Spelling out prosodic structure inside of polysynthetic words*

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24 March 2023

Overview

- Recent renewed interest in prosodic structure and correspondence with syntax (cf. Selkirk 2011 and subsequent work; see overviews in Bennett & Elfner 2019; Elfner 2018).
- Polysynthetic languages provide the necessary phonological length and morphological complexity for testing and comparing predictions of various theoretical approaches to syntax-prosody correspondence.
- But theories remain poorly tested on polysynthetic languages (Elfner 2018). (Although, see recent work in Bogomolets 2020, 2021; Gordon 2023; Miller & Sande 2021; Miller 2018; Weber 2020b, 2021b, 2022b; and case studies in Bogomolets & van der Hulst 2023.)
- This paper:
  - analyze prosodic structure in Blackfoot (Algonquian; ISO 639-3: bla), a polysynthetic language (Frantz 2017)
  - argue against a Syntax-Driven Mapping theory of Prosodic Phonology
  - preliminary analysis using Phasal Spell-out

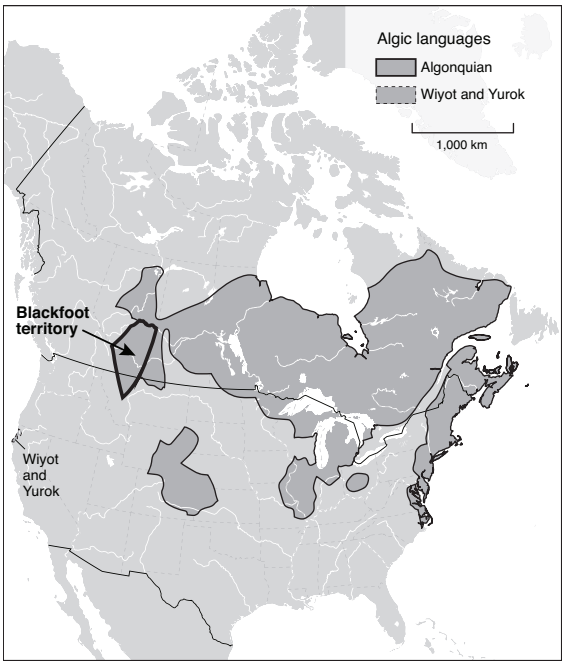
Outline

1 Language background

*Parts of this talk were greatly influenced by chats with Laura Kalin, Bronwyn Bjorkman, Taylor Miller, Hossep Dolatian, Andrei Anghelescu, Emily Elfner, Rose-Marie Déchaine, and Doug Pulleyblank. I owe thanks to the comments from multiple audiences: ICU LINC (online), WSCLA 25 at Sogang (virtual), Phorum at Berkeley, BCGL 14 at Brussels, LingLangLunch at Brown.

1.1 Location and maps

- Westernmost Algonquian language, spoken in Montana and Alberta.
- **Figure 1**: Algonquian family. Map by Eric Leinberger, based on Goddard (1999).



- Four Nations with a shared history, culture, and language (Dempsey 2019; Grinnell 1892: 153; Juneau 2007: 13*ff*), associated with mutually-intelligent dialects.
- **Figure 2**: Blackfoot reserves and dialects (in dark gray). Map by Kevin McManigal.

1.2 Syntax of the verbal complex

- Blackfoot exhibits many polysynthetic properties, including: extensive agglutinative morphology, free word order, multiple "lexical" morphemes or roots within a morphological word, and head-marking. (On syntactic properties of polysynthesis within different theoretical approaches see e.g. Baker 1996; Mattissen 2004; Nichols 1986, 1992.)
- (Simplified) morphological template in (1). See Bloomfield (1946) & Goddard (1990) for the Algonquian template. Stem in [square brackets].[1]

(1) $[_{CP}$person– preverb*– $[$initial–(medial)–final$]_{vP}$ –suffixes$]_{CP}$

- Algonquian stem is a *v*P, containing an "initial" (minimally a $\sqrt{\text{ROOT}}$) and a "final" verbalizing *v*P head which determines valency and may agree with animacy of the argument (Branigan, Brittain, & Dyck 2005; Brittain 2003; Bruening 2001: 122; Hirose 2003; Mathieu 2007; Quinn 2006; Piggott & Newell 2006; Slavin 2012).

(2) a. áaksiksístoyiwa
aak-–[ksisto–-**yi**]–-Ø–-wa
FUT–-[warm–-**II**]–-IND–-3
'It will be warm.' [FR 63]

b. áaksiksísto'simma
aak-–[ksisto–-**'si**]–-mm–-wa
FUT–-[warm–-**AI**]–-IND–-3
'She will have a fever.' [FR 63]

- Optional "medial" root: body part (Dunham 2009) or classifier (Biedny et al. 2021).

(3) áaksiksístokomiwa
aak-–[ksisto–kom–yi]–-Ø–-wa
FUT–-[warm–-liquid–II]–-IND–-3
'It will be warm water.'

- Entire verbal complex can get really really large.

(4) kimátaakonawaipahkitapiistotoohpoaawa
ki–maat–aak–onawa–ipahk–[itap–iistoto]–o–hp–oaawa
2–NEG–FUT–ever–bad–[towards–CAUS.TA]–2OBJ–IND–PL
'I will never forsake you (pl).' [FR 78]

[1] References to pages in Frantz & Russell (2017) are given as "[FR #]". Abbreviations used in this article follow the Leipzig Glossing Standards (Comrie, Haspelmath, & Bickel 2015), plus: AI = animate intransitive, AN = animate, CMD = command clause, CNJ = conjunctive order, COLLEC = collective noun, CONJ = conjunction, II = inanimate intransitive, IN = inanimate, IND = independent order, OBV = obviative, PRX = proximate, SUB = subject, TA = transitive animate, TI = transitive inanimate, TI1 = transitive inanimate (Class 1).

- Suffixes = clausal heads, agreement (Bliss 2013; Grishin 2023; Ritter & Wiltschko 2014).[2]

(5)

$\sqrt{\text{ROOT}}$	v^0	Voi^0	Infl^0	AGR-PL	C^0
ksiisto	-yi		-Ø	—	-wa
ksiisto	-'si		-mm	—	-wa
itap	-iistoto	-o	-hp	-oaawa	—

- Verbal complex has the distribution of a CP (e.g. as matrix or embedded clause; Weber 2020b, 2021b.)

(6) itanístsiksimsstaya
it–anist–iksim–[sst–aa]–yi = aawa
LOC–manner–secret–[wish–AI]–PL = PRX.PL

omaahkstsóótoohpommaahsáa sátsáápiniowan
o–m–aahk–sstsi–oto–[ohpomm–a]–hsi = aawa pisatsaapiniowan
3–3–might–town–go.to–[buy–AI]–CNJ = PRX.PL candy

'They decided to go to town to buy some candy.' (BB; 2013-02-13)

- Prefixes = anything else (except DPs, and a few adjuncts like 'yesterday', 'today').
  - maat- 'NEG' — high-scope negation, [4]
  - aak- 'FUT', aahk- 'might' — TAM prefixes, [4]
  - anist- 'manner' — relative root (introduces oblique), [6]
  - sstsi- 'town', ipahk- 'bad', iksim- 'secret' — lexical roots (?), [4], [6]
  - oto- 'go to' — restructuring verbs, [6]
  - sok- 'good' — verbal adjuncts, [7]
- Prefixes include event modifiers = verbal adjuncts (e.g. *sok-* 'good').[3]

(7) soksinihkít!
sok–inihki–t
good–sing.AI–2SG.IMP

'Sing well!' (Bliss 2013: 49)

- **Takeaway:** verbal complex contains CP phrasal syntax and is not simply a complex X^0.

