Morphologically assigned accent and an initial three syllable window in Ese'eja[1]

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1 Introduction

Within the typology of word prosody, there is a growing body of evidence for initial three syllable windows in which primary accent must be located on the first three syllables of the prosodic word (Caballero 2011, Kager 2012). In this paper, we argue that Ese'eja (Takanan; Bolivia/Peru) also demonstrates this rare type of window. We report on findings of a verbal accent study (Vuillermet 2012), which systematically documents the position of accent in a large number of inflected verbs, resulting in a corpus of nearly 2,000 verb forms. This corpus demonstrates a three syllable window, and reveals a complex but consistent system varying according to (1) stem syllable count, (2) root transitivity, and (3) the type of suffix added. Accent position cannot be accounted for by reference to purely phonological structure such as syllable count, the quantity of the syllable, the quality of the vowel, or the sonority of the onset.

We decompose the Ese'eja metrical window into an interaction of morphologically-assigned accent patterns from various suffixes, using common OT constraints. We classify inflectional suffixes into dominant, recessive, and rightmost-preserving, and tense/mood suffixes in particular to different Suffix Accent Groups (SAGs). Each SAG type triggers a specific cophonology (Inkelas & Zoll 2007). SAGs 1 and 3 assign accent to the ultima of the stem, while SAGs 2 and 4 assign accent to the penult of the stem. Additionally, SAG 1 suffixes have a cophonology ranking which enforces the creation of iambs (RHTYPE=I >> RHTYPE=T), whereas SAGs 2/3/4 enforce trochees.

After all inflectional material is added to the stem, iterative footing takes place resulting in rhythmic accent across the word. The leftmost foot in the word receives primary accent, and is realized with primary prominence phonetically. Because iterative footing and rhythmic accent are established before primary accent delegation, we therefore classify Ese'eja accent as a 'count system' with bottom-up parsing, and see it as challenging the Primary Accent First (PAF) model (van der Hulst 1996). We argue that the Ese'eja count system cannot be reduced to a prosodic system with only rhythm plus phrase edge prominence without primary word stress.

Further, we contrast our analysis with that of Kager (2012) advocating for ternary feet with weak layering. The main difference between these approaches is that under our analysis, the relative ranking of RHTYPE constraints across co-phonologies accounts for the different patterns, whereas under ternary feet the main parameter involves the ranking of ALIGN-HD-L. Moreover, when morphologically-assigned accent falls outside of the initial three syllable window, we argue that Ese'eja demonstrates a novel type of repair, which we call 'rhythmic repair'. Under this type, when accent is assigned outside of the metrical window, primary prominence appears on a

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Glossing follows the Leipzig Glossing Rules except the following: INSTR 'instrument', RPST 'remote past', POT1 'potential 1', POT2 'potential 2', and PRIV 'privative'.

position within the window which is rhythmically dependent on the window external accent. We contrast this to 'default repair' where accent falls on a default position within the window (Kager 2012). We support our position with evidence from nominal accent.

2 Brief overview of the language

2.1 Geographic location and vitality

Approximately 1,700 Ese'eja people live in the southwestern Amazon, in 9 villages in Bolivia and Peru. Ese'eja [ISO 639-3: ese] is classified as a Takanan language, with approximately 1,500 Ese'eja speakers and three variants: Madidi, Palmareal and Baawaja. The Baawaja variant is moribund; the Madidi and Palmareal variants are still used on a daily basis in most villages though not always transmitted to the younger generations (Vuillermet 2012: 58; 69ff.). Data for this paper comes from original fieldwork by the second author in the Bolivian community of Portachuelo Bajo with Madidi speakers.

2.2 Morphology of Ese'eja verbs

Here, we present basic information on the morphological structure of Ese'eja verbs which is necessary to understand the verbal accent patterns discussed below. Ese'eja verbs have a total of 15 morphological positions, i.e. 'morphological slots', shown in Table 1. As this study concerns inflectional morphology, the inflectional slots are bold and underlined.

Table 1: Morphological template for verbal predicates

-3	-2	-1	0	+1	+2	+3	+4	+5	**+6**	+7	**+8**	+9	+10	**+11**
Tense/Mood	Valency	Incorporated Noun	Verbal Root 1	Verbal Root 2	Manner Adj. Root	Adverbials	Valency	Associated Motion / Adverbials	**Indexation**	Associated Motion	**Tense/Mood**	Adverbials	Aspect	**Tense/Mood**

A number of observations can be made. A verb may appear with more than one root, showing verb root compounding, incorporated nouns, and manner adjective root incorporation. Non-inflectional morphology (adverbials, valence-changing morphology, and associated motion morphology) appear closer to the root than inflectional morphology (subject indexation, tense/mood, aspect), though one should note that slots hosting inflectional material are interleaved with non-inflectional slots. The indexical marker has two roles. In one, it optionally indexes 3rd person plural subjects, and in another *-ka* obligatorily indexes both singular and plural 3rd person agents of transitive verbs. No marker indexes 1st or 2nd person. The present study explores verbs marked for inflectional material only, defined as the verbal categories necessary to form an independent word (Vuillermet 2012: Chapter 8).

2.3 Phonology

The canonical syllable structure of Ese'eja is (C)V, and no consonant clusters or codas exist.[2] There are four vowel contrasts /i e a o/ and three diphthongs /i̯a i̯o o̯e/. The only surface codas are glides which result from vowel-vowel sequences, e.g. /mei/ 'stone' [méj]. Accent shifts which occur under cliticization reveal these vowels as underlying heterosyllabic, e.g. /mei=a/ 'stone=INSTR' [me.í.a] (*[méj.a]~*[mé.ja]) (Vuillermet 2012: 177-178). Adjacent identical vowels in sequences such as /aa/ are treated as separate vowels and not a phonemic long vowel, based on similar evidence from accent shifts.

