On the misalignment of prosodic edges and syllables
Prosodic edges may align with syllable edges at the expense of syntax-prosody alignment.

Syntax: ...C-{V… ...V-{V…

Prosody: ... .C{V.[ ... ... .V{V.[ ... P-to-σ align ≫ S-to-P align

... [.C{V. ... ... [.V{V. ... P-to-σ align ≫ S-to-P align

{ = left edge of stem, [ = left edge of prosodic stem

(Downing 1998b; McCarthy and Prince 1993a; Nespor and Vogel 2007)
IsiXhosa reduplication

RED base is a prosodic constituent; stem-initial vowel not included

A. CONSONANT-INITIAL STEMS

ukú-{{phátha ukú-phathá-{{phatha ‘touch’
ukú-{{sebénza ukú-sebe-{{sebénza ‘work’

B. VOWEL-INITIAL STEMS, INFIXING

ukw-{{á[látha ukw-{{á-lathá-[latha ‘point at’
uk-{{ó[phúla uk-{{ó-phulá-[phula ‘break’

{ = left edge of stem, [ = left edge of prosodic stem

(Cassimjee 1994; Downing 1998a,b)
KiHehe reduplication

RED base is a prosodic constituent; prefix-final consonant included

A. CONSONANT-INITIAL STEMS

kú-[ceénga  kú-ceenga-[ceénga ‘build’
kú-[teléka kú-teleka-[teléka ‘cook for’

B. VOWEL-INITIAL STEMS, “EXFIXING”

[kw]-íimbíla  kw-íimbíla-[kw]-íimbíla ‘sing’
[kw]-áaka  kw-áaka-[kw]-aáka ‘burn’

{ = left edge of stem, [ = left edge of prosodic stem

(Downing 1998a; Odden and Odden 1985)
Prosodic edges may align with syllable edges at the expense of syntax-prosody alignment. Often taken as evidence that prosodic constituents are distinct from syntactic constituents (Indirect Reference)

“Prosodic constituents”
- “interface categories” extrinsically defined by their relation to syntax
- not metrical, rhythmic, or sonority-related categories like feet and syllables

(Itô and Mester 2012)

(Inkelas 1993; Nespor and Vogel 2007; Pierrehumbert and Beckman 1988; Selkirk 1984)
Introduction

Prosodic edges and syllable edges may misalign to maintain syntax-prosody alignment.

Syntax: \( \ldots \text{C-\{} V \ldots \) \( \ldots \text{V-}\{ V \ldots \)

Prosody: \( \ldots \text{.C}\{ V \ldots \) \( \ldots \text{.V}\{ V \ldots \) \( \text{P-to-\( \sigma \) align} \gg \text{S-to-P align} \)

IsiXhosa

KiHehe

\( \ldots \text{.C}\{[ V \ldots \) \( \ldots \text{.V}\{[ V \ldots \) \( \text{S-to-P align} \gg \text{P-to-\( \sigma \)align} \)

???

Blackfoot

\{ = \text{left edge of stem, [ = left edge of prosodic stem}\)
1. Language background and syllable structure

2. Evidence for the left edge of a prosodic constituent

3. Evidence that syllables span the left edge

4. Arguments against syntax-prosody misalignment for Blackfoot

5. Summary
Language background and syllable structure
Blackfoot (Algonquian family)

Figure 1: Map by Eric Leinberger.

(Frantz 2009; Frantz and Russell 2017)
Syntax and prosody

- Verbal complex = CP
- Stem = VP/nP

**Syntax**

\[
\text{CP} \{ \text{prefix-} \text{vP} \{ \sqrt{\text{ROOT-}} \text{v-} \text{V} \} \text{vP-} \text{I}^0 \text{-C}^0 \} \text{CP}
\]

**Prosody**

\[
\text{PPh} \{ \text{prefix-} \text{PWd} \{ \sqrt{\text{ROOT-}} \text{v-} \text{V} \} \text{PWd-} \text{I}^0 \text{-C}^0 \} \text{PPh}
\]

(this talk)

(Bliss 2013; Déchaine and Weber 2015, 2018; Déchaine and Wiltschko 2010; Weber 2020)
Data sources

- Fieldwork with native speakers (for: phonology and syllable structure sections)
  - Especially Totsinámm (Beatrice Bullshields; BB)

- Reference materials (for: morpheme alternations)
  - Grammar (Frantz 2017)
  - Dictionary (Frantz and Russell 2017)
## Phonological inventory