[2] I treat the "theme suffix" as Voi^0, following Oxford (2019) & Oxford (2014). This has not been specifically proposed for Blackfoot, though Bliss (2013) puts the theme in a functional head between v^0 and Infl^0.

[3] Recent arguments for syntactic adjuncts inside "words": Déchaine & Weber (2015, 2018), Fenger (2020), Mathieu, Fry, & Barrie (2017), Newell & Piggott (2014), Piggott & Travis (2013), & Weber (2022b).

1.3 Phonology and orthography

- Some aspects of the phonological inventory are still contested (Derrick & Weber 2023).
- I use orthography from Frantz (1978, 2017) for morphemic analyses.
  - double letters for long segments,
  - /ɛː/ = <ai>, /ɔː/ = <ao>, /ʔ/ = <’>, /j/ = <y>.

Table 1: Blackfoot phonemic inventory

	Labial	Coronal	Dorsal	Glottal
Stops	p pː	t tː	k kː	ʔ <’>
Pre-Assibilants		ˢt ˢtː	ks	
Affricates		ts tːs	ks	
Fricatives		s sː	x	
Nasals	m mː	n nː		
Glides	w	j <y>	(w)	

	front	central	back
high	i iː		o oː
mid	ɛː <ai>		ɔː <ao>
low		a aː	

- Sounds with a restricted distribution:
  - /x/ is only preconsonantal (coda position; Reis Silva 2008)
  - /ʔ/ is usually preconsonantal, occasionally between vowels (Peterson 2004)
- Allowable clusters: /sC/; /xC/; /ʔC/ (and C is optionally followed by [j])
- Syllable shapes: CV, CVV, CVC;[4] vowels predictably short and lax in closed syllables.
- Short or long [s] can occur as a syllable nucleus (Elfner 2006; Frantz 2017; Goad & Shimada 2014).

(8) Cs [o.**ks**.káʔ.sɪt] ‘run!’ (BB)
Css [mox^{w}.kín.**ʔsː**.tsɪs] ‘elbow’ (BB)

- Contrastive vowel length in open syllables (Elfner 2006; Frantz 2017; Goad & Shimada 2014; Weber 2020b)

(9) CV [ʔâː.k**o**.kaː] ‘he will rope’ (BB)
CVV [ʔâː.k**oː**.kaː] ‘she will hold a Sundance’ (BB)

[4] Possibly more shapes with advocalic [s].

- Vowel length neutralization before word-medial codas (Elfner 2006; Frantz 2017; Weber 2020b). Evidence that codas are moraic; heavy syllables = CVV, CVC.

(10)	CVC	[só.**ka?**.si.m]	‘shirt, dress’	(BB)
		[**ʔɪm**.mo.já:.n]	‘fur coat’	(BB)
	CVVC	—	—	

2 Methodology

2.1 Theoretical background

e.g. indirect reference theory

- Phonological processes are frequently limited to prosodic constituents in a hierarchical structure (Hayes 1989; Nespor & Vogel 2007; Selkirk 1986; Selkirk 1984).
  - “Prosodic constituents” = interface categories (Inkelas 1993; Itô & Mester 2012; Selkirk 1986), and not metrical structure like feet and syllables.
  - Derived from syntax, but not always isomorphic to syntax.
- Blackfoot has two “word-like” categories:
  - Prosodic Word (PWd)
  - Prosodic Stem (PStem; Downing 1999; Inkelas 1993)
- Evidence based on standard methods:
  - phonological generalizations across a domain(Hall 1999; Nespor & Vogel 2007)
  - minimality constraints for a domain (Hall 1999; Nespor & Vogel 2007)
  - phonotactic generalizations, especially at domain edges (Hall 1999)
- Domain defined by a span of templatic positions, as developed in Tallman (2020, 2021).

2.2 Root alternations

- How to determine phonotactic constraints at edges?
- Generalizations over robust root alternations.

> *Almost all Blackfoot stems and roots have more than one shape*, and their shapes depend upon whether affixes are added, and may even depend upon which affixes are added. (Frantz & Russell 2017: *vii*; emphasis mine)

- Consider two positions: (1) left edge, and (2) after prefix.

(11) LEFT EDGE
[$\sqrt{\text{ROOT}}$–v^0]–suffixes

(12) AFTER PREFIX
prefix–[$\sqrt{\text{ROOT}}$–v^0]–suffixes

- Look for constraints on the root-initial segment in the *Left edge* versus *After prefix* positions.
- Attempted to use the same stem in both positions. This was not always possible, due to gaps in the dictionary.

2.3 Corpus

- Most forms from most recent dictionary(Frantz & Russell 2017)
- Headwords are abstract stems and some roots
- Stems are not broken down morphemically in Frantz & Russell (2017), and in many cases the morphemic analysis is unclear. Most forms in this handout include a five line gloss, as an empirical contribution.
- **Figure 3**: excerpts from the Blackfoot dictionary.

> **ipon** *vrt;* terminate, end, be rid of; see **iponiistam** take off; see **iponisayi** become a widower; **áaksiponikso'kowammiyiiwa** she will end their friendship; **nitsíiponawaatohtoo'pa** I got rid of it (e.g. a cold, or a chore); see **iponota'si** sell cattle.

> **iponip** *vta;* cease carrying (offspring) in one's teeth (said of an animal); **ponipisa!** stop carrying him (e.g. a pup)!; **áaksiponipiiwáyi** she will stop carrying him with her teeth; **iipónipiiwáyi** she stopped carrying him with her teeth; **anná imitáíkoana ákaiponipawa** the pup is no longer being carried by its mother.

- Entries frequently contain "diagnostic" forms, meant to show the reader the different forms of the root (Frantz & Russell 2017: *xxi*):

(a) left edge (imperatives, nouns, intransitive verbs),
(b) after a consonant (frequently *aak-* 'FUT'),
(c) after a vowel (frequently *a-* 'IPFV').

- Data is in orthography. Converted to IPA transcriptions based on known descriptions of the language (Derrick & Weber 2023; Elfner 2006; Weber 2020b; Windsor 2017) and orthography (Frantz 1978, 2017). Converted IPA is in ⟦ ⟧.

3 Prosodic structure: two distinct constituents

3.1 Establishing the Prosodic Word

- There is a PWd domain roughly equivalent to the CP phrase.
- Phonotactic evidence = alternations at the left edge of the root. Glides and vowels are avoided at the left edge.

3.1.1 No [-cons] allowed at "Left edge"

- Roots begin in long vowels, as seen in the "After V" context.
- Epenthetic [ʔ] at "Left edge".
- Vowel coalescence across morpheme boundaries.

(13) LEFT EDGE
⟦ʔ**i**ː.tsː.káːt⟧
iitsskáát
[√**ii**tssk–aa]–t–Ø
[√scuffle–AI]–2SG.IMP–CMD
'fight!' [FR 38]

(14) AFTER V
⟦ʔéː.soː.k**éːi**.tsː.kaː.wa̧⟧
*áísook**áíi**tsskaawa*
a–isook**a**–[√**ii**tssk–aa]–Ø–wa
IPFV–used.to–[√scuffle–AI]–IND–3
'he used to fight' [FR 319]

- Roots begin in glides [j], as seen in the "After V" context.
- Deletion of glide at "Left edge".
- Feeds [ʔ] epenthesis.

