The case for NONINITIALITY

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1 Overview

- Wide range of research on prosodic recursion (Itô & Mester 2003, 2012; Ladd 2008; Selkirk 2011)
- Growing body of research argues for recursion in metrical categories (feet) to account for:
  - **quantity-insensitive** ternary stress rhythms (Martínez-Paricio & Kager 2015)
  - window stress systems (Kager 2012)
  - bounded tone spreading (Breteler & Kager 2017)
  - phonotactics (Bennett 2013)
  - edge effects typical of extrametricality (Kager & Martínez-Paricio 2018)
- I argue that ternary feet cannot replace extrametricality (boxed above). Two main arguments:
  1. recursive feet can*not* correctly derive default third syllable stress (and by extension, antepenultimate stress) in a quantity-sensitive language
  2. the universal constraint set should include NONINITIALITY (or some version of extrametricality) (Buckley 2014; Bye & de Lacy 2000; Kager 1999; McCarthy 2003)
- Empirical evidence: Blackfoot (Algonquian; Frantz 2009) syllable structure and default third syllable stress assignment is incompatible with recursive feet

What do I mean by NONINITIALITY?

- A counterpart to NONFINALITY, which has two definitions (cf. Hyde 2011):
  1. non-exhaustive or underparsing at right edge
  2. prohibition of stressed syllable at right edge (based in rhythmic or phonetic properties)
- I mean the **non-exhaustive** definition (more on this later)

2 Organization

§3 Blackfoot syllable structure: weight contrast

§4 Blackfoot stress: quantity-sensitive, default third syllable stress

§5 Why a recursive foot analysis fails

§6 An analysis using NONINITIALITY

§7 Typological implications

3 Blackfoot syllable structure

3.1 Phonological inventory

- Main takeaway: length distinction for consonants and vowels

	Labial	Coronal	Dorsal	Glottal
Stops	p pː	t tː	k kː	ʔ
Assibilants		ˢt ˢtː	k͡s	
Fricatives		s sː	x	
Nasals	m mː	n nː		
Glides	w	j	(w)	

	front	central	back
high	i iː		o oː
mid	ɛː		ɔː
low		a aː	

- Allophones in the following transcriptions:
  - Alveolar assibilant: /t/ → [t͡s] / __ i
  - Dorsal fricative: /x/ → { ç / __ [-back], x^w / __ [+round] }
  - Short lax vowels { ɪ, ɛ, ʌ, ɔ, ʊ } occur before [sC] clusters and geminates
- Some voiceless syllable nuclei:
  - [s̩], [s̩ː] are moraic vocoids (Denzer-King 2009; Goad & Shimada 2014a,b; Weber 2020)
  - { ç, x, x^w } can also occur as syllable nucleus (Miyashita 2018; Weber 2020)

3.2 Syllable structure

- Main takeaway:[1]
  - Light vs. heavy distinction for syllables
  - CVV and CVC are heavy syllables
  - Extra consonant at the right edge

(1) VOWEL LENGTH IS CONTRASTIVE

a. [á:.k**o**.ka]
áak**o**kaawa
aak–[**o**k–aa]–Ø–wa
FUT–[rope–AI]–IND–3SG
'he will rope' (BB)

b. [á:.k**oː**.ka]
áak**oo**kaawa
aak–[**oo**k–aa]–Ø–wa
FUT–[Sundance–AI]–IND–3SG
'she'll sponsor a Sundance' (BB)

[1] AI = animate intransitive, CMD = command clause, II = inanimate intransitive, IND = independent order. Note: ⟦ ⟧ notation means example was taken from textual sources.

(2) CONSONANT LENGTH IS CONTRASTIVE

a. [é:.po.**t**a]
áípo**t**aawa
a–[ipot–aa]–Ø–wa
IPFV–[beat.*v*–3OBJ]–IND–3
'he is getting a beating' (BB)

b. [é:.pʊ**t.t**a]
áípo**tt**aawa
a–[ipo**tt**–aa]–Ø–wa
IPFV–[fly–AI]–IND–3
'he is flying' (BB)

- Evidence that closed syllables are heavy (more evidence in Weber 2020)
  1. Neutralization of vowel length in closed syllables:
     - open: CV, CVV; closed: CVC, *CVVC
  2. Quantity-sensitivity: CVV and CVC both attract stress (shown in §4.2)
- Only short vowels before codas = /x, s, ʔ/, or a geminate consonant (Elfner 2006; Weber 2020)

(3) ONLY SHORT VOWELS BEFORE CONSONANT CLUSTERS in /x, s, ʔ/

a.	⟦ki.t͡sí:.**kiç**.pa⟧	*kitsíi**kiih**pa?*	'what did you do?'
	⟦ni.tá.ji:.t͡sɪ.**max**.pɪn.na:.n⟧	*nitáyiitsi**maah**pinnaan*	'we are storing food'
	⟦**ox**^{w}.pí.nį̥⟧	***oh**píni*	'his/her lung'
b.	⟦**ɪs**.pí.kṣ:.ko.jį̥⟧	***iss**píksskoyi*	'high forest (of tall trees)'
c.	⟦**áʔ**.poʔ.ta.ki.wą̥⟧	***a'**po'takiwa*	'he worked'

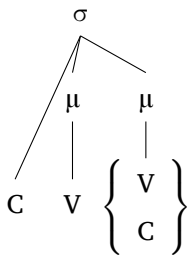
(4) ONLY SHORT VOWELS BEFORE GEMINATES

[**kɪp**.pχ^{w}.kúk.kɪ.t]	***kip**pohkókkit*	'please give me it!' (BB)
⟦**mʊt**.to.k͡sí.s⟧	***mot**toksís*	'knee'
⟦ni.**tɬ́k**.ka:⟧	*ni**ták**kaa*	'my friend'

- Vowel length neutralization in Moraic Theory (Hayes 1989; Hyman 1985; Pulleyblank 1994)
  - "Weight by Position" (Hayes 1989): codas are moraic; bimoraic maximal syllable

(5) LIGHT SYLLABLE

(6) HEAVY SYLLABLE



- Exceptions at the right edge:
  1. Final consonants are a subset of syllable onsets; /x, s, ʔ/ prohibited finally.
  2. CVVC, CVCC allowed (*unlike* medial syllables).
  3. Vowel length distinctive before final consonants, shown below.

