Deg Xinag "Voiceless Unaspirates": A Case of Phonologically Driven Phonetics?

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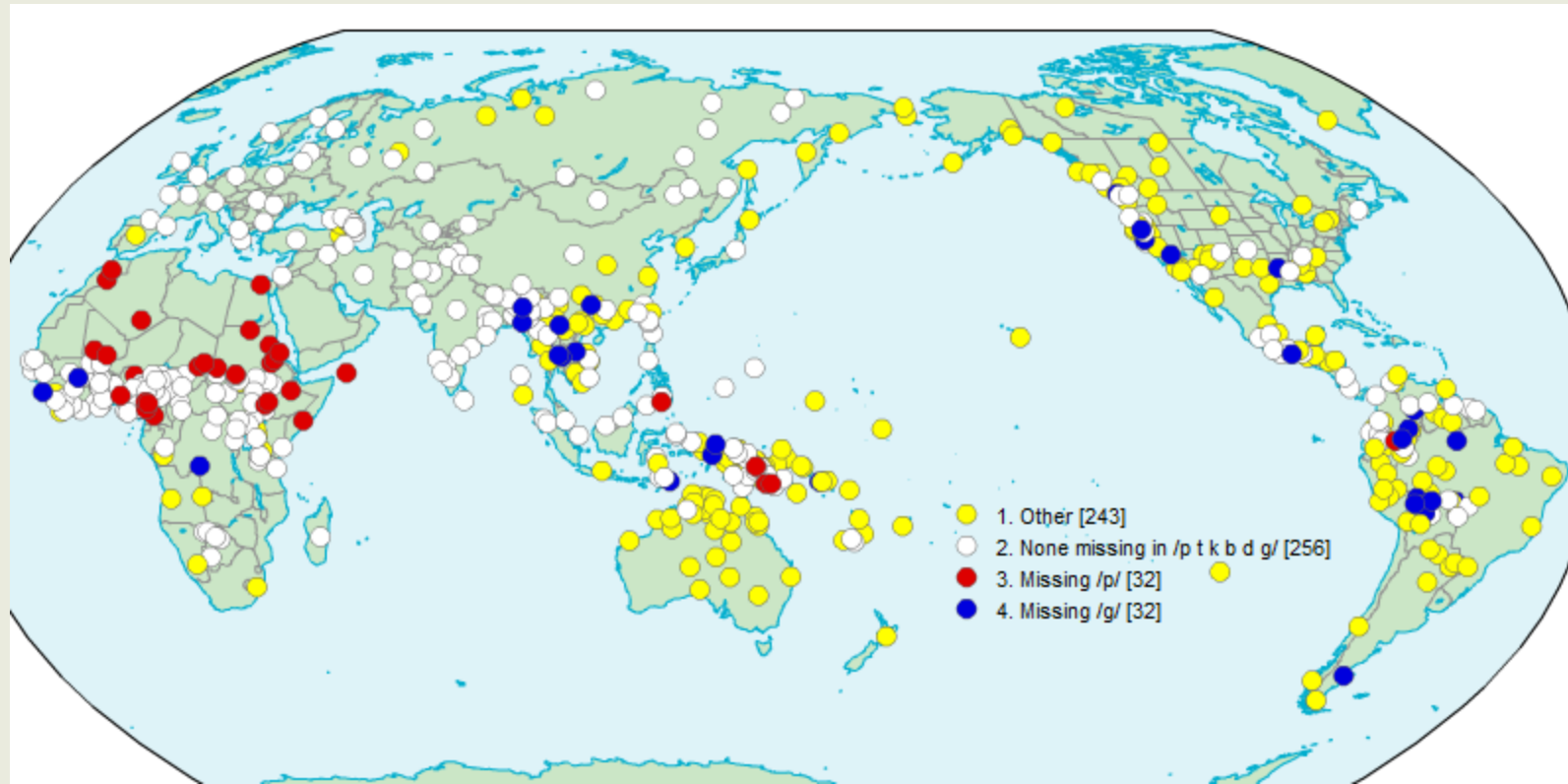
UCSD colloquium, May 14, 2012

Overview

- Sound inventories
- Athabaskan stops and affricates
- Deg Xinag stops and "Jeff's question"
- Tsek'ene stops
- Conclusions

Pressures on sound inventories

- Aerodynamic ("missing /g/")

Maddieson, Ian. 2005. '5. Voicing and Gaps in Plosive Systems.' In *The World Atlas of Language Structures*, ed. by Martin Haspelmath, Matthew S. Dryer, David Gil and Bernard Comrie. Oxford: Oxford University Press. 26-29.

3

Other pressures on sound inventories

- Phonological
  - symmetry
  - simplicity

- Grimm's Law
  - PIE *bʱ dʱ gʱ > Proto-Germanic *b d g
  -     *b d g   >   *p t k
  -     *p t k   >   *f θ x

Hayes, Bruce. 1999. 'Phonetically Driven Phonology: The Role of Optimality Theory and Inductive Grounding.' In *Functionalism and Formalism in Linguistics*, ed. by Michael Darnell, Edith A. Moravcsik, Frederick Newmeyer, Michael Noonan and Kathleen M. Wheatley. Amsterdam: John Benjamins. 243-285.

Hayes, Bruce, and Donca Steriade. 2004. 'Introduction: the phonetic bases of phonological Markedness.' In *Phonetically-Based Phonology*, ed. by Bruce Hayes, Robert Kirchner and Donca Steriade. Cambridge: Cambridge University Press. 1-33.

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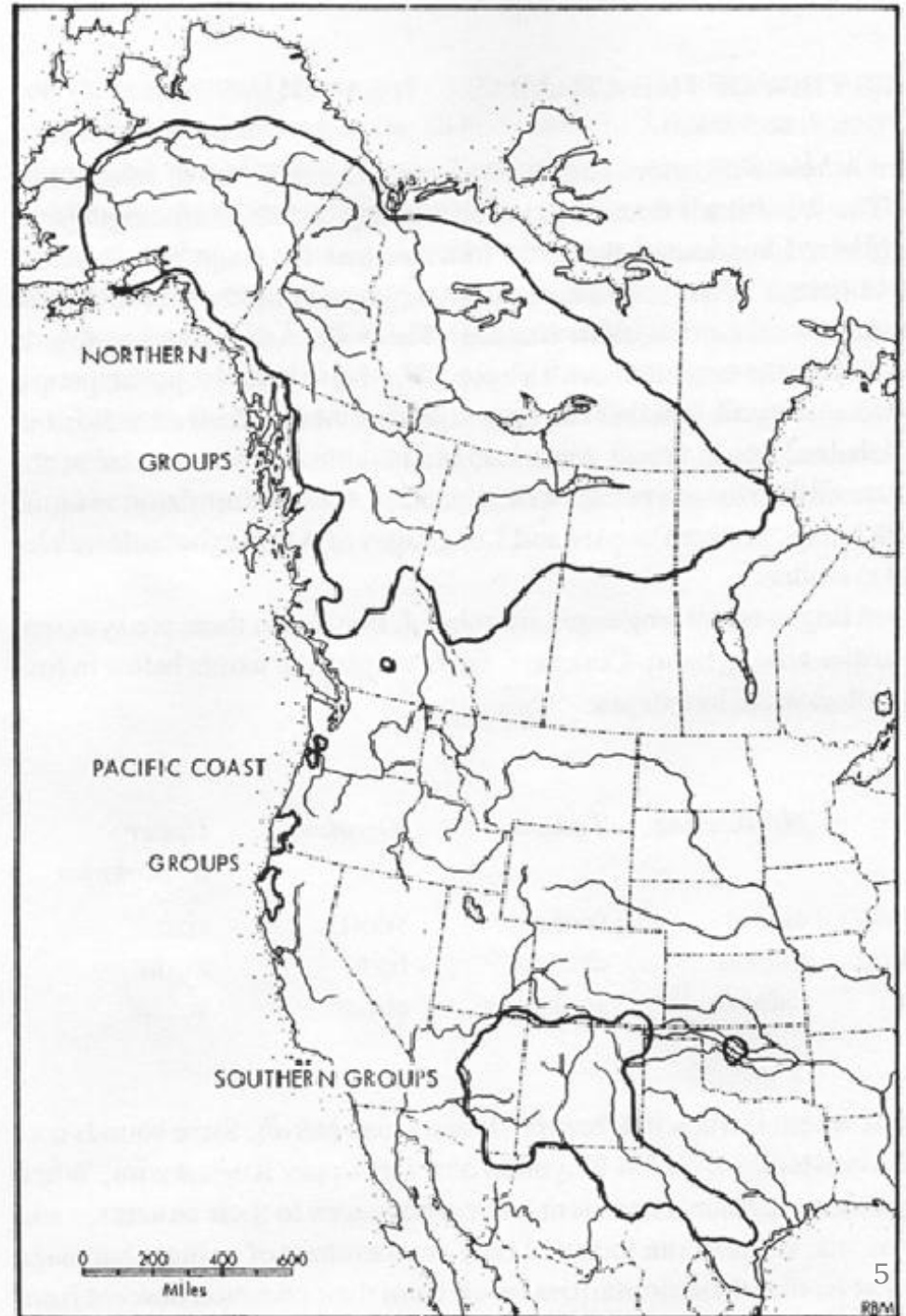
Parr, Richard T. 1974. *A Bibliography of the Athapaskan Languages*. Ottawa: National Museums of Canada/Musées Nationaux du Canada.

