Syncope in East Cree: phonological or phonetic?
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Introduction*

Syncope (vowel deletion) in East Cree can be analysed as a phonological or a phonetic process.

Determining the status of syncope has implications for (the learnability of) syllable and foot structure, and for the phonemic basis of the East Cree orthography.

Outline

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1. Background

1.1 Situating East Cree

Figure 1 - Cree-Montagnais-Naskapi dialect continuum (Junker 2004)

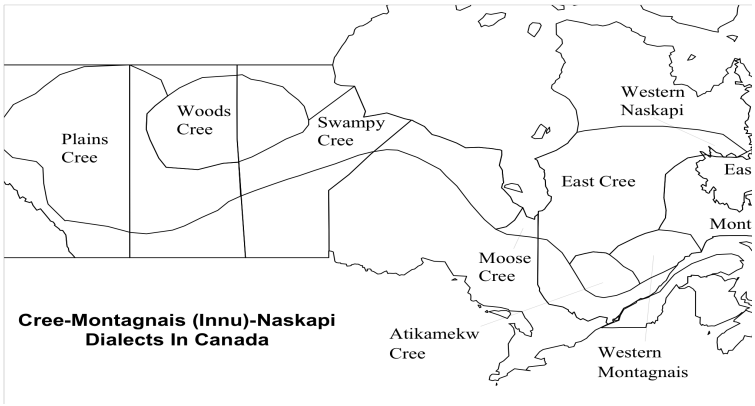
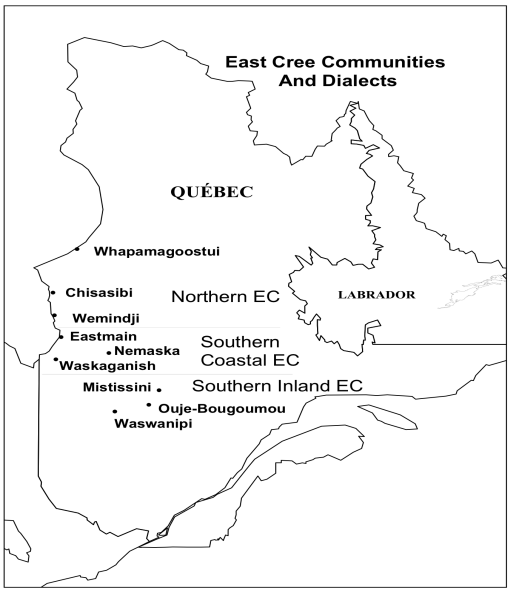


Figure 2 - Dialects of East Cree (Junker 2004)



1.2 East Cree phonemes, syllable structure

- Similar in other Cree-Montagnais-Naskapi dialects; for Plains Cree, see Wolfart (1996).

1. Consonants[1]

p t	ch [tʃ]	k, k^{w}
s	sh [ʃ]	h
m	n	
w	y	

2. Vowels

Heavy	*Light*
î [i(:)] û [u(:)]	i [ɪ, ɨ, ə] u [ʊ]
â [æ(:), ɛ(:)]	a [ɪ, ɛ, ɨ, ə, ʌ]

[1] [w] and [y] are allophones of /u/ and /i/.

3. Syllable structure (words without syncope); e.g. a.mis.k^{w} ‘beaver’

Onsets				Nuclei		Codas	Word-final appendix				
p	t	tʃ	k,k^{w}	î, i	û, u	s ʃ h	p	t	tʃ	k, k^{w}	
	s	ʃ	h					s	ʃ		h
m	n			â, a			m	n			
w	y						w	y			

1.3 Phonology vs. phonetics

Grammatical level	Diagnostics	Examples
PHONOLOGY (ABSTRACT UNITS)	• Categorical rules • Potential effects on other phonological units	• V is either present or absent • V presence/absence has consequences for syllable and foot structure • V deletion —> resyllabification, Stray Erasure of Cs, etc.
PHONETIC IMPLEMENTATION (PRONUNCIATION)	• Gradient rules • No effect on phonological units	• Continuum in pronunciation between present and absent vowel • Syllables are simply pronounced differently • Progressively shorter [ə]s become [ə̥], then [^{h}]