(7) [ɪs.sa.p**í**.t]
issap**í**t
[issap–i]–t–Ø
[look–AI]–2SG.IMP–CMD
'look!' (BB)

(8) [a.p**iː**.t]
ap**íí**t
[ap–ii]–t–Ø
[sit–AI]–2SG.IMP–CMD
'sit!' (BB)

(9) [pɪs.k**á**.n]
pisskán
[pissk–an]
[herd–NMLZ]
'buffalo jump' (BB)

(10) [pʌs.k**áː**.n]
passk**áá**n
[[passk–aa]–n]
[[dance–AI]–NMLZ]
'dance' (BB)

- Weber (2020) analyzes these as degenerate syllables without a nucleus; any non-moraic parsing works.
- Next sections show these final consonants do not affect stress assignment.
- More frequent in Káínai dialect because it lacks some nominal singular suffixes:[2]

(11) a. [pʌs.káː.n] 'dance' (Káínai dialect)

b. [pʌs.káː.n̥i̥] 'dance' (Siksiká dialect)

4 Blackfoot stress

- Main takeaways:
  - Culminative syllabic prominence in Blackfoot signalled with high F_0
  - Default location: second syllable if heavy, else third syllable
  - Blackfoot instantiates a clear 'default third' prominence system

4.1 Syllabic prominence

- Prominent syllable: primarily signalled via higher F_0 than surrounding syllables (Van Der Mark 2003).
- Level high or falling tone, depending on environment (Frantz 2009; Stacy 2004; Taylor 1969).

[2]Subject to a lot of speaker variation. Final devoicing in Blackfoot has been studied in Bliss (2013), Bliss & Gick (2009), Bliss & Glougie (2010), Gick et al. (2012), & Windsor (2017a,b).

- Pitch is interpolated between the edges of the verb and the pitch peak on the most prominent syllable; that is, pitch rises to a pitch peak and falls steeply after the pitch peak (Miyashita & Weber 2020; Weber & Allen 2012).
- Location in verbs is predictable, with few exceptions.

4.2 Data

- Speaker: Beatrice Bullshields (BB); late 60s, Káínai (Blood) dialect in Alberta
- Data elicited are verbal stems and suffixes with no prefixal morphology (to avoid phrasal effects):

(12) IMPERATIVE
[iç.kíː.taː.t]
iihkíítaat
[iihki–it/aa]–t–Ø
[dry–by.heat/II]–IMP.2SG–IMP
'bake!' (BB)

(13) INDEPENDENT
[iç.kíː.ta]
iihkíítaawa
[iihki–it/aa]–Ø–wa
[dry–by.heat/II]–IND–3
's/he baked.' (BB)

(14) NOMINALIZATION
[iç.kíː.taː.n]
iihkíítaan
[[iihki–it/aa]–n]
[[dry–by.heat/II]–NMLZ]
'(the) baking' (BB)

- For monosyllabic verbs, prominence falls on the single heavy syllable.

(15) MONOSYLLABIC VERBS

'enter!'	[píː.t]	*píít*	**Ḿ**
'it (anim.) is six'	[néː.j] ∼ [néː.i]	*nááiwa*	**Ḿ**
'it (inan.) is six'	[nɔ́ː.w] ∼ [nɔ́.o]	*nááowa*	**Ḿ**

- For disyllabic verbs, prominence falls on the second syllable, regardless of syllable weight.

(16) DISYLLABIC VERBS

a. 'drink!'	[sɪ.míː.t]	*simít*	L **Ĺ**
b. 'sit!'	[a.píː.t]	*apíít*	L **Ḿ**
'say!'	[a.níː.t]	*aníít*	L **Ḿ**
'rope!'	[o.káː.t]	*okáát*	L **Ḿ**
'roping'	[o.káː.n]	*okáán*	L **Ḿ**
'possession'	[i.náː.n]	*ináán*	L **Ḿ**
's/he entered'	[i.píː.m]	*ipíím*	L **Ḿ**
c. 's/he ate'	[iː.jí]	*iiyíwa*	H **Ĺ**
's/he barked'	[iç.kí]	*iihkíwa*	H **Ĺ**
'eat!'	[oː.jí.t]	*ooyít*	H **Ĺ**
'take it!'	[ma?.t͡sí.t]	*ma'tsít*	H **Ĺ**
'bark!'	[oxʷ.kí.t]	*ohkít*	H **Ĺ**

d.	‘s/he roped’	[iː.káː]	*iikááwa*	H **Ḿ**
	‘sleep!’	[oʔ.káː.t]	*o’káát*	H **Ḿ**
	‘Sundance lodge’	[oː.káː.n]	*ookáán*	H **Ḿ**

- For verbs longer than two syllables, prominence falls on the second syllable if it is heavy, and otherwise on the third syllable.