The Ese'eja prosodic system is understood as involving accents which are assigned on various syllables within a prosodic word. Each prosodic word has one primary accent, which must appear within the first three syllables of the word, which we understand to be an initial 3-σ metrical window. In this way, the Ese'eja accent system has prosodic properties of both culminativity and obligatoriness (Hyman 2009: 217), and plays a role in demarcating prosodic words. The position of primary accent is dependent on its morphosyntactic environment, and any notion of a 'default' accent is difficult to establish. Within the phonetic system, the primary accent receives the greatest prosodic prominence, whose main acoustic correlates are higher pitch and greater intensity (in other words, bearing primary 'stress'). Throughout this paper, the term 'accent' refers to a representation in the phonological system, while the term 'prominence' refers to its instantiation in the phonetic system. Ese'eja prosody has previously been investigated in Key and Wyma (1964), Key (1968), Vuillermet (2006, 2012), and Rolle (2013).

3 Ese'eja verbal accent

3.1 Ese'eja verbal accent study

Accent position cannot be accounted for by reference to phonological structure alone such as syllable counting, the quality of the vowel, the quantity of the syllable, and the sonority of the onset (the latter three playing no parts in the distribution of accent), nor solely to the part of speech. A key challenge to any analysis of verbal accent is the polysynthetic nature of Ese'eja, with over 50 distinct verbal suffixes, the possibility of incorporating more than one root (verbal, adjectival, and nominal), and the frequent co-occurrence of accent-shifting clitics. In order to isolate verbs in specific inflected contexts, the second author conducted a verbal accent study which consisted of systematically eliciting verb forms controlling for morphological structure (Vuillermet 2012). In total, 75 monomorphemic verb roots were selected and classified according to two main factors: syllable count and valency. Most roots used were 1-2 syllables. A small number of monomorphemic 3-σ roots were used, though these are rare.[3] The majority of verb roots in Ese'eja are inherently transitive or intransitive, and only two ambitransitive roots have been identified.

Each verb root was systematically combined with 13 tense/mood inflectional affixes (from slots [+8] and [+11] in Table 1 above). In the vast majority of cases, these root+tense/mood verbal words were elicited with and without the person indexation suffix *-ka* (appearing in slot [+6], between the root and tense/mood). This totaled to approximately 2,000 verb forms. For these

[2] Consonant contrasts are /p t tʃ k kʷ ʔ ɓ ɗ s ʃ χ h m n ɲ j w/. The following spelling conventions are used: /tʃ/ <ch>, /ʔ/ <'>, /ɓ/ <b>, /ɗ/ <d>, /ʃ/ <sh>, /χ/ <j>, /ɲ/ <ñ>, /j/ <y>. Glides which follow consonants in onset position are written as <w> and <y> in this paper, e.g. <kwya> /kwja/ 'hit X', rather than <kuia>.

[3] Only one 4-σ verb root exists, *homishoka-* 'have a rest' (intransitive), which we suspect to be diachronically multimorphemic. When *homishoka-* is inflected it shows irregular accent patterns and cannot be captured by our current analysis (Vuillermet 2012: 232, 268).

verb forms, the linguist presented a pronunciation of the word, and the consultant would either accept this pronunciation as correct (and usually repeat it), or correct the location of primary prominence. Those forms which were in doubt were re-checked a few days later and sometimes confirmed by a second consultant. Calixto Callaú Casirno (also called Kanono) proved to be the only native speaker of Ese'eja to be highly reliable at discerning correct from incorrect accent patterns. Other consultants were not consistent, and we attribute this to being influenced by previous forms pronounced within that recording session or influenced from pronunciations from the linguist. See Vuillermet (2012: 227-230) for more on methodology. The following section presents the 'paradigms' obtained, i.e. the position of the primary verbal accent according to the relevant variables.

3.2 Observations of primary verbal accent position

This section provides our observations of the position of primary prominence across our verb corpus, which we henceforth refer to as the position of 'primary accent'. We present these observations on primary accent as they vary according to four variables: (1) syllable count, (2) the tense/mood suffixes, which subdivide into Suffix Accent Groups (henceforth 'SAG'), (3) transitivity of the verb root, and (4) presence of the indexical marker *-ka*. Table 2 summarizes the distribution of primary accent on intransitive roots of 1, 2 and 3 syllables, and Table 3 its distribution on transitive roots of the same syllable count. In each table, the verbs provided are representative for all verb roots with the same number of syllables. In these tables, syllables are separated by a period, and primary accent is indicated with an acute accent and in bold.

Table 2: Intransitive verb roots

Intransitive		**SAG 1** *-me* POT1 'may'	**SAG 2** *-nahe* PST	**SAG 3** *-kyae* POT2 'might'	**SAG 4** *-ani* PRS	**SAG 4** *-he* FUT
1-σ	Ø	**pá**-me	**pá**-na.he	**pá**-kya.e	**pá**-a.ni	**pá**-he
pa 'cry'	-ka	pa-**ká**-me	**pá**-ka-na.he	**pá**-ka-kya.e	**pá**-ka-a.ni	**pá**-ka-he
2-σ *besa*	Ø	be.**sá**-me	**bé**.sa-na.he	be.**sá**-kya.e	**bé**.sa-a.ni	**bé**.sa-he
'bathe'	-ka	be.sa-**ká**-me	**bé**.sa-ka-na.he	**bé**.sa-ka-kya.e	be.**sá**-ka-a.ni	be.**sá**-ka-he
3-σ *towaa*	Ø	to.wa.**á**-me	to.**wá**.a-na.he	**tó**.wa.a-kya.e	to.**wá**.a-a.ni	to.**wá**.a-he
'jump'	-ka	to.**wá**.a-ka-me	**tó**.wa.a-ka-na.he	**tó**.wa.a-ka-kya.e	**tó**.wa.a-ka-ani	**tó.**wa.a-ka-he