<table>
<thead>
<tr>
<th>Category</th>
<th>Labial</th>
<th>Coronal</th>
<th>Dorsal</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td>p, pː</td>
<td>t, tː</td>
<td>k, kː</td>
<td>? ʔ</td>
</tr>
<tr>
<td>Assibilants</td>
<td>ts, tːs</td>
<td>ks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-assibilants</td>
<td>ˢt, ˢtː</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td>s, sː</td>
<td>x &lt;h&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasals</td>
<td>m, mː</td>
<td>n, nː</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glides</td>
<td>w</td>
<td>j &lt;y&gt;</td>
<td>(w)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vowels</th>
<th>front</th>
<th>central</th>
<th>back</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>i, iː</td>
<td>o, oː</td>
<td></td>
</tr>
<tr>
<td>mid</td>
<td>e, &lt;ai&gt;</td>
<td>o, &lt;ao&gt;</td>
<td></td>
</tr>
<tr>
<td>low</td>
<td>a, aː</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Doubled letters for long segments.

(Derrick and Weber n.d.; Weber 2020)
Syllable structure

Diagnostics for syllabification:
(later used to show that C-V and V-V are syllabified across a morpheme boundary)

1. Vowel length neutralized before codas
2. Onsetless syllables resolved via coalescence or epenthesis
3. Codas restricted to /ʔ/, /s/, /x/, geminate

Analysis: Optimality Theory framework

(McCarthy and Prince 1993a,b; Prince and Smolensky 1993)
Contrastive vowel length in open syllables.

CV  [ʔâː.ko.kaː]  ‘he will rope’  (BB)
CVV [ʔâː.koː.kaː]  ‘she will hold a Sundance’  (BB)

**Short vowels**

V

**Long vowels**

V

(Hayes 1989; Hyman 1985; Pulleyblank 1994)
Syllable structure: vowel length neutralized before codas

Vowel length neutralization before codas.

CV  [po:no.kâ:]  ‘elk’  (BB)
CVV [poʔ.tô:.ki.t]  ‘let go of me!’  (BB)
CVC [só.ka?.si.m]  ‘shirt, dress’  (BB)
     [ʔim.mo.já:.n]  ‘fur coat’  (BB)
CVVC  —  —

Maximal syllable

Diagnostic for codas: preceding vowel is short
Syllable structure: onsetless syllables resolved

Vowel coalescence avoids onsetless syllables inside of the PPh

Vowel-initial suffix: /-ip/ ‘bring’

**AFTER C**

- [ʔomatsípiːs]
  - \{√omat−ip/i−:s\}−Ø
  - \{√start−bring/v−2SG:3.IMP\}−CMD

‘transport him!’

**AFTER V**

- [sɛːpíːs]
  - \{√sa−ip/i−:s\}−Ø
  - \{√out−bring/v−2SG:3.IMP\}−CMD

‘bring her out!’
Syllable structure: onsetless syllables resolved

A coalesced vowel is syllabified as a single nucleus

(Elfner 2006; Weber 2020)
Epenthesis avoids onsetless syllables at the beginning of the PPh

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
<th>BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ʔapíːt]</td>
<td>‘sit!’</td>
<td></td>
</tr>
<tr>
<td>[ʔimitâː]</td>
<td>‘dog’</td>
<td></td>
</tr>
<tr>
<td>[ʔotán]</td>
<td>‘his/her daughter’</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/ap-ii-t/</th>
<th>ONS</th>
<th>Max(µ)</th>
<th>Dep</th>
<th>*Diph</th>
<th>Unif</th>
<th>*V:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. a.pí:.t</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. pí:.t</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ?a.pí:.t</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Elfner 2006; Weber 2020)
Syllable structure: epenthesis avoids illicit clusters

Codas restricted to /ʔ/, /s/, /x/, geminate

[koʔ. Khá] ‘corner’ (BB)
[pʌs.ká:.n] ‘dance’ (BB)
[óxʷ.ko.to.kí] ‘rock’ (BB)
[mʊt.to.ksí.s] ‘knee’ (BB)
Syllable structure: epenthesis avoids illicit clusters

Epenthesis avoids illicit clusters

Consonant-initial suffix: /-p/ ‘tie’

**After C**

[ʔaˈksipɪstɑːt]

\{√aak–p/ist–aa\}–t–Ø

\{√lid–tie/v–V\}–2SG.IMP–CMD

‘use that pole!'