(17) LONGER WORDS

a. HEAVY SECOND SYLLABLE, LIGHT FIRST SYLLABLE

‘speech, talk’	[a.nís.sɪ.n]	*aníssin*	L **Ḿ** L
‘s/he danced’	[i.pʌ́s.ka]	*ipásskaawa*	L **Ḿ** L
‘s/he chopped wood’	[i.kâʔ.kjaː.ki]	*ikáʼkiaakiwa*	L **Ḿ** H L
‘s/he sliced meat thinly’	[i.jíː.t͡sɪt.t͡sɪ.ma]	*iyíítsittsimaawa*	L **Ḿ** H L L

b. HEAVY SECOND SYLLABLE, HEAVY FIRST SYLLABLE

‘travelling’	[aʔ.póxʷ.sɪ.n]	*aʼpóóhsin*	H **Ḿ** L
‘work’	[aʔ.púʔ.ta.kṣ.sɪ.n]	*aʼpóʼtakssin*	H **Ḿ** L
‘s/he was thirsty’	[iʔ.náː.ki]	*iʼnáákiwa*	H **Ḿ** L
‘s/he baked’	[iç.kíː.ta]	*iihkíítaawa*	H **Ḿ** L
‘baking’	[iç.kíː.taː.n]	*iihkíítaana*	H **Ḿ** H
‘s/he bought’	[iç.púm.ma]	*iihpómmaawa*	H **Ḿ** L
‘s/he bought him/her’	[iç.púm.ma.t͡si]	*iihpómmatsiiwa*	H **Ḿ** L L
‘hitchhike’	[pɪç.kóxʷ.sɪ.n]	*piihkóóhsin*	H **Ḿ** L

c. LIGHT SECOND SYLLABLE, LIGHT FIRST SYLLABLE

‘s/he hit’	[i.pi.k͡sî]	*ipiksíwa*	L L **Ĺ**
‘s/he got up’	[i.po.wáː]	*ipowááwa*	L L **Ḿ**
‘s/he hit him/her’	[a.wa.já.ki]	*awayákiyiiwa*	L L **Ĺ** L
‘tell a story!’	[a.tˢɪ.ní.kɪ.t]	*atsiníkit*	L L **Ĺ** L
‘story’	[a.tˢɪ.ní.kṣ.sɪ.n]	*atsiníkssin*	L L **Ĺ** L̥ H
‘s/he gossiped’	[i.sɪ.mím.ʔx̣ʷ.ki]	*isimímmohkiwa*	L L **Ḿ** L̥ L
‘gossip’	[a.sɪ.mím.ʔx̣ʷ.kṣ.sɪ.n]	*asimímmohkssin*	L L **Ḿ** L̥ L̥ L

d. LIGHT SECOND SYLLABLE, HEAVY FIRST SYLLABLE

‘s/he told a story’	[iː.t͡sɪ.ní.ki]	*iitsiníkiwa*	H L **Ĺ** L
‘s/he dove’	[ɾˢt.ta.jí]	*isttayíwa*	H L **Ĺ**
‘baby’	[ɪs.sɪ.t͡sí.maː.n]	*issitsímaan*	H L **Ĺ** H
‘take!’	[maʔ.ta.kí.t]	*maʼtakít*	H L **Ĺ**
‘s/he took’	[iʔ.ta.kí]	*iʼtakíwa*	H L **Ĺ**
‘s/he wet it’	[iʔ.pɪ.ˢtó.t͡sɪm.ʔa̰]	*iʼpistótsima*	H L **Ĺ** H L̥

4.3 Interim summary of data

- The data above can be summarized as follows.

(18) a. If the verb is monosyllabic, prominence falls on the single (non-degenerate) syllable;

b. If the verb is disyllabic, prominence falls on the second syllable;

c. If the verb is longer than two syllables, then prominence falls on the second syllable if it is heavy and the third syllable otherwise.

- Default third syllable prominence when other specific conditions are not met.[3]
- Prominence has many properties of metrical stress (e.g. Hayes 1995; Hyman 2006; Kager 2007)
  - Culminative (at most one primary prominence; sometimes other smaller, local pitch maxima)
  - Obligatory (all verbs have prominence)
  - Demarcative (tends towards left edge)
  - Quantity sensitivity (falls on second syllable if heavy)
  - Second and third syllable stresses can be unified via a quantity-sensitive iamb:

1. Heavy syllable: $(\acute{\sigma}_{\mu\mu})$
2. Light syllable followed by heavy: $(\sigma\ \acute{\sigma}_{\mu\mu})$
3. Light syllable followed by light: $(\sigma\ \acute{\sigma})$

(19) POLYSYLLABIC WORDS: PRIMARY FOOT SHOWN

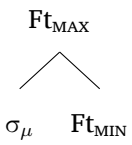
a.	‘speech, talk’	[a.(nís).sɪ.n]	*aníssin*	L (**Ḿ**) L
	‘travelling’	[aʔ.(póxʷ).sɪ.n]	*a’póóhsin*	H (**Ḿ**) L
b.	‘s/he hit’	[i.(pi.k͡sî)]	*ipiksíwa*	L (L **Ĺ**)
	‘s/he told a story’	[iː.(t͡sɪ.ní).ki]	*iitsiníkiwa*	H (L **Ĺ**) L
c.	‘s/he got up’	[i.(po.wáː)]	*ipowááwa*	L (L **Ḿ**)

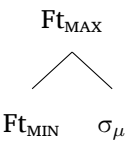
- Because of these properties, I argue that Blackfoot has default third syllable stress [typologically rare!]
- Question: what causes misalignment between the left edge of the verb and the left edge of the foot?