Table 3: Transitive verb roots

Transitive		**SAG 1** *-me* POT1 'may'	**SAG 2** *-nahe* PST	**SAG 3** *-kyae* POT2 might'	**SAG 4** *-ani* ~ *-aña* PRS	**SAG 4** *-he* FUT
1-σ *kwya*	Ø	**kwyá**-me	**kwyá**-na.he	**kwyá**-kya.e	**kwyá**-a.ña	**kwyá**-he
/kwja/ 'hit X'	-ka	kwya-**ká**-me	**kwyá**-ka-na.he	(**kwyá**-ka.kya.e)[4]	**kwyá**-ka-a.ni	**kwyá**-ka-he
2-σ *bana*	Ø	ba.**ná**-me	ba.**ná**-na.he	ba.**ná**-kya.e	ba.**ná-**a.ña	ba.**ná**-he
'sow X'	-ka	ba.na-**ká**-me	**bá**.na-ka-na.he	**bá**.na-ka-kya.e	ba.**ná**-ka-a.ni	ba.**ná**-ka-he
3-σ *ishe'a* 'wait	Ø	i.she.**'á**–me	**í**.she.'a-na.he	**í**.she.'a-kya.e	**í**.she.'a-a.ña	**í**.she.'a-he
for X'	-ka	i.**shé**.'a-ka-me	**í**.she.'a-ka-na.he	**í**.she.'a-ka-kya.e	**í**.she.'a-ka-a.ni	**í**.she.'a-ka-he

[4] The form *kwya-ka-kyae* 'she/he/they may have bit her' was not elicited. However, on the basis of observations of the other monosyllabic transitive roots, we infer that the accent falls on the root.

We discuss a number of observations below. First, primary accent always falls on one of the first three syllables of the word, supporting the three-syllable initial window observed previously for Ese'eja. However, the position of primary accent within this window demonstrates that the suffixes form distinct SAGs. For instance, the present markers *-ani ~ -añа* and future marker *-he* in the last two columns belong to SAG 4 because they result in the same surface accent pattern, and differ from suffixes outside their group. The survey reveals that there are four distinct patterns, summarized in Table 4. We stress the consistency of these patterns with different verbs which match in all relevant variables.

Table 4: Tense/mood suffixes forming different Suffix Accent Groups (SAGs)

Category	Subcategory	Morpheme	# of σ	Morph. slot	SAG
Tense	Present	*-ani ~ añа*	2	+11	4
		-(e)ki	1 (2)	+11	4
		-haa	2	+11	4
		-ba'e	2	+11	4
	Future	*-he*	1	+8	4
	Remote Past	*-a =pwa*	1 + 1	+11 (+clitic)	[5][5]
	Past	*-(a)nahe*	2 (3)	+11	2
Mood	Potential 2	*-kyae*	2	+11	3
	Potential 1	*-me*	1	+11	1
	External obligation	*-ka…-ji*	1 + 1	+6 +11	1
'Commands'	Imperative	*-kwe*	1	+11	1
	Prohibitive	*a'a …-ji*	2 + 1	(particle) +11	1
	Apprehensive	*-chana*	2	+11	1

SAGs are not sensitive to the syllable count of the suffixes, e.g. 1-σ *-me* and 2-σ *-chana* in SAG 1 have the same accent pattern. SAGs are in part split along semantic grounds. The two largest groups are 1 and 4. SAG 1 has five members and is comprised of mood markers. SAG 4 also has five members, all non-past tense markers. Morphologically, the four present tense markers all occupy slot [+11], while the future marker *-he* appears in [+8], as aspect markers (if present) follow it. SAG 2 and 3 consist of only one member each, the past tense marker *-nahe* and the potential past marker *-kyae* respectively.

The fact that surface position of the accent is sensitive to the transitivity of the root is illustrated with the ambitransitive verb *shiye-* 'smell good' vs. 'perfume X' in Table 5. When this verb combines with SAG 1 or 3 affixes, accent uniformly falls on the second syllable on both the transitive and intransitive form. However, when this root combines with SAG 2 or 4 affixes, accent falls on the first syllable if it is intransitive, and the second if transitive.

[5] This fifth suffix accent group pattern involves a final suffix *-a* in [+11] and an enclitic *=pwa,* glossed as REMOTE PAST (RPST) 'did long ago'. In these constructions, *=pwa* consistently appears with primary accent, while the verbal complex it adjoins to is deaccentuated, e.g. *ojahia-k(a)-a=**pwá*** 'he spit X (long ago)'. This pattern is the only exception to the initial 3-σ metrical window. The marker *=pwa* could plausibly originate from the grammaticalization of *po* 'be' plus the recent past marker *-a,* and presently be classified as a type of clitic (Vuillermet 2012:240). This is supported by the fact that deaccentuation of verbs also occurs with certain verb + auxiliary constructions, e.g. Vuillermet (2012:531).

Table 5: Ambitransitive *shiye-* illustrating different accent patterns conditioned by transitivity

	SAG			
Verb	**1**	**2**	**3**	**4**
shiye 'smell good' (INTR)	shi.**yé**-me	**shí**.ye-na.he	shi.**yé**-kya.e	**shí**.ye-a.ni
shiye 'perfume X' (TRAN)	shi.**yé**-me	shi.**yé**-na.he	shi.**yé**-kya.e	shi.**yé**-a.ña

Further observations pertain to the indexical marker *-ka*. Differences in accent pattern with respect to the transitivity of the verb root disappear when *-ka* is present, as shown by Table 6.

Table 6: Transitivity insensitivity with roots marked by *-ka*

		SAG			
		1	**2**	**3**	**4**
2-σ	INTR	be.sa-**ká**-me	**bé**.sa-ka-na.he	**bé**.sa-ka-kya.e	be.**sá**-ka-ani
	TRAN	ba.na-**ká**-me	**bá**.na-ka-nahe	**bá**.na-ka-kyae	ba.**ná**-ka-ani
3-σ	INTR	to.**wá**.a-ka-me	**tó**.wa.a-ka-na.he	**tó**.wa.a-ka-kyae	**tó**.wa.a-ka-ani
	TRAN	i.**shé**.'a-ka-me	**í**.she.'a-ka-nahe	**í**.she.'a-ka-kyae	**í**.she.'a-ka-ani

Further, the accent patterns of 3-σ roots are not identical to that 2-σ verbs + *-ka*, illustrating the effect of *-ka* on the placement of primary accent as a whole. For example, compare intransitive 2-σ *besa-* + *-ka* + SAG 2 *–nahe* whose form is [**bé**.sa-ka-na.he] vs. 3-σ *towaa-* [to.**wá**.a-na.he], and transitive 2-σ *bana-* + *-ka* + SAG 4 *–he* [ba.**ná**-ka-he] vs. 3-σ *ishe'a-* [**í**.she.'a-he].

