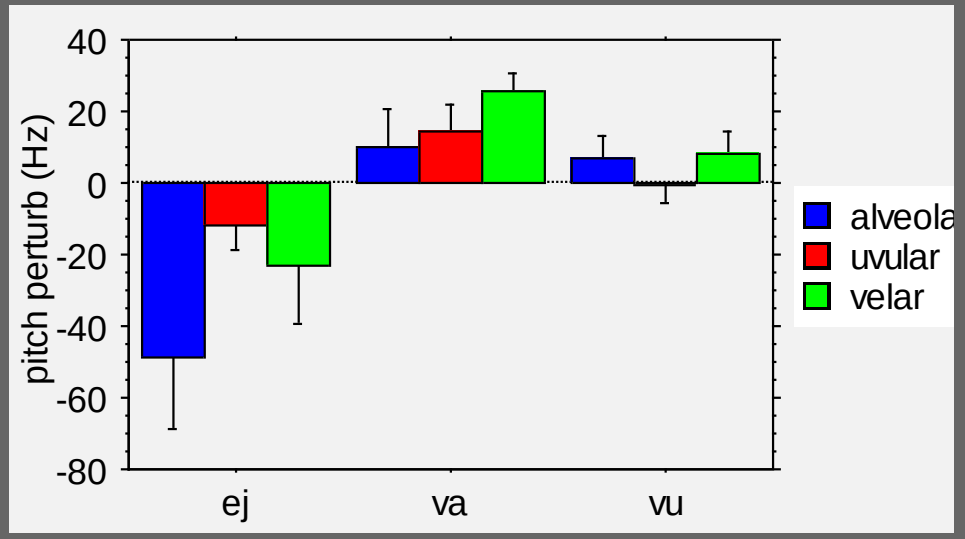


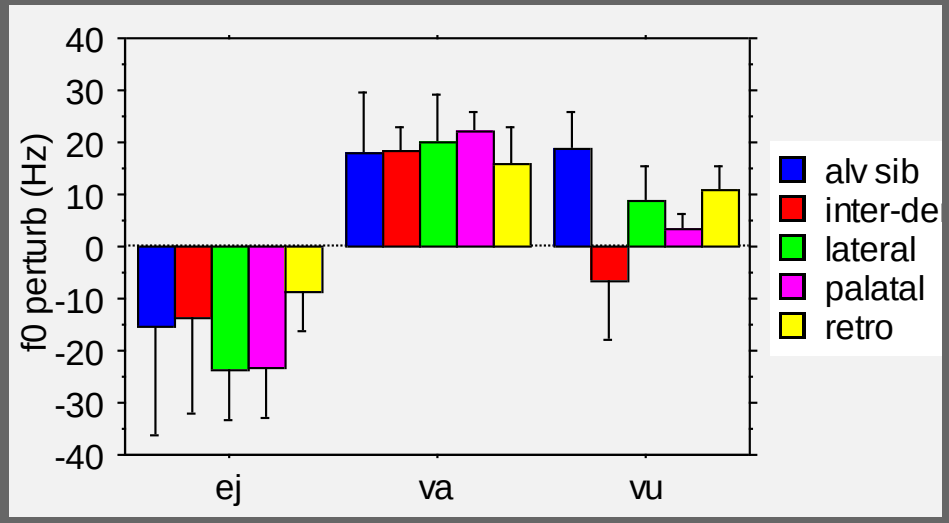
  - affricates
    - Lar: : ej > vu, ej > va
    - Place: inter-dent > pal, lat > pal