5 Why a recursive foot analysis fails

- Recursive feet (aka weakly-layered feet or internally layered feet) (cf. Martínez-Paricio & Kager 2015)
- Maximal foot = binary minimal foot plus weak (monomoraic) syllable adjunct

[3] In the interest of transparency, I have simplified the data here. Stress can also fall on the first syllable if particular and well-defined morphological *and* phonological criteria are met. Stress falls on the fourth syllable if the second and third syllables both contain voiceless syllable nuclei and the conditions for first syllable stress are not met. Neither of these facts affect the default position for stress. Data is in the appendix for the interested reader.

(20) a. 

b. 

- Recursivity arises in order to satisfy a higher-ranked constraint (such as PARSE-σ, to create a fully exhaustive parse.
- Left-aligned recursive feet correctly derive third syllable stress for some forms in Blackfoot, as below.

(21) POLYSYLLABIC WORDS: RECURSIVE FOOT ANALYSIS FOR LIGHT INITIAL SYLLABLES

a.	'speech, talk'	[(a.(nís)).sɪ.n]	*aníssin*	(L (**Ĺ**)) L
b.	's/he hit'	[(i.(pi.k͡sî))]	*ipiksíwa*	(L (L **Ĺ**))
c.	's/he got up'	[(i.(po.wá:))]	*ipowááwa*	(L (L **Ĺ**))

5.1 Problem 1: Heavy initial syllables do not affect stress patterns

- Same pattern of stress (second if heavy, otherwise third) when the first syllable is heavy.
- But recursive feet cannot have a heavy adjunct syllable.
- Initial syllable would be parsed into a foot; it would be stressed since it is leftmost within the verb.

(22) POLYSYLLABIC WORD: 'TRAVELLING'

a.	[aʔ.póxʷ.sɪ.n]	H **Ĺ** L	actual stress pattern
b.	[(aʔ.(póxʷ)).sɪ.n]	*(H (**Ĺ**)) L	impossible recursive foot (heavy adjunct)
c.	*[(áʔ).poxʷ.sɪ.n]	(**Ĺ**) H L	predicted outcome using recursive feet (left-aligned foot)

(23) POLYSYLLABIC WORD: 'S/HE TOLD A STORY'

a.	[i:.t͡sɪ.ní.ki]	H L **Ĺ** L	actual stress pattern
b.	[(i:.(t͡sɪ.ní)).ki]	*(H (L **Ĺ**)) L	impossible recursive foot (heavy adjunct)
c.	*[(í:).t͡sɪ.ni.ki]	(**Ĺ**) L L L	predicted outcome using recursive feet (left-aligned foot)

- **Problem:** some constraint *repels* feet (or the head foot, or a stressed syllable) from the left edge of the verb, but *only* when the first foot is heavy.
  - Similar arguments for Kashaya (Pomoan), another quantity-sensitive language with default third syllable stress (Buckley 2014)

5.2 Problem 2: Heavy initial syllables behave differently under cyclic stress assignment

- Even if heavy adjuncts are allowed, cyclic stress assignment still treats initial heavy and initial light syllables alike.
- When event nominalizations are possessed, accent shifts to a stem-initial syllable (underlined) when it is heavy, but not when it is light.

(24) a. 'work' [aʔ.púʔ.ta.kʂ.sɪ.n] H **Ĥ** L L̥ L
b. 'your work' [kɪ.t=áʔ.puʔ.ta.kʂ.sɪ.n] L= **Ĥ** H L L̥ L

(25) a. 'story' [a.t͡sɪ.ní.kʂ.sɪ.n] L L **Ĺ** L̥ L
b. 'my story' [nɪ.t͡s=ɪ.t͡sɪ.ní.kʂ.sɪ.n] L= L L **Ĺ** L̥ L

- **Problem:** Recursive foot is restructured, but *only* when the stem-initial syllable is heavy.

(26) a. 'work' [(aʔ.(púʔ)).ta.kʂ.sɪ.n] (H (**Ĥ**)) L L̥ L
b. 'your work' *[kɪ.t=(áʔ.(puʔ)).ta.kʂ.sɪ.n] L= (H (**Ĥ**)) L L̥ L
c. 'your work' [(kɪ.t=áʔ).(puʔ).ta.kʂ.sɪ.n] (L= **Ĥ**) (H) L L̥ L ← restructuring

(27) a. 'story' [(a.(t͡sɪ.ní)).kʂ.sɪ.n] (L (L **Ĺ**)) L̥ L
b. 'my story' [nɪ.t͡s=(ɪ.((t͡sɪ.ní)).kʂ.sɪ.n] L= (L (L **Ĺ**)) L̥ L ← no restructuring
c. 'my story' *[(nɪ.t͡s=í).(t͡sɪ.ní).kʂ.sɪ.n] *(L= **Ĺ**) (L L)]) L̥ L

6 An analysis using NONINITIALITY

- Optimality Theory (McCarthy & Prince 1993a,b; Prince & Smolensky 1993).
  - Assumption: no gradiently-evaluated constraints (McCarthy 2003).
  - Assumption: secondary feet are covert. All foot heads are underlined; primary foot head marked with acute accent.
  - Assumption: the domain where syllables are parsed into feet is the Phonological Phrase (PPh; Weber 2020)

6.1 Constraints and ranking

- Default patterns of stress need the following constraints and rankings.
- NONINITIALITY enforces non-exhaustive parsing at edges

(28) NONINITIALITY (NONINIT)
*Ft / [$_{\text{PPh}}$ —
'PPh-initial feet are prohibited within the PPh.' (McCarthy 2003; Kager 1999: 151)

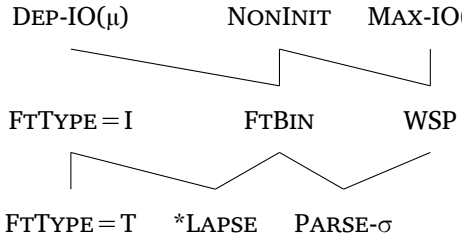
(29) FOOT BINARITY (FTBIN)
Feet must be binary under a moraic or syllabic analysis.
(Broselow 1982; McCarthy & Prince 1993b; Prince 1980)

(30) WEIGHT-TO-STRESS PRINCIPLE (WSP)
Assign a violation for every heavy syllable which is not the head of a foot.
(Prince 1990; Prince & Smolensky 1993)

(31) *LAPSE
Assign one violation-mark for each pair of adjacent syllables which are not foot heads.