- Aspiration [^{h}] is in complementary distribution with schwa [ə] in a number of Salishan languages; conditioning factors include unstressed position, and location of [ə] between voiceless segments (Urbanczyk 1977:77-80).
- Schwa deletion in English is the endpoint of a phonetic reduction process, resulting from gestural overlap; conditioning factors include conditioning factors include unstressed position, and location of [ə] between voiceless segments, and speech rate (Beckman 1996; Davidson 2006).
- Voiceless vowels are aspiration with formant structure in Cayuga (Doherty 1993: 276-94), Comanche (Jakobson, Fant, and Halle 1967:52).

2. The problem: why the status of syncope matters

4. Syllable structure (words with syncope); e.g. am.sk^{w} ?

Onsets				Codas	Word-final appendix				
p	t	tʃ	k,k^{w}	s ʃ h	p	t	tʃ	k, k^{w}	
	s	ʃ	h			s	ʃ		h
m	n				m	n			
w	y				w	y			

- Cannot characterize syllable structure, appendices, if phonological vowel deletion occurs.
- Paradigmatic alternations like English [ˈfo̲ɹəgɹæf] vs. [fə̲ˈtʰɑgrəfi] rare in EC.

5. Lack of alternation in NEC paradigms

a.	nitihtutânânâtik	[n̥.tʰ.tu.taː.naː.ˈdaː.dɪkʰ]	*I do it in the distance*
b.	nitihtutânâtik	[n̥.tʰ.tu.taː.ˈnaː.dɪkʰ]	*we do it in the distance*
c.	nitihtutimwânânâtik	[ˈn.tʰ.tu.də.mwaː.naː.naː.dɪkʰ]	*we do it in the distance (relational)*
d.	nitihtutimwânâtik	[ˈn.tʰ.tu.tə.mwaː.ˈnaː.dɪkʰ]	*you do it in the distance (relational)*

3. Proposed solution

- Northern East Cree data suggest that syncope is a gradient, phonetic process.

6. NEC syncope — transcriptions suggest gradient outcomes

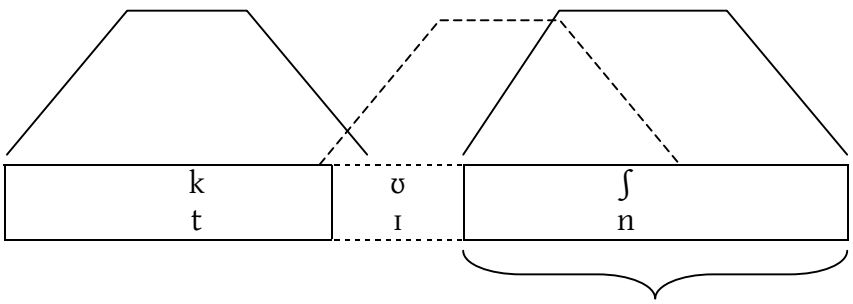
	Orthographic form	*Phonetic realizations*	*Gloss*
a.	is.pí.kun	[**s**.ˈpɪ.kʊn], [**s̬**.ˈpɪ.kʊn]	*taste*
b.	uh.pí.nim	[**x**.ˈpɪn.nəm], [**ʊh**.ˈpɪn.nəm]	*s/he lifts it*
c.	uh.tâ.wî.mâu	[**x**.tæ.ˈwi.mæw], [**ʊ̯h**.tæ.ˈwi.mæw]	*his/her father*
d.	ush.chî.shikw	[**ʰʃ**.ˈdʒiː.ʃɪkʷ̥], [**ʊʃ**.ˈdʒiː.ʃɪkʷ̥]	*his / her eye*

- Problem:
  - Reliance on impressionistic transcriptions;
  - Impressionistic transcriptions are suggestive, but provide only one type of evidence for the status of syncope.
- Solution: shed light on the status of syncope through
  - Acoustic analysis
  - Interpreted within the framework of Gestural or Articulatory Phonology (Browman & Goldstein 1990)
  - Plus, phonological units play a role. (This is a necessary departure from Articulatory Phonology, but is consistent with Cohn's Phonetic Implementation model.)