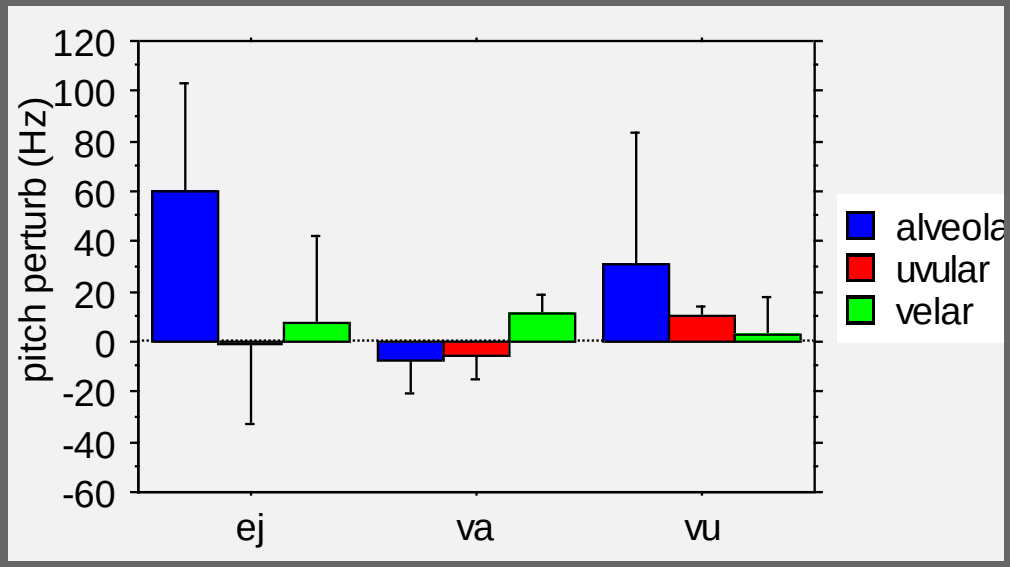
- f0 perturbation
  - pitch lowerers (AJ, ED, HM).
    - stops
      - Lar: ej < vu < va
      - Place: alv < uvu, vel
    - affricates
      - Lar: ej < vu < va

ED:

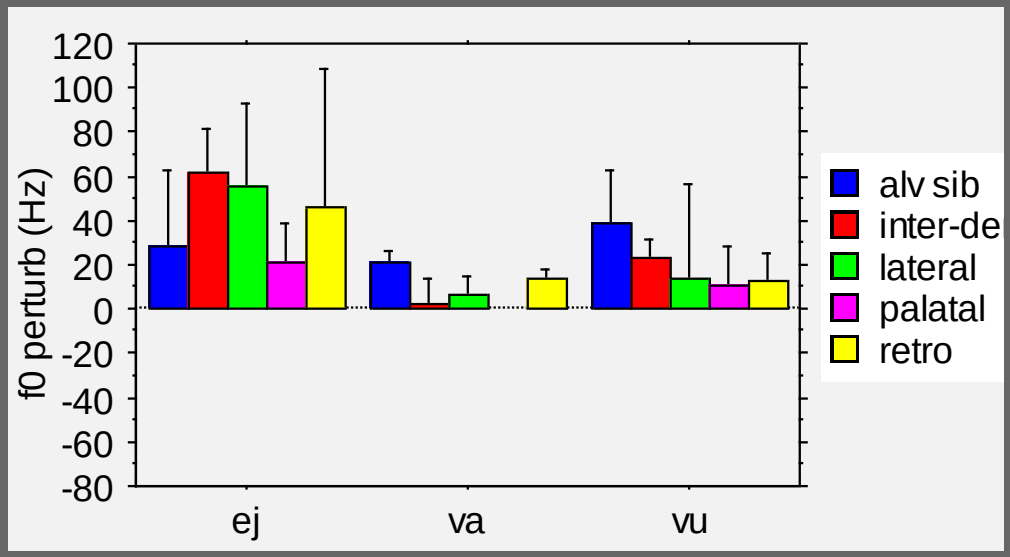




- pitch raiser (RD)
  - stops
    - Lar: ej > va

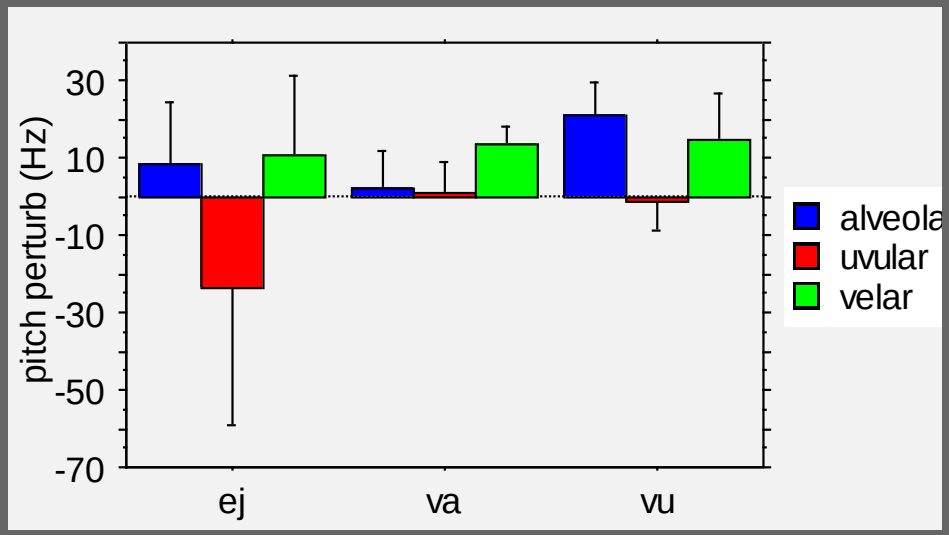


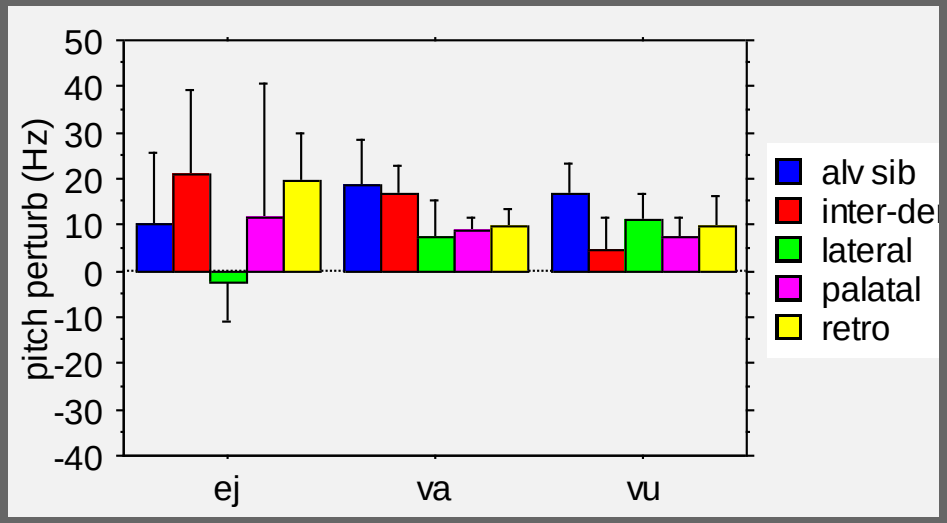
  - affricates
    - Lar: ej > va, vu



- pitch equivocators (JD, LH, PA)
  - stops
    - Lar: ej < vu
    - Place: uvu < alv, vel
  - affricates

JD:





Comparison with Witsuwit'en

- Witsuwit'en laryngeal contrasts
  - 1 manner (stops)
  - 2 places (alveolar, uvular)
  - 3 positions (initial, post-vocalic, post-s)
- Deg Xinag laryngeal contrasts
  - 2 manners (stops, affricates)
  - 3 stop places, 5 affricate places (releases)
  - 1 position (post-vocalic)

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

Witsuwit'en vs. Deg Xinag

- Similarities
  - Ejectives have intermediate VOT, most jitter perturbation, slowest rise time
  - 3 types of f0 perturbation after ejectives: lowering, raising, "flat"/"equivocal"
  - Place effects:
    - dorsals have longer VOT and closure duration (Wit: uvular; DX: velar) as expected (Cho and Ladefoged 1999)
    - faster rise time (why?)
- Differences—nothing major or obvious!

Cho, Taehong, and Peter Ladefoged. 1999. 'Variation and universals in VOT: Evidence from 18 languages.' *Journal of Phonetics* 27:207-229.