(32) PARSE SYLLABLE (PARSE-σ)
A σ must be dominated by a Foot. (McCarthy 2003, among others)

(33)



6.2 Summary tableaux

- Main takeaways:
  - First syllable of each optimal candidate is not parsed into a foot.
  - (Except for monosyllables.)
- A PPh with three or more syllables has stress on the third syllable if the second is light, regardless of whether the first syllable is light, (34), or heavy, (35).

(34) [a͡tsiníkɪt] *atsiníkit* ‘tell a story!’

/a͡tsiniki-t/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
☞ a. [a.(t͡si.ní).kɪ.t]						*	**
b. [a.t͡si.(nɪ.kí).t]						**!	**
c. [a.(t͡sí).(nɪ.kɪ).t]					*!		*
d. [(a.t͡sí).(nɪ.kɪ).t]			*!				
e. [a.(t͡sí:).(nɪ.kɪ).t]		*!					*

(35) [i:t͡sɪníki] *iitsiníkiwa* ‘s/he told a story’

/i:t͡siniki-wa/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
☞ a. [i:.(t͡si.ní).ki]				*		*	**
b. [i:.t͡si.(ni.kí)]				*		**!	**
c. [i:.(t͡sí).(ni.kí)]				*	*!		*
d. [(i:.t͡sí).(ni.kí)]			*!	*			
e. [(í:).(t͡si.ni).ki]			*!				*
f. [i:.(tˢí:).(ni.kí)]		*!		*			*

- A PPh with three or more syllables have stress on the second syllable if heavy, regardless of whether the first syllable is light, (36), or heavy, (37).

(36) [ipʌ́ska] *ipásskaawa* ‘s/he danced’

/ipaska:/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
☞ a. [i.(pʌ́s).ka]							**
b. [i.(pʌs.ká)]				*!		*	*
c. [i.(pʌ́s).(ka:)]		*!					*
d. [(i.pʌ́s).ka]			*!				*

(37) [içkí:ta] *iihkíítaawa* ‘s/he baked’

/içki:ta/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
☞ a. [iç.(kí:).ta]				*			**
b. [iç.(ki:.tá)]				**!		*	*
c. [iç.(ki.tá)]	*!			*		*	*
d. [iç.(kí:).(ta:)]		*!		*			*
e. [(iḉ).(ki:).ta]			*!				

- A disyllable PPh has second syllable stress regardless of whether they are L Ĺ, (38), L H́, (39), H Ĺ, (40), H H́, (41).

(38) [sɪmít] *simít* ‘drink!’

/simi-t/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
a. [(sɪ.mí).t]			*!				
b. [(sí).mɪ.t]			*!		*		*
☞ c. [sɪ.(mí).t]					*		*
d. [sɪ.(mí:).t]		*!					*
e. [(sɪ.mí:).t]		*!	*				

(39) [apí:t] *apíít* ‘sit!’

/api:-t/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
a. [(a.pí:).t]			*!				
☞ b. [a.(pí:).t]							*

(40) [o:jít] *ooyít* ‘eat!’

/o:ji-t/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
a. [o.(jí).t]	*!				*		*
b. [o:.(jí:).t]		*!		*			*
c. [(o:.jí).t]			*!	*			
d. [(ó:).jɪ.t]			*!				*
☞ e. [o:.(jí).t]				*	*		*

(41) [i:ká:] *iikááwa* ‘s/he roped’

/i:ka:-wa/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
a. [(í:).(ka:)]			∗!				
b. [i.(ká:)]	∗!						∗
☞ c. [i:.(ká:)]				∗			∗

- Finally, a monosyllabic PPh has stress on the single syllable, in violation of NONINIT. I have assumed that a PPh without a head foot is ill-formed and banned by GEN. Alternatively, such a form could violate a constraint like PROPER HEADEDNESS (Itô & Mester 2003).

(42) [pí:t] *píít* ‘enter!’

/pí:-t/	MAX(μ)	DEP(μ)	NONINIT	WSP	FTB	*LAPSE	PAR-σ
☞ a. [(pí:).t]			∗				

6.3 Interim summary

- Blackfoot stress:
  - quantity-sensitive
  - default third syllable, regardless of weight of initial syllable
- Recursive foot analysis fails:
  - only light syllables can be adjuncts to a minimal foot
  - predicts that initial light vs. heavy syllables should pattern differently
- NONINITIALITY solves the problems the recursive foot analysis has
  - it prohibits parsing at the left edge “across the board”
  - light and heavy initial syllables both remain unparsed
- Symmetrical non-exhaustive parsing or extrametricality is needed for quantity-sensitive languages. This suggests it is also necessary for quantity-insensitive languages. Next section explores some typological implications for adding NONINITIALITY to CON.