**After V**

[aˈwápɪstɑːt]

\{√aawa–p/ist–aa\}–t–Ø

\{√wander–tie/v–V\}–2SG.IMP–CMD

‘make a cradle swing!’
Syllable structure: epenthesis avoids illicit clusters

<table>
<thead>
<tr>
<th>/koʔki/</th>
<th>CodaCond</th>
<th>Max</th>
<th>Dep</th>
<th>Dep(µ)</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. koʔ.ki</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. koʔ.ʔi.ʔi</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ko ki</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/aːk-pist-aː-t/</th>
<th>CodaCond</th>
<th>Max</th>
<th>Dep</th>
<th>Dep(µ)</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ʔak.pi.ʰtaː.t</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ʔaːksi.pi.ʰtaː.t</td>
<td></td>
<td></td>
<td>**</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. ʔaː.pi.ʰtaː.t</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Itô 1989)
Syllable structure: summary diagnostics

1. Vowel length neutralized before codas
2. Onsetless syllables resolved via coalescence or epentheses
   ◦ Onsetless syllables are not allowed
   ◦ Coalesced vowels form a single syllable nuclei
3. Codas restricted to /ʔ/, /s/, /x/, geminate
   ◦ Illicit clusters avoided via [i] epentheses
Evidence for the left edge of a prosodic constituent
Evidence for the left edge of a prosodic domain

- Phonologically active constraint against [-cont] segments
- Drives roots alternations, including a productive pattern of epenthesis at left edge
- Evidence: vowel-initial and obstruent-initial roots in two positions.
  - Left edge of the PPh (e.g. PWd and PPh are not distinct)
  - After prefix (e.g. PWd and PPh are distinct)

### Syntax

<table>
<thead>
<tr>
<th>CP</th>
<th>(prefix–)</th>
<th>vP { √root–ν–V }</th>
<th>vP –I₀–C₀</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left edge</td>
<td>PPh</td>
<td>PWd [√root–ν–V]</td>
<td>PWd –I₀–C₀</td>
<td>PPh</td>
</tr>
<tr>
<td>After prefix</td>
<td>PPh [prefix–]</td>
<td>PWd [√root–ν–V]</td>
<td>PWd –I₀–C₀</td>
<td>PPh</td>
</tr>
</tbody>
</table>
Roots which begin with a short vowel \{i, o, a\}

**Left Edge**

[ʔi.tsí.nxʷ.toː.t]

{√itsin–oht–oo}–t–Ø

{√among–put.v–V}–2SG.IMP–CMD

‘place it among the rest!’

**After C**

[ʔà:.ki.tsí.nxʷ.to:.mᵃ]

aak–{√itsin–oht–oo}–m–a

FUT–{√among–put.v–V}–IND–3

‘he will place it among the rest’

**After V**

[ʔéi.tsí.nxʷ.to:.mᵃ.jᵢ]

a–{√itsin–oht–oo}–m–Ø=ayi

IPFV–{√among–put.v–V}–IND–3=OBV.SG

‘he is placing it among the rest’
Roots which begin with a short vowel \{i, o, a\}

**Left edge**

\[?o.káː.t\]

\{\sqrt{\text{ok–aa}}–t–Ø\}

\{\sqrt{\text{snare–V}}–2\text{SG.IMP–CMD}\}

‘rope!’

**After C**

\[?âː.ko.kaː.wḁ\]

aa\k–{\sqrt{\text{ok–aa}}–Ø–wa}

fut–{\sqrt{\text{snare–V}}–\text{IND–3}}

‘he will rope’

**After V**

\[?âː.koː\]

a–{\sqrt{\text{ok–aa}}–Ø–wa}

ipfv–{\sqrt{\text{snare–V}}–\text{IND–3}}

‘he is roping’ (BB)
Roots which begin with a short vowel {i, o, a}

**Left Edge**

[ʔa.tsi.ni.ki.t]

/{√atsinik–i}–t–Ø

/{√relate.story–V}–2SG.IMP–CMD

‘relate a story!’ (BB)

**After C**

[ʔàː.ki.tsi.ni.ki.wḁ]

/aa–{√itsinik–i}–Ø–wa

/FUT–{√tell.story–V}–IND–3

‘s/he will relate a story’

**After V**

[ʔéi.tsi.ni.ki.wḁ]

/a–{√itsinik–i}–Ø–wa

/IPFV–{√tell.story–V}–IND–3

‘s/he is relating a story’
Roots which begin with a short vowel \{i, o, a\}

**LEFT EDGE**

[ʔa.kș.tá.ki.t]