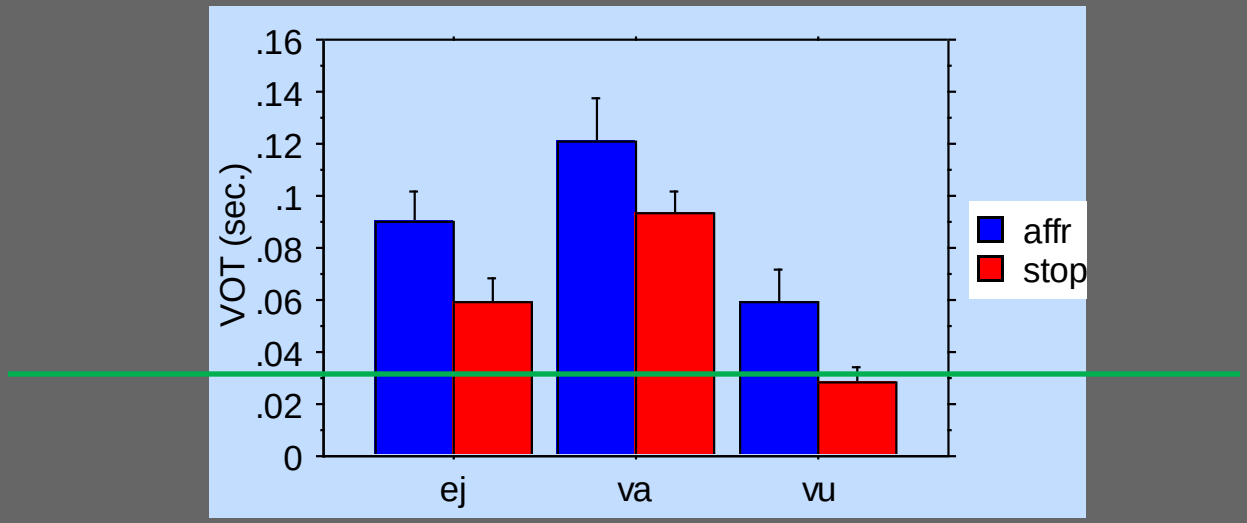
McDonough-Wood 'revised Athabaskan inventory' revisited

1. Are Athabaskan languages with affricate-like realizations of voiceless aspirated stops distributed across different branches of the family?

- A few so far. But not all:
  - not Deg Xinag (Alaska branch (Leer's clf))
  - not Witsuwit'en (B.C. branch)

2. Do aspirated affricates pattern with aspirated stops and/or unaspirated affricates?

- VOT?



  - aspirated affricates > aspirated stops > voiceless unaspirated affricates > unaspirated stops

3. Are long VOT ejectives found in all branches of Ath?

- Found in
  - Southerly Outlying branch
    - Hupa (Gordon 1995)
    - Navajo (McDonough and Ladefoged 1993)
  - Eastern branch
    - Dëne Sųłiné (Hogan 1976)
    - (apparently) N. Slavey, Dogrib (McDonough and Wood 2008)
- Not found in
  - Alaska branch: Deg Xinag
  - British Columbia branch: Witsuwit'en and Carrier
  - Southerly Outlying branch: W. Apache (Gordon et al. 2001)

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.

Gordon, Matthew, Brian Potter, John Dawson, Willem de Reuse, and Peter Ladefoged. 2001. 'Phonetic Structures of Western Apache.' *International Journal of American Linguistics* 67:415-448.

McDonough, Joyce, and Peter Ladefoged. 1993. 'Navajo Stops.' *UCLA Working Papers in Phonetics* 87 (Fieldwork Studies of Targeted Languages):151-164.

Conclusions

- ‘the revised Athabaskan inventory’ of McDonough and Wood 2008 is not supported by detailed phonetic evidence from Deg Xinag
- f0 perturbation effects from glottalic consonants in 2 non-tonal Athabaskan languages a microcosm of familial tonogenesis

Xisrigidisddhinh

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- To speakers: Alta Jerue, Edna Deacon, Hannah Maillelle, James Dementi, Lucy Hamilton, Katherine Hamilton, Phillip Arrow, Raymond Dutchman

Some of the Deg Xinag speakers

Phillip Arrow

Edna Deacon

Lucy Hamilton

Raymond Dutchman

James Dementi