7 Typological implications

- Main argument for asymmetrical extrametricality was *absence* of languages with a three syllable window for stress at the left edge (Gordon 2002; Hayes 1995; Hayes 1980; Hyde 2011; Prince & Smolensky 1993).

- Further research shows this is not an absolute absence, but a strong asymmetry remains.
- StressTyp2:[4] = typological stress database lists three languages (Table 1)
  - Winnebago (Siouan; Hale & White Eagle 1980); consistent third mora stress
  - Laragia (Australian; Capell 1984); three syllable window at left edge
  - Kashaya (Hokan; Buckley 1994, 1997; Oswalt 1961, 1988): third syllable default stress

Table 1: StressTyp2: third vs. antepenultimate stress

Location	Third	Antepenultimate
Fixed	1	16
"Default"	0	14
Three-syllable window	2	36
Total (out of 699)	3	66

- Primary literature reveals several more, discussed in Kager (2012):
  1. Blackfoot (Algonquian; Weber 2020: default third syllable stress
  2. Azkoitia Basque (Hualde 1998): default third syllable accent
  3. Choguita Rarámuri (Uto-Aztecan; Caballero 2008, 2011): three syllable window at left edge
  4. Terêna (Arawakan; Bendor-Samuel 1963; Harden 1946): three syllable window at left edge
- There is not an absolute asymmetry between languages with third syllable stress and languages with antepenultimate stress!
- Suggestion: the asymmetry arises from a different functional pressure:
  - Iambic systems are far rarer than trochaic (Table 2; Goedemans & van der Hulst 2013)
  - Third syllable stress requires NONINITIALITY *and iambs* (rare)
  - Antepenultimate stress requires NONINITIALITY *and trochees* (common)
- Other arguments for asymmetry involve asymmetries on stress clash/lapse at edges = asymmetries in *rhythm*, not parsing
  - Maybe: prohibition against stressed syllables (the other NONFINALITY) is indeed asymmetrical
  - Literature sometimes talks about evidence for one type of NONFINALITY as if it is evidence for the other.
  - Differences need to be teased apart.

[4] http://st2.ullet.net/?

Table 2: WALS Feature 17A: Rhythm types

Value	Representation
Trochaic	153
Iambic	31
Dual	4
Undetermined	37
Absent (no rhythmic stress)	98
Total	323

8 Summary

- Blackfoot (Algonquian) is a quantity-sensitive language with a clear default third-syllable stress pattern, which occurs regardless of whether the first syllable is heavy or light.
- Recursive foot analysis cannot capture these facts.
- A NONINITIALITY account (underparsing allowed at edges) works.
- No problems with adding NONINITIALITY to CON?
  - The typological argument for asymmetrical extrametricality must be tempered.
  - Rarity of initial three-syllable stress windows could be due to the rarity of iambic systems.
- Future: teasing out the effects of different "types" of extrametricality
- I welcome any and all comments.

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A Stress determined by initial syllable and clause type

Some PPhs have first syllable accent, (43). This only occurs when three conditions are met: (1) the first syllable of the PPh is heavy, (2) the first syllable of the PPh contains a [-high] vowel, and (3) it is in the independent clause type.

(43) POLYSYLLABIC PPH: FIRST SYLLABLE STRESS

‘s/he said’	[á:.ni:]	*áániiwa*	**Ḿ** H
‘s/he cried’	[á:.se?.ni]	*áásai’niwa*	**Ḿ** H L
‘s/he boiled it’	[á:.kx̟ʷ.sɪ.m]	*áákohsima*	**Ḿ** L̰ L
‘s/he played’	[áw.ʔx̟.ka]	*áwahkaawa*	**Ḿ** L̰ L
‘s/he sold it’	[á?.pç̟.kx̟.tu:.m]	*á’pihkahtooma*	**Ḿ** L̰ L̰ L
‘s/he worked’	[á?.puʔ.ta.ki]	*á’po’takiwa*	**Ḿ** H L L
‘s/he took’	[má?.ta.ki]	*má’takiwa*	**Ḿ** L L
‘s/he took it’	[má?.t͡sɪ.m]	*má’tsima*	**Ḿ** H
‘it (anim) is red’	[mɔ́xʷ.k͡sɪ.nʌm.m]	*máóhksinamma*	**Ḿ** L H

Regarding the claim that the syllable must be heavy, consider the following verbs (repeated from above). These begin with a light syllable vowel in the indicative clause type.[5]

(44) ‘s/he hit him/her’	[a.wa.já.ki]	*awayákiyiiwa*[6]	L L **Ĺ** L
‘s/he hit’	[i.pi.k͡sî]	*ipiksíwa*	L L **Ĺ**
‘s/he got up’	[i.po.wá:]	*ipowááwa*	L L **Ḿ**
‘s/he gossiped’	[i.sɪ.mím.ʔx̟ʷ.ki]	*isimímmohkiwa*	L L **Ḿ** L̰ L
‘s/he entered’	[i.pí:.m]	*ipííma*	L **Ḿ**
‘s/he danced’	[i.pʌ́s.ka]	*ipásskaawa*	L **Ḿ** L
‘s/he chopped wood’	[i.kâʔ.kja:.ki]	*iká’kiaakiwa*	L **Ḿ** H L
‘s/he sliced meat thinly’	[i.jí:.t͡sɪt.t͡sɪ.ma]	*iyíítsittsimaawa*	L **Ḿ** H L L

[5]There is massive neutralization at the left edge of vowel-initial indicative clauses, as I show in **??**. All verbs begin with either [i], [i:], or a heavy, stressed [-high] vowel.

