Effects on consonant duration in Fort Ware Tsek'ene

Sharon Hargus, University of Washington

June 26, 2010

Athabaskan/Dene Languages Conference,
University of Oregon

Overview

- Tsek'ene
- Intervocalic consonants (IVCs) in Athabaskan languages
- IVC duration in Tsek'ene: an experiment
- IVC length contrast in Tsek'ene: an experiment
- Conclusions

Tsek'ene

- a.k.a. Sekani, Sékanais, etc.
- Kwadacha (a.k.a. Fort Ware)

from Kari 2008 *Distribution of Na-Dene languages.*

Thanks to:

Mike Abou

Eileen McCook

Edna McCook

Mary Charlie

Funding provided by

- National Science Foundation (DEL-0651853)
- Kwadacha Education Society

Intervocalic consonants (IVCs)

- Bird (2004) re Lheidli Carrier
  - IVCs significantly longer than consonants in other positions (initial, final, cluster-internal)
- McDonough and Ladefoged (1993) re Navajo
  - 'the overwhelming impression is of the extraordinary length of the consonants, particularly when they are compared with the lengths of the vowels, which are no longer than they would be in citation forms of disyllabic English words' (p. 163)

Beaver IVCs

- Müller 2009
  - Lengthening of IVCs ‘impressionistically… does not seem to be as pronounced for Beaver as Bird (2004) has described for Carrier.’
  - But for nasals
    - word internal and word-initial (IP-internal) nasals > IP-initial nasals

Closer examination of the case for long IVCs

- In Navajo
  - McDonough and Ladefoged 1993 measured VOT of stops and affricates, and closure duration of stops and affricates. But there was no language-internal control, no comparison of VOT or closure duration of stops or affricates in different positions.

Long IVCs in Carrier

- Data from 1 speaker. Note (p. 77):
  - IVC mean duration 334 ms.
  - mean duration of following open syllable vowel: 450 ms.
- Was this speaker talking unusually slowly when the word list was recorded?

Different inherent C durations

- (e.g.) Umeda 1977 (American English): vls fricatives > other Cs
- In Bird's study of Carrier, unequal numbers of different types of consonants used in each position (see Appendix B).
  - "…z-scores were used to normalize for inherent consonant duration when comparing the duration of consonants across positions. This was necessary because not all consonants occurred in all positions with equal frequency.." (p. 75).
  - However, in a simulation I created using hypothetical durations and the different numbers of Cs in different positions as reported by Bird in App. B, I obtained "significant" effect of position.

Confounding factors

- Lack of control for morphological structure, stress
  - “A preliminary study on IVC duration as a function of stress showed that IVCs did not differ significantly in duration in words with first vs. second syllable stress (Bird 2002).” (p. 76)
  - But Tuttle 2005 (presented at 2000 ALC, Moricetown, B.C.) found that in San Carlos (Western Apache dialect), stem-initial stops were longer than prefix-initial or stem-final stops, and stem-initial nasals longer than prefix-initial nasals; noted length could be due to stress or stem.

Measurement

- Word-initial closure duration of stops was measured (see Appendix B, p. 89), but how?

IVC duration in Tsek'ene: an experiment

- Bird's research questions
  - "to verify the claim made by previous authors that intervocalic consonants are unusually long in Athabaskan languages" (p. 69)
  - "to explore IVC duration (a) as a function of linear positioning and (b) as a function of their positioning with respect to morphological boundaries in nouns and verbs" (p. 72).
- If methodological problems with Bird's study can be overcome
  - Can long IVC durations be replicated in another Athabaskan language? (Fort Ware Tsek'ene)

Questions

- Does position and/or stress affect the duration of consonants with internal cues to duration?
  - Hypothesis: stress will affect consonant duration to a greater extent than position
- Does this depend on whether a word is uttered in isolation or whether it is part of a sentence?
  - Hypothesis: no

Experimental design

- Word list design
  - Fricatives ([s z ʃ ɬ]) and consonantal approximants ([n l]) in word-initial, IVC positions
  - Word-initial = stem-initial; IVC = word- or stem-medial
  - Nouns, adverbs
  - Equal numbers of consonants in each position
  - Before stressed, unstressed vowels (Hargus 2005a, b)