Na-Dene

Athabaskan

DISTRIBUTION OF NA-DENE LANGUAGES

Kari, James. 2008. Distribution of Tli-Na-Dene Languages. Fairbanks: Dena'inaq' Titaztunt.

Koyukon Consonants

	Labial	Alveolar	Lateral	Alveolar	Velar*	Back Velar	Glottal
Stops/Affricates							
plain	b	d	dl	dz	g (j)	gg	’
aspirated		t	tl	ts	k (ch)	kk	
glottalized		t’	tl’	ts’	k’ (ch’)	kk’	
Continuants							
voiced	m	n	l	z	y	gh	
voiceless		nh	ł	s	yh (sh)	h	ĥ

*Upper dialect alveolo-palatal variants shown in parentheses.
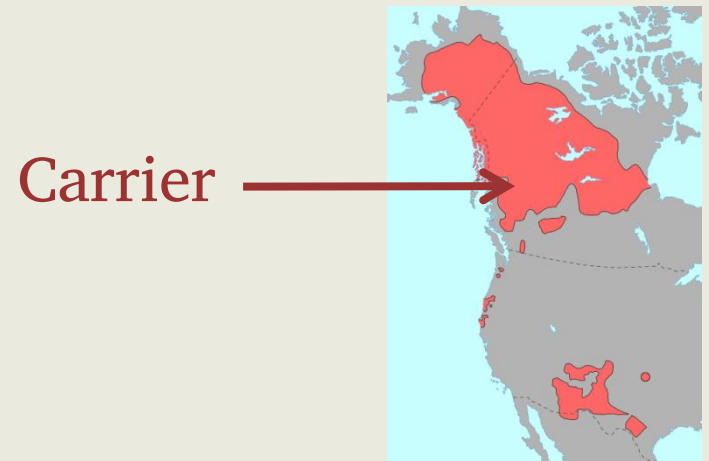
Koyukon

Marlow, Patrick. 2000. 'Koyukon Sound System and Orthography.' In *Koyukon Athabaskan Dictionary*, ed. by Jules Jetté and Eliza Jones. Fairbanks: Alaska Native Language Center. lxvi-lxxi.
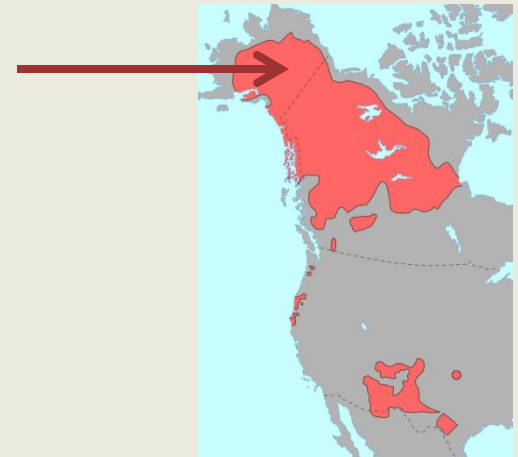
The "plain" stops and affricates

- "Among the consonants *b* and *p, d* and *t, k* and *g* are respectively undifferentiated through the whole Dene linguistic group." (Morice 1891: 173)

Carrier

Morice, Adrien-Gabriel. 1891. 'The Déné languages, considered in themselves and in their relations to non-American idioms.' *Transactions of the Canadian Institute* 1:170-213.

The "plain" stops and affricates

- "Three types of stops are found…: intermediate (or sonant), aspirated surd, and glottalized (fortis)." (Sapir 1915: 554)

Sapir, Edward. 1915. 'The Na-Dene languages: A preliminary report.' *American Anthropologist* 17:534-558.

More recent descriptions

- Koyukon stops/affricates are "unaspirated", "aspirated", and "glottalized" (Thompson 1977: 4)

- Typical Athabaskan "stops/affricates...are phonologically voiceless unaspirated, aspirated and glottalised" (Rice 1994: 107)

Thompson, Chad. 1977. *Koyukon Verb Prefixes*. M.A. thesis, Department, University of Alaska Fairbanks.

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

Recent instrumental descriptions

- Hupa: "unaspirated", "aspirated" "ejective" stops. VOT: (Gordon 1995: 2, 12)
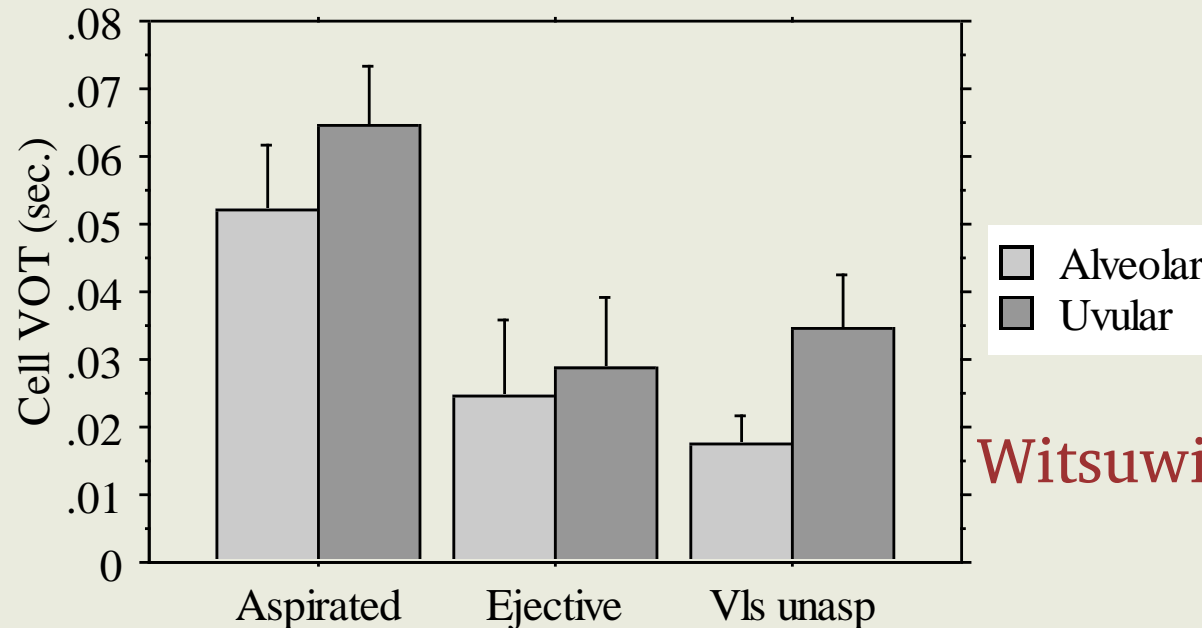
Consonant	n	Mean (ms)	Std.dev.
p	6	10.8	1.4
t	61	15.5	5.2
kʲ	7	44.0	9.0
q	9	27.0	15.5
tʰ	35	82.2	23.2
kʲʰ	28	84.2	35.1
t'	15	92.8	28.4
kʲ'	47	80.2	45.2
q'	27	89.4	40.3
t͡s	11	70.8	19.0
t͡sʰ	9	152.3	39.2
t͡ʃʷʰ	12	167.1	51.9
t͡s'	4	120.3	17.7
t͡ʃ'	7	89.6	30.0
t͡ɬ'	13	102.0	26.9
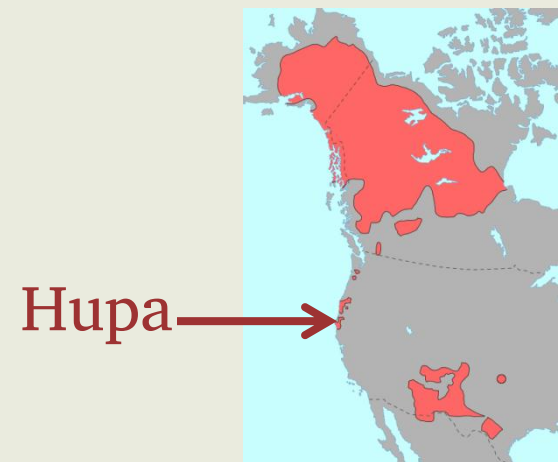
Hupa →

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.