[6]This verb is exceptional because it is in the independent clause type and begins with a [-high] vowel, but the first syllable is

Regarding the claim that the syllable must contain a [-high] vowel, consider the following verbs (repeated from above). These begin with a heavy syllable in the independent clause type, but the vowel is [+high]. None of these have first syllable stress.

(45)	‘s/he ate’	[iː.jí]	*iiyíwa*	H **Ĺ**
	‘s/he roped’	[iː.ká:]	*iikááwa*	H **Ĥ**
	‘s/he told a story’	[iː.t͡sɪ.ní.ki]	*iitsiníkiwa*	H L **Ĺ** L
	‘s/he dove’	[ɪˢt.ta.jí]	*isttayíwa*	H L **Ĺ**
	‘s/he was thirsty’	[iʔ.náː.ki]	*i’náákiwa*	H **Ĥ** L
	‘s/he took’	[iʔ.ta.kí]	*i’takíwa*	H L **Ĺ**
	‘s/he wet it’	[iʔ.pɪ.ˢtó.t͡sɪm.ʔa̰]	*i’pistótsima*	H L **Ĺ** H L̰
	‘s/he baked’	[iç.kíː.ta]	*iihkíítaawa*	H **Ĥ** L
	‘s/he bought him/her’	[iç.púm.ma.t͡si]	*iihpómmatsiiwa*	H **Ĥ** L L

Regarding the claim that first syllable stress only obtains in the independent clause type, I have included the imperative and independent clause types for several verbs below. If the verb is intransitive (AI) and if I elicited an event nominalization, I included those as well. All have initial stress in the independent clause type, but not in the imperative or event nominalization. If the verb begins with an open syllable, then the initial vowel is short in the imperative and nominalization, but long in the independent.

(46)	*Stem gloss*	*Imperative*	*Independent*	*Event nominalization*
	‘say’ (AI)	[a.níː.t]	[áː.niː]	[a.nís.sɪ.n]
	‘cry’ (AI)	[a.sé?.nɪ.t]	[áː.se?.ni]	[a.sén.ʔs̩.sɪ.n] (‘cry-baby’)
	‘boil’ (TI)	[a.kx̩ʷ.sí.t]	[áː.kx̩ʷ.sɪ.m]	—
	‘walk, play’ (AI)	[aw.ʔx̩.káː.t]	[áw.ʔx̩.ka]	[aw.ʔx̩.káː.n]
	‘sell’ (TI)	[aʔ.pç̩.kx̩.tóː.t]	[áʔ.pç̩.kx̩.tuː.m]	[aʔ.pç̩.kx̩.táː.n]
	‘take’ (TI)	[maʔ.t͡sí.t]	[máʔ.t͡sɪ.m]	—
	‘work’ (AI)	[aʔ.pú?.ta.ki]	[áʔ.puʔ.ta.ki]	[aʔ.pú?.ta.kʂ.sɪ.n]

There is pervasive left-edge allomorphy within the independent clause type, but for other verbs it typically involves a different vowel quality, not a different stress pattern (Frantz 2009; Taylor 1969). Some examples from BB are given below. If the verb begins with a short [a] or a short or long [o] in the imperative, then this vowel ablauts to either [i] or [iː] in the independent clause type. Verbs that begin with a consonant in the imperative typically append an initial [i] in the independent, and stems that begin with long vowels sometimes append an initial [ij]. I discuss these left-edge mutations further in **??**.

not heavy. This verb is listed in the dictionary with a long initial [aː], but BB typically pronounces this with a short initial vowel, sometimes with a secondary stress on the initial syllable.

(47)	*Stem gloss*	*Imperative*	*Independent*	*Event nominalization*
	'relate story'	[a.t͡sɪ.ní.ki.t]	[iː.t͡sɪ.ní.ki]	[a.tˢɪ.ní.kˌs.sɪ.n] ('story')
	'gossip'	[a.sɪ.mím.ʔxˌʷ.ki.t]	[i.sɪ.mím.ʔxˌʷ.ki]	[a.sɪ.mím.ʔxˌʷ.kˌs.sɪ.n]
	'read'	[a.kˌs.tá.kɪ.t]	[iː.kˌstá.ki]	—
	'rope'	[o.ká:.t]	[iː.ká:]	[o.ká:.n]
	'eat'	[oː.jít]	[iː.jí]	[ɔːów.ʔxˌ.sɪ.n] ('food')
	'bark'	[oxˌʷ.kí.t]	[iç.kí]	[oxˌʷ.kˌs.sí.n]
	'bite'	[sɪ.kˌs.tá.kɪ.t]	[i.sí.kˌs.ta.ki]	[sɪ.kˌs.tá.kˌs.sɪ.n]
	'pack'	[aː.kˌç.táː.t]	[i.já:.kˌç.ta]	[aː.kˌç.táː.n]

The data above can be summarized as follows.

(48) a. If the PPh begins with a heavy syllable containing a [-high] vowel in the independent clause type, then stress falls on the first syllable.

b. For BB, the stems which begin with a long [-high] vowel neutralize to short in the imperative and event nominalizations.

B Interaction of stress with voiceless syllable nuclei

If the third syllable contains a voiceless nucleus, then stress falls on the second syllable, regardless of whether the second syllable is light or heavy. For example, in [i.sí.kˌs.ta.ki] 's/he bit', since the second syllable is light we expect stress to fall on the third syllable. The third syllable in this case is [kˌs], which contains a voiceless nucleus. A voiceless nucleus has no vibration of the vocal folds and therefore no F_0 which could carry pitch, the main correlate of Blackfoot stress. ın these cases, pitch accent occurs one syllable to the left. When the second syllable is heavy, as for [i.já:.kˌç.ta] 's/he packed' and [ɪs.púm.ʔˌç.ta] 's/he helped out', second syllable stress is already predicted by the generalizations from above.