Sample words

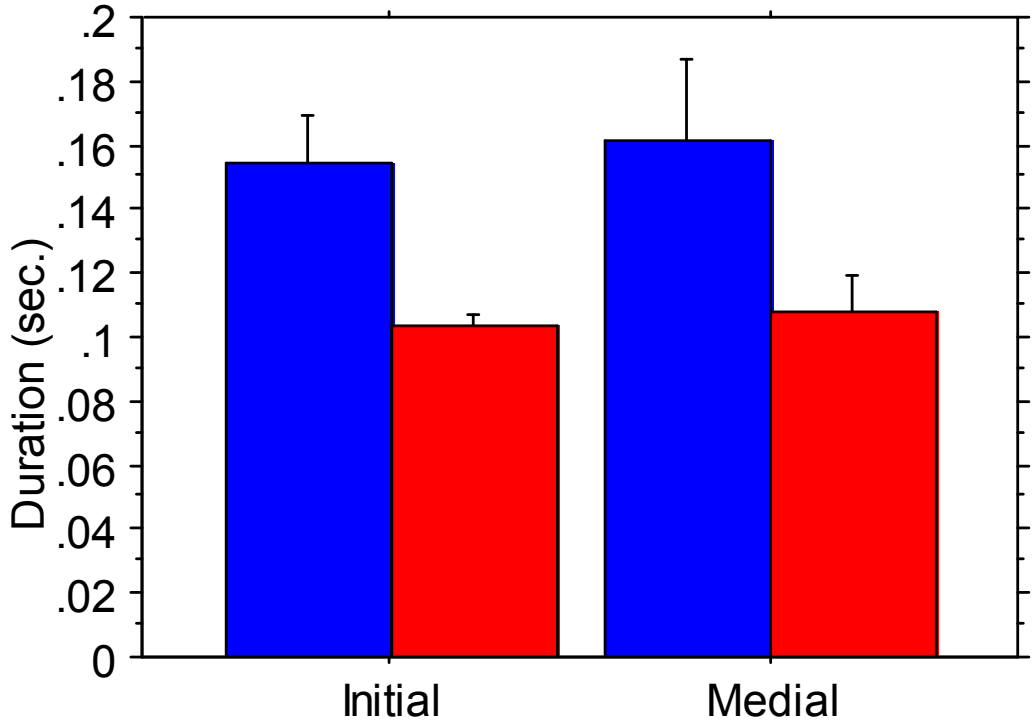
	initial	IVC
before stressed (1 [z] , 4 [s], 1 [ʃ], 1 [l] , 1 [ɬ], 4 [n])	n (pairs) = 10-12/speaker ˡsa dè˧ 'sunlight‘	n (pairs) = 10-12/speaker bùˡsa 'cat'
before unstressed (2 [s], 1 [l], 6 [n])	n (pairs) = 9-7/speaker sùˡne ‘slowly’	n (pairs) = 9-7/speaker ˡusà˧ ‘pot, bucket’

Experimental design, cont.

- Four native speakers (1 male, 3 female)
- 2 repetitions requested
- 1 measured (loudest)
- Words recorded in isolation and in S. MA:
  - l̲abàt ‘mittens’
  - L̲abàt ʔəndɪndìh. Wì̀sdli. ‘Put on your mittens. It’s cold.’
  - Tsek’en̲e ‘Sekani’
  - Tsek’en̲e ɣilę. ‘They’re Sekani.’
- (Position of word within S not controlled for)

Results: IVC duration

- Words in isolation (group)
  - Repeated measures, 2-factor ANOVA (each speaker's mean duration = dependent variable)
  - Effect of Stress: F[1,3] = 73.134, p = .0034

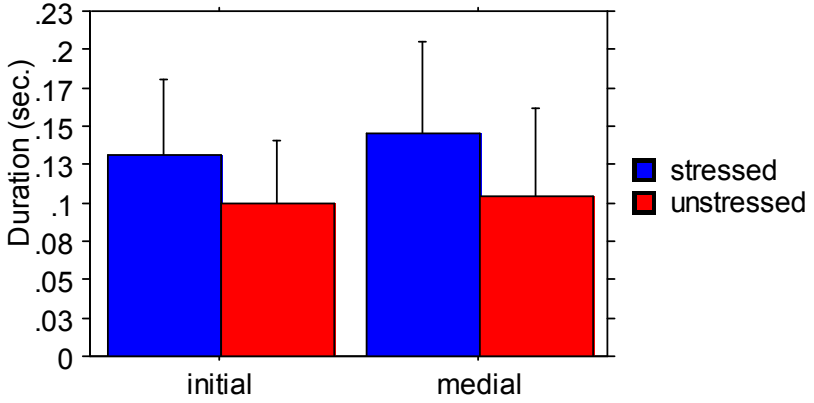


.154 (.0154)	.109 (.0031)	.162 (.0252)	.108 (.0115)

mean (standard deviation)

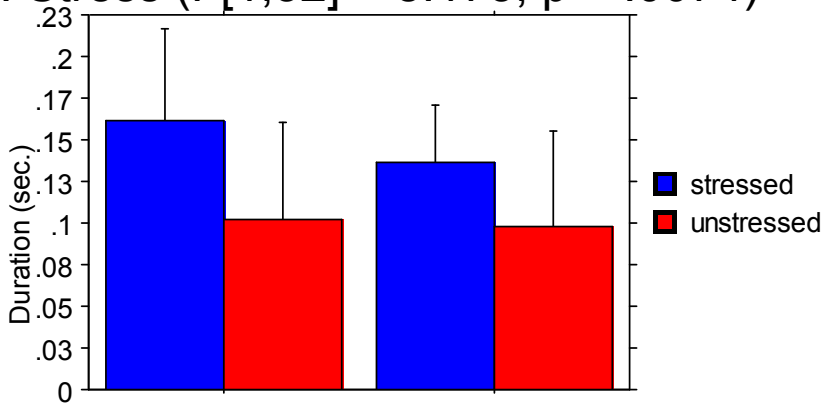
- Words in isolation (individuals)
  - Factorial, 2-factor ANOVA