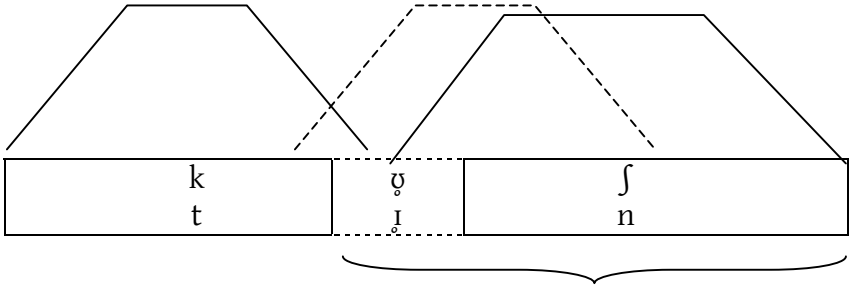
3.1 Proposal

- Syncope is phonetic; the vowel nucleus is not deleted.
- Instead, gestural overlap occurs.
- In syncope environments, consonants in the syllable margin overlap the nucleus; sometimes, they completely eclipse the vocalic nucleus. (Beckman 1996; Coleman 1992, 1994, 2001; Davidson 2006; Dirksen and Coleman 1997; Goad et al. 2003).

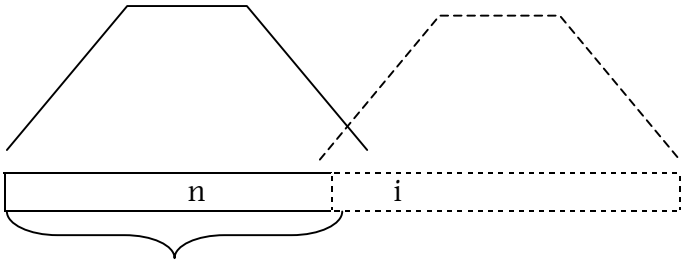
7. Syllables with [n, ʃ] in coda; no syncope [kʊʃ, kɪn]



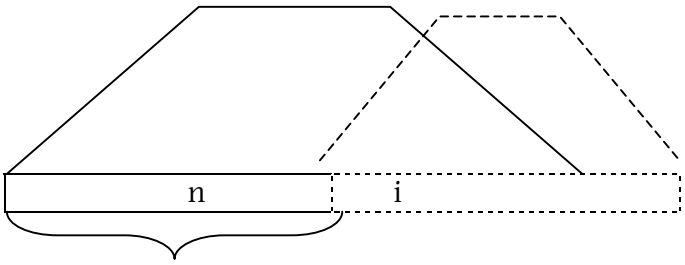
8. Syllables with [n, ʃ] in coda; gestural overlap (syncope) [kʃʃ, kn̥]



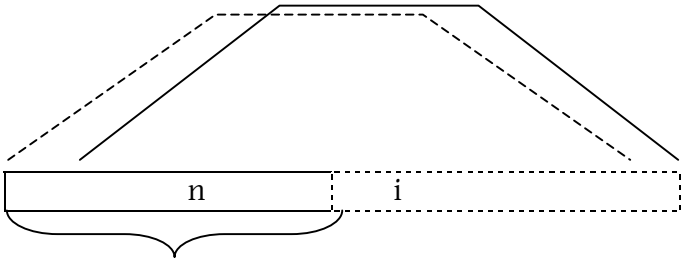
9. Syllables with [n] in onset, no syncope [nɪ]