Witsuwit'en

- alveolar and uvular stops (Hargus 2007)

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

Chilcotin

- "unaspirated (or plain)", "voiceless aspirates", "ejective" stops/affricates (Ham 2008)

Chilcotin

	Closure (ms)	VOT (ms)	Stop (ms)
Plain	76 (45)	**46 (45)**	122 (72)
Aspirated	78 (49)	**105 (47)**	183 (76)
Ejective	67 (48)	**102 (54)**	155 (77)

Ham, SooYoun. 2008. *Tsilhqut'in Ejectives: A Descriptive Phonetic Study*. M.A. thesis, Department of Linguistics, University of Victoria.

Navajo

- ## Mean VOT (McDonough and Ladefoged 1996: 126)

Place of articulation	unaspirated	aspirated	glottalized
bilabial	12 (5)	— — —	— — —
coronal	6 (2)	130 (29)	108 (31)
velar	45 (9)	154 (43)	94 (21)

McDonough, Joyce, and Peter Ladefoged. 1996. 'The Specification of Stop Contrasts in Navajo.' In *Dam phonology: HIL phonology papers 2*, ed. by Marina Nespor. The Hague: Holland Acad. Graphics. 123-142.
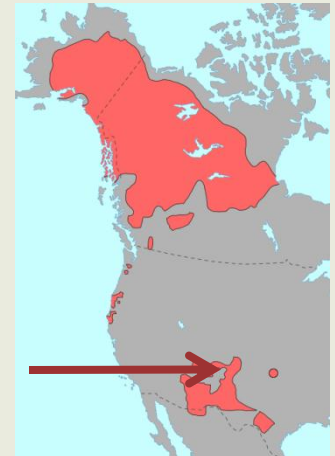
Navajo

Jicarilla Apache

- *n > [n]
  [d]~[nd] (≠ [t]) (Tuttle 2000, Hoijer 1938)

*[n] > [d]   *[t] > [t]

Jicarilla
Apache

Tuttle, Siri G. 2000. 'Unaspirated coronal stops in Jicarilla Apache.' *UCLA Working Papers in Phonetics* 98:39-53.
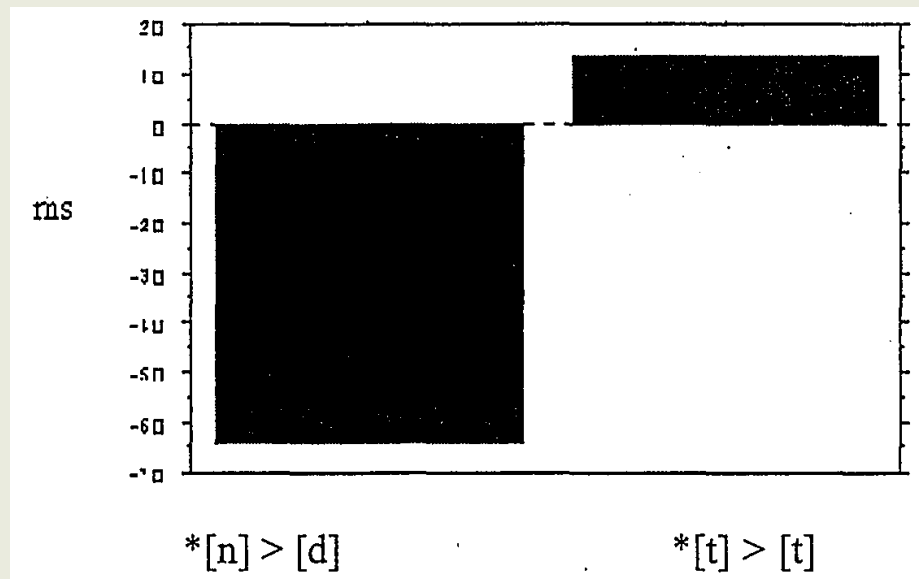
Western Apache

- "unaspirated", "aspirated", "glottalized" stops

Western Apache

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.
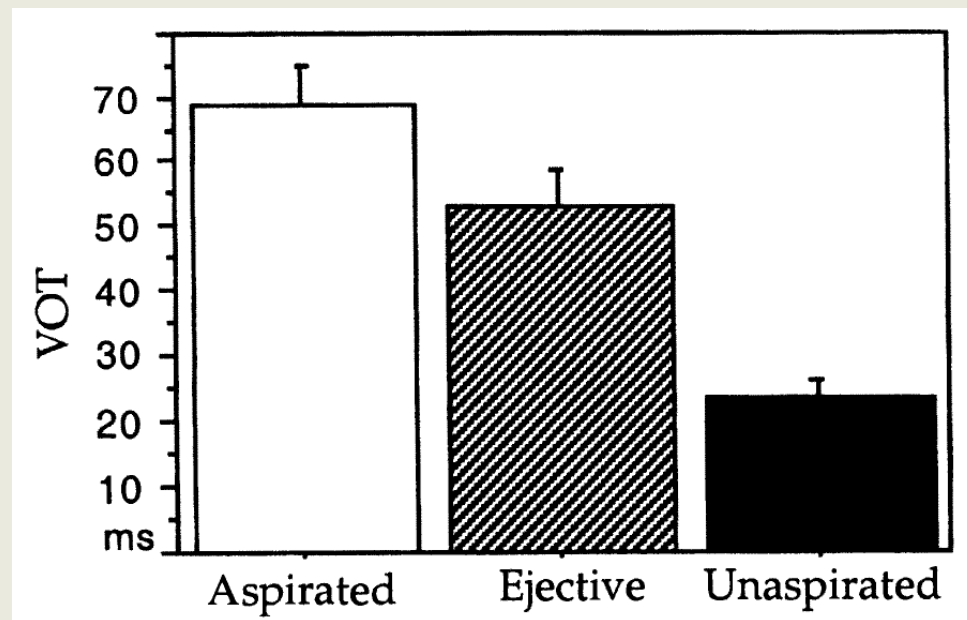
Western Apache

- also "contrastively voiced stops"
- 'they are in position'; cf. Navajo [sɪnɪl]

[t]	[d]	[n]	[nd]
[sɪtɪl]	[sɪdɪl]	[sɪnɪl]	[sɪndɪl]
3 speakers	2 speakers	2 speakers	1 speaker

Tahltan

- /b t k/ (Bob 1997). % voiced:

speaker	post-sibilant			post-nasal			intervocalic		
	b	d	g	b	d	g	b	d	g
1	34 %	0 %	0 %	100 %	70 %	52 %	88 %	65 %	24 %
2	31 %	0 %	0 %	100 %	63 %	62 %	91 %	61 %	24 %
3	70 %	0 %	0 %						
4	65 %	0 %	0 %	100 %	68 %	89 %	87 %	62 %	65 %
5	0 %	0 %	0 %	31 %	32 %	39 %	26 %	46 %	24 %

Tahltan
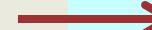
Bob, Tanya. 1997. *Laryngeal Phenomena in Tahltan*. MA thesis, Department of Department of Linguistics, University of British Columbia.