MA: Stress (F[1,38] = 4.800, p = .0347)



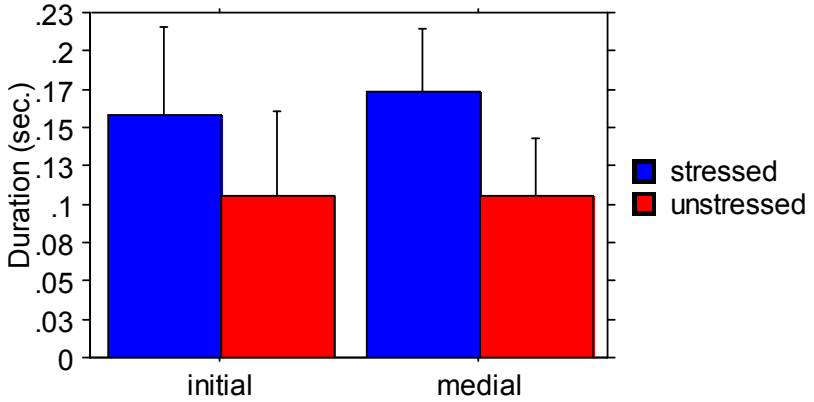
.131 (.0488)	.100 (.0400)	.145 (.0597)	.105 (.0571)

EM: Stress (F[1,32] = 8.173, p = .0074)



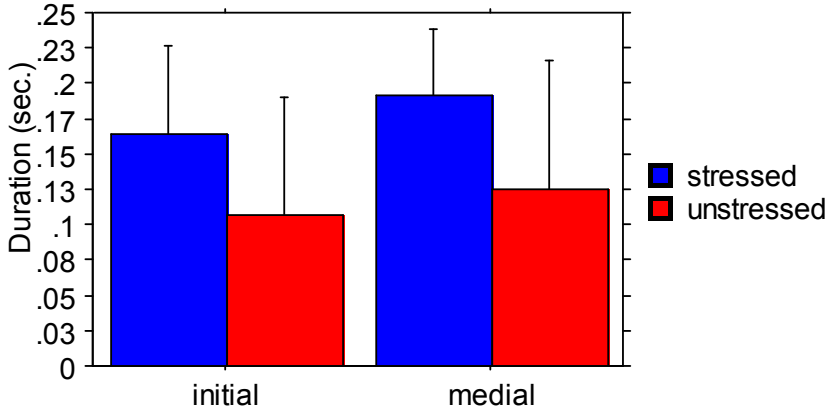
.165 (.0614)	.107 (.0837)	.191 (.0470)	.125 (.0915)

ELM: Stress (F[1,34] = 13.829, p = .0007)



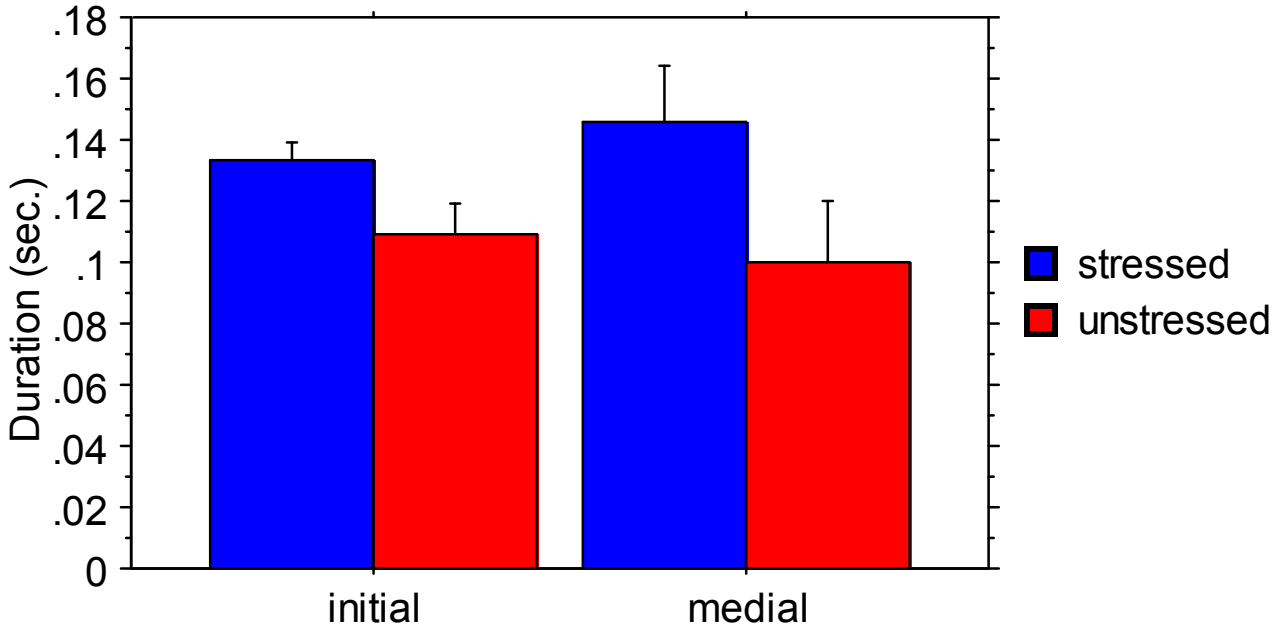
.165 (.0614)	.107 (.0837)	.191 (.0470)	.125 (.0915)

