Yale

On the misalignment of prosodic edges and syllables

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workshop on structure and constituency in languages of the americas (wscla 25)

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Introduction

- Prosodic Phonology: a theory of how utterances are "chunked" into smaller domains.
- Small number of constituent types, arranged in a hierarchical structure.
  - Utt $>$ IPh $>$ PPh $>$ PWd $>$ Ft $>$ σ
- Each constituent type is defined by unique phonological generalizations.
- Related to syntax, but indirect. Evidence: mismatches from syntactic constituents for non-syntactic reasons.

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

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-íimbila-[**kw**-{iimbíla	‘sing’
[**kw**-{áaka	kw-áaka-[**kw**-{aáka	‘burn’

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

(Downing 1998a; Odden and Odden 1985)

Introduction

- Mismatches from syntax for phonological reasons;
- Align the prosodic edge to an *onset* by underparsing or overparsing.

Syntax:	…C-{V…	…V-{V…		ATTESTED?
Prosody:	… .C{V.[…	… .V{V.[…	underparsing the stem	IsiXhosa
	…[.C{V. …	…[.V{V. …	overparsing the prefix	KiHehe

{ = left edge of stem, [= left edge of prosodic stem
(Downing 1998b; McCarthy and Prince 1994; Nespor and Vogel 2007)

"Prosodic constituents"

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

Two relationships:

- P-to-σ align
- S-to-P align

(Inkelas 1990; Itô and Mester 2012; Selkirk 1986)

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

Introduction

Prosodic edges may align with syllable edges at the *expense* of syntax-prosody alignment.
Prosodic edges and syllable edges may misalign to *maintain* syntax-prosody alignment.

Syntax:	…C-{V…	…V-{V…		ATTESTED?
Prosody:	… .C{V.[…	… .V{V.[…	P-to-σ align ≻ S-to-P align	IsiXhosa
	… [.C{V. …	… [.V{V. …	P-to-σ align ≻ S-to-P align	KiHehe
	… .C{[V. …	… .V{[V. …	S-to-P align ≻ P-to-σalign	??? **Blackfoot**

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

Outline

1. Phonology 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

Phonology and syllable structure

Blackfoot (Algonquian family)

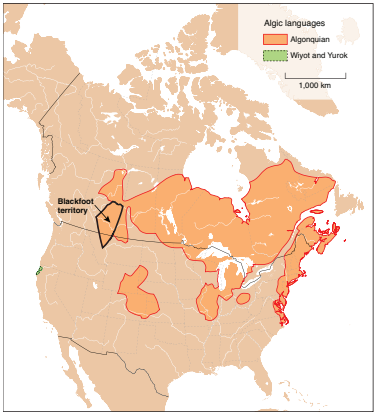


Figure 1: Map by Eric Leinberger.

(Frantz 2009; Frantz and Russell 2017)

Overview

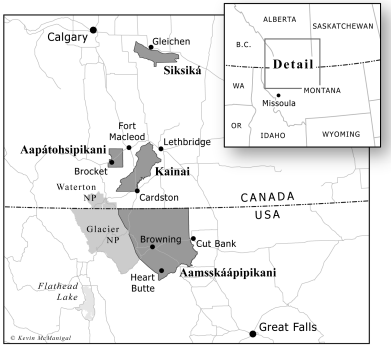


Figure 2: Blackfoot reserves. Map by Kevin McManigal.

- Siksiká (Blackfoot)
- Aapátohsipikani (Peigan)
- Kainai (Blood)
- Aamsskáápipikani (Southern Piegan)

(some lexical, morphological, phonological differences, but mutually intelligible)

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

	Labial	Coronal	Dorsal	Glottal
Stops	p pː	t tː	k kː	ʔ <’>
Assibilants		ts tːs	ks	
Pre-assibilants		ˢt ˢtː		
Fricatives		s sː	x <h>	
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	

Doubled letters for long segments.

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

Contrastive mid vowels

- Many [ɛː] and [ɔː] arise from coalescence across boundaries
- Orthography reflects the underlying form

[ɔ́ːkaː]

a–{√ok–aa}–Ø–wa

IPFV–{√rope–V}–IND–3

‘he is roping’ (BB)

(Frantz 1978, 2017)

Contrastive mid vowels

- But some [ɛː] and [ɔː] are morpheme-internal
- Occur in overlapping environments with other long vowels
- Some minimal pairs

[ɔːníːt]
{√ao–n/i–i}–t–Ø
{√hole–by.needle/*v*–V}–2SG.IMP–IMP
‘pierce it!’ (BB)

[aːníːt]
{√aan–ii}–t–Ø
{√say–V}–2SG.IMP–IMP
‘say (s.t.)!’ (BB)

(Weber 2020)

Syllable structure: onsetless syllables resolved

- Via coalescence or other vowel hiatus resolution strategies.
- Via [ʔ]-epenthesis at the left edge before underlying vowels

UR	IPA	Gloss	
/apíːt/	[ʔapíːt]	‘sit!’	(BB)
/imitâː/	[ʔimitâː]	‘dog’	(BB)
/otán/	[ʔotán]	‘his/her daughter’	(BB)

(Elfner 2006; Weber 2020)

Syllable structure: vowel length neutralized before codas

Contrastive vowel length in open syllables.

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

Short vowels

Long vowels

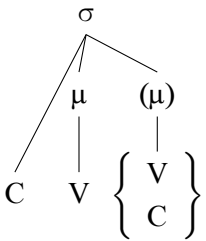
(Hayes 1989; Hyman 1985; Pulleyblank 1994)

Syllable structure: vowel length neutralized before codas

Vowel length neutralization before codas.