(15) LEFT EDGE
⟦ʔiː.pi.ˢtó.tsit⟧
iipístotsit
[√**y**iip–istot]–i–t–Ø
[√decrease–CAUS.*v*]–TI1–2SG.IMP–CMD
'decrease the volume of it!' [FR 35]

(16) AFTER V
⟦ni.tá.**j**iː.pi.ˢto.tsiʔ.pa̧⟧
*nitá**y**iipistotsii'pa*
nit–a–[√**y**iip–istot]–i–hp–a
1–IPFV–[√decrease–CAUS.*v*]–TI1–IND–3
'I am decreasing the amount' [FR 313]

- Abstract representation of each root, before vowel coalescence:

(17)

	Left edge		*After V*	*UR*	*Gloss*
a.	[ʔiːtsːk]	∼	[iːtsːk]	/iːtsːk/	'scuffle'
b.	[ʔiːp]	∼	[jiːp]	/jiːp/	'decrease'
c.	*[jiːp]	∼	*[jiːp]		

- Phonotactic constraint: no roots begin with a vowel or glide at the left edge.

3.1.2 Domain of syllabification

- All syllables are CV, CVC throughout the PWd.
- Final extra C at right edge.
- Syllable structure maintained via epenthesis and coalescence.
- Some suffixes begin in consonants, as seen in "After V" context.
- Epenthetic [i] occurs between consonants in the "After C" context.

(18) a. AFTER C

⟦nitâ:ksox^{w}ks**ip**i^{s}ta:⟧
*nitáaksoohks**ip**istaa*
nit–aak–[$\sqrt{}$yoohk–**p**ist–aa]–(hp)
1–FUT–[$\sqrt{}$lid–**tie.*v***–AI]–(IND)
'I will close the tipi flap' [FR 319]

b. AFTER V

⟦ʔamo**p**í^{s}ta:ni⟧
*amo**p**ístaani*
[[$\sqrt{}$amo–**p**ist–aa]–n]–i
[[$\sqrt{}$gather–**tie.*v***–AI]–NMLZ]–IN.SG
'ceremonial bundle' [FR 13]

- Some suffixes begin in vowels, as seen in the "After C" and "After V" contexts.
- Vowels /o + i/ diphthongize across morpheme boundaries.

(19) a. AFTER C

⟦ʔomats**íp**i:s⟧
*omats**íp**iisa*
[$\sqrt{}$omat–**ip**i]–:s–Ø
[$\sqrt{}$start–**bring**.*v*]–2SG:3.IMP–CMD
'transport him!' [FR 193]

b. AFTER V

⟦ʔamó**íp**i:sa:wą̊⟧
*amó**íp**iisaawa*
[$\sqrt{}$amo–**ip**i]–:s–Ø = aawa
[$\sqrt{}$gather–bring.*v*]–2SG:3.IMP–CMD = PRX.PL
'gather them!' [FR 195]

- Abstract representation of each root, before vowel coalescence:

(20)

	After C		*After V*	*UR*	*Gloss*
a.	[-ipi^{s}t]	∼	[-pi^{s}t]	/-pi^{s}t/	'tie.*v*'
b.	[-ipi]	∼	[-ipi]	/-ipi/	'bring.*v*'
c.	*[-p]	∼	*[-p]		

3.2 Establishing to Prosodic Stem

- There is a PStem domain roughly equivalent to the *v*P phrase.
- Primary evidence = alternations at the left edge of the root. A conspiracy of processes avoids [+cons] segments at morphological junctures.

- This talk: focusing on three types of roots that begin in CV.[5]

3.2.1 Vowel-initial roots

- Roots begin in {i, a, o}, as seen in the "Left edge" and "After C" contexts.
- The "After V" context shows there is vowel coalescence across morpheme boundaries.

(21) a. LEFT EDGE

⟦ʔ**i**.tsí.nx̣ʷ.to:.t⟧
***i**tsínohtoot*
[√**i**tsin–oht]–oo–t–Ø
[√among–put.*v*]–TI–2SG.IMP–CMD

'place it among the rest!' [FR 120]

b. AFTER C

⟦ʔâ:.k**i**.tsi.nx̣ʷ.to:.má.jį̨⟧
*áak**i**tsinohtoomáyi*
aak–[√**i**tsin–oht]–oo–m–Ø = ayi
FUT–[√among–put.*v*]–TI–IND–3 = PRX.PL

'he will place it among the rest' [FR 120]

c. AFTER V

⟦ʔ**é:**.tsi.nx̣ʷ.to:.má.jį̨⟧
***áí**tsinohtoomáyi*
a–[√**i**tsin–oht]–oo–m–Ø = ayi
IPFV–[√among–put.*v*]–TI–IND–3 = OBV.SG

'he is placing it among the rest' [FR 120]

(22) a. LEFT EDGE

⟦ʔ**o**.ká:.t⟧
***o**káát*
[√**o**k–aa]–t–Ø
[√snare–AI]–2SG.IMP–CMD

'rope!' [FR 182]

b. AFTER C

⟦ʔâ:.k**o**.ka:.wą̨⟧
*áak**o**kaawa*
a–[√**o**k–aa]–Ø–wa
FUT–[√snare–AI]–IND–3

'he will rope' [FR 182]

c. AFTER V

[ʔ**ó:**.ka:]
***áó**kaawa*
a–[√**o**k–aa]–Ø–wa
IPFV–[√snare–AI]–IND–3

'he is roping' (BB)

[5] No roots begin with glides before a short vowels, and [x] and [ʔ] do not occur in onset position. I haven't fully analyzed roots that begin with underlying clusters or whose first vowel is long.

- Two subpatterns for [a]-initial roots: the after prefix context begins in [o] or [i].

(23) a. LEFT EDGE
[ʔ**a**.kṣ.tá.ki.t]
***a**kstákit*
[$\sqrt$**a**k–st–aki]–t–Ø
[$\sqrt$count–*v*–AI]–2SG.IMP–CMD
'read!' (BB)

b. AFTER C
⟦ʔâː.k**o**.kṣ.ta.ki.wa̱⟧
*áak**o**kstakiwa*
aak–[$\sqrt$**a**k–st–aki]–Ø–wa
FUT–[$\sqrt$read–*v*–AI]–IND–3
'she will read' [FR 188]

c. AFTER V
⟦ʔ**ó**ː.kṣ.ta.ki.wa̱⟧
***áó**kstakiwa*
a–[$\sqrt$**a**k–st–aki]–Ø–wa
IPFV–[$\sqrt$read–*v*–AI]–IND–3
's/he is reading/counting' [FR 188]

(24) a. LEFT EDGE
[ʔ**a**.tsi.ní.ki.t]
***a**tsinikit*
[$\sqrt$**a**tsinik–i]–t–Ø
[$\sqrt$relate.story–AI]–2SG.IMP–CMD
'relate a story!' (BB)

b. AFTER C
⟦nox^{w}.k**i**.tsí.ni.ki.wa̱⟧
*noohk**i**tsínikit*
noohk–[$\sqrt$**a**tsinik–i]–t–Ø
please–[$\sqrt$relate.story–AI]–2SG.IMP–CMD
'please tell a story!' [FR 120]

c. AFTER V
⟦ʔ**é**ː.tsi.ni.ki.wa̱⟧
***áí**tsinikiwa*
a–[$\sqrt$**a**tsinik–i]–Ø–wa
IPFV–[$\sqrt$tell.story–AI]–IND–3
's/he is relating a story' [FR 120]

- The roots with initial [#a] ∼ [i] are highly restricted phonologically: the following consonant is always a voiceless coronal {t, ts, s}.
- The [#a] ∼ [o] pattern occurs before labials, velars, and voiced/sonorant coronals.
- Essentially in complementary distribution (with a few exceptions, discussed in Appendix A).