MC: Stress (F[1,34] = 7.055, p = .0119)



.165 (.0614)	.107 (.0837)	.191 (.0470)	.125 (.0915)

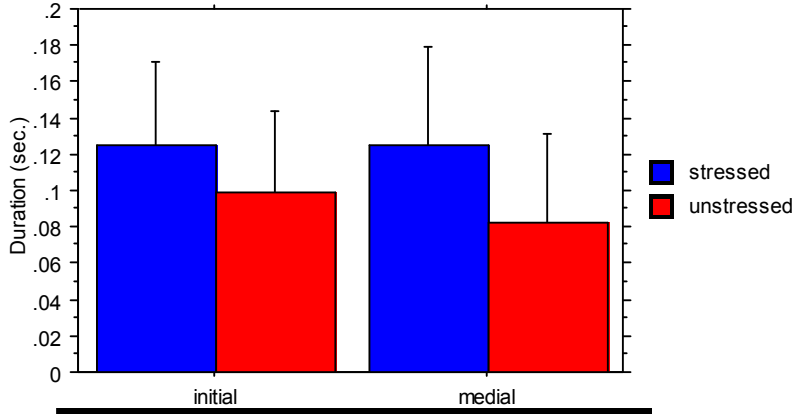
- Words in sentence (group)
  - Repeated measures ANOVA (each speaker's mean duration = dependent variable), 2 factors
  - Effect of Stress: F[1,3] = 394.990, p = .0003
  - Position, Stress interaction effect: F[1,3] = 36.712, p = .0090



.133 (.0064)	.110 (.0094)	.145 (.0188)	.100 (.0196)

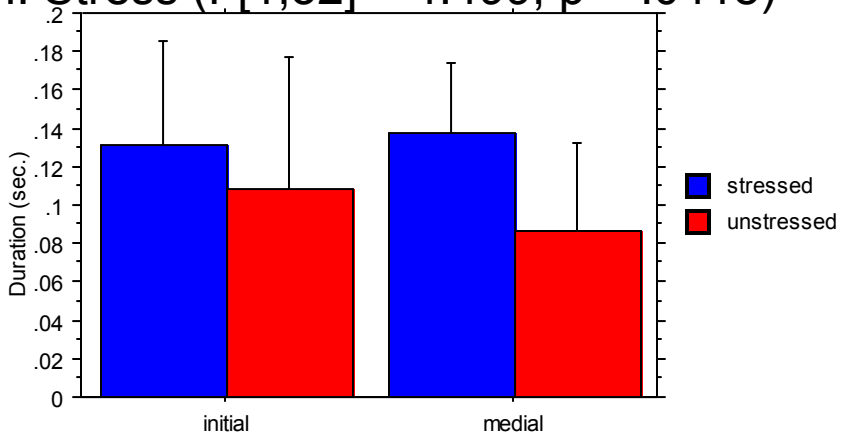
- Words in sentence (individuals)
  - Factorial ANOVA (2 factors)

MA: Stress (F[1,38] = 5.034, p = .0308)



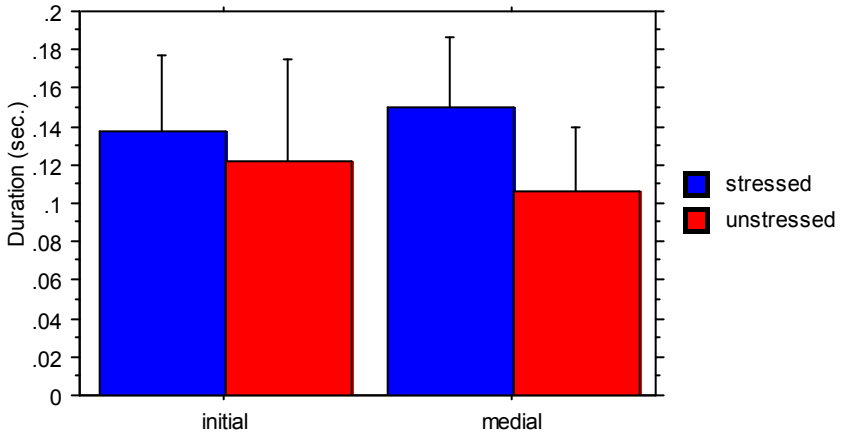
.125 (.0463)	.099 (.0453)	.125 (.0540)	.082 (.0489)