10. Syllables with [n] in onset, syncope [n̥]



11. Syllables with [n] in onset, syncope [ˈn]



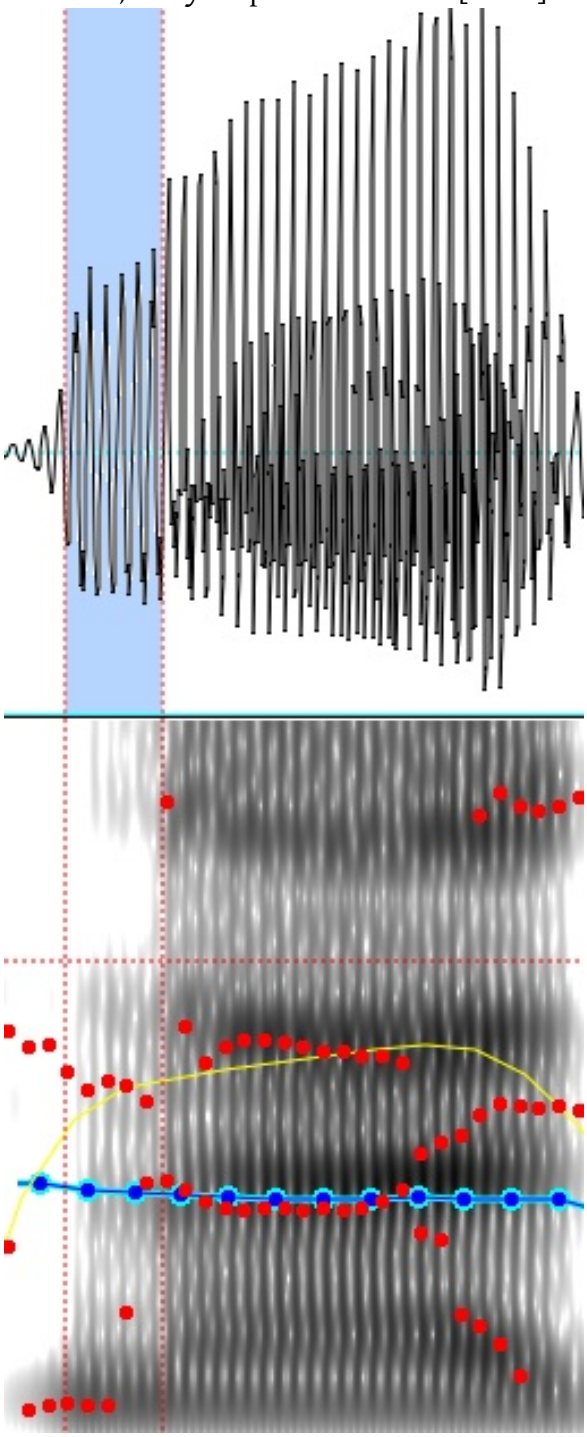
3.2 Predictions

Phonological process	Phonetic process
Syllable nucleus deleted	Syllable nucleus remains
V properties such as DURATION erased	V properties such as DURATION unaffected, but V quality is eclipsed by surrounding C gestures
C properties such as DURATION unaffected	Cs can lengthen
Typically, stray Cs deleted	Alternatively, C duration unaffected, but timing of C onset and offset is affected