• Abstract representation of each root, before vowel coalescence:

(25)

	UR	Left edge		After C	=	After V	
a.	/itsin-/	⟦ʔitsin-⟧	∼	⟦itsin-⟧	=	⟦itsin-⟧	‘among’
b.	/ok-/	⟦ʔok-⟧	∼	⟦ok-⟧	=	⟦ok-⟧	‘snare’
c.	/ak-/	⟦ʔak-⟧	∼	⟦ok-⟧	=	⟦ok-⟧	‘count, read’
d.	/atsinik-/	⟦ʔatsinik-⟧	∼	⟦itsinik-⟧	=	⟦itsinik-⟧	‘count, read’
e.	*/a/	*[a]	∼	*[a]	=	*[a]	

• Phonotactic constraint: no roots begin with [a] after a prefix.[6]

• The two subpatterns are phonologically conditioned by the following segment.

• Vowel coalescence with a preceding vowel.

3.2.2 Nasal-initial roots

• Roots begin with nasals, as shown by the “Left edge” condition.

• Initial nasal deletes in the “After C” and “After V” contexts.

(26) a. LEFT EDGE
⟦**mi**.sá.mi.pɛː.ta.pi.’si.nạ̊⟧
***mi**sámipaitapi’ssina!*
√**mi**sám–[ipa–itapi]–’ssin–a
√long.in.time–[life–person]–COLLEC–PRX
‘people of long ago’ [FR 150]

b. AFTER C
⟦ʔâː.ks**i**.sa.mo.wạ̊⟧
*áaks**i**samowa*
aak–[√**mi**sam–o]–w = áyi
FUT–[√long.in.time–II]–IND–3 = PRX.PL
‘it will be a long time’ [FR 97]

c. AFTER V
⟦ʔá.k**ɛː**.sa.mo.wạ̊⟧
*ák**ai**samowa*
akaa–[√**mi**sam–o]–wa
PRF–[√long.in.time–II]–IND–3
‘it’s been a long time’ [FR 145]

(27) a. LEFT EDGE
⟦**mo**.ká.kit⟧
***mo**kákit!*
[√**mo**kak–i]–t–Ø
[√wise–AI]–2SG:3.IMP–CMD
‘be smart!’ [FR 182]

[6]This is a simplification, because roots which begin with an underlying long [aː] at the left edge can and do begin in [a] after a prefix. This might be some kind of chain shift.

b. AFTER C
⟦ʔâː.k**o**.ka.ki.wa̧⟧
*áak**o**kakiwa*
aak–[√**mo**kak–i]–Ø–wa
FUT–[√wise–AI]–2SG:3.IMP–IND–3
'she will be smart' [FR 182]

c. AFTER V
⟦ni.k**ɔ́ː**.kɪs.ko.a.wa̧⟧
nikáókakisskoawa
n–ikaa–[√**mo**kak–i]–ssko–aa–Ø–wa
1–PRF–[√wise–AI]–by.foot.*v*–3OBJ–IND–3
'I have 'wised him up'' [FR 183]

(28) a. LEFT EDGE
⟦**ma**.kíː.ni.maː.wa̧⟧
***ma**kíínimaawa*
[√**ma**kiin]–imaa–Ø–wa
[√bury.*v*]–AI–IND–3
'curlew' (lit.: burial lodge) [FR 145]

b. AFTER C
⟦ʔâː.k**o**.kiː.niː.wá.ji̧⟧
*áak**o**kiiniiwáyi*
aak–[√**ma**kiin]–ii–Ø–w = ayi
FUT–[√bury.*v*]–AI–IND–3 = OBV.SG
'she will bury him in an elevated cache' [FR 184]

c. AFTER V
⟦ʔaː.k**ɔ́ː**.kiː.naː.wa̧⟧
aakáókiinaawa
aaka–[√**ma**kiin]–aa–Ø–wa
many–[√bury.*v*]–3OBJ–IND–3
'curlew' (lit.: burial lodge) [FR 145]

• Abstract representation of each root, before vowel coalescence:

(29)

	Left edge		After C	=	After V	
a.	⟦misam-⟧	∼	⟦isam-⟧	=	⟦isam-⟧	'long in time'
b.	⟦mokaki-⟧	∼	⟦okaki-⟧	=	⟦okaki-⟧	'wise'
c.	⟦makiin-⟧	∼	⟦okiin-⟧	=	⟦okiin-⟧	'spread'
d.	*[N]	∼	*[N]	=	*[N]	

• Observation #1: no roots begin with a nasal after a prefix.

• Observation #2: nasal deletion feeds the [#a] ∼ [o] alternation, (29c).

• Observation #3: allomorphy does not optimize syllable structure.

  – Deletion after consonants *could* avoid unattested consonant clusters,
  – But deletion after vowels creates a marked vowel hiatus context.
  – Simple concatenation would be better.

• Vowel coalescence with a preceding vowel.

3.2.3 Obstruent-initial roots

- Roots begin with obstruents, as shown by the "Left edge" condition.
- Epenthetic [i] before the obstruent in the "After C" and "After V" contexts.
- Opaque interaction in the "After V" context, because after vowel coalescence it just looks like the final vowel of the prefix lengthens and changes quality.

(30) a. LEFT EDGE
⟦po.ni.pi.sa̧⟧
ponipisa!
[√pon–p]–is–Ø
[√cease–by.mouth.*v*]–2SG:3.IMP–CMD
'stop carrying him (e.g. a pup)!' [FR 92]

b. AFTER C
⟦ʔâː.ks**i**.po.ni.piː.wá.ji̧⟧
*áaks**i**ponipiiwáyi*
aak–[√pon–p]–ii–Ø–w = áyi
FUT–[√cease–by.mouth.*v*]–3SUB–IND–3 = PRX.PL
'she will stop carrying him with her teeth' [FR 92]

c. AFTER V
⟦ʔá.k**ɛː**.po.ni.pa.wa̧⟧
*áka**i**ponipawa*
áka–[√pon–p]–a–Ø–wa
PRF–[√cease–by.mouth.*v*]–3OBJ–IND–3
'he [pup] is no longer being carried by its mother' [FR 92]

(31) a. LEFT EDGE
⟦ka.mo.táːt!⟧
kamotáát!
√kamot–áá–t–Ø
√survive–AI–2SG:3.IMP–CMD
'escape!' [FR 43]

b. AFTER C
⟦ʔâː.ks**i**.ka.mo.taː.wa̧⟧
áaks-ikamot-aa-wa
aak–[√kamot–áá]–Ø–wa
FUT–[√survive–AI]–IND–3
'she will escape, give birth' [FR 43]

c. AFTER V
⟦máː.to.m**ɛː**.ka.mo.taː.wa̧⟧
*máátoma**i**kamotaawa*
maat–omaa–[√kamot–áá]–Ø–wa
NEG–yet–[√survive–AI]–IND–3
'she has not yet given birth' [FR 43]

(32) a. LEFT EDGE
⟦so.ma.to:t!⟧
somatoot!
[$\sqrt{}$som–át]–oo–t–Ø
[$\sqrt{}$spread–*v*]–TI–2SG:3.IMP–CMD
'place a covering on it!' [FR 99]

b. AFTER C
⟦ni.tâ:.ks**i**.só.ma:.kį̥⟧
*nit-áaks-**i**sóm-aaki*
nit–aak–[$\sqrt{}$som–i?]–áki–(hp)
1–FUT–[$\sqrt{}$spread–*v*]–AI–(IND)
'I will spread (e.g. the tablecloth)' [FR 99]

c. AFTER V
⟦?**é:**.so.ma:.ki⟧
*á-**í**som-aaki*
a–[$\sqrt{}$som–áá]–Ø–(wa)
IPFV–[$\sqrt{}$spread–AI]–IND–(3)
'she spread a hide out' [FR 99]

- Abstract representation of each root, before vowel coalescence:[7]

(33)

	Left edge		After C	=	After V	
a.	⟦pon-⟧	∼	⟦ipon-⟧	=	⟦ipon-⟧	'cease'
b.	⟦kamot-⟧	∼	⟦ikamot-⟧	=	⟦ikamot-⟧	'escape'
c.	⟦som-⟧	∼	⟦isom-⟧	=	⟦isom-⟧	'spread'
d.	*[C]	∼	*[C]	=	*[C]	

- Observation #1: no roots begin with an obstruent after a prefix.
- Observation #2: epenthesis is made opaque by vowel coalescence in the "After V" context.
- Observation #3: allomorphy does not optimize syllable structure.
  - Epenthesis after consonants *could* avoid unattested consonant clusters.
  - But epenthesis after vowels creates a marked vowel hiatus context.
  - Simple concatenation would be better.
- Observation #4: the [i] cannot be part of the root and then deleted at the "Left edge", or else the vowel-initial roots should pattern the same.