Dene Sųłiné

Dene
Sųłiné

- "voiceless" and "voiced" stops and affricates (Hogan 1976)

- "Some evidence of voicing during the closure is present in the Dene Sųłiné CL examples, in both the aspirated and unaspirated versions" (McDonough and Wood 2008)

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

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

Interim summary

- Syllable-initial 3-way laryngeal contrast for stops/affricates
  - ejective
  - aspirated
  - "plain"
- "Plain" stops are generally voiceless unaspirated
- Some languages have voiced stops
  - predictable from place (Tahltan)
  - unpredictable (synchronically) < *n (Apachean)

Syllable-initial vs. –final contrasts

- e.g. Witsuwit'en
- Syllable-initial

p $\quad$ t tʰ t' $\quad\quad$ c cʰ c' $\quad\quad$ kʷ kʷʰ kʷ' $\quad$ ʔ

$\quad\quad$ ts tsʰ ts'

$\quad\quad$ tɬ tɬʰ tɬ'

- Syllable-final

p $\quad$ t $\quad\quad\quad\quad$ c $\quad\quad\quad\quad$ kʷ $\quad\quad\quad\quad$ ʔ

$\quad\quad$ ts

$\quad\quad$ tɬ

Witsuwit'en

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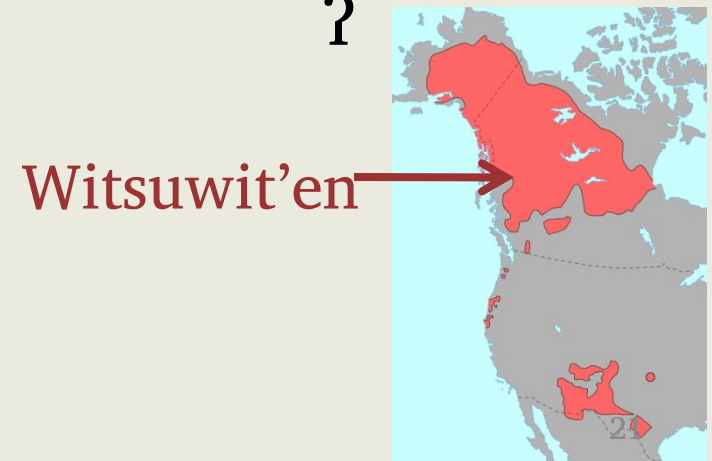
Deg Xinag

Deg Xinag

Yukon R. freezing up, near Anvik AK

Syllable-initial consonants

p pʰ		t tʰ t'			k kʰ k'	q qʰ q'	ʔ
	tθ tθʰ tθ'	ts tsʰ ts'	ʈʂ ʈʂʰ ʈʂ'	tʃ tʃʰ tʃ'			
		tɬ tɬʰ tɬ'					
v	θ ð	s z	ʂ ʐ	ʃ		χ ʁ	h
		ɬ l					
m		n		j			

Krauss, Michael. 1962. Ingalik, Ms.

Deg Xinag

- Syllable-final

p		d t			g k	G q	ʔ
	dð tθ	dz ts	ḍẓ ṭṣ				
		dl tɬ					
v	θ ð	s z	ṣ ẓ	ʃ		χ ʁ	
		ɬ l					
m m'		n n̥ n'		j j' j̥	ŋ ŋ' ŋ̥		

Krauss, Michael. 2000. 'Koyukon Dialectology and Its Relationship to Other Athabaskan Languages.' In *Koyukon Dictionary*, ed. by Jules Jetté and Eliza Jones. Fairbanks: Alaska Native Language Center, University of Alaska Fairbanks. l-lxv.

Origin of final voicing contrast

	Proto-Athabaskan	*Deg Xinag*
*tV > d	*tʃ'əteʔ, *tʃ'ə̰teʔ 'robe, blanket'	ts'əd
*t', t > t	*tɬ'ət' 'fart'	tɬ'ət
(V reduction)	*-te: loc.REL	-tə kətəqʰat̲ə 'store' (lit. 'where things are bought')

Jeff Leer

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

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

Jeff's question about Deg Xinag

"you identify plain occlusive onsets as voiceless. So I am puzzled, since in most cases I've seen, when the phonology gives you a chance to put it to the test, they tend to pattern as voiced rather than voiceless." (p.c. 9-22-11, commenting on prepublication version of Hargus 2012)

Hargus, Sharon. 2012. 'Deg Xinag Rounding Assimilation: A case study in phonologization.' *Journal of Laboratory Phonology* 3:163-193.

Jeff's reasoning

- plain stops pattern with voiced fricatives
  - Gwich'in *ddhah* 'mountain': "one thing that really strikes me is that the release (dh) of the onset is deliberately voiced"
  - "see early phonetic transcriptions of various Ath languages like Chip, where Li actually writes gamma after stem onset g."

Gwich'in
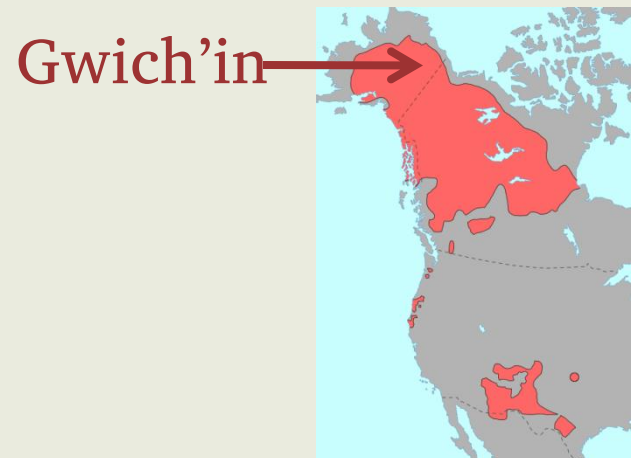
Jeff's reasoning, cont.

- plain stops pattern with voiced fricatves
    - Navajo: "emphatic stem onset variants (used for dramatic effect, often involving velar affricated release), where 'plain occlusives' show themselves to be voiced by the fact that the velar affricated release of the emphatic variant is voiced, e.g. dz^ɣ, j^ɣ, and g^ɣ...z^ɣ and zh^ɣ...Their voiceless counterparts are ts^x, ch^x, k^x, s^x, sh^x, emphatic variants of ts, ch, k, s, sh."

Reichard, Gladys A. 1948. 'Significance of Aspiration in Navaho.' *International Journal of American Linguistics* 14:15-19.

Jeff's question, paraphrased

- Have the historical voiceless unaspirated stops and affricates become voiced stops in initial position in DX?

- I didn't think so.

Are plain stops phonetically voiced in DX?

- Measure voicing, controlling for
  - preceding segment/position
  - following stress
- Compare with:
  - final voiced stops in DX
    - my prediction: different
  - initial voiceless unaspirated stops in a normal Ath language
    - my prediction: same

Methods

- Speakers
  - 6 remaining (80-90 years-old)
  - 4 recorded
- Word lists
- Field recordings

1. Final voicing study

What are effects of:
- consonant voicing
- consonant manner

on:
- % voiced closure
- vowel duration   ?

	voiceless	**voiced**
stops	nəʁetɬʰaq "it collapsed"	yəxətɬʰaɢ "crummy house"
affricates	taɬtətθ '(3SG) is shivering"	taɬtədð "red-necked grebe" (lit. "the one which is shivering")

Measurements

- Vowel duration
- Voicing in closure
- Voicelessness in closure

} % voiced
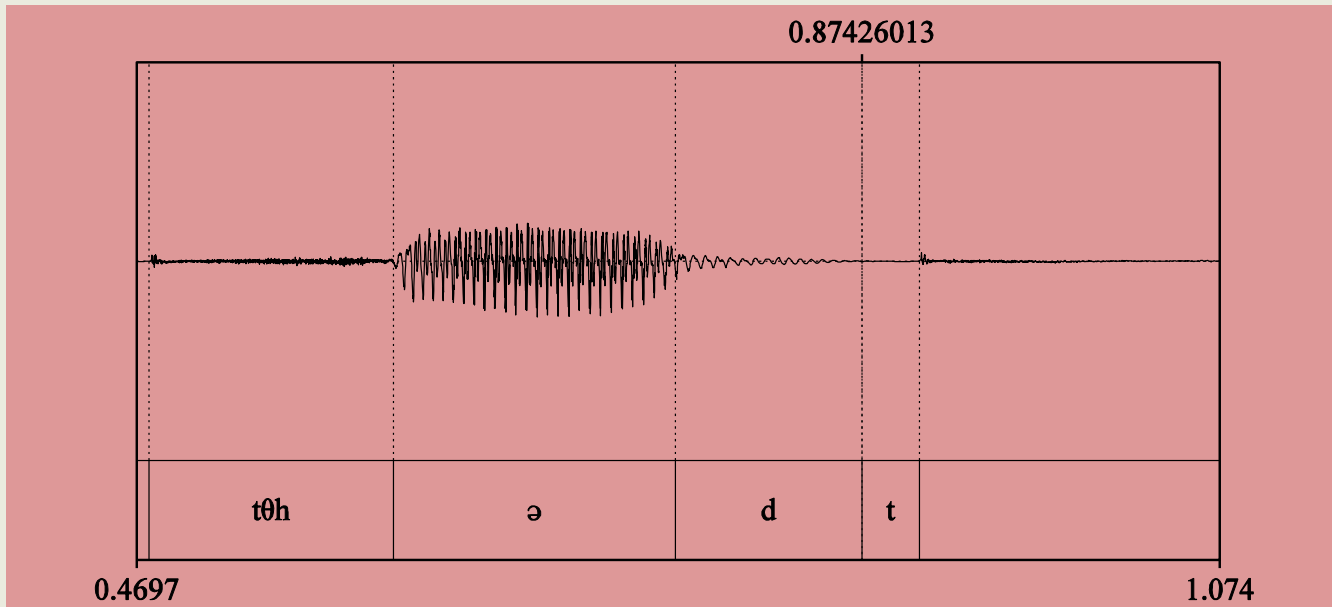
kətθʰə<u>d</u> "ruffed grouse'