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

Maximal syllable



Syllable structure: codas are restricted

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

[koʔ.kí]	‘corner’	(BB)
[pʌs.ká:.n]	‘dance’	(BB)
[óxʷ.ko.to.kɪ̥]	‘rock’	(BB)
[mʊt.to.ks.í.s]	‘knee’	(BB)

(assume some codas escape a CodaCond; Itô 1989)

Evidence for the left edge of a prosodic constituent

Syntactic and prosodic structure

- Verbal complex = CP — Phonological Phrase (PPh)
- Stem = VP/*v*P — Prosodic Word (PWd)

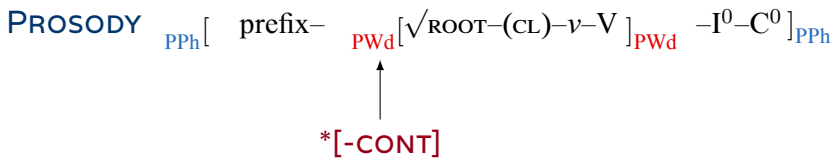
SYNTAX $_{\text{CP}}\{$ prefix– $_{v\text{P}}\{$ √ROOT–(CL)–*v*–V $\}_{v\text{P}}$ –I^0–C^0 $\}_{\text{CP}}$

PROSODY $_{\text{PPh}}[$ prefix– $_{\text{PWd}}[$ √ROOT–(CL)–*v*–V $]_{\text{PWd}}$ –I^0–C^0 $]_{\text{PPh}}$

(Bliss 2013; Déchaine and Weber 2015, 2018; Déchaine and Wiltschko 2010; Weber 2020, 2021)

Evidence for the PWd constituent

- Phonotactic constraints can define prosodic constituents (Bennett 2018; Hall 1999).
- Within the PWd: vowel hiatus resolution and epenthesis to conform to syllable structure.
- Left edge of PWd: left edge restriction against [-cont] segments (e.g. stops).



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

Within the PWd: vowel-initial suffixes

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!’

(examples of other vowels in appendix)

Within the PWd: consonant-initial suffixes

Consonant-initial suffix: /-**p**/ ‘tie’

After C

[ʔaːk**s**i**p**íˢtaːt]

{√aa**k**–**p**/ist–aa}–t–Ø

{√wrap–tie/*v*–V}–2SG.IMP–CMD

‘use that pole!’

After V

[ʔaːwá**p**iˢtaːt]

{√aawa–**p**/ist–aa}–t–Ø

{√move–tie/*v*–V}–2SG.IMP–CMD

‘make a cradle swing!’

Within the PWd: consonant-initial suffixes

Consonant-initial suffix: /-**k**a/ ‘leg’

After C

[ʔiːkómx̣**ksik**awa̱]

ii\ik–{√omah**k**–**k**a–Ø}–Ø–wa

IC\DEG–{√big–leg–V}–IND–3

‘he has big feet’

After V

[ʔam**ok**ápiˢtaːt]

{am**o**–**k**a–p/ist–aa}–t–Ø

{gather–leg–tie/*v*–V}–2SG.IMP–CMD

‘hobble!’

Within the PWd: consonant-initial and vowel-initial suffixes

Suffix alternations, modulo coalescence

	After C		After V	UR	Gloss
a.	[-ip]	~	[-ip]	/-ip/	‘bring’
b.	[-ip]	~	[-p]	/-p/	‘tie’
	[-ika]	~	[-ka]	/-ka/	‘leg’
c.	*[-p]	~	*[-p]		

(Casali 1996; Itô 1989)

Within the PWd: analysis of syllable structure

Optimality Theory analysis

Ons	Every syllable has an onset.
Max	Every element in the input has a correspondent in the output.
Dep	Every element in the output has a correspondent in the input.
*Diph	Diphthongs are prohibited.
Unif	No element of the output has multiple correspondents in the input.
*V:	Long vowels are prohibited.

(McCarthy and Prince 1993, 1994; Prince and Smolensky 1993)

Within the PWd: analysis of syllable structure

‘bring her out!’

/sa-ipi-ːs/	Ons	Max	Dep	*Diph	Unif	*Vː
a. sa.i.píː.s	∗!					
b. sa.píː.s		∗!				
c. sa.ji.píː.s			∗!			
d. sai.píː.s				∗!		
☞ e. sɛː.píː.s					∗	∗
f. sɛ.ɛ.píː.s	∗!				∗	

NB: a coalesced vowel is syllabified as a single nucleus

(Elfner 2006; Weber 2020)

Syllable structure: epenthesis avoids illicit clusters

‘corner’

/ko?ki/	CodaCond	Max	Dep	*Cod
☞ a. ko?.ki				*
b. ko.?i.ki			*!	
c. ko.ki		*!		

‘use that pole!’

/aːk-pist-aː-t/	CodaCond	Max	Dep	*Cod
a. ʔak.pí.ˢtaː.t	*!		*	*
☞ b. ʔaː.ksi.pí.ˢtaː.t			**	
c. ʔaː.pí.ˢtaː.t		*!	*	

CodaCond, Max ≫ Dep

(Itô 1989)

One further correlate of epenthesis

Two types of morphophonemic /i/ and /i:/

Determined by whether a preceding /k/ assibilates to [ks] or not (Frantz 2017)

Assibilation

[soksi^{s}totsít]

{√sok–istot/Ø–i}–t–Ø

{√good–caus/*v*–V}–2sg.imp–cmd

‘groom the area!’

No assibilation

[sokinís]

{√sok–in–:s}–Ø

{√good–by.hand.*v*–2sg:3.imp}–cmd

‘doctor him!’