\{√ak–st–aki\}–t–Ø

\{√count–v–V\}–2SG.IMP–CMD

‘read!’ (BB)

**AFTER C**

[ʔá:.ko.kș.ta.ki.wã]

aak–\{√ok–st–aki\}–Ø–wa

FUT–\{√read–v–V\}–IND–3

‘s/he will read’

**AFTER V**

[ʔó:.kș.ta.ki.wã]

a–\{√ok–st–aki\}–Ø–wa

IPFV–\{√read–v–V\}–IND–3

‘s/he is reading/counting’
Roots which begin with a short vowel \{i, o, a\}

Root alternations, modulo coalescence

<table>
<thead>
<tr>
<th><strong>LEFT EDGE</strong></th>
<th><strong>AFTER PREFIX</strong></th>
<th><strong>UR</strong></th>
<th><strong>GLOSS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [ʔitsin]</td>
<td>~ ~ [itsin]</td>
<td>/itsin/</td>
<td>‘among’</td>
</tr>
<tr>
<td>b. [ʔok]</td>
<td>~ ~ [ok]</td>
<td>/ok/</td>
<td>‘snare’</td>
</tr>
<tr>
<td>c. [ʔatsinik]</td>
<td>~ ~ [itsinik]</td>
<td>/atsinik, itsinik/</td>
<td>‘relate a story’</td>
</tr>
<tr>
<td>d. [ʔak]</td>
<td>~ ~ [ok]</td>
<td>/ak, ok/</td>
<td>‘count’</td>
</tr>
<tr>
<td>e. *[ʔaC]</td>
<td>~ [aC]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(phonologically optimizing allomorphy; Mascaró 2007)
Roots which begin with an obstruent

**LEFT EDGE**

[pʊmːós]

\(\sqrt{\text{pomm–o–:\text{s}}}–\emptyset\)

\(\sqrt{\text{transfer–v–2sg:3.imp}}–\text{cmd}\)

‘transfer (e.g. the medicine bundle) to him!’

**AFTER C**

[ʔâːksipʊm:oji:wájì]

aak–\(\sqrt{\text{pomm–o–yii}}–\emptyset–\text{w=ayi}\)

fut–\(\sqrt{\text{transfer–v–3sub}}–\text{ind–3=obv.sg}\)

‘he will transfer it to her’

**AFTER V**

[ʔé:pʊm:akiwâ]

a–\(\sqrt{\text{pomm–\emptyset–aki}}–\emptyset–\text{wa}\)

ipfv–\(\sqrt{\text{transfer–v–v}}–\text{ind–prx}\)

‘the one transferring (previous owner)’

Yale
Roots which begin with an obstruent

<table>
<thead>
<tr>
<th>/aːk-pomm-o-yii-w=ayi/</th>
<th>CodaCond</th>
<th>Max</th>
<th>Dep</th>
<th>Dep(µ)</th>
<th>Unif</th>
<th>*V:</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?âːk.póm.mo.jiː.wá.jį</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>b. ?âː.ksi.póm.mo.jiː.wá.jį</td>
<td></td>
<td>**</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ?âː.póm.mo.jiː.wá.jį</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/aː-pomm-aki-wa/</th>
<th>CodaCond</th>
<th>Max</th>
<th>Dep</th>
<th>Dep(µ)</th>
<th>Unif</th>
<th>*V:</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.pʊm.ma.ki.wḁ</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ?ēː.pʊm.ma.ki.wḁ</td>
<td></td>
<td>**!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Change in vowel quality and length is not driven by syllable structure constraints

Yale
1. Roots have the same form after consonants or vowels

<table>
<thead>
<tr>
<th>Left edge</th>
<th>After C</th>
<th>After V</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [mɔːxk]</td>
<td>[omɔːxk]</td>
<td>[omɔːxk]</td>
<td>‘red’ (\varnothing \sim V)</td>
</tr>
<tr>
<td></td>
<td>[naːn]</td>
<td>[inaːn]</td>
<td>‘possess’</td>
</tr>
<tr>
<td>b. [maːn]</td>
<td>[an]</td>
<td>[an]</td>
<td>‘recent’ (N \sim \varnothing, V: \sim V)</td>
</tr>
<tr>
<td></td>
<td>[niːpo]</td>
<td>[ipo]</td>
<td>‘upright’</td>
</tr>
<tr>
<td>c. [pomː]</td>
<td>[oxpomː]</td>
<td>[oxpomː]</td>
<td>‘buy’ (\varnothing \sim ox)</td>
</tr>
<tr>
<td>d. [kipita]</td>
<td>[ipːita]</td>
<td>[ipːita]</td>
<td>‘aged’ (\varnothing \sim i, gemination)</td>
</tr>
<tr>
<td>e. [pomː]</td>
<td>[ipomː]</td>
<td>[ipomː]</td>
<td>‘transfer’ (\varnothing \sim i)</td>
</tr>
</tbody>
</table>
2. Root alternations avoid plosives and nasals after a prefix