Final voicing contrast results

Dependent variable: Vowel duration
Independent variables: C voicing, Manner
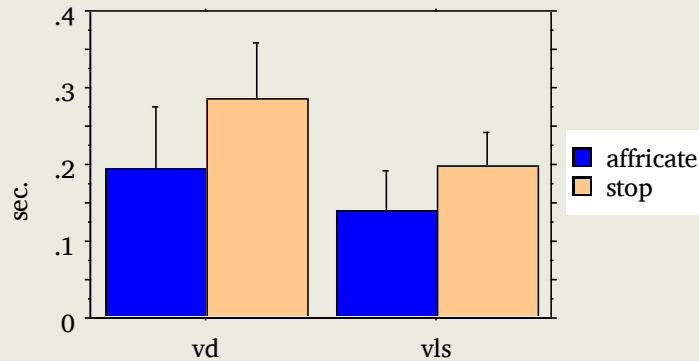
ED: vd > vls;
    stops > affr
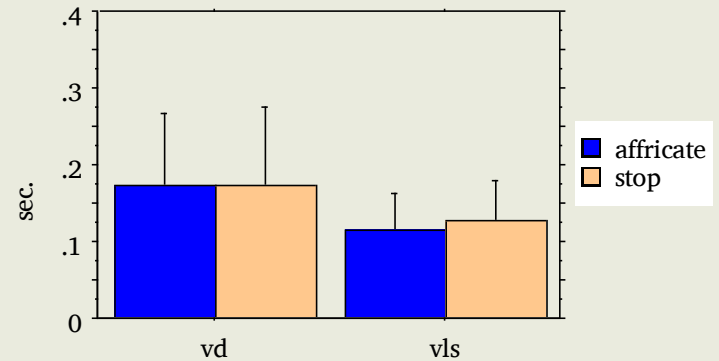
JD
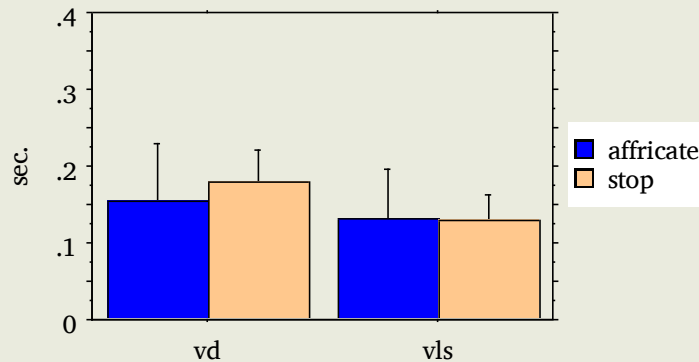
LH: vd > vls
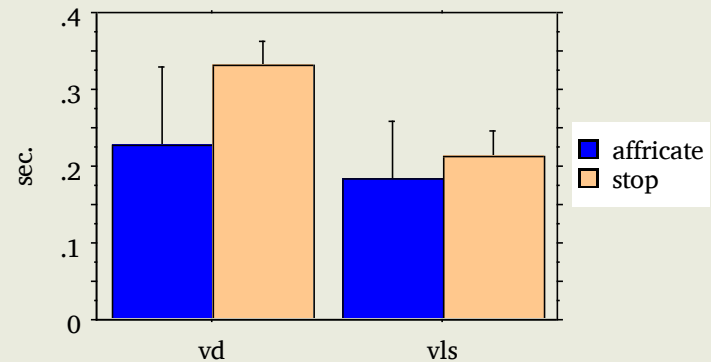
PA: vd > vls;
    stops > affr

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Final voicing contrast results

Dependent variable: % voiced
Independent variables: C voicing, Manner
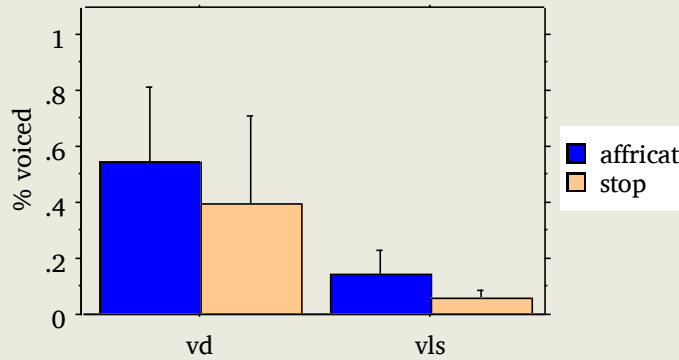
ED: vd > vls;
    affr > stops
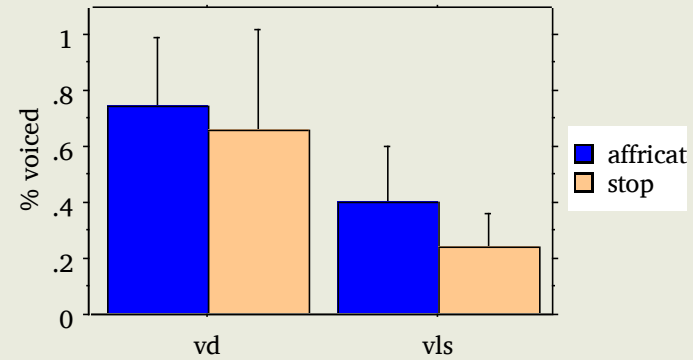
JD: vd > vls
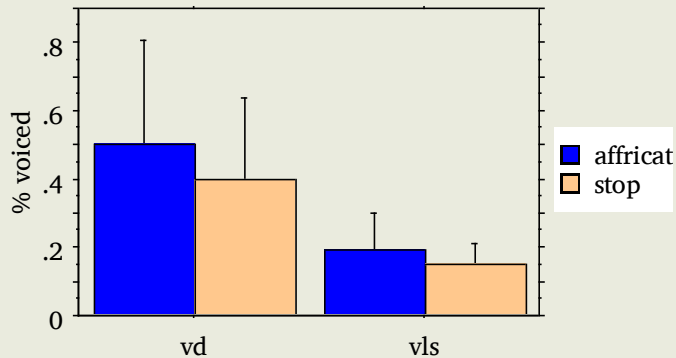
LH: vd > vls
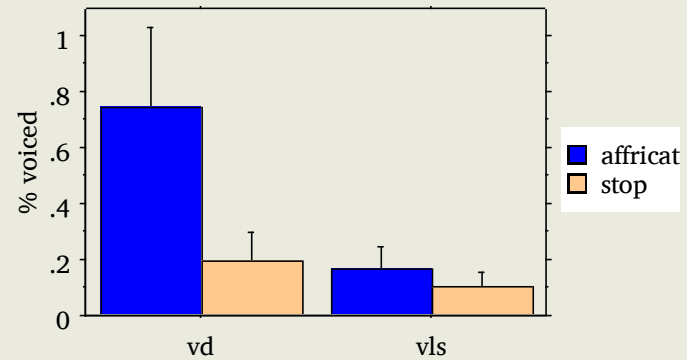
PA: vd > vls
    affr > stops
    interaction

Realization of final voicing

	vowel duration	% voicing
ED	✓	✓
JD		✓
LH	✓	✓
PA	✓	✓

2. DX "plain" /t/

What are effects of: on
- preceding context   • %voiced
- following stress   • VOT   ?

Hargus, Sharon. 2005. 'Stress in polysyllabic morphemes: Sekani and Deg Xinag.' In *Proceedings of the 2005 Athabaskan Languages Conference*, ed. by Suzanne Gessner. Fairbanks: Alaska Native Language Center, University of Alaska Fairbanks. 39-66.

