SYLLABIFICATION AND BLACKFOOT “s”
By: Donald Derrick

MAIN CLAIM
- Blackfoot has a syllabic ‘s’:
  (i.e., ‘s’ sometimes acts like a vowel)

EVIDENCE FOR THIS CLAIM:
- If ‘s’ is syllabic, then the syllabification system of Blackfoot is maximally simple:

  EXAMPLE 1: WITH SYLLABIC /s/

  nitssksskópa'ko
  [nit'skskskópa'ko]
  nit-i-tssksskópa'-ok-a
  1PS-VERB-watch-INV-3PS
  “she left me to watch”
  (F&R 1995:226)
  (BB 06/03/16)

  CV     CS:
  CS: CV CVC CV

- If ‘s’ were not syllabic, then the syllabification system of Blackfoot is very complicated:

  EXAMPLE 2: WITHOUT SYLLABIC /s/

  nitssksskópa'ko
  [nit'skskskópa'ko]
  nit-i-tssksskópa'-ok-a
  1PS-VERB-watch-INV-3PS
  “she left me to watch”
  (F&R 1995:226)
  (BB 06/03/16)

  CVCC: CC:V CVC CV

1 OUTLINE
- § 2 Background on Blackfoot
- § 3 Phonemic Inventory
- § 4 Syllabification without s
- § 5 Syllabification With /s/
- § 6 Syllabification System I: Syllables with syllabic /s/
- § 7 Syllabification System II: Syllables Without Syllabic /s/
- § 8 Discussion
- § 9 Summary and Conclusion
2 BACKGROUND ON BLACKFOOT
• Blackfoot: Algonquian language with 8000 speakers.
• Four Dialects in southern Alberta and northern Montana (NLA, 2006, Frantz, 2006).
• This analysis is based on the Blood dialect.

3 PHONEMIC INVENTORY

3.1 VOWEL INVENTORY
• Three underlying vowels, i,a,o (And possibly u [Taylor, 1969]) contrast short and long.

3.2 CONSONANT INVENTORY
• My transcriptions use the vowel devoicing marker [ˌ] to indicate the back fricative (Frantz, 1991) or pre-aspiration (Reis-Silva, 2006).

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td>p p:</td>
<td>t t:</td>
<td></td>
<td>k k:</td>
<td>?</td>
</tr>
<tr>
<td>Fricatives</td>
<td>s s:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricates</td>
<td>t' tː</td>
<td>k' kː</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasals</td>
<td>m mː</td>
<td>n nː</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glides</td>
<td>w</td>
<td>j</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Elfner, 2005)

4 SYLLABIFICATION WITHOUT S

4.1 WORD EDGE PHONOTACTICS

4.1.1 WORD ONSET
• Blackfoot words begin with one and only one short consonant {p,t,k,m,n}.

4.1.2 WORD CODAS
• Typically, Blackfoot words end in vowels or geminates.
• The possible singleton consonant word codas include {p,t,k,m,n,?}.
• Words may end with nasal geminates.

4.1.3 NUCLEUS
• Blackfoot allows short, long, and long diphthong vowels as a syllable nucleus:
**4.2 INTERVOCALIC PHONOTACTICS**

- Intervocalic phonotactics are slightly more restrictive.

**4.2.1 VENNEMANN’S LAWS** (Vennemann 1988, Elfner 2004)

**4.2.1.1 VENNEMANN’S HEAD LAW**

- The ‘best’ syllables have simple onsets

---

1 The onset is one of \{p,t,k,m,n,\} and he coda is one of \{p,t,k,m,n,?C\}.

2 The coda is one of \{m,n\} word finally and \{m,n,p,t,k\} word interally.
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**FIGURE 4: HEAD LAW**

![Diagram](image)

4.2.1.2 **VENNEMANN'S CODA LAW**
- The ‘best’ syllables have no coda, next best have simple codas.