Table 1: Segments allowed at left edge of roots in two positions

<table>
<thead>
<tr>
<th></th>
<th>p</th>
<th>k</th>
<th>m</th>
<th>n</th>
<th>j</th>
<th>w</th>
<th>iː</th>
<th>oː</th>
<th>ɛː</th>
<th>ɔː</th>
<th>aː</th>
<th>i</th>
<th>o</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left edge</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>After prefix</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

[-cont] [-cons]

Proposal

Root alternations and epenthesis occur to satisfy an *#[-cont] edge constraint at the left edge of the PWd.
Left edge constraint triggers epenthesis

- *#[-cont] Assign a violation mark for every [-cont] segment which is leftmost in the PWd.
- Al(PWd, σ) The left edge of every PWd aligns with the left edge of a σ.

CdCnd, Onset, *#[-cont] \( \gg \) Dep \( \gg \) Unif, Dep(μ), Al(PWd, σ), *V: \( \gg \) *Cod
After V: *#[-cont] $\gg$ Dep, Dep(µ)

<table>
<thead>
<tr>
<th>a-{pom:-aki-wa</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#[-cont]</th>
<th>Dep</th>
<th>UNIF</th>
<th>Dep(µ)</th>
<th>AL(PWd,σ)</th>
<th>*V:</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.{[pum.ma.ki.wå</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
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<td>*</td>
</tr>
<tr>
<td>b. ?á.[?i.{pum.ma.ki.wå</td>
<td></td>
<td></td>
<td>***!</td>
<td>*</td>
<td></td>
<td></td>
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<td>*</td>
</tr>
<tr>
<td>c. ?ê[ê.{pom.ma.ki.wå</td>
<td></td>
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<td>**</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<td>*</td>
</tr>
</tbody>
</table>

Optimal candidate violates AL(PWd,σ)

(NB: discussion of other ways to avoid violations of AL(PWd,σ) in later sections…)
### After C: Coda Cond, \(*\#-\text{cont}\) \(\Rightarrow\) Dep, Dep(\(\mu\))

<table>
<thead>
<tr>
<th>Candidate</th>
<th>CDND</th>
<th>ONS</th>
<th>(*#-\text{cont})</th>
<th>Dep</th>
<th>UNIF</th>
<th>Dep((\mu))</th>
<th>AL(PWd,(\sigma))</th>
<th>V:</th>
<th>COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (\text{ʔâk.}}}{{pó̂m.m̥.ɔ̌.jiː.wá.ji̯}\</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>b. (\text{ʔâːks[ị.}}}{{pó̂m.m̥.ɔ̌.jiː.wá.ji̯}\</td>
<td></td>
<td></td>
<td>**</td>
<td>*</td>
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<td>**</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

**Optimal candidate violates** AL(PWd,\(\sigma\))

(NB: discussion of other ways to avoid violations of AL(PWd,\(\sigma\)) in later sections…)
Left edge constraint triggers epenthesis

**LEFT EDGE**

<table>
<thead>
<tr>
<th>{pom:-o:s}</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#[-CONT]</th>
<th>DEP</th>
<th>UNIF</th>
<th>DEP(μ)</th>
<th>AL(PWd,σ)</th>
<th>*V:</th>
<th>*COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. {pum.mó: s}</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>b. [ʔi.{pum.mó: s}</td>
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<td>**</td>
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</tr>
<tr>
<td>c. ʔ[ʔi.{pum.mó: s</td>
<td></td>
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<td></td>
<td>**</td>
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</tr>
</tbody>
</table>

Solution: epenthesis of a mora at left edge of PPh must be blocked
Diagnosing the left edge of the the vP/VP

- **ANCHOR-L[µ]:** Assign a violation if the leftmost mora in a CP in the input has a correspondent in the output which is not leftmost within a PPh in the output.