Hargus, Sharon. 2010. 'Vowel quality and duration in Yukon Deg Xinag.' In *Working Papers in Athabaskan Languages 2009*, ed. by Siri G. Tuttle and Justin Spence. Fairbanks: Alaska Native Language Center. 33-73.

Word list for DX "plain" /t/

	ˈ__V (stress)	__V (no stress)
#__	t̠əɬ "blood"	t̠əˈva "who"
n/l__	jənˈt̠ətθ "(3SG) is spinning it"	nt̠əˈðət "(3SG) is standing"
vls fric__	nəsˈt̠ətθ "I'm spinning it"	ˈtʰoχt̠ə "3 times"
a/e/o__	eˈt̠əχə "Innoko R. area"	ʈʂ'at̠əˈt'on "it (inanimate) is thin"
ə/ʊ__	vəˈt̠aɖʐ "his/her younger sister"	kət̠əˈŋədz "grass"

Measurements

- VOT
- voicing in closure
- voicelessness in closure
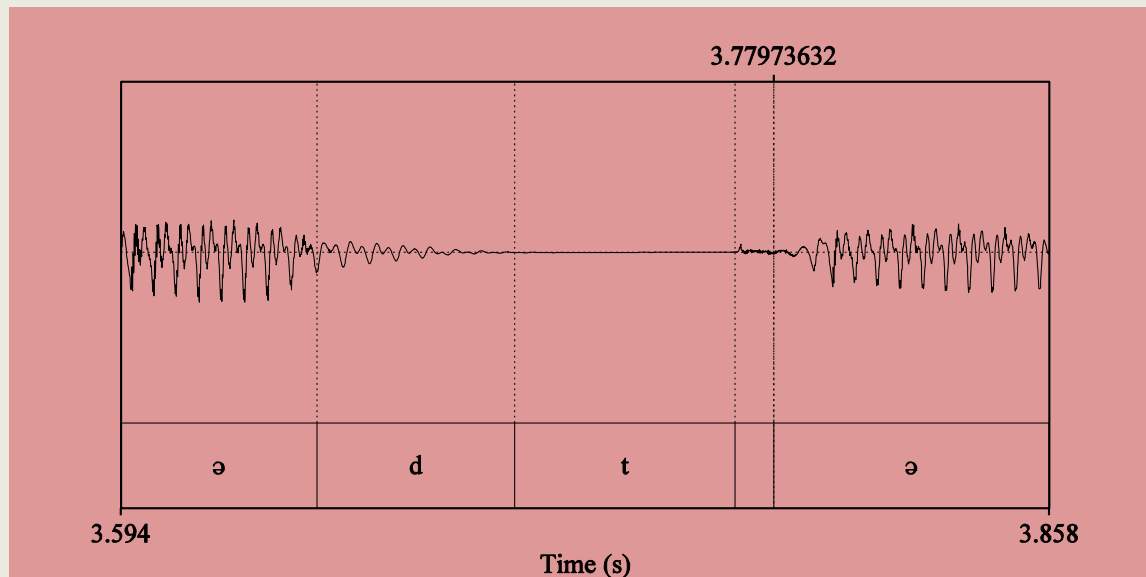
[kət̪əˈŋədz] "grass"

Results

- % voicing
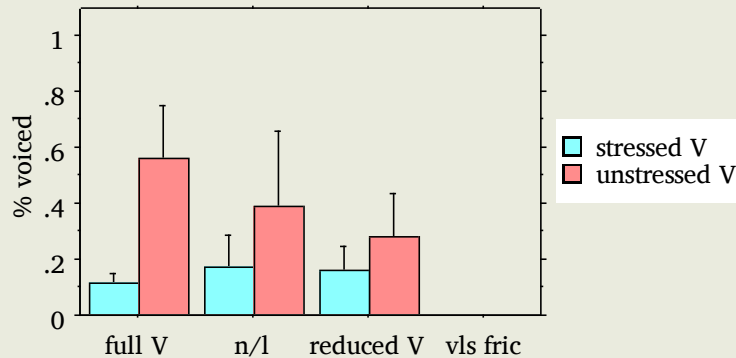
ED
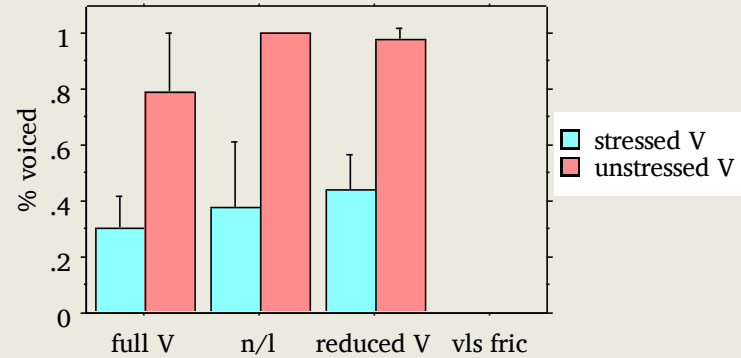
JD
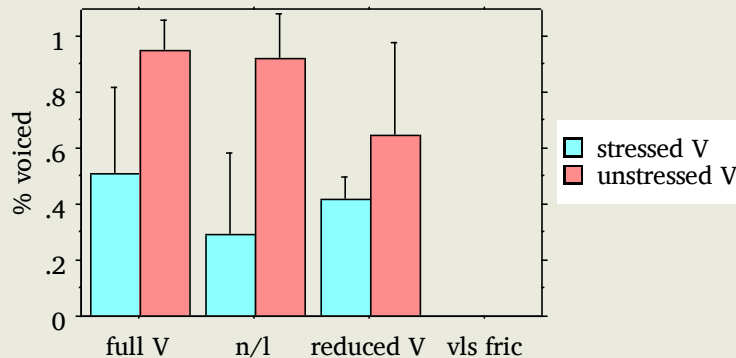
LH
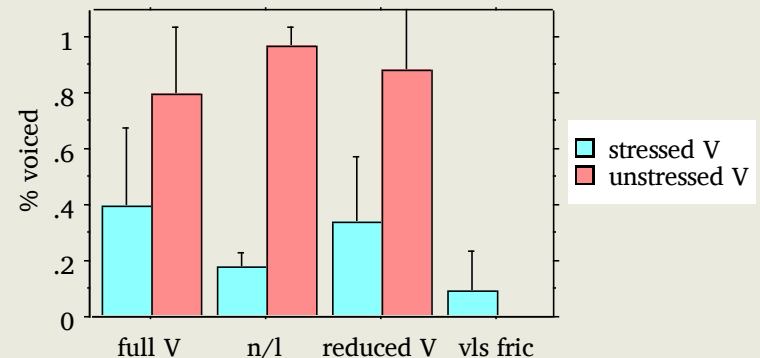
PA

greater % voiced when followed by unstressed (> stressed)
greater % voiced when preceded by voiced (> vls)

Results

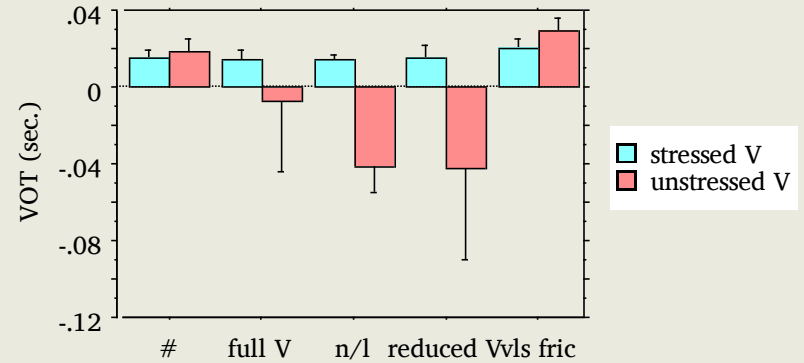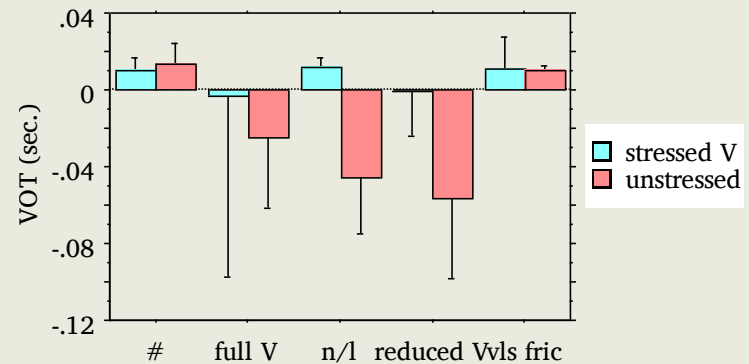- VOT