**FIGURE 5: CODA LAW**

![Diagram](image)

4.2.1.3 **VENNEMANN'S CONTACT LAW**
- Where VC.CV, C1 > sonorous than C2
- i.e. “cluster” where the “s” is more sonorous than the “t”

**FIGURE 6: CONTACT LAW**

![Diagram](image)

4.2.2 **RESULT: ONLY TWO WITHIN WORD SYLLABLE CODAS**
- There are no stops clusters in Blackfoot (F&R 1995)
- glides only separate two vowels (Elfner, 2004)
- No nasal + stop or stop + nasal sequences (F&R 1995).
- Therefore only two intervocalic codas in Blackfoot
4.2.2.1 GLOTTAL STOP CODAS

**Figure 7: ? Codas**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>imitáó'komi</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
<tr>
<td>[ʔimitáóʔkomi]</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>imitá-o'komi</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
</tr>
<tr>
<td>doghave lice</td>
<td>“flea”</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
<tr>
<td>(F&amp;R 1995:56)</td>
<td>(BB 05/10/12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2.2.2 NASAL CODAS

- Nasal + voiceless vowels are separated by an epenthetic ?, creating nasal codas

**Figure 8: Nasal Codas**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>iitainnihtao'p</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
<tr>
<td>[ʔiiténʔitaoʔp]</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>iit-a-innihta( ki)-o'p</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
<td>μ</td>
</tr>
<tr>
<td>where-DUR-boil-place-IOBJ</td>
<td>“cooking pot”</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
<tr>
<td>(F&amp;R 1995:29)</td>
<td>(BB 05/10/18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2.3 MAX 2 MORAS PER SYLLABLE

- Long vowels and diphthongs shorten and short vowels become lax when followed by geminates (see figure 8 syllable 2 above)

**Figure 9: Geminates Shorten Long Vowels**

- The features of the delinked V delete or merge with the preceding V (Elfner, 2005).
4.2.4 **ONSETLESS SYLLABLES**

- Long sequences of vowels lead to onsetless syllables

**FIGURE 10: ONSETLESS SYLLABLES**

![Diagram](image)

5 **SYLLABIFICATION WITH /s/**

- There are 5 kinds of /s/ sounds in Blackfoot: 1) assibilants, 2) affricates, 3) singleton /s/, 4) geminate /s/, and 5) syllabic /s/.

5.1 **ASSIBILANTS**

- In Blackfoot, /t/ becomes /ts/ before all /i/s, and /k/ becomes /ks/ before most /i/s heteromorphologically (Armoskaite & Chávez 2005).
- In citation speech, they are about half the duration of a singleton /s/ in onset position (Derrick, 2006b).
- Because assibilation requires the context of a high front vowel, assibilants are all onsets.

5.2 **AFFRICATES**

- Singleton Affricates occur word-initially, word-finally, and word-internally in onsets or codas.
- The most complex example is “picnic”

**FIGURE 11: GLOTTAL STOP + AFFRICATE**

![Diagram](image)
5.2.1 **WORD INTERNAL GEMINATE AFFRICATES**

**Figure 12: Geminate Affricate + Consonant**

koohpáattstaan

[kopá:t'tan]

koohpáattstaan

“yeast bread”

(F&R 1995)

(BB 05/11/29)

5.3 **SINGLETON /s/**

- Blackfoot singleton /s/ can form simple onsets.
- Blackfoot /s/ in onset position may also be part of complex /s/ + {p,t,k} onsets.