(/k/ does not assibilate before other vowel qualities)

One further correlate of epenthesis

Two types of morphophonemic /i/ and /i:/

Determined by whether a preceding /k/ assibilates to [ks] or not (Frantz 2017)

Assibilation

[siksíʔpojiwa̧]

{√sik–i'po/yi}–Ø–wa

{√black–speak/V}–IND–3

'he swore'

No assibilation

[sikíʔtsit]

{√sik–i't–i}–t–Ø

{√black–by.mind.*v*–V}–2SG.IMP–CMD

'consider it unclean!'

(/k/ does not assibilate before other vowel qualities)

One further correlate of epenthesis

Epenthetic [i] always causes a preceding /k/ to assibilate

Assibilation

[ʔaːksipíˢtaːt]

{√aak–p/ist–aa}–t–Ø

{√wrap–tie/*v*–V}–2SG.IMP–CMD

‘use that pole!’

No assibilation

* [ʔaːkipíˢtaːt]

{√aak–p/ist–aa}–t–Ø

{√wrap–tie/*v*–V}–2SG.IMP–CMD

‘use that pole!’

One further correlate of epenthesis

- Reflexes of two different Proto-Algonquian (PA) vowels (Berman 2006)
- Epenthetic [i] is a reflex of PA *connective-i* (Bloomfield 1946)

	Suffix	Gloss	k-assibilation?	PA vowel
a.	-istot	‘caus’	✓	* i
	-i’po	‘speak’	✓	* i
b.	-in	‘by hand’	✘	* e
	-i’t	‘by mind’	✘	* e
c.	-p ∼ -ip	‘tie’	✓	Ø ∼ * i

Within the PWd: interim summary

- Coalescence and epenthesis driven by syllable structure constraints.
- Epenthesis occurs between consonants *only*.
- Epenthesis always causes *k*-assibilation.

At the left edge of the PWd

- Plethora of root alternations, determined by prosodic position (when they occur)
  - One form at the left edge of the PPh
  - One form after a prefix (no difference based on syllable structure)

At the left edge of the PWd

Left Edge

[naːmitápiːwa̱]

{√naam–itap/ii}–Ø–wa

{√alone–person/V}–IND–3

‘he is on his own’

After C

[ʔâːksamitapiːwa̱]

aak–{√jaam–itap/ii}–Ø–wa

FUT–{√alone–person/V}–IND–3

‘he will be on his own’

After V

[ʔákaːjâːmitapiːwa̱]

akaa–{√jaam–itap/ii}–Ø–wa

PRF–{√alone–person/V}–IND–3

‘he is completely on his own’

At the left edge of the PWd

Left Edge

[niːmjáʔpiːˢtsi̥]

{√niimi–a’p/ii}–Ø–istsi

{√messy–have.quality/V}–IND–IN.PL

‘articles which cause a mess’

After C

[ʔâːksimiçtakiwḁ]

aak–{√imi–iht–aki}–Ø–wa

FUT–{√messy–put.*v*–V}–IND–3

‘she will make a mess’

After V

[ʔiːkɛ́ːmiçtakiwḁ]

ii\akaa–{√imi–iht–aki}–Ø–wa

IC\PRF–{√messy–put.*v*–V}–IND–3

‘he places his articles in a messy way’

At the left edge of the PWd

Left edge

[nâːnsːkoːs]

{√naan–ssk/o–:s}–Ø

{√own–get/*v*–2sg:3.imp}–cmd

‘get something for her!’

After C

[ʔâːksinaːnsːkojiːwájį̥]

aak–{√naan–ssk/o–yii}–Ø–w=ayi

fut–{√own–get/*v*–3sub}–ind–3=prx.pl

‘he will pick up something for her’

After V

[nitaʔpɛːnaːnsːkaː]

nit–a’p–a–{√naan–ssk/aa}–(hp)

1–around–ipfv–{√own–get/V}–ind

‘I am going about acquiring gifts’

At the left edge of the PWd

Left edge

[pʊm:ó:s]

{√pomm–o–:s}–Ø

{√transfer–*v*–2sg:3.imp}–cmd

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

After C

[ʔâ:ksipúm:oji:wájį̨]

aak–{√pomm–o–yii}–Ø–w=ayi

fut–{√transfer–*v*–3sub}–ind–3=obv.sg

‘he will transfer it to her’

After V

[ʔé:pʊm:akiwą̨]

a–{√pomm–Ø–aki}–Ø–wa

ipfv–{√transfer–*v*–V}–ind–prx

‘the one transferring (previous owner)’

Root alternations conditioned by position within PPh

	Left edge	After C =	After V	Gloss	Process
a.	[**n**a:m]	[**j**a:m]	[**j**a:m]	‘alone’	*glide substitution*
	[**m**a:k]	[**j**a:k]	[**j**a:k]	‘arrange’	
b.	[**n**i:mi]	[imi]	[imi]	‘messy’	*truncation*
	[**n**i:po]	[ipo]	[ipo]	‘upright’	
c.	[na:n]	[**i**na:n]	[**i**na:n]	‘possess’	*epenthesis*
	[mɔ:xk]	[**o**mɔ:xk]	[**o**mɔ:xk]	‘red’	
d.	[pom:]	[**i**pom:]	[**i**pom:]	‘transfer’	
e.	[pom:]	[**ox**pom:]	[**ox**pom:]	‘buy’	*/ox/-accretion*
f.	[kipita]	[ip:ita]	[ip:ita]	‘aged’	*epenthesis + gemination*

Roots beginning in vowels do not alternate

Left edge

[ʔ**i**.tsí.nx̣^{w}.to:.t]

{√**i**tsin–oht–oo}–t–Ø

{√among–put.*v*–V}–2SG.IMP–CMD

‘place it among the rest!’