EM: Stress (F[1,32] = 4.499, p = .0418)



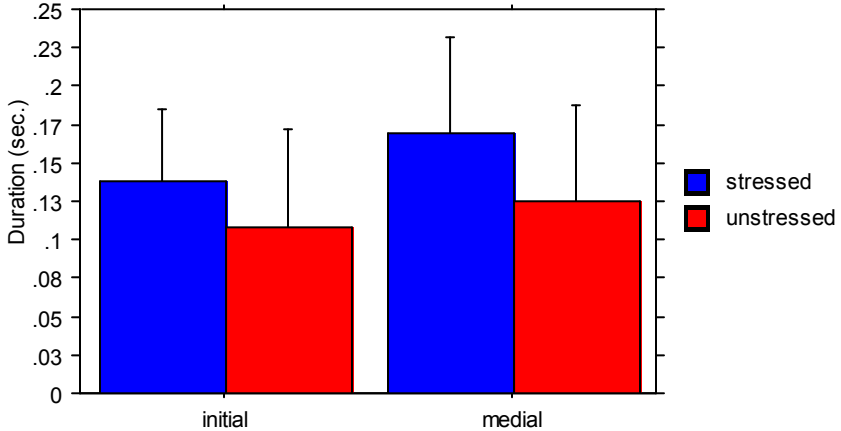
.131 (.0544)	.109 (.0680)	.138 (.0358)	.087 (.0453)

ELM: Stress (F[1,34] = 4.880, p = .0340)



.138 (.0392)	.122 (.0535)	.150 (.0371)	.106 (.0328)

MC: no significant factors



.138 (.0470)	.109 (.0637)	.169 (.0627)	.125 (.0625)

Summary of IVC experiment results

- IVCs in Fort Ware Tsek'ene are not significantly longer than word-initial Cs
- Cs are longer before stressed vowels than before unstressed vowels
- These results generally hold of words in sentences as well as isolation

Domain-initial strengthening

- A force opposing IVC lengthening. Evidence in Athabaskan languages:
  - Apachean (Tuttle 2005)
  - Deg Xinag prefixal [tɬ’] (< [tɬ]) in word-initial position (Hargus 2008)
  - Beaver plosives have significantly longer VOT in IP-initial position than in word-initial position (Müller 2009)
- Lack of initial strengthening in FWS: mostly affects stops and affricates?

IVC length contrast in Tsek'ene: an experiment

- Bird's research question again
  - "to explore IVC duration (a) as a function of linear positioning and (b) as a function of their positioning with respect to morphological boundaries in nouns and verbs" (p. 72).
- This is a relatively uninteresting research question for an Athabaskan language, with no obvious consequences for other areas of grammar.

A possibly more interesting question

- Can geminate Cs arise from morphological concatenation or are such putative sequences not distinguishable from singletons?
- In Tsek'ene, most stem-initial *n > d
  - Exceptions include some forms of 'say'. An imperfective paradigm: 'haven't told 3sg'

1s ʔədu ʔì dɪ (s)sį	1p ʔədu ʔì ts'ɪ di
2s ʔədu ʔì dɪ (n)ni	2p ʔədu ʔì dahni
3s ʔədu yèhni	3p ʔədu ʔì ɣɪ di

Hypotheses

- In 2sg form of ‘say’, [n] is not a geminate, does not contrast in duration with [n] in 3sg
- In 1sg form of ‘say’, [s] is not a geminate, contrasting in duration with [sz] (1sg *s-* + verb stem initial [z] (no voicing assimilation in FWS))