**Figure 13: Word-Initial Complex Onset**

skiim

[skiim]

skiim

“female animal”

(F&R 1995:214)

(BB 06/02/09)

5.3.1 **WORD EDGE /s/ SUPPORTS COMPLEX CODAS**

**Figure 14: Word-Final Complex Coda**

iihtaikskimopi

[ʔińteik'kimopiists]\(^3\)

iiht-a-iks-kimopi-ists

LNK-DUR-INT-place of honour-IPL

“Hunting Equipment”

(BB 05/10/18)

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\(^3\) I am not sure why this is a super-long /i/, but multiple tokens produced the same results, so I have transcribed those results and represent them in the syllabification analysis.
5.3.2 **Singleton /s/ as Onset**

**Figure 15: Word-Internal Singleton /s/ Onset**

niisippo

![niisipo]

niis-(k)iipo

four-ten

“forty”

(F&R 1995:134)

(BB 05/10/12)

5.3.3 **Singleton /s/ Word Internal Coda**

- Short affricate-like duration (Derrick, 2006b).
- But /s/ segment blocks OCP effects allowing the formation of /k=/ asibilations (Chávez-Peón, 2006).
- Does not prevent the vowel-shortening effects of a following geminate:

**Figure 16: Singleton /s/ + Geminate**

исаиство

[?isєsto:] isi-stt-too

VERB-shout-go

“announce”

(F&R 1995:198)

(BB 06/02/09)

5.3.4 **Singleton /s/ Adds Complexity**

**Figure 17: Syllables with Complex Word-Edges**

\[ \sigma \]

\[ N \]

\[ \mu \]

\[ \mu \]

\[ (\mu) \]

\[ (s+\{p,t,k\} \text{ or } C) \]

\[ \nu \]

\[ (V) \]

\[ (V) \]

\[ (C:) \text{ or } ?C \text{ or } s+\{t,t',tt,tt'\}) \]
5.4 Geminate /s/

**Figure 18: Geminate /s/ + Vowel**

nississ

[nɪsɪsɪs]

n-ississ

my-young sib of female

“younger sibling of a female”

(F&R 1995:85)

(BB 06/02/01)

5.4.1 Geminate /s/ and Complex Onsets

**Figure 19: Geminate /s/ + Consonant**

nitaissta

[nɪtəɪssta]

nit-a-i-sssta

I-DUR-VERB-sucking milk

“I am sucking milk”

(F&R 1995:228)

(BB 06/03/02)

5.5 Syllabic /s/

• Long /s/ can also occur after stop consonants, and I analyze these as syllabic /s/.

5.5.1 Comparing Geminate /s/ and Syllabic /s/

**Figure 20: Stop + Singleton /s/**

nitaaksi’kiok

[nɪtaksɪʔkiok]

nit-aak-si’ki-ok

1PS-FUT-cover/tame-INV

“he will tame me”

(BB 06/03/16)
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- The long /s/ forms its own syllable.

**Figure 21: Stop + Long /s/ = Syllabic /s/**

nitaaksskskoipsa

[nitakskskoipga]
nit-aak-sskskaa-ip-a

1PS-DUR-VERB-measure-move-3PS

“I will measure (it)”

(F&R 1995:225)

(BB 06/03/16)

5.5.2 Syllabic ‘s’ with a Geminate Onset

- Syllabic ‘s’ forms onset to otherwise onsetless syllable

**Figure 22: Geminate + Syllabic /s/**

isttssóot

[ʔistssóot]
i-sttssi-oo-t

VERB-in the forest-go-CMD

“forest”

(F&R 1995:97)

(BB 05/11/23)

- For an alternate analysis that suggests the long /s/ loses its mora and incorporates it into the onset of the following syllable, see Elfner (2005).
- This analysis may be correct with certain speakers or dialects in the case of long /s/ followed by vowels.
- The ambiguity is similar to that of the word “cuddly” in English - is it 2 or three syllables?

6 Syllables with Syllabic /s/

**Figure 23: Syllabic /s/ Syllables**
6.1 The only long consonant to follow a glottal stop is long /s/.

- However, syllabic /s/ is not a coda to a preceding vowel and so may follow a /ʔ/ as in the word *awóʔ*sstaakssin* [awóʔ?stakssin]⁴ or “cross” (F&R, 1995).