After C

[ʔâ:.**k**i.tsi.nx̣^{w}.to:.mą̣]

aa**k**–{√**i**tsin–oht–oo}–m–a

FUT–{√among–put.*v*–V}–IND–3

‘he will place it among the rest’

After V

[ʔé:.tsi.nx̣^{w}.to:.má.jį̣]

a–{√**i**tsin–oht–oo}–m–Ø=ayi

IPFV–{√among–put.*v*–V}–IND–3=OBV.SG

‘he is placing it among the rest’

Some root alternations involve epenthesis

Root alternations, modulo coalescence

	Left edge		After Prefix	UR	Gloss
a.	[itsin]	~	[itsin]	/itsin/	‘among’
b.	[na:n]	~	[ina:n]	/na:n/	‘possess’
	[pom:]	~	[ipom:]	/pom:/	‘transfer’
c.	*[n]	~	*[n]		
	*[p]	~	*[p]		

(other allomorphs are lexically listed; Mascaró 2007)

Some root alternations involve epenthesis

An [i] accretion at the left edge of a root always causes /k/-assibilation, just like epenthesis

[ʔâːksipóm:ojiːwájį̨]
aak–{√pomm–o–yii}–Ø–w=ayi
FUT–{√transfer–*v*–3SUB}–IND–3=OBV.SG
'he will transfer it to her'

* [ʔâːkipóm:ojiːwájį̨]
aak–{√pomm–o–yii}–Ø–w=ayi
FUT–{√transfer–*v*–3SUB}–IND–3=OBV.SG
'he will transfer it to her'

(other allomorphs are lexically listed; Mascaró 2007)

Root alternations not conditioned by syllable structure

- An epenthesizing root is shown below.
- Not surprising: same form occurs after C and V

‘the one transferring’

/a-pomm-aki-wa/	Ons	Max	Dep	Unif	*V:	*Cod
☞ a. ʔá.pʊm.ma.ki.wa̧			*			*
☹ b. ʔéː.pʊm.ma.ki.wa̧			**!	*	*	*

Well-formed syllable structure without epenthesis.

Root alternations avoid natural classes at edges

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

	p	k	m	n	j	w	iː	oː	ɛː	ɔː	aː	i	o	a
Left edge	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
After prefix	✘	✘	✘	✘	✓	✓	✓	✓	✘	✘	✘	✓	✓	✓
					[-cont]		[-cons]							

(NB: glottal stop and /x/ do not occur at left edge of stem; /s/ and /t/ missing from table)

Left edge constraint triggers epenthesis

Proposal

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

- ***#[-cont]** Assign a violation mark for every [-cont] segment which is leftmost in the PWd.

CdCnd, Onset, *#[-cont] ≫ Max ≫ Dep ≫ Unif, *V:, *Cod

Left edge PWd constraint triggers epenthesis

After V: *#[-cont] ≫ Dep

‘the one transferring’

a-{pom:-aki-wa	CdCnd	Ons	*#[-cont]	Max	Dep	Unif	*V:	*Cod
a. ʔá.{[pʊm.ma.ki.wạ			*!		*			*
b. ʔɔ́{[ɔ́m.ma.ki.wạ				*!	*	*	*	*
☞ c. ʔɛ́[ɛ́.{pʊm.ma.ki.wạ					**	*	*	*

Left edge constraint triggers epenthesis

After C: *#[-cont] ≫ Dep

‘he will transfer it to her’

aak-{pom:-o-ii-w=ayi	CdCnd	Ons	*#[-cont]	Max	Dep	Unif	*V:	*Cod
a. ʔâk.{[púm.mo.jiː.wá.jį	*!		*!		*		*	**
b. ʔâː.k[{úm.mo.jiː.wá.jį				*!	*		**	*
☞ c. ʔâː.ks[i.{púm.mo.jiː.wá.jį					**		**	*

Left edge constraint triggers epenthesis

LEFT EDGE: EPENTHESIS OVERGENERATES!

'transfer to him!'

{pom:-o-:s	CDCND	ONS	*#[-CONT]	MAX	DEP	UNIF	*V:	*COD
☹ a. {[pʊm.mó:.s			*!				*	*
b. {[ʔʊm.mó:.s				*!	*		*	*
☞ c. [ʔi.{pʊm.mó:.s					**		*	*

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.

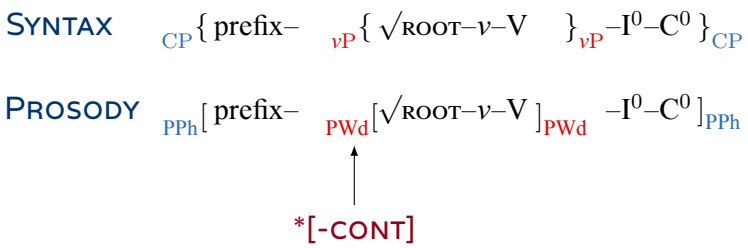
LEFT EDGE: ANCHOR-L[μ] ≫ *#[-CONT]

'transfer to him!'