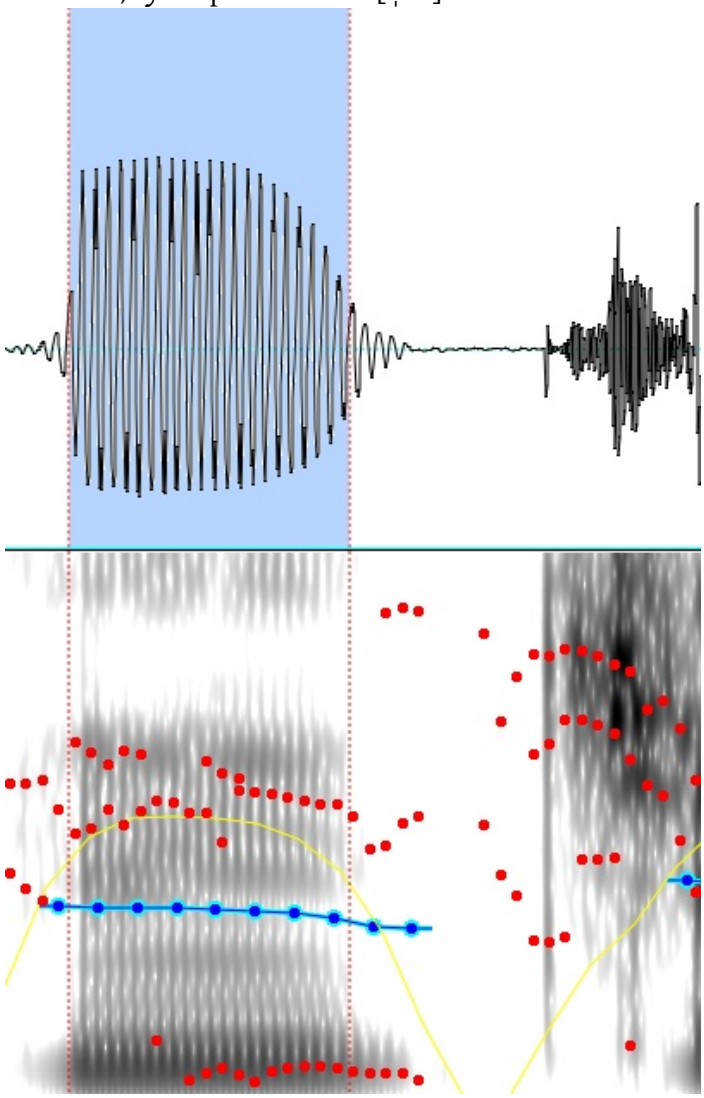
4. Methodology

- Word-list from one Southern East Cree speaker, collected for the http://www.east.cree.org website; the sound files can be heard at http://www.ucs.mun.ca/~cdyck/eastcree.htm/SEC_sound_files_1.htm
- One speech rate: not fast.
- Measured length of
  - unelided CV syllables
  - elided CV and CVh syllables
- Measured length of non-word-final /n, m, s, ʃ/ in onset and coda position (positions conflated for t-tests).
- Measured length of release for plosives /p, t, k/ in onset position.
- Segment selection identified in Praat (Boersma and Weenink 2009) by ear, waveform, spectrogram. Examples are provided below.

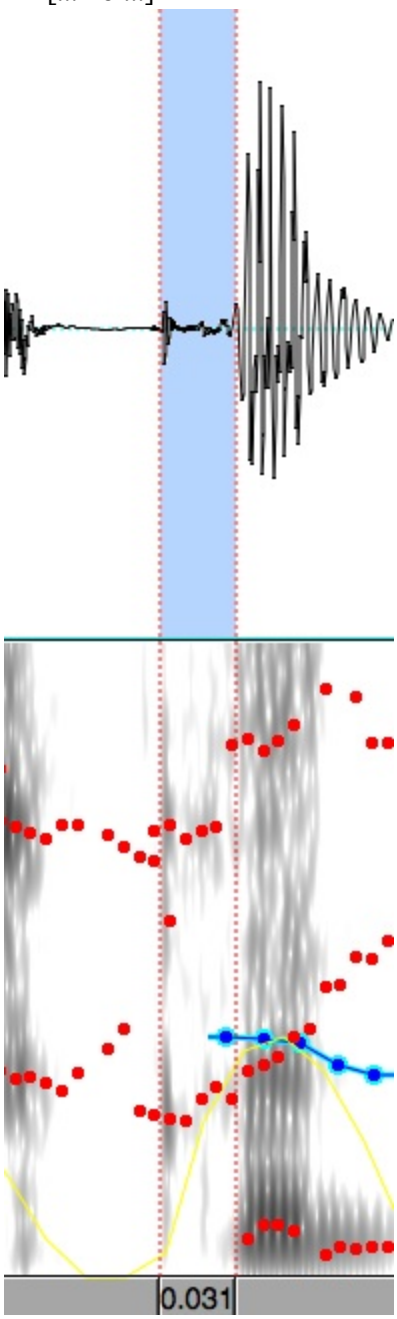
12. Nasal, no syncope *NÂchîushtam* [naː ...]