A summary of observations is provided in (1), which any analysis must capture.[6]

(1) Observations of primary accent position
   a. **Initial 3-σ window**: Accent appears on first three syllables of the prosodic word
   b. **Transitivity sensitivity:** Transitivity alters the surface position of primary accent
   c. **Transitivity insensitivity:** Transitivity alternations are absent with ***-ka***
   d. **Morphological composition sensitivity**: 3-σ roots different from 2-σ roots + *-ka*
   e. **SAGs 1/2/3/4:** Tense/mood suffixes form Suffix Accent Groups based on the effect they have on the position of primary accent

4 Analysis

This section presents our analysis of verbal accent. Accentual patterns emerge from a complex interaction of inherent accent, morphologically-assigned accent, and rhythmic accent emerging from iterative footing. We frame our analysis as a serial derivation where evaluation takes places serially in morphosyntactically defined domains moving outward to the word and phrase level, employing standard OT constraints. Due to space limitations, we abstract away from some details which include fully developed tableaux.

One preliminary remark is in order. A major assumption of this analysis is that there is uniform exponence of an accent assigned by a specific root or suffix. For example, we assume that if the suffix *-nahe* assigns accent to the penultimate syllable of the stem it combines with, it will do so by default in all cases regardless of morphological environment. This is in contrast to non-uniform exponence in which accent assignment by particular suffixes varies according to its host,

[6] Five verbs show irregular accent patterns: *po-* 'be', *ani-* 'sit', *neki-* 'stand', and *jewa-* 'come to get', and *dasya-* 'lie (to) X', which are outside of our analysis. See Vuillermet (2012: 253-257) for details on these irregularities.

e.g. assigning accent to a different position on the stem depending on whether the stem contains a transitive vs. intransitive verb root, a two vs. three syllable verb root, bare root vs. complex stem, etc. We assume uniform exponence though we acknowledge systems in which the prosodic shape of complex words does not involve uniform exponence, e.g. many Oto-Manguean languages described within Palancar & Léonard (2016).

4.1 Derivation of transitive accent and morphologically-assigned accent

We present here the derivation of transitive accent and morphologically-assigned accent.

4.1.1 Inherent transitive accent

We analyze verb roots in Ese'eja as forming two prosodic types co-varying with transitivity: intransitive verbs are unaccented roots, whereas transitive verbs are accented on their final syllable, illustrated in (2). Transitive accent is indicated by underlying and an acute accent.

(2)

Intransitive		Transitive	
pa-	'cry'	*kwyá-*	'hit X'
besa-	'bathe'	*baná-*	'sow X'
towaa-	'jump'	*ishe'á-*	'wait for X'

This inherent transitive accent is motivated by the transitivity differences observed in Table 5 above, and will play a further role below. We remain agnostic here as to whether transitive accent is inherent to verb roots, or is introduced via an abstract segment-less morpheme expressing transitiveness which combines with a verb root.[7] Accent patterns sensitive to transitivity is cross-linguistically rare, but have been reported in Sierra Juárez Zapotec (Bickmore & Broadwell 1998) and Macuiltianguis Zapotec (Tejada 2012: 53-54). The indexing of transitivity plays a large role in Ese'eja grammar, and Takanan and Panoan languages generally (Valenzuela 2003, 2010; Guillaume 2008b; Vuillermet 2008).

4.1.2 Indexical accent: Morphologically-assigned accent from *-ka*

Morphological accent is assigned from the inflectional marker *-ka* in morphological slot [+6], indexing 3rd person plural subjects of intransitive verbs, and 3rd person singular and plural agents of transitive verbs. The suffix *-ka* assigns an accent to the left edge of the root it combines with, and is therefore an instance of non-local accent assignment where accent is not assigned to an immediately adjacent position. Although controversial, this has clear empirical support from Kawahara and Wolf (2010) and Kawahara and Kao (2012), who demonstrate that the Japanese suffix *-zu* (< English plural marker *-s*) assigns non-local accent to the left-edge of its stem.

We refer to accent with *–ka* as 'indexical accent'. When *-ka* is present, transitive accent on transitive roots is erased, resulting in identical patterns with transitive and intransitive roots. We therefore understand *-ka* to be 'dominant', defined as erasing any input accent and assigning its own accent. Notions of 'dominance' are well established in prosodic literature such as in Japanese linguistics (McCawley 1968, Poser 1984, Kawahara 2015); see Inkelas (1998) for broader discussion and references, among others on Indo-European (e.g. Kiparsky 1984).

Dominant indexical accent is shown in (3), where there is uniform accent on the initial syllable of the stem. Indexical accent is double-underlined to distinguish it from transitive accent.

[7] Note that the transitivity value of verb roots would need to be encoded regardless on the roots themselves, due to the fact that the vast majority of roots are uniquely transitive or intransitive (Vuillermet 2012: 245).

(3) Dominant indexical accent from suffix *-ka* overriding transitive accent

	Intransitive			Transitive		
1-σ	pa- + -ka	→	pá-ka-	kwyá-+ -ka	→	kwyá-ka-
2-σ	besa- + -ka	→	bésa-ka-	baná- + -ka	→	bána-ka-
3-σ	towaa- + -ka	→	tówaa-ka-	ishe'á- + -ka	→	íshe'a-ka-

The reader should keep in mind here that the forms in (3) represent intermediate forms in the derivation of these accent patterns. They therefore do not represent the surface position of primary accent and should not be compared at this point to Table 2 and Table 3. Because this stem represents an intermediate form which must be further inflected by a tense/mood suffix to be grammatical, we cannot assess speaker judgments on accent placement on these stems by themselves.