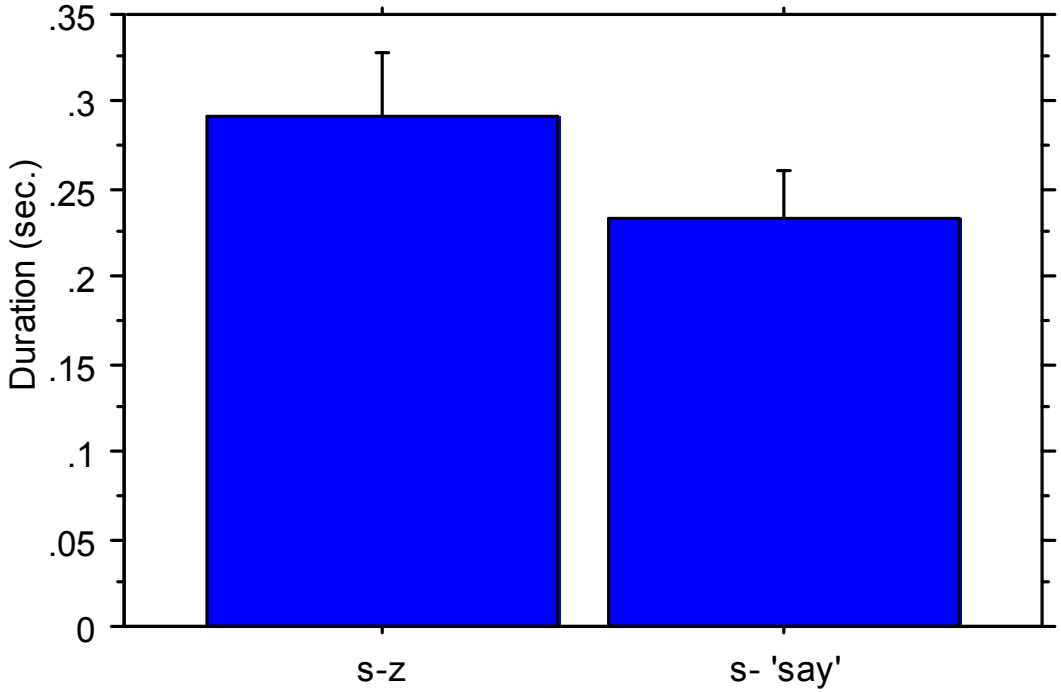
Methodology

- Words recorded in a short sentence
- Position within word controlled for (all IVC)
- 8 pairs (2sg ‘say’ vs. 3sg ‘say’)
  - xǫhdì mədàdi(n)nìʔ 'you already told her'
  - xǫhdì yədàdinìʔ 'she already told her’
- 8 pairs (1sg ‘say’ vs. [sz])
  - ʔədu dèda dɪ(s)sį ‘I'm not saying anything’
  - ʔədu màdèszit‘I'm not bothering him’
- Recorded in 4 blocks: 2sg forms, 1sg forms, 3sg forms, then verbs containing [sz]

Results: IVC length contrast

1sg vs. [sz], across speakers

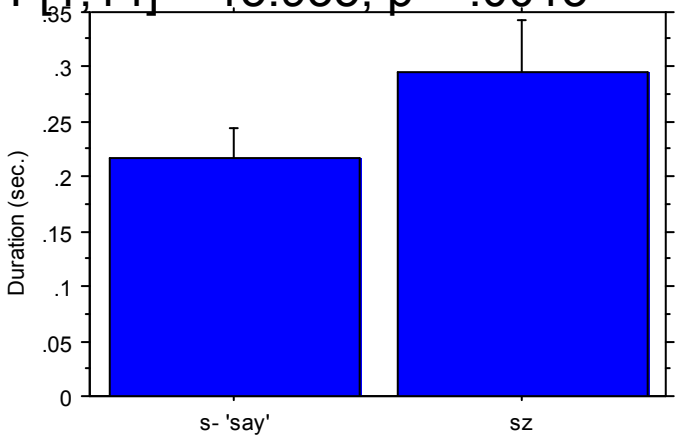
- Repeated measures ANOVA (F[1,3] = 34.504, p = .0098)



.292 (.0362)	.234 (.0273)

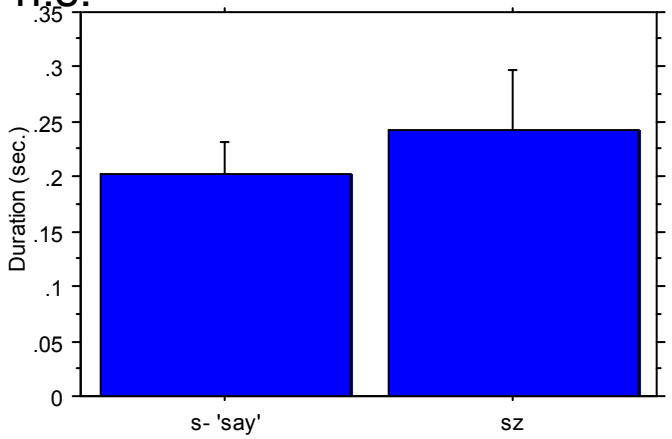
- 1sg vs. [sz] (individuals)
  - Factorial ANOVA

MA: F[1,14] = 15.935, p = .0013



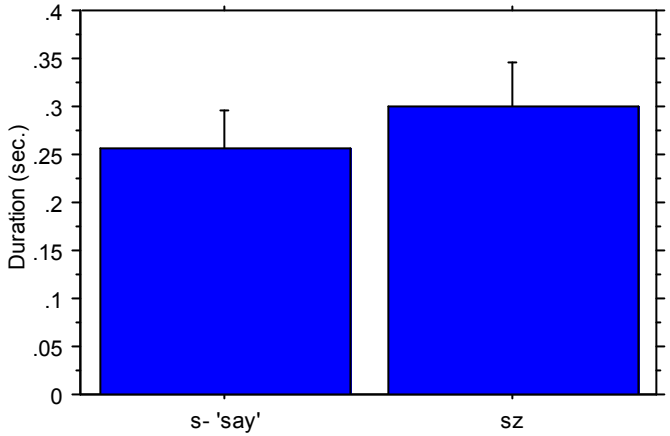
.218 (.0258)	.295 (.0480)

EM: n.s.