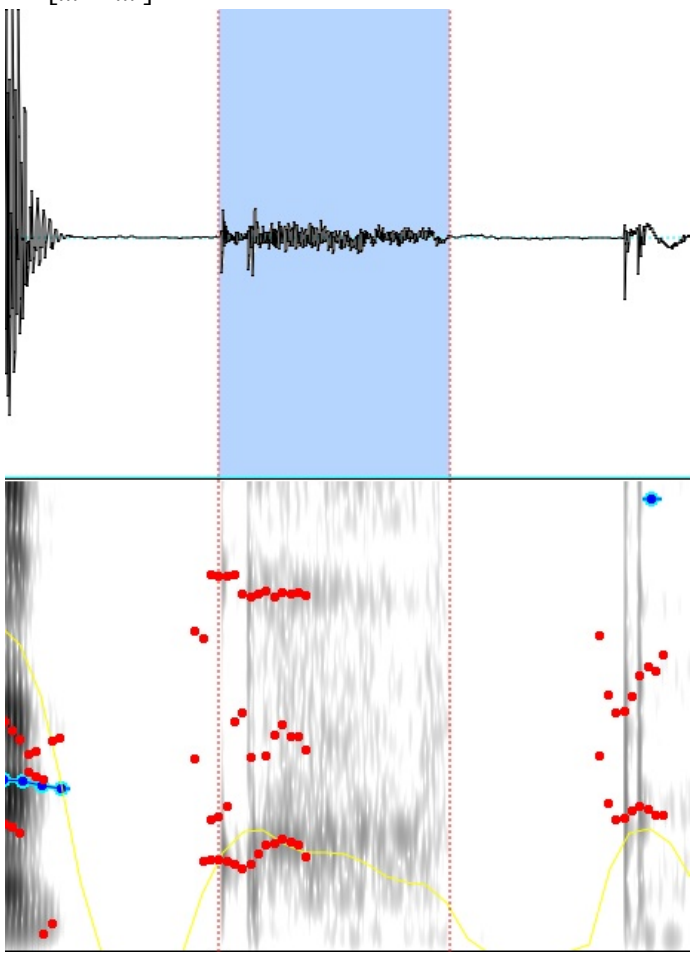
13. Nasal, syncope *NIchikush* [n̩ ...]