{pom:-o-:s	ANCH-L	CDCND	ONS	*#[-CONT]	DEP	UNIF	*V:	*COD	
☞ a. {[pʊm.mó:.s				*				*	*
b. {[ʔʊm.mó:.s					*!	*		*	*
c. [ʔi.{pʊm.mó:.s	*!					**		*	*

Summary: Evidence for a Prosodic Word (PWd) constituent

- Within PWd: suffix alternations driven by syllable structure.
- PWd left edge: restriction against [-cont] segments (e.g. stops) drives root alternations



Evidence that syllables span the left edge

Evidence that syllables span the left edge

ʔé[é].{pʊm.ma.ki.wa̰

a–{√pomm–Ø–aki}–Ø–wa
IPFV–{√transfer–*v*–V}–IND–PRX

‘the one transferring (previous owner)’

ʔâː.ks[**i**].{púm.mo.jiː.wá.jḭ

aak–{√pomm–o–yii}–Ø–w=ayi
FUT–{√transfer–*v*–3SUB}–IND–3=OBV.SG

‘he will transfer it to her’

Diagnostics for syllabification

1. Vowel length neutralized before codas
   - Diagnostic for codas: preceding vowel is short
2. Onsetless syllables resolved via coalescence or epenthesis
   - Diagnostic for nuclei: a coalesced vowel is syllabified as a single nucleus
   - Onsetless syllables repaired via epenthesis at the left edge of a PPh
3. Codas restricted to /ʔ/, /s/, /x/, geminate
   - Illicit clusters avoided via [i] epenthesis

Evidence that syllables span the left edge

Proposal

Syllables and PWds do not exist in the same prosodic hierarchy; there is no need for containment.

- **Al(PWd,σ)** The left edge of every PWd aligns with the left edge of a σ.

CdCnd, Onset, *#[-cont] ≫ Max ≫ Dep ≫ Unif, Al(PWd,σ)), *V:, *Cod

Evidence that syllables span the left edge: V-V syllabification

After V: Onset, *#[-cont] ≫ Al(PWd,σ))

'the one transferring'

a-{pom:-aki-wa	CdCnd	Ons	*#[-cont]	Max	Dep	Unif	Al(PWd,σ))	*V:	*Cod
a. ʔá.{[pʊm.ma.ki.wa̰			*!		*				*
b. ʔɔ́{[ɔ́m.ma.ki.wa̰				*!	*	*	*	*	*
c. ʔá.[ʔí.{pʊm.ma.ki.wa̰					***!				*
☞ d. ʔɛ́[ɛ́.{pʊm.ma.ki.wa̰					**	*	*	*	*
e. ʔɛ́.[ɛ́.{pʊm.ma.ki.wa̰		*!			**	*		*	*
f. ʔɛ́.[ʔɛ́.{pʊm.ma.ki.wa̰					***!	*		*	*

(also true of underlying V-V sequences)

Evidence that syllables span the left edge: C-V syllabification

After C: CdCnd, *#[-cont] ≫ Al(PWd,σ))

'he will transfer it to her'

aak-{pom:-o-ii-w=ayi	CdCnd	Ons	*#[-cont]	Max	Dep	Unif	Al(PWd,σ))	*V:	*Cod
a. ʔâk.{[púm.mo.jiː.wá.jį	*!		*!		*			*	**
b. ʔâ.k[{úm.mo.jiː.wá.jį				*!	*	*	*	*	**
☞ c. ʔâː.ks[i.{púm.mo.jiː.wá.jį					**		*	**	*
d. ʔâk.[i.{púm.mo.jiː.wá.jį	*!*	*!			**			*	**
e. ʔâk.[ʔi.{púm.mo.jiː.wá.jį	*!*	**!			***			*	**

(also true of underlying C-V sequences)

Arguments against syntax-prosody misalignment for Blackfoot

Arguments against syntax-prosody misalignment

- Is the misalignment of prosodic edges and syllable edges *artificial*?
- Why not overparse the prefix (like Kihehe) or underparse the stem (like IsiXhosa)?

‘the one transferring’	AL(PWd,σ))
ʔé[é.{pʊm.ma.ki.wa̰	✘
[ʔé:.{pʊm.ma.ki.wa̰	✓
ʔé:.{[pʊm.ma.ki.wa̰	✓

Last puzzle piece: syntax-prosody mismatches (i.e. [and { may or may not align!)

Match Theory

Anticipating a modified analysis based on exhaustive dominance and correspondence…

- Match constraints require isomorphism between syntactic and prosodic constituents.
- Parallel evaluation of constraints in Optimality Theory

Syntax-prosody correspondences in Match Theory

"syntactic clause"	$\longleftrightarrow$	ι	(intonational phrase)
"syntactic phrase" CP	$\longleftrightarrow$	ϕ	(phonological phrase)
"syntactic word" *v*P/VP	$\longleftrightarrow$	ω	(prosodic word)

(Selkirk 2011; Selkirk 2009)

Defining MATCH constraints

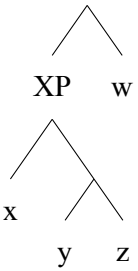
- Originally defined in terms of alignment of both edges (Selkirk 2011)
- Redefined based on exhaustive dominance to ignore phonologically null morphemes and traces (Elfner 2012)

MATCH-PHRASE (to be revised)

Suppose there is a syntactic phrase (XP) 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 phrase (ϕ) in the phonological representation that exhaustively dominates all and only the phonological exponents of the terminal nodes in A.

(Elfner 2012: 28, (19))

Redefining MATCH constraints



XP exh. dom. A= {x, y, z}

Exponents of terminal nodes:

- $x \leftrightarrow$ /bc/
- $y \leftrightarrow$ Ø
- $z \leftrightarrow$ /def/
- $w \leftrightarrow$ /ghi/

/{bc-def}-ghi/	MATCH
a. {[bcdef]}ghi	
b. [a{bcdef}ghi	*
c. {[bcde]}ghi	*
d. {[bcde]f}ghi	*
e. {[bcde}g]hi	*

Problems with MATCH constraints

*#[-CONT] ≫ MATCH(vP,PWD)

'the one transferring'

a-{pom:-aki-wa	CDCND	ONS	*#[-CONT]	MATCH	MAX	DEP	UNIF	AL(PWd,σ))	*V:	*COD
a. ʔá.{[pʊm.ma.ki.wa̱			*!			*				*
b.										
c. ʔé[é.{pʊm.ma.ki.wa̱				*		**	*!	*	*	*
d. [ʔé:.{pʊm.ma.ki.wa̱				*		**	*		*	*
HB e. ʔé:.{[pʊm.ma.ki.wa̱			*!			**!	*!		*!	*

Candidates with correct pronunciation violate MATCH (vP) or are harmonically bound (HB).