[7] Very few roots begin in [t] or [ts], due to a change of *t > *k* in this position (Berman 2006: 275)

3.2.4 Determining motivation for alternations

- Summary of alternations:

(34)

	Left edge		After C	=	After V	
a.	⟦ʔitsin-⟧	∼	⟦itsin-⟧	=	⟦itsin-⟧	‘among’
	⟦ʔok-⟧	∼	⟦ok-⟧	=	⟦ok-⟧	‘snare’
	⟦ʔatsinik-⟧	∼	⟦itsinik-⟧	=	⟦itsinik-⟧	‘relate a story’
	⟦ʔak-⟧	∼	⟦ok-⟧	=	⟦ak-⟧	‘count, read’
b.	⟦misam-⟧	∼	⟦isam-⟧	=	⟦isam-⟧	‘long in time’
	⟦mokaki-⟧	∼	⟦okaki-⟧	=	⟦okaki-⟧	‘wise’
	⟦makiin-⟧	∼	⟦okiin-⟧	=	⟦okiin-⟧	‘spread’
c.	⟦pon-⟧	∼	⟦ipon-⟧	=	⟦ipon-⟧	‘cease’
	⟦kamot-⟧	∼	⟦ikamot-⟧	=	⟦ikamot-⟧	‘escape’
	⟦som-⟧	∼	⟦isom-⟧	=	⟦isom-⟧	‘spread’

- No roots begin in a consonant after a prefix. (Noted in diachronic research; see Berman 2006: 267 and Goddard 2018).
- This generalization only holds true *before* vowel coalescence.
- Not phonologically optimizing = not driven by syllable structure.
- Proposal: phonotactic edge constraint against [+cons] segments drives alternations.
- **Table 2** generalizes over all root alternations, including roots beginning in long vowels and glides.
  - (Abstracted away from vowel coalescence but not other predictable operations, such as [ʔ]-epenthesis at the left edge).
  - Roots never begin in [+cons] after a prefix (solid line).

Table 2: Segments allowed at left edge of roots in two positions

	p	t/ts	k/ks	s	m	n	j	w	iː	oː	ɛː	ɔː	aː	i	o	a
Left edge	✓	(✓)	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
After prefix	✘	✘	✘	✘	✘	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- *Extremely* robust alternations: all consonant-initial roots alternate.
- Productively applies to loanwords and calques:

(35) LEFT EDGE

[póːsa̧]
póósa
[√hpoos]–a
[√cat]–PRX

'cat' (BB)

(36) AFTER C

[síkx^{w}poːsa̧]
*sík**oh**poosa*
sik–[√hpoos]–a
black–[√cat]–PRX

'black cat' (BB)

- Phonotactic constraint only holds at an abstract level; feeds syllabification.
- Do the roots *pon* 'cease' and *hpoos* 'cat' below begin in a vowel on the surface?

(37) ⟦ʔá.kɛ**ː**.po.ni.pa.wa̧⟧
*áka**i**ponipawa*
áka–[√pon–p]–a–Ø–wa
PRF–[√cease–by.mouth.*v*]–3OBJ–IND–3

'he [pup] is no longer being carried by its mother' [FR 92]

(38) [síkx^{w}poːsa̧]
*sík**oh**poosa*
sik–[√hpoos]–a
black–[√cat]–PRX

'black cat' (BB)

3.2.5 Interim summary

- Robust root allomorphy picks out the left edge of the PStem.
- Largely phonologically determined:
  - Conditioned by presence/absence of preceding morpheme.
  - Not constrained to roots; this actually happens at every boundary to the left within the CP as well. (See Weber 2022b for details.)
  - Satisfies a phonological constraint against [+cons] segments after a prefix.
  - Processes are phonological (e.g., deletion/epenthesis of segments).
  - Process is conditioned by morpheme-initial consonant (nasals vs. obstruents).
- But it is also somewhat phonologically opaque:
  - Not conditioned by syllable structure (e.g. non-optimizing).
  - Feeds coalescence and other syllabification processes.
- These processes somehow "see" the morphological juncture to the left of the stem, and know to apply to the right of the juncture. They ignore all the other morphological boundaries inside the stem.
- No evidence of mismatches from syntax.
- Perhaps they are "morphophonological"?

3.3 Prosodic Word $\neq$ Prosodic Stem

- Two prosodic (morphophonological?) domains inside Blackfoot "words".
  - PStem = *v*P stem
  - PWd = CP verbal complex
- Evidence: root alternations and edge phonotactics.
  - Inside PStem: no morphological readjustments, and all alternations are conditioned by syllable structure.[8]
  - Left edge of PStem (and every boundary to the left within the CP): regular root readjustments at each morphological boundary, which are non-optimizing and opaque.
- PWd and PStem are not identical (recursive) categories, as in Ito & Mester (2007) and following work.
  - Different edge constraints!
  - PWd: no [-cons]
  - PStem: no [+cons]

4 Two domains of syllabification/stress

- Each morphophonological domain is associated with a syllabification/stress domain.
- The syllabification/stress domains mismatch from syntax.

4.1 Stress computation

- Stress on verbs without prefixes is regular (Weber 2016).
- Prominence falls on 2nd syllable if heavy, else the 3rd syllable.
- 1st syllable weight has no effect; I assume it is not parsed into a foot.

(39)	'speech, talk'	[a.(**nís**).sɪ.n]	L (**Ĺ**) L
	'travelling'	[aʔ.(**póxʷ**).sɪ.n]	H (**Ĺ**) L
	'tell a story!'	[a.(tˢɪ.**ní**).kɪ.t]	L (L **Ĺ**) L
	'take!'	[maʔ.(ta.**kí**).t]	H (L **Ĺ**)

[8] Question: could the PStem be defined simply by the $\sqrt{\text{ROOT}}$? Under this analysis, there are no morphological adjustments to the right of the $\sqrt{\text{ROOT}}$.

- Stress on verbs with prefixes is different (though not yet analyzed).
- Easy to see when we examine the same root inside and outside the stem (*maan* 'new').

(40) a. $\sqrt{\text{MAAN}}$ AS STEM-INTERNAL ROOT

[maan-íí]-wa	maː.(**níː**).wa̱	*(máː).niː.wa̱	'it is new'
[maan-á'pii]-wa	maː.(**náʔ**).piː.wa̱	*(máː).naʔ.piː.wa̱	'it was recent'
[maan-itápi]-iksi	maː.(ni.**tá**).pi.ksi̱	*(máː).ni.ta.pi.ksi̱	'young people'

b. $\sqrt{\text{MAAN}}$ AS STEM-EXTERNAL PREFIX

máán-[o't-oo]-wa	*maː.(nóʔ).toː.wa̱	(**máː**).noʔ.toː.wa̱	'she recently arrived'
áak-[an-ii]-wa	*aː.ka.(níː).wa̱	(**âː**).ka.niː.wa̱	'it will be new'

4.2 Mismatches from syntax

- Metrical constituents mismatch from the CP.
- Phonological proclitics *ki=* 'CONJ' and *tsa=* 'Q' (Barrie 2014) are included in the domain of syllabification and bleed [ʔ] epenthesis.