14. Plosive aspiration, no syncope *ânisKUtâpân*
    [... kʊ ...]



15. Plosive aspiration, syncope *aKUHp* ‘coat’
    [... kʰ...]



5. Findings

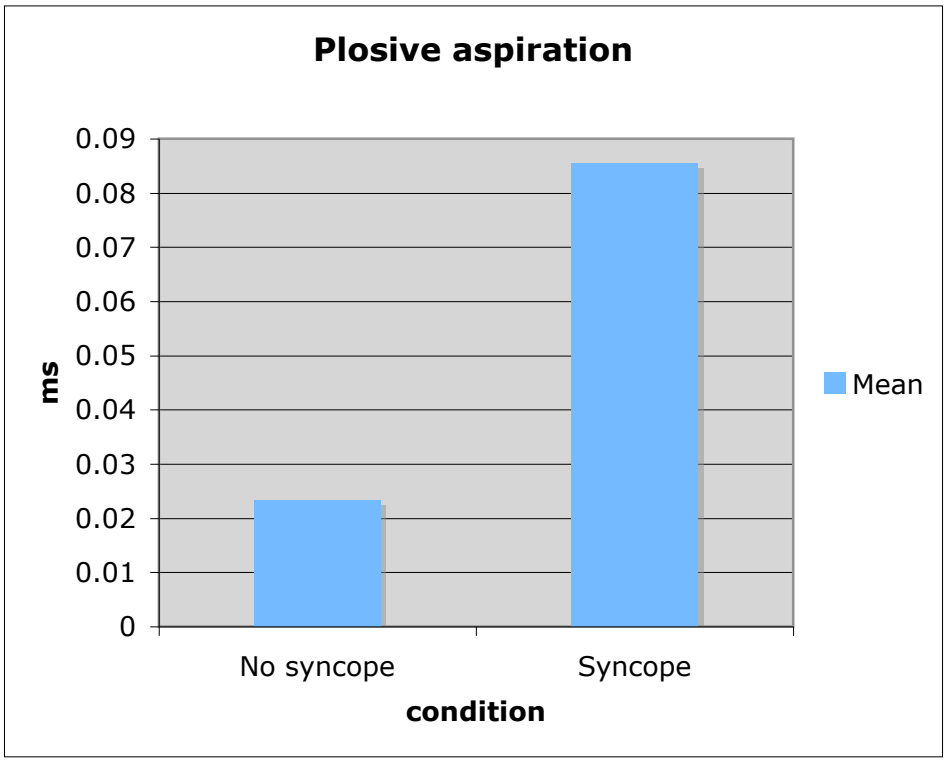
5.1 Syllable length

- No significant difference in length for non-elided CV syllables (M=0.14262, SD= 0.00132) and elided CV(h) syllables (M= 0.13659; SD= 0.00079); ($p > 0.05$)
- (Logan 2010): no significant difference in length between pitch-accented vowels in CV syllables (M= 0.0716, SD= 0.0032) and non-pitch-accented vowels in unelided CV syllables (M= 0.0647, SD= 0.0018); ($p > 0.05$).
- Syllables are the same length, regardless of whether they are pitch-accented, non-pitch-accented, or elided.

5.2 Consonant length

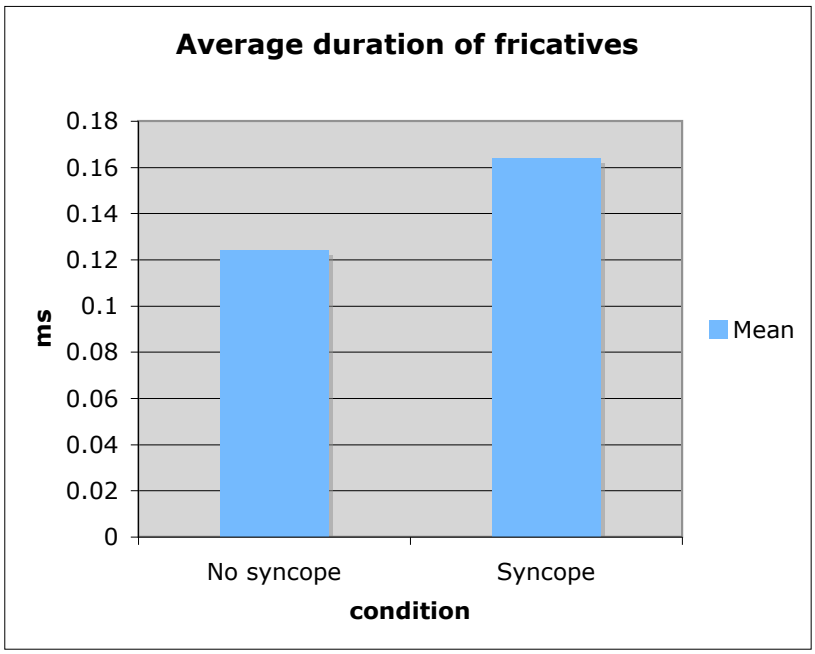
- Cs are significantly shorter in syllables with full vowels, and significantly longer in syllables with apparently elided vowels.