4.1.3 SAG accent: Morphologically-assigned accent from tense/mood suffixes

The root or root+*-ka* stem is the input to further morphological composition with outer tense/mood suffixes in slots [+8]/[+11], which subdivide into Suffix Accent Groups (SAGs) 1/2/3/4. SAGs differ as to which syllable of the input stem they assign accent to. SAGs 1 and 3 assign an accent to the ultima of root/stem input, whereas SAGs 2 and 4 assign it to the penult. We refer to this as SAG accent, exemplified in Table 7 using intransitive verb roots with no inherent accent. Syllables marked with SAG accent are dotted underneath to contrast them with transitive (single underline) and indexical accent (double underline).

Table 7: SAG accent with intransitive roots

SAG	Accent assignment	Position in stem	Examples 1-σ	2-σ	3-σ
1	○ó]$_{stem}$-sfx	Ultima	pá]-me	besá]-me	towaá]-me
2	óo]$_{stem}$-sfx	Penult	pá]-nahe	bésa]-nahe	towáa]-nahe
3	○ó]$_{stem}$-sfx	Ultima	pá]-kyae	besá]-kyae	towaá]-kyae
4	óo]$_{stem}$-sfx	Penult	pá]-he	bésa]-he	towáa]-he

Because intransitive verbs do not have any input accent, SAG accent assignment takes place without complication. However, when these tense/mood suffixes occur with transitive roots with transitive accent, or with a stem with indexical accent, there is an interaction between these different accents. As stated above, the reader should keep in mind here that the forms in Table 7 (and later in Table 9) represent intermediate forms in the derivation of these accent patterns, and therefore do not represent the surface position of primary accent.

We understand SAG accent as forming two types of interaction. SAG 2/3 suffixes are recessive, defined as not assigning accent if an accent already occurs in the stem (cf. 'dominant' accent above with indexical accent which erase input accent). SAGs 2/3 only assign accent (on the penult and ultima respectively) if there is no input accent, as on intransitive roots in Table 7. In contrast, SAG 1/4 suffixes are classified as preserving the 'rightmost accent'. This term is defined as neither automatically erasing input accent (unlike dominant suffixes), nor being blocked from assigning their own accent if an input accent is present (unlike recessive suffixes). Cases of rightmost-preserving accent result in two accents being present, which violates a culminativity constraint against more than one accent present at this intermediate stage. This is resolved through the rightmost accent winning and the leftmost accent being erased regardless of origin.

Recessive and rightmost-preserving accent SAGs are schematized in Table 8. Input accent is underlined, and SAG accent assigned from tense/mood suffixes is dotted; the winner is in bold.

Table 8: Schematized SAG accent types

SAG	SAG accent type	Input accent + SAG accent		Winner in Bold	
2/3	Recessive	…σ́…]$_{stem}$ + σ́]-sfx	→	/…σ **σ́**…/ /…**σ́** σ…/	Input accent
1/4	Rightmost	…σ́…]$_{stem}$ + σ́]-sfx	→	/…σ **σ́**…/ /…σ **σ**…/	Rightmost accent

We exemplify these patterns using 2-σ and 3-σ transitive verb roots with and without *-ka*, with all four SAG accent patterns, shown in Table 9.

Table 9: Exemplification of accent resolution with the different suffix group

SAG accent	SAG	Input accent + SAG accent		Example		Winner
		Transitive	Indexical	Transitive	Indexical	
Recessive	2	…σ́] + σσ]-sfx	[σ́…-ka] + σσ]-sfx	ba**ná**]-nahe ishe**'á**]-nahe	**bá**na-ka]-nahe **í**she'a-ka]-nahe	Input
	3	…σ́] + σσ]-sfx	[σ́…-ka] + σσ]-sfx	ba**ná**]-kyae ishe**'á**]-kyae	**bá**na-ka]-kyae **í**she'a-ka]-kyae	
Rightmost	1	…σ́] + σσ]-sfx	[σ́…-ka] + σσ]-sfx	ba**ná**]-me ishe**'á**]-me	bana-**ká**]-me ishe'a-**ká**]-me	Rightmost
	4	…σ́] + σσ]-sfx	[σ́…-ka] + σσ]-sfx	ba**ná**]-he ishe**'á**]-he	ba**ná**-ka]-he ishe**'á**-ka]-he	

In Table 9, for the recessive SAG types 2/3 the input accent always wins over the SAG accent, regardless of its position in the word, e.g. compare *ishe**'á**-nahe* vs. ***í**she'a-ka-nahe* where input accent wins in both cases. With the rightmost-preserving SAG types 1/4, it is the rightmost accent which wins. We exemplify this with the SAG 4 suffix *-he* 'future' in (4).

(4) Rightmost-preserving accent from SAG 4 - leftmost accent erased

a. Transitive accent
- báná]-he → ba**ná**-he
- ishé'á]-he → ishe**'á**-he

b. Indexical accent
- báná-ka]-he → ba**ná**-ka]-he
- íshe'á-ka]-he → ishe**'á**-ka]-he

In this way, rightmost-preserving accent resembles the Basic Accentuation Principle in Indo-European (Kiparsky & Halle 1977), which states that if a word has more than one accented vowel, the leftmost accent receives word accent. However, in Ese'eja the evaluation of rightmost accent is not at the final stage of this derivation, as will be shown in Section 4.2 where we introduce foot formation and rhythmic accent.

There are two alternative interpretations of the accent interaction given in Table 9 above. One lurking generalization is that when a root marked with transitive accent combines with a suffix assigning SAG accent, the transitive accent is always the winning accent (see the transitive example column in that table). Thus, from these data alone it is equally plausible to say that tran-

sitive accent is dominant over all SAG types, whereas indexical accent is dominant over SAGs 2/3 but recessive to SAGs 1/4. We see this as problematic for two reasons. First, this creates a logical transitivity paradox with SAG 4. Under this scenario, transitive accent is dominant over SAG 4 accent, and SAG 4 accent is dominant over indexical accent: Transitive > SAG 4 > Indexical. However, we saw in (3) above that indexical accent is dominant over transitive accent (Indexical > Transitive), thus creating the paradox. Secondly, this would entail that SAG 4 is recessive to transitive accent, but that is dominant over indexical accent. For this to be viable, any evaluation operation would have to distinguish different types of input accent, in effect knowing the derivational history of the accent in the input. Though not implausible, we find this scenario more complex than the analysis we have presented, and therefore dismiss this alternative.