Problems with MATCH constraints

*#[-CONT] ≫ MATCH(vP,PWd)

'the one transferring'

a-{pom:-aki-wa	CDCND	ONS	*#[-CONT]	MATCH	MAX	DEP	UNIF	AL(PWd,σ))	*V:	*COD
a. ʔá.{[pʊm.ma.ki.wa̰			*!			*				*
☞ b. [ʔá.{pʊm.ma.ki.wa̰				*		*				*
☹ c. ʔé[é.{pʊm.ma.ki.wa̰				*		**!	*!	*!	*!	*
☹ d. [ʔéː.{pʊm.ma.ki.wa̰				*		**!	*!		*!	*
☹ e. ʔéː.{[pʊm.ma.ki.wa̰			*!			**!	*!		*!	*

Correct pronunciation is HB by a candidate that overparses the PWd without epenthesizing!

Problems with MATCH constraints

TWO PROBLEMS

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

Redefining MATCH constraints

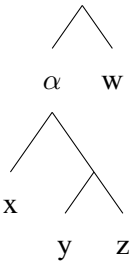
Let S be an input syntactic representation and P its corresponding output phonological representation. Suppose there is a syntactic constituent α in S that exhaustively dominates a set of terminal nodes $A \in S$.

- MAX-SP(α,π): 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 π corresponding to α. (“Don’t underparse.”)

- DEP-SP(α,π): 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 π corresponding to α. (“Don’t overparse.”)

(similar to definitions in Downing 1998b; Guekguezian 2017)

Redefining MATCH constraints



α exh. dom. A = {x, y, z}

Exponents of terminal nodes:

- $x \leftrightarrow$ /bc/
- $y \leftrightarrow$ Ø
- $z \leftrightarrow$ /def/
- $w \leftrightarrow$ /ghi/

/{bc-def}-ghi/	MAX-SP	DEP-SP
a. {[bcdef]}ghi		
b. [a{bcdef}ghi		
c. {[bcde]}ghi		
d. {[bcde]f}ghi	*	
e. {[bcde}g]hi		*

Arguments against syntax-prosody misalignment

After V: *#[-cont], Dep-SP ≫ Dep, Al(PWd,σ)

'the one transferring'

a-{pom:-aki-wa	CdCnd	Ons	*#[-cont]	Dep-SP	Max	Dep	Unif	Al(PWd,σ)	*V:	*Cod
a. ʔá.{[pʊm.ma.ki.wa̰			*!			*				*
b. [ʔá.{pʊm.ma.ki.wa̰				*!		*				*
☞ c. ʔé[é.{pʊm.ma.ki.wa̰						**	*	*	*	*
d. [ʔé:.{pʊm.ma.ki.wa̰				*!		**	*		*	*
e. ʔé:.{[pʊm.ma.ki.wa̰			*!			**	*		*	*

Arguments against syntax-prosody misalignment

After C: *#[-cont] ≫ Dep, Al(PWd,σ)

aak-{pom:-o-ii-w=ayi	CdCnd	Ons	*#[-cont]	Dep-SP	Max	Dep	Unif	Al(PWd,σ)	*V:	*Cod
a. ʔâk.{[pṓm.mo.jiː.wá.jį̨	*!		*			*				**
☞ b. ʔâː.ks[i.{pṓm.mo.jiː.wá.jį̨						**		*	*	*
c. ʔâː.ksi.{[pṓm.mo.jiː.wá.jį̨			*!			**			*	*
d. ʔâː.[ksi.{pṓm.mo.jiː.wá.jį̨			*!	*!		**			*	*

Arguments against syntax-prosody misalignment

Left edge: Anch-L ≫ *#[-cont]

{pom:-o-:s	Anch-L	CdCnd	Ons	*#[-cont]	Dep-SP	Max	Dep	Unif	Al(PWd,σ)	*V:	*Cod
☞ a. {[pʊm.mó:.s				*						*	*
b. [ʔi.{pʊm.mó:.s	*!						**			*	*

Summary

Summary

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
   - Candidate with P-to-σ alignment are not optimal, and do not exhibit epenthesis
   - Match constraints must ignore epenthesis and deletion

Typology

Prosodic edges and syllable edges misalign *systematically* in Blackfoot (Algonquian) to maintain syntax-prosody alignment.

… .C{V.[…	… .V{V.[…	P-to-σ align ≻ S-to-P align	IsiXhosa
… [.C{V. …	… [.V{V. …	P-to-σ align ≻ S-to-P align	KiHehe
… .C{[V. …	… .V{[V. …	S-to-P align ≻ P-to-σalign	Blackfoot

Expected language type if prosodic and metrical hierarchies are split.

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Vowel-initial suffixes

Vowel-initial suffixes

[a]-initial suffix *-ap-* ‘CORD’

AFTER C

[ijíːˢtapapɪnːiːwa̧]

{√iyiistap–ap–inn–ii}–Ø–wa

{√away–CORD–by.hand.*v*–3SUB}–IND–3

‘he adjusted the strand out and away from it’

AFTER V

[nítsːaːpɪnːawa̧]

nit–{√sa–ap–inn–a}–Ø–wa

1–{√out–CORD–by.hand.*v*–3OBJ}–IND–3

‘I adjusted the strand out from the inside of it’

Vowel-initial suffixes

[o]-initial suffix *-op* ‘sit’

After C

[nitâːksːapopiː]

nit–aak–{√sap–op/ii}–(hp)

1–FUT–{√inside–sit/V}–(IND)

‘I’ll ride in (a vehicle)’

After V

[ípʌkːsːɔːpiːwa̧]

{√ipakkssa–op/ii}–Ø–wa

{√bare–sit/V}–IND–3

‘he’s sitting with nothing on (in the nude)’

Vowel-initial suffixes

* i > [i]-initial suffix *-istot* ‘CAUS’

After C

[sapíˢtotóːsa̱]

{√sap–istot/o–:s}–Ø

{√correct–CAUS/*v*–2SG:3.IMP}–CMD

‘reach an agreement with him!’