ED

JD: --unstressed < stressed
    --reduced V , n/l < #
       full/reduced V, n/l < vls fric
    --interaction
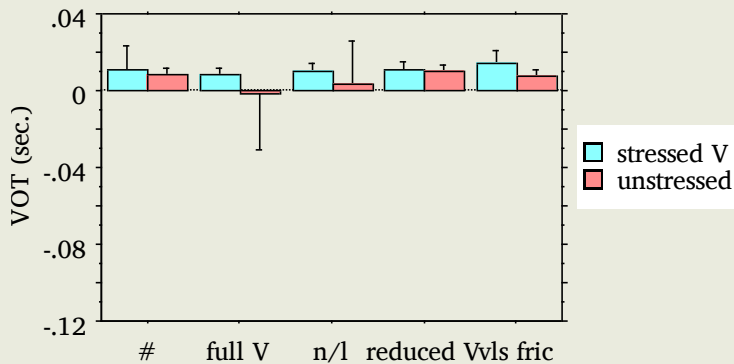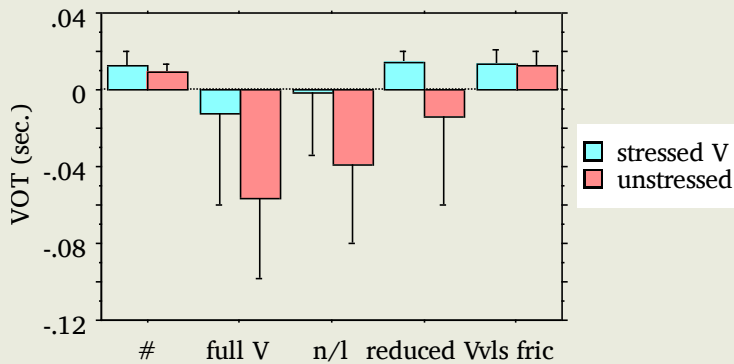
LH: --unstressed < stressed
     --full V, n/l < #, vls fric

PA: --unstressed < stressed
    --reduced V < #, vls fric
    --interaction

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DX syllable-initial "plain" stops

- voiceless
  - word-initially
  - after voiceless
- voiced
  - after voiced
  - (esp. before unstressed)
- verdict: voiceless with predictable voicing

Syllable-initial vs. -final

% voiced

	syll-initial "plain"	syll-final voiced	syll-final "plain"
ED	22	49	5
JD	50	92	17
LH	47	49	16
PA	46	28	12

not word-initial   alveolar stops only

cf. word-initial VOT

	word-initial "plain"
ED	10 (.8)
JD	17 (.6)
LH	11 (.6)
PA	12 (.9)

3. Tsek'ene

Tsek'ene
(Kwadacha)

Tsek'ene

Syllable-initial consonants

p	t tʰ t'			k kʰ k'	ʔ
	ts tsʰ ts'	tʃ tʃʰ tʃ'			
	tɬ tɬʰ tɬ'				
	s z	ʃ ʒ	ç j	x ɣ	h
	ɬ l				
m	n				

Syllable-final consonants

p	t			k	ʔ
	ts				
	tɬ				
	s z	ʃ	j	x ɣ	h
	ɬ l				
m	n				

Tsek'ene "plain" /t/

What are effects of: on
- preceding context   • %voiced
- following stress   • VOT   ?

Hargus, Sharon. 2005. 'Prosody in two Athabaskan languages of northern British Columbia.' In *Athabaskan Prosody*, ed. by Sharon Hargus and Keren Rice. Amsterdam: John Benjamins. 393-423.

Tsek'ene "plain" /t/ word list

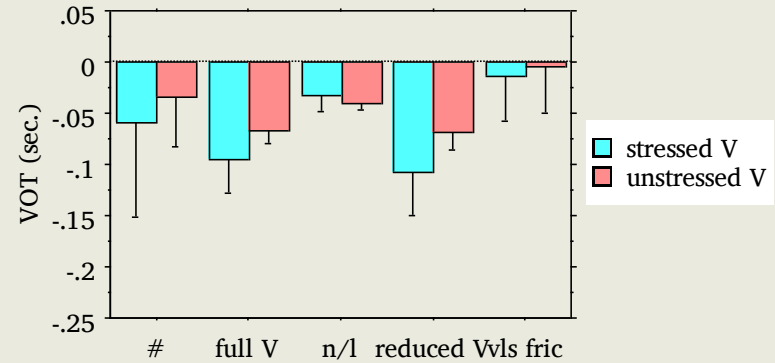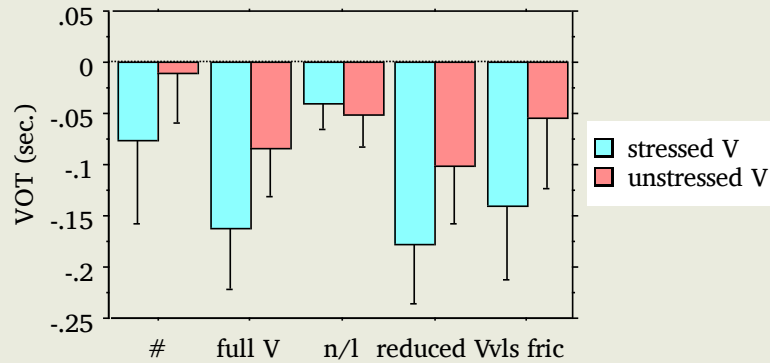|	ˈ__V (stress)	__V (no stress)
#__	tǝz "driftwood"	tǝˈtʃʰɪn "wood, timber"
n/l__	sɪnˈta "(2.SG) sit"	kʰɪsɪɣihˈtǝnte "where they taught me"
vls fric__	tǝsˈtǝli "sucker"	mǝˈts'ahtè' "his hat'
a/e/o/u/i__	ʔǝtʰaˈti "horsefly"	kʰe ˈʔẹti "barefoot"
ǝ/ɪ__	pè̀ˈti "groceries"	ˈts'ǝ̀tè' "blanket"

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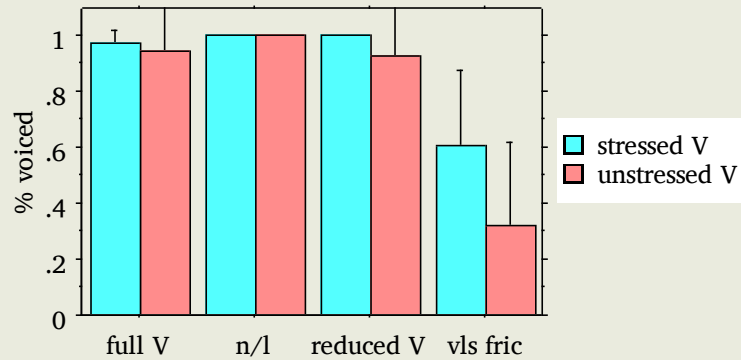
Results

- % voicing

ELM
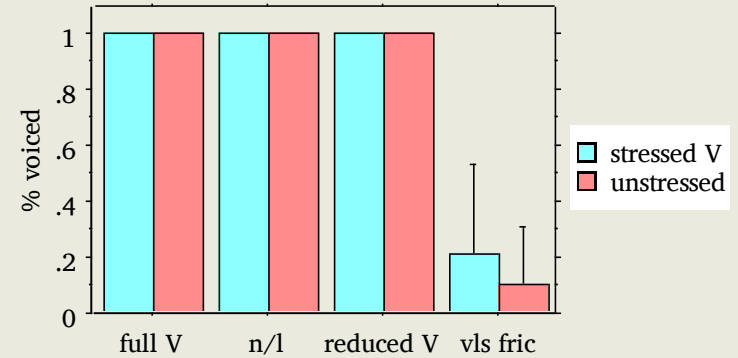
EM
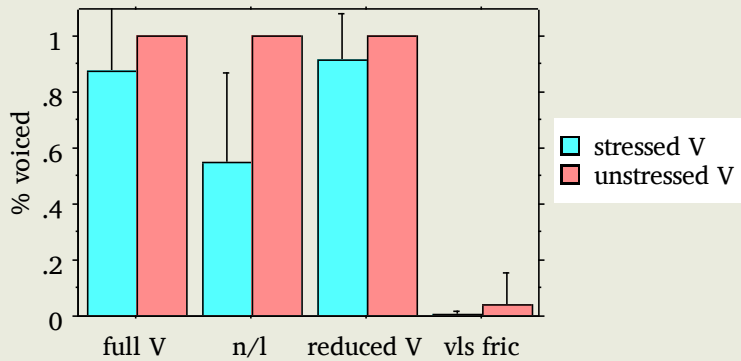
MA
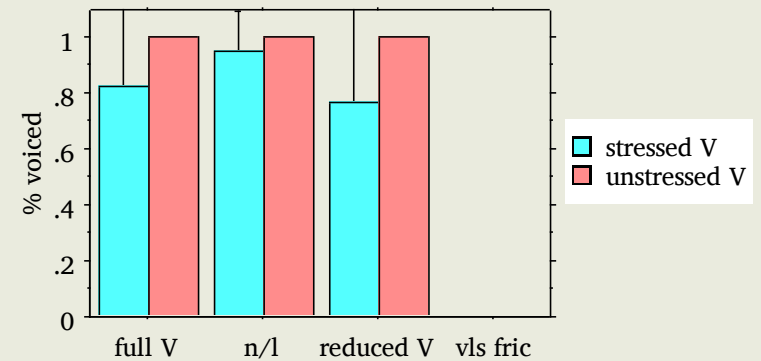
MC