6.2 Long vowels stay long when followed by syllabic /s/

**Figure 24:** Syllabic /s/ ≠ Geminate /s/

moápsspinn [moáp:s:m]  
m-oápssinn  
body part-eye  
“eye”  
(F&R 1995:128)  
(BB 06/02/09)

6.3 Blackfoot allows strings of two syllabic /s/s in a row

**Figure 25:** With Syllabic /s/

nitssskópa'ko [nit'sskópa?ko]  
nit-i-tssskópa'-ok-a  
1PS-VERB-watch-INV-3PS  
“she left me to watch”  
(F&R 1995:226)  
(BB 06/03/16)

7 Syllables Without Syllabic /s/

**Figure 26:** Without Syllabic /s/

nitssksskópa'ko [nit'skskópa?ko]  
nit-i-tssksskópa'-ok-a  
1PS-VERB-watch-INV-3PS  
“she left me to watch”  
(F&R 1995:226)  
(BB 06/03/16)

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⁴ Predicted output. Elicitation scheduled for summer, 2006.
7.1 Why the Alternate Analysis Does Not Work

7.1.1 The long /s/ does not reduce the preceding high front vowel /i/ to lax /ɬ/

**Figure 27: Long /s/ Not Acting Like Geminate /s/**

7.1.2 The order of the coda consonants violates Vennemann's coda law

**Figure 28: Violate Coda Law**

7.1.3 The next syllable starts with /k/, but the onset contains a long /s/  
   - This /s/, as an onset, would lose it's mora (duration) - it does not in Blackfoot.

**Figure 29: Underlying Onset Long /s/ Not Losing Duration**
7.1.4 **The next /k/ violates Vennemann's Onset Law**

FIGURE 30: **Second /k/ Violates Onset Law**

7.2 **Extrasyllabicity**

- Words may have extrasyllabic word edges - but words that have syllables will not have syllabified edges and extrasyllabic word centers.

7.3 **Consultant Support**

- Consonant bounded long /s/s are always their own syllable or “clapping unit”.
- Our consultant will spontaneously break words into syllables in order to teach Blackfoot students how to say long and complex words.

8 **Discussion**

8.1 **Blackfoot Syllables**

FIGURE 31: **V Nucleus, No Geminate in Coda**

FIGURE 32: **V Nucleus, Geminate in Coda**
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FIGURE 33: S NUCLEUS

- Syllabic /s/ has obligatory onsets within words

8.2 PREDICTIVE POWER
- The above syllable analysis, combined with Vennemann's syllable laws, is highly predictive of Blackfoot syllable structure.
- But they alone cannot exclude {m,n} codas followed by {p,t,k,s} onsets - none of which occur in Blackfoot.
- Blackfoot has no recorded examples of syllabic nasals (Frantz 1991, 1995; Elfner 2004).
- If this analysis of syllabification is correct, a universal sonority hierarchy simply does not help in identifying possible syllabic consonants.

9 SUMMARY AND CONCLUSION
- By proposing a syllabic /s/, it is almost possible to keep the same simple syllable system, adding only a few possible complex codas and onsets.
- Vowel nucleus syllables maximally contain an optional simple or s+{p,t,k} onset, a nucleus with a short or long vowel, and an optional coda which may contain one short or long consonant, a glottal stop + singleton consonant or an s + {t,tt,t′,k,k′} (/s/ may be geminate if the stop/affricate is not) coda.
- Syllabic /s/ nucleus syllables maximally have a {p,t,k,ps,ts,ks,s} onset, and a {p,t,k,ts,ks} coda.
- This analysis rejects the validity of the sonority scale for identifying syllable nuclei.

REFERENCES
Armoskaite, Solveiga, and Chávez-Peón, Mario. 2005. Assibilation in Blackfoot. Paper presented in LING 431/531 Field Methods, UBC.
Syllabification and Blackfoot “s”
38th Algonquian Conference, Vancouver, UBC

Reis-Silva, Amélia. 2006. Pre-aspiration in Blackfoot. 38th Algonquian Conference, University of British Columbia, Vancouver, BC.

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