After V

[satéːˢtotoːs]

{√sata–istot/o–:s}–Ø

{√offended–CAUS/*v*–2SG:3.IMP}–CMD

‘purposely make her angry!’

Vowel-initial suffixes

* e > [i]-initial suffix *-i't* 'by mind'

After C

[é:sikimi?takiwa̱]

a–{√isikim–i't–aki}–Ø–wa

IPFV–{√stingy–by.mind.*v*–V}–IND–3

'he is feeling miserly'

After V

[ɪskej?takit]

{√isska'–i't–aki}–t–Ø

{√shock–by.mind.*v*–V}–2SG.IMP–CMD

'be overwhelmed!'

[ej] is an allophone of [é:] before [?] (Derrick and Weber n.d.; Frantz 2017; Weber 2020)

Summary: Vowel-initial suffixes

Underlying short vowels within the stem

V =	a	o	i (< *i)	i (< *e)
After C	a	o	i	i
a+V	a:	ɔ:	ɛ:	ɛ:
i+V	ja/a	jo/o	i:	i:
o+V	a:/a	o:	oi	oi

(Elfner 2006; Weber 2020)

Consonant-initial suffixes

[p]-initial suffix *-p* ‘tie’

After C

[nitâːksoxʷksɨpiˢta]

nit–aak–{√yoohk–p/ist–aa}–(hp)

1–FUT–{√lid–tie/*v*–V}–(IND)

‘I will close the tipi flap’

After V

[aːwápiˢtaːt]

{√aawa–p/ist–aa}–t–Ø

{√move–tie/*v*–V}–2SG.IMP–CMD

‘make a cradle swing!’

Root alternations

Roots which begin with a short vowel {i, o, a}

Left edge

[ʔi.tsí.nx̣ʷ.to:.t]

{√itsin–oht–oo}–t–Ø

{√among–put.*v*–V}–2SG.IMP–CMD

‘place it among the rest!’

After C

[ʔâ:.ki.tsi.nx̣ʷ.to:.mą̣]

aak–{√itsin–oht–oo}–m–a

FUT–{√among–put.*v*–V}–IND–3

‘he will place it among the rest’

After V

[ʔɛ́ɪ.tsi.nx̣ʷ.to:.má.jį̣]

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

[ʔ**o**.ká:.t]

{√**o**k–aa}–t–Ø

{√snare–V}–2SG.IMP–CMD

‘rope!’

After C

[ʔâ:.**k**o.ka:.wa̱]

aa**k**–{√**o**k–aa}–Ø–wa

FUT–{√snare–V}–IND–3

‘he will rope’

After V

[ʔ**ó:**.ka:]

a–{√**o**k–aa}–Ø–wa

IPFV–{√snare–V}–IND–3

‘he is roping’ (BB)

Roots which begin with a short vowel {i, o, a}

Left edge

[ʔ**a**.tsi.ní.ki.t]

{√**a**tsinik–i}–t–Ø

{√relate.story–V}–2SG.IMP–CMD

‘relate a story!’ (BB)

After C

[ʔâ:.**k**i.tsi.ni.ki.wa̱]

aa**k**–{√**i**tsinik–i}–Ø–wa

FUT–{√tell.story–V}–IND–3

‘s/he will relate a story’

After V

[ʔɛ́ɪ.tsi.ni.ki.wa̱]

a–{√**i**tsinik–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

[ʔ**a**.kṣ.tá.ki.t]

{√**a**k–st–aki}–t–Ø

{√count–*v*–V}–2SG.IMP–CMD

‘read!’ (BB)

After C

[ʔâː.**k**o.kṣ.ta.ki.wą]

aa**k**–{√**o**k–st–aki}–Ø–wa

FUT–{√read–*v*–V}–IND–3

‘s/he will read’

After V

[ʔ**ɔ́ɪ**.kṣ.ta.ki.wą]

a–{√**o**k–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

	Left edge		After prefix	UR	Gloss
a.	[ʔitsin]	~	[itsin]	/itsin/	‘among’
b.	[ʔok]	~	[ok]	/ok/	‘snare’
c.	[ʔatsinik]	~	[itsinik]	/atsinik, itsinik/	‘relate a story’
d.	[ʔak]	~	[ok]	/ak, ok/	‘count’
e.	*[ʔaC]	~	[aC]		

(phonologically optimizing allomorphy; Mascaró 2007)

Roots which begin with a long vowel

High long vowels coalesce with preceding vowel

Left edge

[iː.tsː.káː.t]

{√iitssk–aa}–t–Ø

{√scuffle–V}–2SG.IMP–CMD

‘fight!’

After V

[éː.soː.kéː.i.tsː.kaː.wa̧]

a–isooka–{√iitssk–aa}–Ø–wa

IPFV–used.to–{√scuffle–V}–IND–3

‘he used to fight’

Roots which begin with a long vowel

Non-high long vowels begin in a long vowel at the left edge and a [w] after a prefix

Left edge

[aː.kᵩʷ.kí.maː.t]

{√aak–ohk/im–aa}–t–Ø

{√argue–vocalize/*v*–V}–2SG.IMP–CMD

‘argue!’