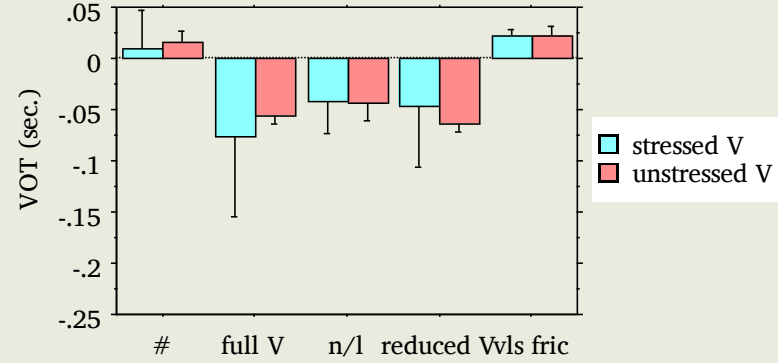# Results

- VOT

ELM: --stressed < unstressed
     --V < #

EM: --stressed < unstressed
    --V < vls fric
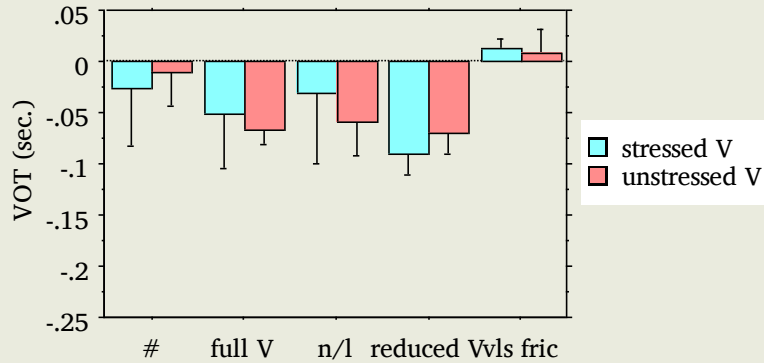
MA: V < #, vls fric
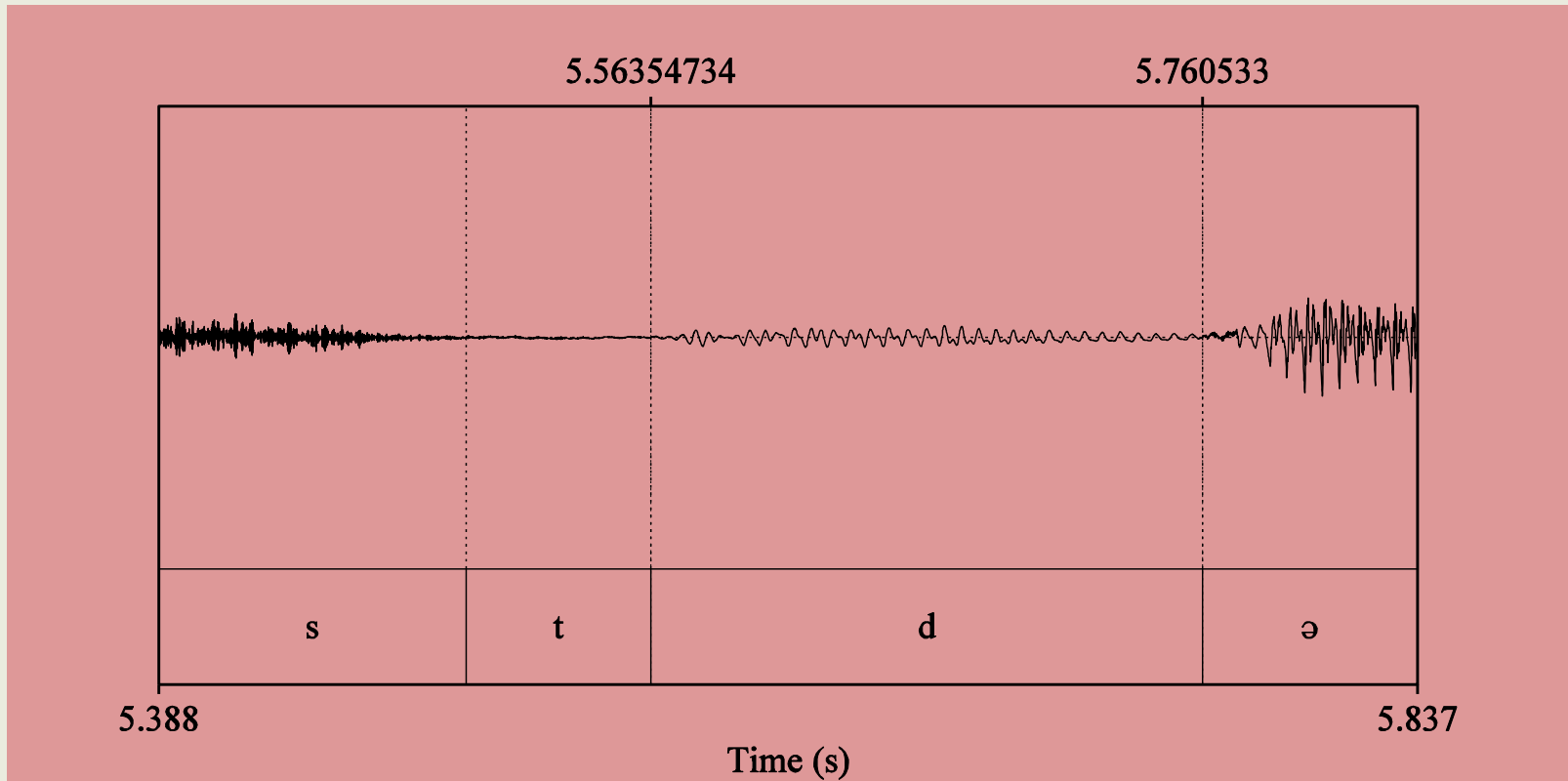

MC: V < #, vls fric
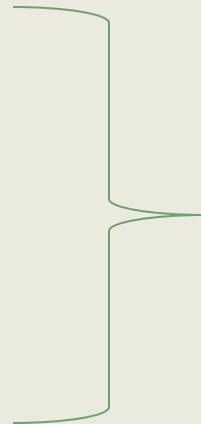
Voicing after vls fricative

[təsˈtəli] 'sucker' (ELM)

Tsek'ene initial "plain" stops

- MC
  - voiceless
    - word-initially
    - after voiceless
  - voiced
    - after voiced

= Deg Xinag

- MA
  - voiceless
    - after voiceless
  - voiced
    - word-initially
    - after voiced
- ELM, EM
  - voiced

Why [d]?

	Proto-Athabaskan	Tsek'ene
*n > /t/	*-nəq 'flat, flexible object moves independently, falls'	-təɣ
*n > /n/	*ŋən 'you'	nɪni

Conclusions

- *Not* a case of phonologically driven phonetics
- *Evolved* asymmetry

	syllable-initial	syllable-final
Deg Xinag	t tʰ t'	t d
Tsek'ene (MC)	t tʰ t'	t
Tsek'ene	d tʰ t'	t

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Edna Deacon

James Dementi

Lucy Hamilton