**LEFT EDGE: ANCHOR-L[µ] ⇒ *#[-cont]**

<table>
<thead>
<tr>
<th>{pom:-o:-s}</th>
<th>ANCH-L</th>
<th>Cdcnd</th>
<th>ONS</th>
<th>*#[-cont]</th>
<th>Dep</th>
<th>Unif</th>
<th>Dep(µ)</th>
<th>Al(PWd,σ)</th>
<th>*V:</th>
<th>*µ/C</th>
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</thead>
<tbody>
<tr>
<td>a. {pum.mó:.s</td>
<td></td>
<td></td>
<td>*</td>
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<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. ?i.{pum.mó:.s</td>
<td>*!</td>
<td></td>
<td></td>
<td>**</td>
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<td>*</td>
<td>*</td>
</tr>
<tr>
<td>c. ?i.{pum.mó:.s</td>
<td>*!</td>
<td></td>
<td></td>
<td>**</td>
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<td>*</td>
</tr>
</tbody>
</table>
Diagnosing the left edge of the the vP/VP: summary

Evidence for the left edge of the Prosodic Word (PWd)
  ◦ Edge restriction against [-cont] segments
  ◦ Triggers root alternations, including epenthesis

Holds of a *prosodic* constituent, not a syntactic constituent (cf. indirect reference theories)
  ◦ Active phonological constraint (not a Morpheme Structure Constraint)
  ◦ Phonological generalizations apply to prosodic constituents
Diagnosing the left edge of the vP/VP: summary

**Syntax**
\[
\{ \text{prefix} - \{ \sqrt{\text{root}} - V - V \} \}_{vP-I^0-C^0} \]

**Prosody**
\[
\ldots C\{V. \ldots \\
\ldots V\{V. \ldots 
\]

**Two further claims**
1. Evidence that syllables span the left edge of the PWd constituent
2. Arguments against syntax-prosody misalignment for Blackfoot
Evidence that syllables span the left edge
Evidence that syllables span the left edge: C-V syllabification

[ʔâː. ƙs[i. pûm.mo.ji:.wá.jj]

aak→{√pomm–o–yii}–Ø–w=ayi
FUT→{√transfer–v–3SUB}–IND–3=OBV.SG
‘he will transfer it to her’

- Final [ks] of prefix is not a coda
- Preceding vowel length is not neutralized
- Initial [i] of stem is not at the left edge of a syllable
- Onsetless syllables are prohibited in Blackfoot

<table>
<thead>
<tr>
<th>aak-{pom:-o-ii-w=ayi</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#{-CONT}</th>
<th>Dep</th>
<th>Unif</th>
<th>Dep(μ)</th>
<th>Al(PWd,σ)</th>
<th>*V:</th>
<th>*COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ʔâ.k.[{pûm.mo.ji:.wá.jj</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>b. ʔâ.ks[i. {pûm.mo.ji:.wá.jj</td>
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<td></td>
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<td>**</td>
</tr>
<tr>
<td>c. ʔâ.k.[i. {pûm.mo.ji:.wá.jj</td>
<td><em>!</em></td>
<td>*!</td>
<td>**</td>
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<td>**</td>
</tr>
<tr>
<td>d. ʔâ.k.[ʔi. {pûm.mo.ji:.wá.jj</td>
<td><em>!</em></td>
<td>**!</td>
<td>***</td>
<td></td>
<td></td>
<td>*</td>
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<td>**</td>
</tr>
</tbody>
</table>

(also true of underlying C-V sequences)
Evidence that syllables span the left edge: V-V syllabification

- Long [é:] is a single syllable nucleus
- Vowel coalescence has occurred
- Cannot be two vowels in hiatus
- Onsetless syllables are prohibited in Blackfoot

<table>
<thead>
<tr>
<th>a-{pom:-aki-wa}</th>
<th>CD(\text{CND})</th>
<th>ON(\text{S})</th>
<th>*#[-CONT]</th>
<th>DE(\text{P})</th>
<th>UNI(\text{F})</th>
<th>DE(\text{P}(\mu))</th>
<th>AL((\text{PWd},\sigma)))</th>
<th>*(\text{V}):</th>
<th>*(\text{COD})</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.{[pum.ma.ki.wa}</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
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<td>*</td>
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<tr>
<td>b. ?é.[é.{pum.ma.ki.wa}</td>
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</tr>
<tr>
<td>c. ?é.[é.{pum.ma.ki.wa}</td>
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<td>d. ?é.[?é.{pum.ma.ki.wa}</td>
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</tr>
</tbody>
</table>