After V

[iç.tá.**w**aː.kᵩʷ.ki.maː.wᵩ̨]

ii\oht–a–{√aak–ohk/im–aa}–Ø–wa

IC\INS–IPFV–{√argue–vocalize/*v*–V}–IND–3

‘he is arguing for that reason’

Roots which begin with a long vowel

- Complementary sets of vowels
- Only long [+high] vowels coalesce
- Only long [-high] vowels have glide epenthesis

	Left edge		After V	UR	Gloss
a.	[iːtʂːk]	~	[iːtʂːk]	/iːtʂːk/	‘scuffle’
b.	[oːk]	~	[oːk]	/oːk/	‘bead’
c.	[aːk]	~	[waːk]	/aːk/	‘argue’
d.	[ɛːˢt]	~	[wɛːˢt]	/ɛːˢt/	‘towards’
e.	[ɔːni]	~	[wɔːni]	/ɔːni/	‘pierce’

Roots which begin with a glide

Some roots begin in a long vowel at the left edge and a [j] after a prefix

Left edge

[iː.pí.ˢto.tsi.t]

{√yiip–istot/Ø–i}–t–Ø

{√decrease–CAUS/*v*–V}–2SG.IMP–CMD

‘decrease the volume of it (e.g. of your load of ironing)!’

After prefix

[ni.tá.jiː.pi.ˢto.tsiː?.pa̰]

nit–a–{√yiip–istot/Ø–i}–hp–a

1–IPFV–{√decrease–CAUS/*v*–V}–IND–3

‘I am decreasing the amount’

Roots which begin with a glide

Root alternations

- Not a complementary set of vowels
- Not even a natural class of vowels (high and low but not mid)

	Left edge		After V	UR	Gloss
a.	[iː p]	~	[jiː p]	/jiː p/	‘decrease’
b.	[oː m]	~	[joː m]	/joː m/	‘husband’
c.	[aː m]	~	[jaː m]	/jaː m/	‘twisted’
d.	*[ɛː...]	~	[jɛː...]		
e.	*[ɔː...]	~	[jɔː...]		

Diagnosing the right edge of the vP/VP

Diagnosing the right edge of the vP/VP

Selected suffixes within the independent clause type.

- Central agreement suffixes (AGR) occur between I^0 and C^0
- Segments in parentheses occur in some phonological environments.

…V^0	–I^0	–AGR	–C^0
-aa ‘3OBJ’	-Ø	-(i)nnaan ‘1PL’	-(w)a ‘3’
-ok ‘INV’	-hp	-oaa ‘PL’	-(y)ini ‘3SG.OBV’
			-(y)i ‘3PL’

Diagnosing the right edge of the vP/VP

After C

[nitsikákomɪm:okɪn:a:nị	kitániksị]
nit–ik–{√akom–imm–ok}–Ø–nnaan–i	k–itan–iksi
1–DEG–{√favor–by.mind.*v*–INV}–IND–1PL–3PL	2–daughter–AN.PL

‘Your daughters love us.’ (Frantz 2009: 56, (i))

After V

[nitsikákomɪm:ʌn:a:nị	kitániksị]
nit–ik–{√akom–imm–aa}–Ø–nnaan–i	k–itan–iksi
1–DEG–{√favor–by.mind.*v*–3OBJ}–IND–1PL–3PL	2–daughter–AN.PL

‘We (excl.) love your daughters.’ (Frantz 2009: 53, (g))

Diagnosing the right edge of the vP/VP

After C

[kitsikákomɪm:okoa:jį̥	kitániksį̥]
kit–ik–{√akom–imm–ok}–Ø–oaa–yi	k–itan–iksi
2–DEG–{√favor–by.mind.*v*–INV}–IND–PL–3PL	2–daughter–AN.PL

‘Your daughters love you (pl.).’ (Frantz 2009: 56, (j))

After V

[kitsikákomɪm:awa:jį̥	nitániksį̥]
kit–ik–{√akom–imm–aa}–Ø–waa–yi	k–itan–iksi
2–DEG–{√favor–by.mind.*v*–3OBJ}–IND–PL–3PL	2–daughter–AN.PL

‘You (pl.) love my daughters.’ (Frantz 2009: 53, (h))

Diagnosing the right edge of the vP/VP

After C		After V	UR	Gloss
[-ɪnːaːn]	∼	[-nːaːn]	/-nːaːn/	‘1PL’
[-oaː]	∼	[-waː]	/-waː/	‘PL’

No assibilation

- No assibilation before epenthetic [i]
- Assibilation blocked across right edge of stem

Additional evidence for the Phonological Phrase

- Right edge: extra consonant slot allowed (Weber 2017)
- Minimal size: CVCC, CVVC
- Domain of obligatory stress (Weber 2016, 2020)
- Domain of *[ti] (Weber 2020)
- Domain of syllable structure and phonotactic generalizations (Weber 2017, 2020)
- Domain of vowel coalescence (Bliss 2013) and syllable-driven epenthesis (present work)

Domain of primary stress

Domain of stress assignment = PPh, not PWd

Stress on prefixes

[i.ksím.ʔṣː.ta.ja]$_{PPh}$

√iksim–{√sst–aa}–Ø–yi=aawa

√secret–{√wish–V}–IND–3PL=PRX.PL

‘they thought’

Stress on prefixes

[i.ta.ní.ˢtsɪ.ksɪm.ʔṣː.ta.ja]$_{PPh}$

it–anist–√iksim–{√sst–aa}–Ø–yi=aawa

then–manner–√secret–{√wish–V}–IND–3PL=PL

‘they decided thus’