16. Length of release for non-word-final plosives



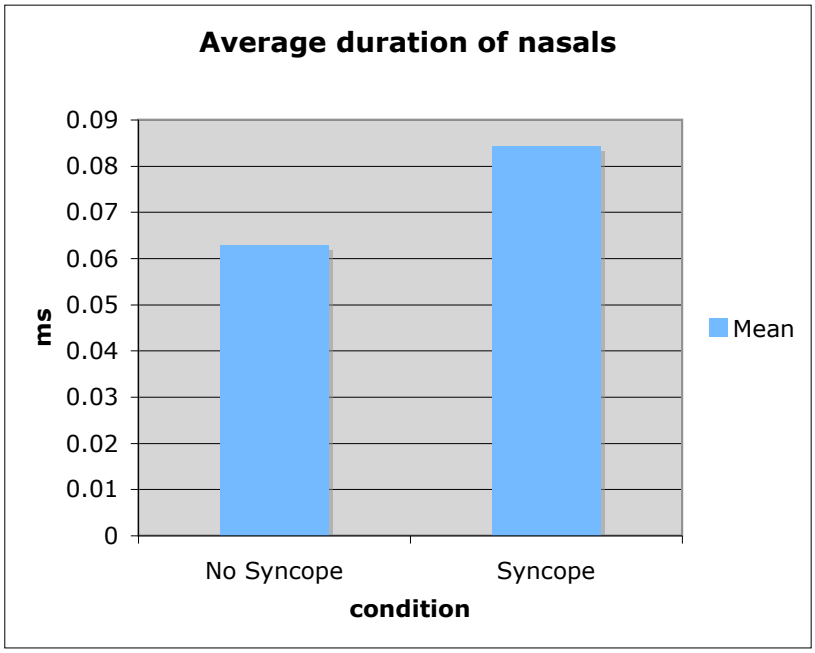
- The plosives /p,t,k/ in SEC have little aspiration when followed by a full vowel (M=0.0234, SD=0.0000), but are heavily aspirated in syllables that have undergone syncope (M=0.0855, SD=0.0013); ($t(52)= 11.6619$, $p<0.01$).

17. Duration of non-word-final fricatives



- The fricatives /s, ʃ/ in SEC are shorter when followed by a full vowel (M= 0.1241, SD= 0.0007), than when followed by a deleted vowel (M= 0.1639, SD= 0.0016); ($t(88)= 6.1061$, $p<0.01$).
- Similarly, in English words like s'pose/suppose, "...the duration of /s/ is significantly longer in tokens with elision than in tokens which exhibit the vowel..." (Davidson 2006:91).

18. Duration of non-word-final nasals



- The nasals /m, n/ in SEC are shorter when followed by a full vowel (M=0.0234, SD=0.0000), than when followed by a deleted vowel (M= 0.0628, SD= 0.0005); ($t(103)= 4.1578$, $p<0.01$).

6. Conclusions

19. Consonant length is in complementary distribution with full vowels (as in Salish; Urbanczyk 1997)

Syncope environment	Elsewhere
C:	CV or VC

- Against Compensatory Lengthening (CL; a phonological account)
  - CL: V shortens, coda C lengthens; CL never affects onsets
  - In EC, [m,n] never in codas in words without syncope
  - Yet [m,n] lengthen, eclipsing the following nucleus:
  - kânichî [ˈkaːn̥tʃiː] ‘sweater’
  - nishikî [n̥ˈʃikiː] ‘my skin’

- EC syncope is phonetic process: increased gestural overlap in syncope environment, with no effect on syllable structure
- Syllable structure is unaffected; evidence: syllable duration is the same, regardless of environment.

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