Another alternative is to interpret SAG 1 as dominant rather than rightmost-preserving. Because SAG 1 assigns an accent to the rightmost syllable of a stem, the winning accent in these cases is identical to the one which wins under a rightmost analysis, and therefore the same predictions are made.

4.2 Iterative feet and primary accent

The derivation laid out above fully combines inflectional material together with roots to create well-formed inflected verbs, and the interaction of accents has been resolved. We lay out here the final steps of this derivation, which involves creating feet and establishing the prominent accent of the word. In what follows, we understand this as being word-level phonological evaluation, which is then fed to higher clitic group and phrase strata. The output of forms in Table 7 and Table 9 act as the input here.

For each Ese'eja verbal word, there is iteration of feet emanating from the position of input accent, resulting from a highly ranked PARSE-SYL constraint. The type of foot depends on the tense/mood suffix. We analyze these suffixes as being associated with different cophonologies (Orgun 1996, Anttila 2002, Caballero 2011, a.o.), in which suffixes representing different morphological constructions are associated with different constraint rankings, as opposed to using morphologically indexed constraints (Inkelas & Zoll 2007). We argue that SAG 1 suffixes have a cophonology ranking which cause the creation of iambs, where the constraint RHTYPE=I is ranked higher than RHTYPE=T. In contrast, SAG 2/3/4 suffixes have cophonology rankings which cause the creation of trochees, i.e. RHTYPE=T >> RHTYPE=I. For example, compare the transitive root *bana-* with two different tense/mood suffixes in (5).

(5)

		Input	Foot formation	Foot type
a.	SAG 1	baná-me	(ba.ná).me	Iamb
b.	SAG 4	baná-he	ba.(ná.he)	Trochee

Both inputs here have accent on the second syllable, differing minimally with respect to foot formation (the example also shows that Ese'eja does not allow degenerate feet). Thus Ese'eja constitutes what Goedemans and van der Hulst (2013) refer to as a 'dual rhythm' language containing both iambic and trochaic patterns, a rare but attested type of accent system. Dual rhythm systems have been noted in nearby Panoan languages as well (Bennett 2013, Tallman 2014: 505, González 2016). No evidence exists at this point for a type of 'Iambic-Trochaic Law' operating in Ese'eja favoring duration asymmetries in iambs (see Hyde 2011 for references).

Because footing is iterative across the word, this results in multiple syllables within a word being accented. We refer to this as 'rhythmic accent' to distinguish it from the types of morphologically-assigned accents outlined above. After rhythmic accent is assigned, the accent within

the foot which is leftmost is designated as the primary accent of the word (and receives primary phonetic prominence). We capture this using a 'Leftmost' constraint what states that the head foot is the leftmost in the (prosodic) word (LEFTMOST: ALIGN HD-FT, LEFT, PRWD, LEFT – Kager 1999: 167, Prince & Smolensky 1993). The creation of iterative feet is shown in Table 10, illustrated with 2-σ and 3-σ intransitive roots, transitive roots, and roots + *-ka*. The syllable with primary accent is marked in bold. In this table, the locations of primary accent match precisely the locations of primary phonetic prominence observed in the verbal accent study as summarized in Table 2 and Table 3 above, demonstrating the success of this analysis.

Table 10: Iterative feet and word level LEFTMOST constrait

SAG	Stem type	Morphological accent	Iterative footing	LEFTMOST constraint	Foot type formed
1	Intr. root	besá]-me	(be.sá).me	(be.**sá**).me	Iamb
		towaá]-me	to.(wa.á).me	to.(wa.**á**).me	
	Trans. root	baná]-me	(ba.ná).me	(ba.**ná**).me	
		ishe'á]-me	i.(she.'á).me	i.(she.**'á**).me	
	Root + *-ka*	bana-ká]-me	ba.(na.ká).me	ba.(na.**ká**).me	
		ishe'a-ká]-me	(i.shé).('a.ká).me	(i.**shé**).('a.kà).me	
2	Intr. root	bésa]-nahe	(bé.sa).(ná.he)	(**bé**.sa).(nà.he)	Trochee
		towáa]-nahe	to.(wá.a).(ná.he)	to.(**wá**.a).(nà.he)	
	Trans. root	baná]-nahe	ba.(ná.na).he	ba.(**ná**.na).he	
		ishe'á]-nahe	(í.she).('á.na).he	(**í**.she).('à.na).he	
	Root + *-ka*	bána-ka]-nahe	(bá.na).(ká.na).he	(**bá**.na).(kà.na).he	
		íshe'a-ka]-nahe	(í.she).('á.ka).(ná.he)	(**í**.she).('à.ka).(nà.he)	
3	Intr. root	besá]-kyae	be.(sá.kya).e	be.(**sá**.kya).e	Trochee
		towaá]-kyae	(tó.wa).(á.kya).e	(**tó**.wa).(à.kya).e	
	Trans. root	baná]-kyae	ba.(ná.kya).e	ba.(**ná**.kya).e	
		ishe'á]-kyae	(í.she).('á.kya).e	(**í**.she).('à.kya).e	
	Root + *-ka*	bána-ka]-kyae	(bá.na).(ká.kya).e	(**bá**.na).(kà.kya).e	
		íshe'a-ka]-kyae	(í.she).('á.ka).(kyá.e)	(**í**.she).('à.ka).(kyà.e)	
4	Intr. root	bésa]-he	(bé.sa).he	(**bé**.sa).he	Trochee
		towáa]-he	to.(wá.a).he	to.(**wá**.a).he	
	Trans. root	baná]-he	ba.(ná.he)	ba.(**ná**.he)	
		ishe'á]-he	(í.she).('á.he)	(**í**.she).('à.he)	
	Root + *-ka*	baná-ka]-he	ba.(ná.ka).he	ba.(**ná**.ka).he	
		ishe'á-ka]-he	(í.she).('á.ka).he	(**í**.she).('à.ka).he	

The main motivation behind positing both iambic and trochaic feet is that it allows us to maintain a uniform leftmost constraint across word-level phonology. We illustrate this in (6). If we assumed for example uniform trochaic feet, we would have to say that SAG 1 suffixes trigger the rightmost foot to receive primary accent, rather than the leftmost as with other SAG accents, shown in example (a). Although this would result in the same surface pattern for example (b) [ishe'á-me], for [ishé'a-ka-me] in (c) this would incorrectly predict primary accent on [ka] in the final foot.