(41) [**kjɔ́ː**toxʷkǫ̱ta **kjɔ́ː**toɪsomôʔsi]

ki áótoohkohtaa
ki= a–oto–ohk–oht–aa–Ø–wa
CONJ= IPFV–go.to.do–firewood–*v*–AI–IND–3

ki áótoissomo'si
ki= a–oto–som–o'si–Ø–wa
CONJ= IPFV–go.to.do–fetch.water–AI–IND–3

'…and she would go after firewood and go after water'

(BB; Creation Story, line 4)

- Metrical constituents mismatch from the *v*P. Suffixes are included in the domain of stress.

(42) ⟦so.(ki.nís)⟧
sokinísa
[$\sqrt{}$sok–in]–ísa
[$\sqrt{}$good–by.hand.*v*]–2SG:3.IMP

'doctor him!' [FR 257]

- PWd-level stress ignores morphological boundaries between prefixes.

(43) ⟦(ni.tsí).tsi.nɔ:.ks.kaʔ.sɪ̥⟧
nitsitsínaoksk a'si
nit–ítsin–a–[√oksk–a'si]–(hp)
1–among–IPFV–[√run–*v*]–(IND)

'I joined in the run' [FR 120]

- PWd-level stress ignores left edge of PStem.

(44) ⟦(i.tsí.(tsi.náʔ).ps:i.wa̧⟧
itsiná'paissiwa
itsin–a'p–issi–Ø–wa
among–about–be.AI–IND–3

'he's among people, not alone' [FR 120]

4.3 Interim summary

- Two prosodic domains (PWd, PStem):
  - No mismatches from morphosyntactic boundaries.
  - Phonotactic restrictions trigger morpheme alternations which are non-optimizing, and which feed metrification.
  - The phonotactic restriction is often made opaque by metrification.
- Two domains of syllabification/stress.
  - Roughly equivalent to the prosodic domains.
  - Allow mismatches from morphosyntax.
- What kind of theory of the prosody-syntax interface can account for Blackfoot?
- More narrow representational question: are the root alternations triggered by phonotactic constraint at the left edge of a *prosodic domain*, or are they triggered more generally by a morphological *juncture*?

5 Analysis: two attempts

5.1 Analysis #1: syntax-driven mapping (rejected)

- Name taken from Miller (2018), who summarizes previous macro types of prosodic phonology theories.
- Three theories of how syntactic constituents maps to prosodic constituents.
  1. Alignment Theory (McCarthy & Prince 1994; Selkirk 1996; Werle 2009)
  2. Wrap Theory (Kabak & Revithiadou 2009; Truckenbrodt 1999)
  3. Match Theory (Selkirk 2011)
- Assume the following mapping:
  - CP $\leftrightarrow$ PWd
  - *v*P $\leftrightarrow$

5.1.1 Problem #1: violations of Proper Headedness

- A straightforward mapping would look like this:

(45) a. $[\text{aka-}[\surd\text{ipon-p}]_{vP}\text{-a-wa}]_{CP}$ Syntactic structure

b. *(á.ká (po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ Isomorphic structure: vio's *#[-cont]

c. (á.kɛ́ (ɛ́.po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ Prosodic structure: vio's DEP

- The idea is that the isomorphic structure in (45b) violates a phonotactic constraint *#[-cont] that holds of the PStem boundary. A more harmonic candidate violates DEP to *remove* the obstruent from the left edge of the PStem. The vowels coalesce across the PStem boundary, with details worked out in Weber (2020a, 2021a).
- But this violates Proper Bracketing (Itô & Mester 2003): basically, each prosodic constituent has one and only one parent node. (That is, no prosodic constituent can be part of two or more higher-order constituents.)
- But the syllable [kɛ́ː] *spans* the left PStem boundary.
- Not a well-formed tree!
- Even if we assume that the metrical hierarchy is divorced from the prosodic hierarchy (Downing 1999; Inkelas 1993), it's hard to figure out what this structure would mean.

- Why not mismatch the PStem so that it aligns with a syllable boundary? These candidates violate the *#[-cont] constraint, and they are harmonically bound by a candidate that does not epenthesize or misalign at all.

(46) a. (á.ké (é.po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ Actual prosodic structure: vio's DEP

b. (á.(ké꞉.po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ Overparsing: vio's DEP, ALIGN, *#[+cont]

c. (á.ké꞉.(po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ Underparsing: vio's DEP, ALIGN, *#[+cont]

d. (á.ka.(po.ni.pa.wa̰)$_{\text{PStem}}$)$_{\text{PWd}}$ More harmonic structure: vio's *#[+cont]

- Besides, in some cases metrification parses an obstruent into the coda position, due to opaque coalescence between the vowel and a following /x/. Here, there is no way to split the syllable and avoid violations of *#[-cont], and there is no way to allow mismatches and avoid violations of *#[-cont].

(47) (sík(**x**$^{\text{w}}$po꞉sa̰)$_{\text{PStem}}$)$_{\text{PWd}}$
sik–[$_{\surd}$hpoos]–a
black–[$_{\surd}$cat]–PRX

'black cat' (BB) (=38)

- This form is harmonically bound by a candidate that does not epenthesize [o] at all.

5.1.2 Problem #2: no alternations at the left edge

- If the *v*P maps to a PStem, then it should always map to a PStem.
- But there are no root alternations when the PStem and PWd boundaries align.

(48) a. ((po.ni.pi.sa̰)$_{\text{PStem}}$)$_{\text{PWd}}$
[$_{\surd}$pon–p]–is–Ø
[$_{\surd}$cease–by.mouth.*v*]–2SG:3.IMP–CMD

'stop carrying him (e.g. a pup)!'
[FR 92] (=30a)

b. *((**i**po.ni.pi.sa̰)$_{\text{PStem}}$)$_{\text{PWd}}$
[$_{\surd}$pon–p]–is–Ø
[$_{\surd}$cease–by.mouth.*v*]–2SG:3.IMP–CMD

'stop carrying him (e.g. a pup)!'
[FR 92]

- Possible to hack this by saying that epenthesis and deletion are *blocked* whenever they would create more violations of ONSET.
- But this seems to miss other generalizations that suggest the entire CP is contained in a PWd, not a PStem.

5.1.3 Problem #3: cannot easily capture multiple recursion

- Each prefix to the stem also exhibits root alternations, implying that they also are parsed into a (recursive) PStem.
- As discussed in Weber (2022b), none of theories of syntax-driven mapping can account for multiple recursion in Blackfoot. (See Weber 2022b for Alignment Theory and Wrap Theory; I show Match Theory here.)
- Evidence: toy candidates and standard candidates.
- (MatchWord is redefined to map *v*P to PStem instead of a X^0 to a PWd.)

(49) MATCH(*v*P,PSTEM) (Abbrev: M(*v*P))

Suppose there is a syntactic *v*P phase in the syntactic representation that exhaustively dominates a set of one or more terminal nodes α. Assign one violation mark if there is no prosodic stem (PStem) in the phonological representation that exhaustively dominates all and only the phonological exponents of the terminal nodes in α.

(50) MATCH(PSTEM,*v*P) (Abbrev: M(PStem))

Suppose there is a prosodic word (PStem) in the phonological representation that exhaustively dominates a set of phonological exponents. Assign one violation mark if there is no syntactic *v*P phase in the syntactic representation that exhaustively dominates one or more terminal nodes α which correspond to all and only the phonological exponents of the PStem.

- Harmonically Bound (HB) candidates are not optimal under any constraint ranking = our grammar predicts that these structures exist in no languages.
- Recursive PStems are HB! (PStems shown in parentheses.)