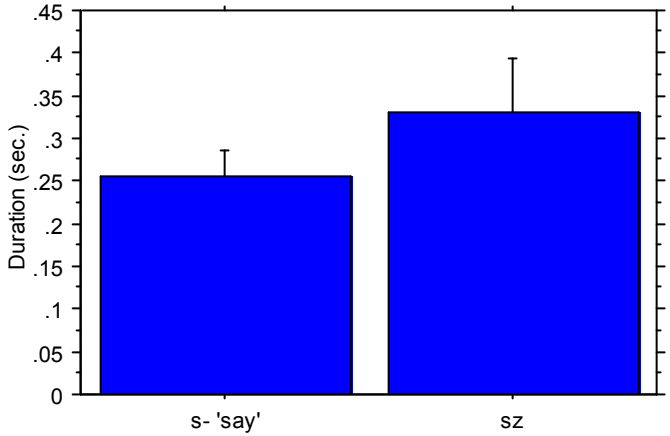
.203 (.0282)	.243 (.0544)

ELM: n.s.



.257 (.0388)	.299 (.0476)

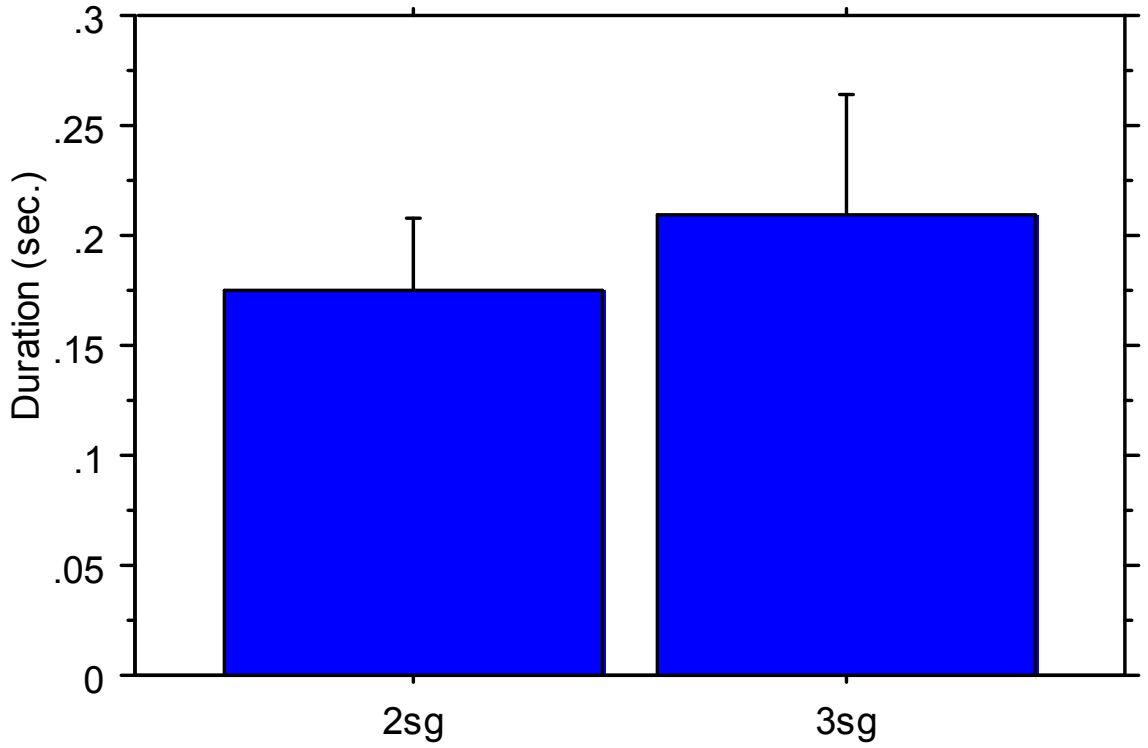
MC: F[1,14] = 8.925, p = .0098



.257 (.0299)	.331 (.0635)

2sg [n] vs. 3sg [n], across speakers

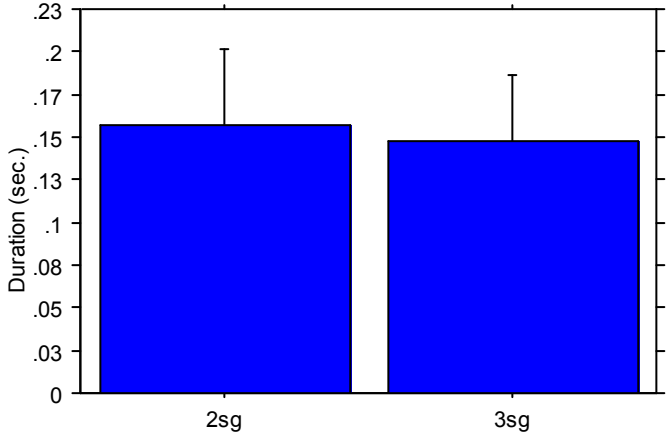
- Repeated measures ANOVA: no significant difference