(6)

	Foot type	Input	Footing+Leftmost	Cf. Uniform trochee
a.	SAG 4 Trochee	ishe'á-he	(**í**.she).('à.he)	(**í**.she).('à.he)
b.	SAG 1 Iamb	ishe'á-me	i.(she.**'á**).me	(ì.she)(**'á**.me)
c.	SAG 1 Iamb	ishe'a-ká-me	(i.**shé**).('a.kà).me	*i.(shè.'a).(**ká**.me)

We compare our dual rhythm analysis to an alternative in Section 4.3.

Our analysis has a number of ramifications. First, the input accent is not co-extensive with the location of primary prominence within a prosodic word. In other words, morphological accent and surface primary prominence do not always align. This non-alignment results in certain complexities. In example (7), in (a) SAG 3 input morphological accent is on the third syllable, but due to iterative trochaic footing the first syllable receives primary accent and corresponds to primary word prominence. Similarly, in (b) SAG 1 input accent is on the fourth syllable, but due to iterative iambic footing the second syllable receives primary accent.

(7)

a.	Trochaic SAG 3:	σσσ́]-σσ	→	σ́σσ̀σσ
		to.wa.á]-kya.e	→	(**tó**.wa).(à.kya).e
b.	Iambic SAG 1:	σσσσ́]-σ	→	σσ́σσ̀σ
		i.she.'a-ká]-me	→	(i.**shé**).('a.kà).me

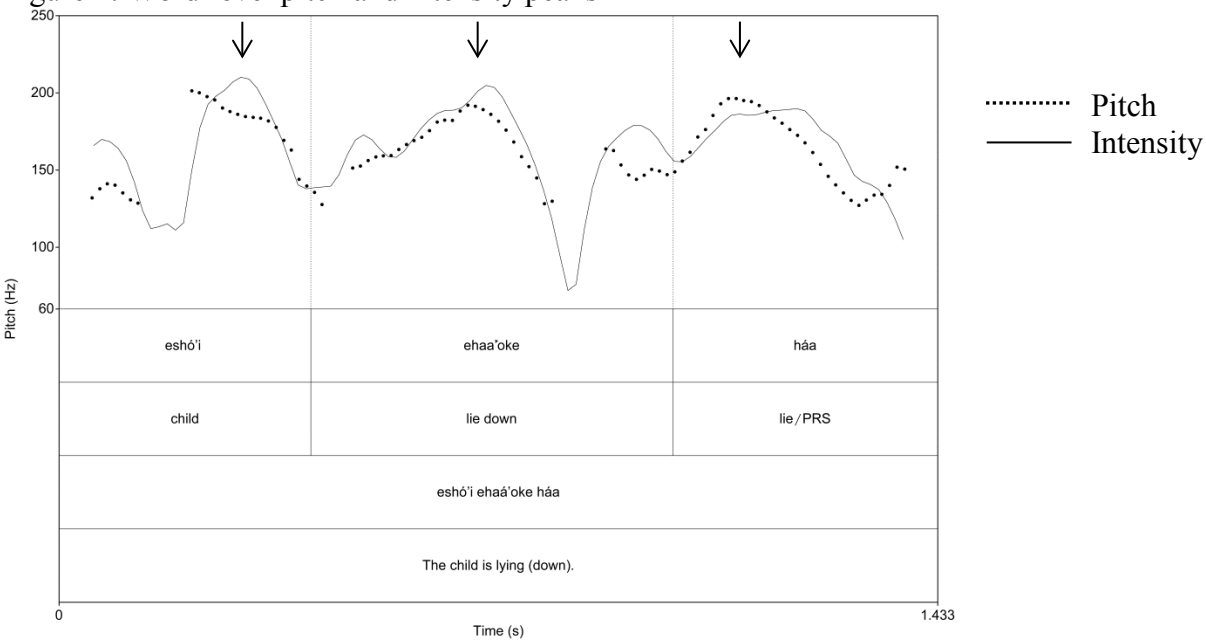
If morphologically assigned accent was completely co-extensive with primary prominence, it would not be clear how to account exhaustively account for its position other than through extensive allomorphy of the type 'if the stem is two syllables then primary accent falls on the final syllable; if three syllables then on the first'. Such an approach would not capture the rhythmic nature of the position of primary prominence.

Further, as a consequence this analysis strictly views the positions of primary prominence as dependent on rhythmic iterative footing, which itself is depends on the assignment of morphological accent. The Ese'eja accent algorithm therefore manifests bottom-up parsing under Hayes' (1995) terminology in which iterative footing takes place before primary accent is established, with an edgemost rhythmic beat being 'upgraded' to primary accent status. Such systems are also referred to as 'count systems' (van der Hulst 1996), and argued to be typologically rare (constituting only 8% of the 180 languages surveyed in Goedemans & van der Hulst 2014: 130). In contrast to this type, van der Hulst forwards a Primary Accent First (PAF) model (van der Hulst 1984, 1996, 2012, Goedemans & van der Hulst 2014, a.o.), involving top-down parsing. Under this model, primary accent is independently assigned first and footing/rhythm is established only afterwards, either parasitic on the location of primary accent (i.e. 'Echo Rhythm'), or independent from it ('Polar Rhythm').