(51)

$[\text{pre–}[\text{stem}]_{vP}]_{CP}$	M(*v*P)	M(PSTEM)	EXH	BIN	*REC
HB a. {(pre–(stem))}		*		*!	*!
b. {pre–(stem)}			*	*	
HB c. {(pre–stem)}	*!	*		*!	
HB d. {(pre)–(stem)}		*			
HB e. {((pre)–(stem))}		**!			*!

(52)

[pre–pre–[stem]$_{vP}$]$_{CP}$	M(*v*P)	M(PSTEM)	EXH	BIN	*REC
HB a. {(pre–(pre–(stem)))}		*!*		*!	*!*
HB b. {(pre–pre–(stem))}		*		*!	*!
c. {pre–pre–(stem)}			*	*	
HB d. {(pre–pre–stem)}	*!	*		*!	
e. {(pre–pre)–(stem)}		*			
HB f. {(pre)–(pre–stem)}	*!	*!			

- Instead, we need an analysis that requires every unique prosodic constituent (at *v*P and above) to correspond to a PStem. This is nearly identical to MATCHPHRASE from Elfner (2012: 28) in (**??**), except that it requires XPs to match to a PWd instead of a PPh.

(53) MATCH(XP,PSTEM) (Abbrev: M(XP))

Suppose there is a syntactic phrase (XP) in the syntactic representation, *where XP = vP or XP dominates vP*, that exhaustively dominates a set of one or more terminal nodes α. Assign one violation mark if there is no *prosodic stem (PStem)* in the phonological representation that exhaustively dominates all and only the phonological exponents of the terminal nodes in α.

(54) MATCH(PSTEM,XP) (Abbrev: M(PStem))

Suppose there is a prosodic stem (PStem) in the phonological representation that exhaustively dominates a set of phonological exponents. Assign one violation mark if there is no syntactic constituent (XP), where XP = *v*P or XP dominates *v*P, in the syntactic representation that exhaustively dominates one or more terminal nodes α which correspond to all and only the phonological exponents of the PStem.

- This works! Now the recursive PStem candidates are not HB.

(55)

[pre–[stem]$_{XP}$]$_{XP}$	M(XP)	M(PSTEM)	EXH	BIN	*REC
a. {(pre–(stem))}				*	*
HB b. {pre–(stem)}	*		*!	*	
c. {(pre–stem)}	*			*	
d. {(pre)–(stem)}	*	*			
e. {((pre)–(stem))}		*			*

(56)

[pre–[pre–[stem]$_{XP}$]$_{XP}$]$_{XP}$	M(XP)	M(PSTEM)	EXH	BIN	*REC
a. {(pre–(pre–(stem)))}				*	**
b. {(pre–pre–(stem))}	*			*	*
HB c. {pre–pre–(stem)}	**		*!	*	
d. {(pre–pre–stem)}	**			*	
e. {(pre–pre)–(stem)}	**	*			
f. {(pre)–(pre–stem)}	**	*			

- Problem: hacky definition restricts Match to only look at the *v*P or above. Seems like we are missing something.
- Problem: some XPs match to a PStem, some to a PWd, and some to a PPh. Seems like we are missing something.
- Weber (2022b) suggests that the theory we need for prosodic word correspondence might have the same underlying properties at the theory we need for prosodic phrase correspondence. But the paper leaves this suggestion "unsolvged".

5.2 Interim summary

- Any theory with PStems and metrification at the same *time* will run into problems.
- This theory misses the idea that morphological readjustment feeds and is made opaque by metrification.
- **Takeaway**: we need derivational layers.
- Some insights from Weber (2022b): something like a theory of phrasal correspondence might work.
- Phrasal syntax, phrasal syntax-to-phonology mapping?
- **Suggestion**: the derivational layers are phases (Chomsky 2000).

5.3 Analysis #2: phasal spell-out of *v*P and CP (in-progress?)

- Spell out each phase
  - Categorized *x*P = PStem.
  - Full CP = PWd
- At each spell out, there is a chance for prosodic constituents to be adjusted or added. (Language variation expected here.)
- Phonological readjustment rules follow (re-)prosodification and feed metrification.
- Steps in mapping syntax to phonology:

1. Spell-out (linearize, exponence, (re-)prosodification)
2. Flattening of inner prosodic domain (metrification and bracket erasure)
3. Phonological readjustment (in PWd)

- Illustration derivation of:

(57) ⟦po.ni.pi.sa̰⟧
ponipisa!
[$\sqrt{}$pon–p]–is–Ø
[$\sqrt{}$cease–by.mouth.*v*]–2SG:3.IMP–CMD
'stop carrying him (e.g. a pup)!' [FR 92]

- Phase 1: *v*P phase

1. Spell-out of *v*P into a PStem:
   - Syntax: $[\sqrt{\text{ROOT}}\text{–}v^0]_{v\text{P}} \rightarrow$
   - Prosody: $(\text{pon-p})_{\text{Pstem}}$
2. Flattening of inner domains (n/a)
3. Phonological readjustments (n/a)

- Phase 2: CP phase

1. Spell-out of CP into a PWd; allow for re-prosodification of PStem boundaries. In this case, right edge of PStem extends to include suffixes:
   - Syntax: $[[\sqrt{\text{ROOT}}\text{–}v^0]_{v\text{P}}\text{–suffixes}]_{\text{CP}} \rightarrow$
   - Prosody: $((\text{pon-p})_{\text{Pstem}}\ \text{-:s})_{\text{PWd}}$
2. Flattening of inner domains
   - Prosody: $(\text{po.ni.pis})_{\text{PWd}}$
3. Phonological readjustments (n/a)

- Illustration derivation of:

(58) ⟦ʔá.kɛ:.po.ni.pa.wa̰⟧
ákaiponipawa
áka–[√pon–p]–a–Ø–wa
PRF–[√cease–by.mouth.*v*]–3OBJ–IND–3
'he [pup] is no longer being carried by its mother' [FR 92] (=30c)

- Phase 1: *v*P phase
  1. Spell-out of *v*P into a PStem:
     - Syntax: $[\sqrt{\text{ROOT}}\text{–}v^0]_{v\text{P}} \rightarrow$
     - Prosody: $(\text{pon-p})_{\text{Pstem}}$
  2. Flattening of inner domains (n/a)
  3. Phonological readjustments (n/a)

- Phase 2: CP phase
  1. Spell-out of CP into a PWdz
     - Syntax: $[\text{prefixes–}[\sqrt{\text{ROOT}}\text{–}v^0]_{v\text{P}}\text{–suffixes}]_{\text{CP}} \rightarrow$
     - Prosody: $(\text{akaa-}(\text{pon-p-a-wa})_{\text{Pstem}}\ )_{\text{PWd}}$
  2. Flattening of inner domains
     - Prosody: $(\text{akaa-}(\text{pon-p-a-wa})_{\text{Pstem}}\ )_{\text{PWd}} \rightarrow$
     - Prosody: $(\text{akaa-po.ni.pa.wa})_{\text{PWd}}$
  3. Phonological readjustments (deletion/epenthesis at each juncture in the PWd)
     - $(\text{akaa-po.ni.pa.wa})_{\text{PWd}} \rightarrow$
     - $(\text{akaa-}\mathbf{i}\text{po.ni.pa.wa}(_{\text{Pstem}})_{\text{PWd}}$

6 Discussion: current and future work

- Gaps in the Blackfoot corpus
  - Problem: entries do not always include all three contexts. The "After V" context is especially rare, and roots are nearly always shown after an [a] (not other vowels).
  - need a larger corpus and a way to analyze words into morphemes