(49) VOICELESS THIRD SYLLABLE: STRESS FALLS ON THE SECOND SYLLABLE

's/he bit'	[i.sí.kˌs.ta.ki]	*isikstakiwa*	L **Ĺ** L̥ L L
's/he packed'	[i.já:.kˌç.ta]	*iyaakihtaawa*	L **Ĥ** L̥ L
's/he helped out'	[ɪs.púm.ʔˌç.ta]	*isspómmihtaawa*	H **Ĥ** L̥ L

If the second syllable is light and voiceless, then stress falls either on the first syllable or the third syllable. It falls on the first syllable under the same conditions as above (first syllable must be heavy and contain a [-high] vowel; must be an independent clause). Otherwise it falls on the third syllable, as expected.

(50) VOICELESS SECOND SYLLABLE

a. STRESS FALLS ON THE FIRST SYLLABLE

's/he boiled it'	[á:.kˌxˌʷ.sɪ.m]	*áákohsima*	**Ĥ** L̥ L
's/he played'	[áw.ʔˌx.ka]	*áwahkaawa*	**Ĥ** L̥ L

b. STRESS FALLS ON THE THIRD SYLLABLE

‘s/he hunted’	[i.kṣ.kí.ma]	*ikskímaawa*	L L̥ **Ĺ** L
‘boil it!’	[a.kx̣^{w}.sí.maː.t]	*akohsímaat*	L L̥ **Ĺ** H
‘play!’	[aw.ʔx̣.káː.t]	*awahkáát*	L L̥ **Ĥ**
‘playing’	[aw.ʔx̣.káː.n]	*awahkáán*	H L̥ **Ĥ**
‘barking’	[ox^{w}.kṣ.sí.n]	*ohkssín*	H L̥ **Ĺ**
‘read!’	[o.kṣ.tá.kɪ.t]	*okstákit*	L L̥ **Ĺ** L
‘s/he read’	[iː.kṣ.tá.ki]	*iikstákiwa*	H L̥ **Ĺ** L
‘s/he sang’	[in.ʔç.kí]	*inihkíwa*	H L̥ **Ĺ**

If both the second and third syllables are light and voiceless, then stress falls either on the first syllable or the fourth syllable. It falls on the first syllable under the same conditions as above (first syllable must be heavy and contain a [-high] vowel; must be an independent clause). Otherwise it falls on the fourth syllable.

(51) VOICELESS SECOND AND THIRD SYLLABLES

a. FIRST SYLLABLE STRESS

‘s/he sold it’	[áʔ.pç̣.kx̣.tuː.m]	*á’pihkahtooma*	**Ĥ** L̥ L̥ L

b. FOURTH SYLLABLE STRESS

‘song’	[nin.ʔç.kṣ.sí.n]	*ninihkssín*	H L̥ L̥ **Ĺ**
‘sell it!’	[aʔ.pç̣.kx̣.tóː.t]	*a’pihkahtóót*	H L̥ L̥ **Ĥ**
‘purchase’	[aʔ.pç̣.kx̣.táː.n]	*a’pihkahtáán*	H L̥ L̥ **Ĥ**

C Idiosyncratic stress

I have also found several stems which have unexpected stress location. The examples in (a) below have second syllable stress, even though the second syllable is light and stress normally falls on the third syllable in that case, (b).

(52)	a.	‘s/he danced’	[iç.pí.jɪ]	*ihpíyiwa*	H **Ĺ** L
		‘s/he spoke’	[iʔ.pó.jɪ]	*i’póyiwa*	H **Ĺ** L
	b.	cf. ‘s/he dove’	[ɪ^{s}t.ta.jí]	*isttayíwa*	H L **Ĺ**

One stem consistently has second syllable stress on a light syllable in independent clauses, (a). Normally if the second syllable is light, then stress falls on the third syllable. This stem has expected second syllable stress in the imperative and event nominalization, (b), where the second syllable is heavy.

(53)	a.	‘s/he drew’	[i.sí.na:.ki]	*isínaakiwa*	L **Ĺ** H L
		cf. ‘s/he got up’	[i.po.wá:]	*ipowááwa*	L L **Ḧ**
	b.	‘draw!’	[sɪ.ná:.kɪ.t]	*sináákit*	L **Ḧ** L
		‘writing’	[sɪ.ná:.kṣ.sɪ.n]	*sináákssin*	L **Ḧ** L̥ L

Finally, some stems have (expected) stress on a heavy second syllable in independent clauses, (54), but unexpected stress on an initial syllable in nominalizations, (55). Stress falls on the same syllable of the stem in both cases (e.g. always on [pʌ́s] in the two forms of ‘dance’), so this might be due to some pressure from paradigm uniformity.

(54)	a.	‘s/he danced’	[i.pʌ́s.ka]	*ipásskaawa*	L **Ḧ** L
	b.	‘s/he bought (s.t.)’	[iç.púm.ma]	*iihpómmaawa*	H **Ḧ** L
	c.	‘s/he found (s.t.)’	[iç.kó:.ni.ma]	*iihpómmaawa*	H **Ḧ** L L

(55)	a.	‘(a) dance’	[pʌ́s.ka:.n]	*pásskaan*	**Ḧ** H
	b.	‘(a) purchase’	[púm.ma:.ni]	*pómmaani*	**Ḧ** H L
	c.	‘s/he got found’ (name)	[kó:ni.ma:.n]	*kóónimaan*	**Ḧ** L H