(Also true of underlying V-V sequences)
Arguments against syntax-prosody misalignment for Blackfoot
Arguments against syntax-prosody misalignment

- Some suboptimal candidates satisfy $A_L(PWd,\sigma)$ by violating $\text{MATCH}$ (S-to-P alignment)
  - This requires a redefinition of $\text{MATCH}$ constraints (Elfner 2012; Selkirk 2011)
  - $\text{MATCH}$ is violated by over- or underparsing underlying material
  - ...but not by epenthesis or deletion
Match Theory (Selkirk 2011; Selkirk 2009)

- **Match** constraints require exact correspondence between syntactic and prosodic constituents.
- Parallel evaluation of constraints in Optimality Theory
- **Match** constraints can be violated in order to satisfy higher-ranked constraints.

**Syntax-prosody correspondences in Match Theory**

- "syntactic clause" $\leftrightarrow \iota$ (intonational phrase)
- "syntactic phrase" $\leftrightarrow \phi$ (phonological phrase)
- "syntactic word" $\leftrightarrow \omega$ (prosodic word)
Defining MATCH constraints

Let $S$ be an input syntactic representation and $P$ its corresponding output phonological representation.

- $\text{MATCH}(\alpha, \pi)$: Suppose there is a syntactic constituent $\alpha$ in the syntactic representation that exhaustively dominates a set of one or more terminal nodes $A$. Assign one violation mark if there is no phonological constituent $\pi$ in the phonological representation that exhaustively dominates all and only the phonological exponents of the terminal nodes in $A$.

For Blackfoot: $\text{MATCH}(vP,PWd)$ is relevant

(based on $\text{MATCH-PHRASE}$ in Elfner 2012; Selkirk 2011)
Problems with MATCH constraints

*#[−cont] \implies MATCH(vP,PWd)

<table>
<thead>
<tr>
<th>a-{pom:-aki-wa}</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#[-cont]</th>
<th>MATCH</th>
<th>Dep</th>
<th>UNIF</th>
<th>Dep(μ)</th>
<th>Al(PWd,σ)</th>
<th>V:</th>
<th>Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.{pum.ma.ki.wa}</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
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</tr>
<tr>
<td>b. ?é[é.]{pum.ma.ki.wa}</td>
<td></td>
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</tbody>
</table>

Correct candidate violates MATCH(vP,PWd)
Problems with MATCH constraints

<table>
<thead>
<tr>
<th>Candidate</th>
<th>CdCND</th>
<th>ONS</th>
<th>#[-cont]</th>
<th>MATCH</th>
<th>Dep</th>
<th>UNIF</th>
<th>Dep(µ)</th>
<th>Al(PWd,σ)</th>
<th>*V:</th>
<th>*COD</th>
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<tbody>
<tr>
<td>a-{pom:-aki-wa</td>
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<td>MATCH</td>
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</tr>
<tr>
<td>a. ʔá.{póm.m̥a.k̥i.w̥a</td>
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<td>!*</td>
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<tr>
<td>b. ʔá.{póm.m̥a.k̥i.w̥a</td>
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<tr>
<td>c. ʔé[é.{póm.m̥a.k̥i.w̥a</td>
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<td>*</td>
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<td>**!</td>
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</tbody>
</table>

Correct candidate is harmonically bound by a candidate that overparses the PWd!
Problems with MATCH constraints

<table>
<thead>
<tr>
<th>a-{pom:-aki-wa</th>
<th>CdCND</th>
<th>ONS</th>
<th>*[#-cont]</th>
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<th>UNIF</th>
<th>Dep(µ)</th>
<th>AL(PWd,σ)</th>
<th>*V:</th>
<th>*COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.{[pʊm.mak.ɪ.wḁ</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>*</td>
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<tr>
<td>b. [ ?á.{pʊm.mak.ɪ.wḁ</td>
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<tr>
<td>c. ?è[è.{pʊm.mak.ɪ.wḁ</td>
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<td></td>
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<td>*</td>
<td>**!</td>
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</tr>
<tr>
<td>d. [?è::{pʊm.mak.ɪ.wḁ</td>
<td></td>
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<td>*</td>
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<td>*</td>
</tr>
<tr>
<td>e. ?è::{[pʊm.mak.ɪ.wḁ</td>
<td></td>
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<td>!</td>
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</tr>
</tbody>
</table>

**TWO PROBLEMS**

1. MATCH should penalize overparsing (b), but *not* epenthesis (c) and (d)
2. MATCH should distinguish overparsing from underparsing (Guekguezian 2017)
   - e.g. IsiXhosa vs. KiHehe, or candidates (d) and (e)
Redefining MATCH constraints

Let $S$ be an input syntactic representation and $P$ its corresponding output phonological representation. Suppose there is a syntactic constituent $\alpha$ in $S$ that exhaustively dominates a set of terminal nodes $A \in S$.