.176 (.0324)	.209 (.0557)

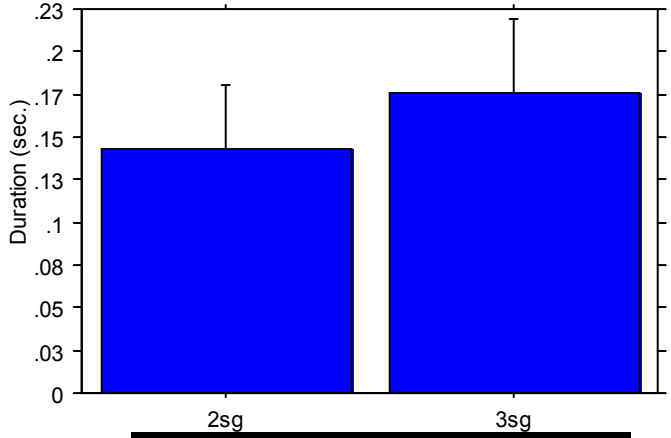
- 2sg vs. 3sg [n] (individuals)
  - Factorial ANOVA

MA: n.s.



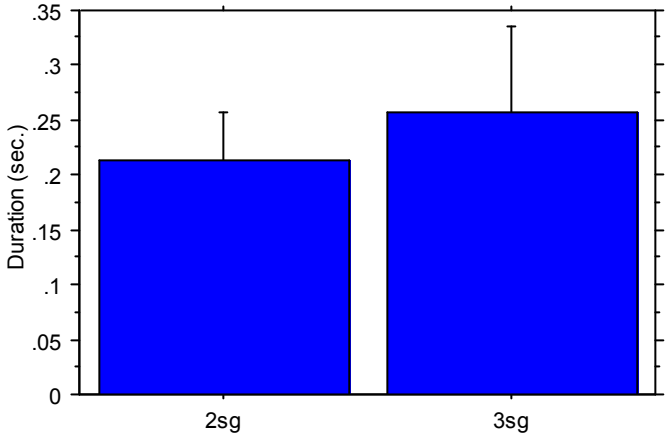
2sg	3sg
.157 (.0452)	.148 (.0381)

EM: n.s.



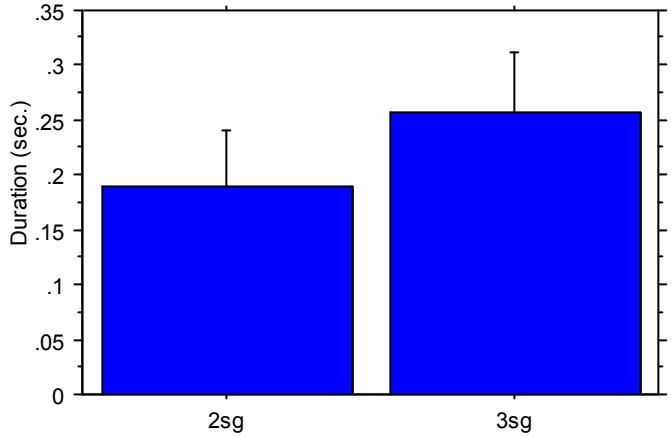
2sg	3sg
.143 (.0378)	.175 (.0435)

ELM: n.s.



2sg	3sg
.214 (.0427)	.256 (.0797)

MC: F[1,14] = 6.295, p = .0250



2sg	3sg
.189 (.0516)	.256 (.0550)

Summary of results

- In the irregular verb ‘say’
  - *s- 1sg + [n] (say) > [s], significantly shorter in duration than *s*- 1sg + stem-initial [z] (across speakers, all 4 individuals)
    - If there were lengthening of IVCs, neutralization of length distinction would be predicted to occur
  - *ŋ- 2sg + [n] (say) > [n], not significantly different in duration than stem-initial [n] in 3sg forms (across speakers, 3 of 4 individuals)
    - What about MC? In general, in FWS *ŋ- perfective > 0, but MC sometimes preserves (MC *wìnle* ‘there is’ vs. MA *wìlę*). For MC, maybe 3sg is /n-n/. Again, no IVC lengthening; length contrast preserved.

Conclusions

- Findings of long IVC durations not replicated in FWS
  - Not pan-Athabaskan
- Stress a more important factor than position
- FWS contrasts long and short consonants in some morphological contexts

Methodology

- In Bird 2004, high standard deviations (but no numbers provided) blamed on field data from ‘one elderly speaker’ (p. 79); ‘it is not possible to control the environment in which speech is elicited in the same way as it is possible in a laboratory setting’.
- To paraphrase Bird, it is possible to collect fieldwork data in much the same way as in a laboratory setting.
- Experimental data collection in field situations involving endangered languages should be held to the same standards as non-endangered languages.

- Musii cho!