- Blackfoot Words database (Weber 2022a; Weber et al. 2023)[9]
  - relational database of inflected words and phrases, and their subparts
  - 63,493 lexical forms have been digitized to date from 30 sources

[9] https://www.blackfootwords.com/

  - timespan: 1743–2017 (almost 300 years!)
  - Version 1.1 includes 9 of 30 sources
  - words are tokenized at the stem and morpheme level
  - each token linked to an abstract lemma
- What is the typology of re-prosodification?
  - Algonquian Prosodic Structure Working Group
  - Examining the same sets of diagnostics for prosodic structure across many Algonquian languages.
  - Special sessions at the Algonquian Conference (2022) and the LSA (2023)

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A Other patterns for roots with initial short vowel

A.1 Initial [a]: [#a] ∼ [o] before coronals

- The minor pattern for roots with initial [#a] ∼ [i] is highly restricted phonologically: the following consonant is always a voiceless coronal {t, ts, s}.
- The [#a] ∼ [o] pattern occurs before labials, velars, and voiced/sonorant coronals.
- Essentially in complementary distribution (with a few exceptions, listed in the Appendix).
- But: some overlap with the initial [#a] ∼ [o] pattern as well. For example, the two roots below have similar segmental strings to ‘relate a story’ above, but alternate with [o].

(59) a. ⟦ʔ**a**.tsi.na.jíː.ˢtsi̥⟧
***a**tsinayíístsi*
√**a**tsinayí–ístsi
√fat–IN.PL
'fats' [FR 19]

b. ⟦ʔá.k**ɔː**.tsi.na.ji.ji̥⟧
*ák**ao**tsinayiyi*
ák**aa**–√**a**tsinayi–yi
PRF–√fat–IN.SG
'old fat' [FR 19]

(60) a. ⟦ʔ**a**.tsí.mo.taːt⟧
***a**tsimotáát!*
[√**a**tsimot–áá]–t–Ø
[√escape–AI]–2SG.IMP–CMD
'escape!' [FR 214]

b. ⟦ʔâː.k**o**.tsí.mo.taːt⟧
*áak**a**tsimotaawa!*
aak–[√**a**tsimot–áá]–Ø–wa
FUT–[√escape–AI]–IND–3
'she will flee' [FR 214]

- For this reason, the two allomorphs are not phonologically predictable. I will treat roots with [#a] ∼ [o] before coronals as having lexically listed allomorphs, though nothing hinges on this.

(61) a. {/atsinayi-/, /otsinayi-/} 'fat'
b. {/atsimot-/, /otsimot-/} 'escape'

A.2 Initial obstruent: #C ∼ iC, plus root-internal changes

- Two processes of root-internal changes

1. Vowel syncope and gemination (Berman 2006); SNAKE-STEMS in Thomson (1978).

(62) a. LEFT EDGE

⟦po.no.ká.wḁ⟧
ponokáwa
√ponoka–wa
√elk–PRX
'elk' [FR 230]

b. AFTER C

⟦si.ksín.no.kɛː.ksi̥⟧
siksínnokaiksi
sik–√nnoka–iksi
black–√elk–AN.PL
'black elks' [FR 230]

c. AFTER V

⟦ma.kɐn.no.kɔː.mi.taː.wḁ⟧
makainnokaomitaawa
maka–√nnoka–√omitaa–wa
stunted–√elk–√dog–PRX
'horse of stunted growth, e.g. a Shetland pony' [FR 144]

(63) a. LEFT EDGE

⟦ki.pi.tá.aː.kiː.wa̧⟧
kipitáaakiiwa
√kipitá–√aakii–wa
√old.woman–√woman–PRX

'old woman' [FR 138]

b. AFTER C

⟦po.ksíp.pi.táaː.kiːks⟧
poksíppitáaakiiksi
pok–√ppitá–√aakii–iksi
small–√old.woman–√woman–AN.PL

'little old women' [FR 138]

c. AFTER V

⟦ʔa.mɛ́p.pi.tá.aː.kiː.wa̧⟧
amáíppitáaakiiwa
amá–√ppitá–aakii–wa
pathetic–√old.woman–√woman–PRX

'pathetic old woman' [FR 12]

2. Vowel syncope before <ssC> (Berman 2006); SCRATCH-STEMS in Thomson (1978).

(64) a. LEFT EDGE

⟦pɪs.tsí.px^{w}.toːt⟧
pisstsípohtoot!
pisst–íp–oht–oo–t

'bring it in' [FR 96]

b. AFTER C

⟦ʔâː.ksi.ps.tsi.p^{w}.toː.ma̧⟧
áaksipsstsipohtooma
áak–psst–ip–oht–oo–m–a

'she will bring it in' [FR 96]

c. AFTER V

⟦ni.tɛ́ː.ps.tsoʔ.kjaː.wa̧⟧
nitáípsstso'kiaawa
nit–á–psst–yo'ki–aa–wa

'I am enclosing them' [FR 97]

(65) a. LEFT EDGE

⟦ksis.ka.nɔ́ː.to.ni.wa̧⟧
ksisskanáótoniwa
ksisskan–áótoni–wa

'it is/was morning' [FR 67]

b. AFTER C

⟦ʔa.kâː.ksi.ks.ka.nɔ́ː.tʊn.ni.wa̰⟧
akáaksiksskanáótonniwa
aká–ak–iksskan–áótonni–wa
'it will soon be morning' [FR 67]

c. AFTER V

⟦ʔá.kɛː.ks.ka.nɔ́ː.tʊn.ni.wa̰⟧
ákaiksskanáótonniwa
áka–iksskan–áótonni–wa
'it has become morning' [FR 67]

- Idiosyncratic and exceptional; ∼20 forms total (Thomson 1978).
- Not all stems with the right shape undergo these processes.
- Example (66) is phonologically similar to (67b) but has no root-internal changes.

(66) a. LEFT EDGE

⟦pɪs.ka.ni̥⟧
pisskani
√pissk–an–i
√fence–NMLZ–IN.SG
'buffalo jump' [FR 228]

b. AFTER C

⟦po.ksi.pís.ka.ni^{s}tsi̥⟧
poksipísskanistsi
pok–√píssk–an–istsi
small–√fence–NMLZ–IN.SG
'small (miniature) buffalo jumps' [FR 228]

- Summary of allomorphs:

(67)

	Left edge		After C	=	After V	
a.	⟦ponoka-⟧	∼	⟦inːoka-⟧	=	⟦inːoka-⟧	'elk'
	⟦kipita-⟧	∼	⟦ipːita-⟧	=	⟦ipːita-⟧	'old woman'
b.	⟦pist-⟧	∼	⟦ipst-⟧	=	⟦ipst-⟧	'in'
	⟦ksiskan-⟧	∼	⟦ikskan-⟧	=	⟦ikskan-⟧	'early'

- Neither form is easily derivable from the other.
- Possibly an abstract analysis is possible for (67a): /pnoka-/ 'elk', /kpita-/ 'old woman'. One problem is that these forms include consonant clusters which are never seen on the surface, and they require particular phonological processes that exist nowhere else in the grammar, such as changing a cluster to a geminate.
- Possibly an abstract analysis is possible for (67b): /pst-/ 'in', and *kskan-* 'early'. One problem is that there are roots which begin at the left edge with CsC clusters, but which follow some other pattern. Possibly those have some other, different, abstract analysis.
- It is unclear whether we are simply recreating an internal reconstruction.
- If abstract URs are not used, then lexically listed allomorphs would work. (The [i] after prefixes is treated as epenthetic.)

(68) a. {/ponoka-/, /nnoka-/} ‘elk’
{/kipita-/, /pːita-/} ‘old woman’
b. {/pist-/, /pst-/} ‘in’
{/ksiskan-/, /kskan-/} ‘early’