- $\text{Max-SP}(\alpha, \pi)$: Assign a violation mark for every element that (1) is an exponent of a morpheme in $A$ and (2) has a correspondent in $P$ which is not dominated by a $\pi$ corresponding to $\alpha$.

- $\text{Dep-SP}(\alpha, \pi)$: Assign a violation mark for every element that (1) is an exponent of a morpheme that is not in $A$ and (2) (has a correspondent in $P$ which) is dominated by a $\pi$ corresponding to $\alpha$.

(similar to definitions in Downing 1998b; Guekguezian 2017)
After V: Dep-SP $\gg$ Dep, Al(PWd,σ)

<table>
<thead>
<tr>
<th>a-{pom:-aki-wa</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#{-CONT}</th>
<th>Dep-SP</th>
<th>Dep</th>
<th>UNIF</th>
<th>Dep(μ)</th>
<th>Al(PWd,σ)</th>
<th>*V:</th>
<th>*COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ?á.{[pum.ma.ki.wḁ</td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
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<tr>
<td>b. [ʔá.{pum.ma.ki.wḁ</td>
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<td>*!</td>
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<tr>
<td>c. ?éë.{pum.ma.ki.wḁ</td>
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<tr>
<td>d. [ʔé:.{pum.ma.ki.wḁ</td>
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<tr>
<td>e. ?é:.{[pum.ma.ki.wḁ</td>
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<td>*!</td>
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</tbody>
</table>
Arguments against syntax-prosody misalignment

**After C: *#[-cont] \(\rightarrow\) Al(PWd,\(\sigma\))**

<table>
<thead>
<tr>
<th></th>
<th>aak-{pom:-o-ii-w=ayi</th>
<th>CdCND</th>
<th>ONS</th>
<th>*#[-cont]</th>
<th>Dep-SP</th>
<th>Dep</th>
<th>Unif</th>
<th>Dep((\mu))</th>
<th>Al(PWd,(\sigma))</th>
<th>*V:</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>?â:k.{{p²m.mo.ji:.wá.jí</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>b.</td>
<td>?â:ksi.{{p²m.mo.ji:.wá.jí</td>
<td></td>
<td>**</td>
<td></td>
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<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>?â:ksi.{{p²m.mo.ji:.wá.jí</td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d.</td>
<td>?â:ksi.{{p²m.mo.ji:.wá.jí</td>
<td></td>
<td>!</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>*</td>
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</tbody>
</table>
Arguments against syntax-prosody misalignment

**Left edge: Anch-L $\gg$ *#[-cont]**

<table>
<thead>
<tr>
<th>{pum:-o:-s}</th>
<th>Anch-L</th>
<th>CdCnd</th>
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<th>Dep</th>
<th>Unif</th>
<th>Dep((\mu))</th>
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<th>*V:</th>
<th>*Cod</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. {pum.mó:s}</td>
<td></td>
<td></td>
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Summary
Prosodic edges and syllable edges misalign *systematically* in Blackfoot (Algonquian) to maintain syntax-prosody alignment.

1. **Evidence for the left edge of a prosodic constituent**
   - Edge restriction against [-cont] segments
   - Triggers root alternations, including epenthesis

2. **Evidence that syllables span the left edge**
   - Prefix-final C is an onset, not a coda
   - Prefix-final V coalesces with following V

3. **Arguments against syntax-prosody misalignment for Blackfoot**
   - Optimal candidate with P-to-σ alignment does not epenthesize
   - Match constraints must ignore epenthesis and deletion
Constraints: $M, \text{DEP-SP}, \text{MAX-SP}, \text{AL}(\text{PWd},\sigma)$

Factorial typology:

1. $\text{ONSET, AL}(\text{PWd},\sigma) \gg \text{DEP-SP} \gg \text{MAX-SP}$  
   IsiXhosa

2. $\text{ONSET, AL}(\text{PWd},\sigma) \gg \text{MAX-SP} \gg \text{DEP-SP}$  
   KiHehe

3. $\#[-\text{CONT}], \text{DEP-SP}, \text{MAX-SP} \gg \text{AL}(\text{PWd},\sigma)$  
   Blackfoot
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References