Count systems such as Ese'eja represent counterexamples to the Primary Accent First model, and suggest that languages may parameterize the 'order' and relationship between primary accent and rhythmic parsing. In an effort to unify all prosodic systems under PAF, van der Hulst (2012) argues that 'count systems' are actually languages without true word level primary stress. This analysis reduces count systems to only iterative rhythm at the word level, followed by 'post-grammatical phrasal anchoring of intonational pitch movements' at the edge of a phrase which may be mistaken for primary word stress (van der Hulst 2012: 1515). Under this analysis, count systems are therefore only rhythm plus phrase edge prominence, without primary word stress.

This analysis cannot account for the present count system, as Ese'eja does demonstrate word-level primary stress. In Section 2.3, we noted that the main acoustic correlates of primary prominence (i.e. primary 'stress') were higher pitch and greater intensity. In Ese'eja, each phonological word has a single peak of pitch and intensity, in isolation or in an utterance. An example is provided in Figure 1, involving the three-word utterance *esho'i ehaa'oke haa* 'the child is lying (down)'. Word-level pitch and intensity peaks occur at the arrows, and are present on all three words, not merely at the phrasal edge.

Figure 1: Word-level pitch and intensity peaks



This figure illustrates that pitch and intensity peaks are properties of phonological word-level prosody, and not merely the result of edge prominence at the phonological phrase-level. Space prevents us from further supporting our claim. We refer the reader additionally to Vuillermet (2012: 205-223) for an initial sketch of Ese'eja intonation, though this requires further analysis.

An additional remark on secondary stress (i.e. 'secondary prominence') is required. This theory rests on the iterative creation of rhythmic accents, which are phonological objects. We should therefore expect these phonological objects to have phonetic effects, i.e. for the language to demonstrate secondary stress. Vuillermet (2012: 199) notes that secondary stresses can be echoed every other syllable from the primary prominence, 'but it is not always audible' in fluent speech. Additionally, in early work on Ese'eja prosody, Key and Wyma (1964: 31) observed a '[predictable] secondary stress [that] automatically falls on every other syllable in both directions from the primary stress'.

4.3 Decomposing syllable windows

This derivation shows the emergence of an initial three syllable metrical window, in which primary accent is located on one of the first three syllables of the word. This initial 3-σ window is also found in the nominal and adjectival systems, which are also subject to morphosyntactically conditioned accent changes often from clitics (Vuillermet 2012: 200-205). Initial 3-σ windows are rare cross-linguistically compared to other types of windows (Kager 2012: 1464), though the number of documented cases is increasing. Of interest here, a large number of reported initial 3-σ

windows occur in South America, namely Júma (a.k.a. Içuã Tupi; Tupí-Guaraní: Brazil), Tereno (a.k.a. Terêna; Arawakan: Brazil), Guajiro (Arawakan: Colombia/Venezuela), Yavitero (Arawakan: Venezuela), and Aguaruna (Jivaroan: Peru) (Kager 2012: 1464-1465 for references).

Kager (2012) presents two views for understanding such windows. The first is a 'non-decomposable' view, in which metrical windows are understood as phonological accentual domains. The second is a 'decomposable' view, in which metrical windows are derived from 'representations that are independently required for the analysis of rhythmic stress systems' (Kager 2012: 1454). Our analysis follows Kager in adopting the decomposable view.

A critical issue in decomposing syllable windows is how to allow for the third syllable from an edge to bear primary accent, but not one any further away. Two leading analyses are positing extrametricality of a domain-edge syllable, and ternary feet involving weak layering (a third type not discussed here involves simple vs. extended lapse constraints). Kager (2012) argues for ternary feet in which a foot is composed of a 'head' component notated in square brackets plus a single 'adjunct', which is footed but not subject to incorporation into the head. Under this theory, a three syllable window with either third syllable or antepenultimate stress is represented as #(σ [σ σ́])… and …([σ́ σ] σ)# respectively, compared to representations with extrametricality, #<σ> (σ σ́)… and …(σ́ σ) <σ>#. Metrical windows therefore emerge from constraints governing the position of the stressed syllable within the head, the adjunct within the foot, and the foot within the word (e.g. constraints ALIGN-WORD-LEFT and/or ALL-FT-LEFT). Kager demonstrates that a factorial typology involving constraints pertaining to ternary feet with weak layering adequately generates the attested range of variation in three syllable windows, avoiding any known pathologies (e.g. midpoint pathology), while analyses involving a "maximally binary foot model plus extrametricality" undergenerates the typology of such windows (Kager 2012: 1478).

In contrast, our analysis does not involve either of these approaches. In Section 4.2 we proposed that the Ese'eja initial metrical window emerges from a PARSE-SYL constraint interacting and a LEFTMOST constraint, with SAG 1 ranking RHTYPE=I high and SAGs 2/3/4 ranking RHTYPE=T high. This is shown in the rightmost columns in Table 11, where the ↑ indicates higher ranking (the examples are taken from Table 10). In contrast, the ternary analysis would involve highly ranked ALIGN-WORD-L and ALIGN-HD-R, the latter enforcing heads to be right-aligned within their feet. The differences between Suffix Accent Groups would therefore be captured by the relative ranking of an ALIGN-HD-L constraint enforcing left-aligned heads. SAG 1 would rank this relatively low, resulting in ternary feet. SAGs 2/3/4 would rank this relatively high, which together with highly ranked ALIGN-HD-R would result in only maximally binary feet. This is shown in the middle columns.

Table 11

Constraints		**Ternary analysis alternative** ALIGN-HD-R, ALIGN-WORD-L		**Our analysis** PARSE-SYL, LEFTMOST	
SAG		1 *-me*	4 *-he*	1 *-me*	4 *-he*
	# σ	↓ ALIGN-HD-L	↑ ALIGN-HD-L	↑ RHTYPE=I	↑ RHTYPE=T
Trans.	2	([ba.**ná**]).me	([ba.**ná**]).he	(ba.**ná**).me	ba.(**ná**.he)
	3	(i.[she.**'á**]).me	([**í**.she]).(['à.he])	i.(she.**'á**).me	(**í**.she).('à.he)
√ + *-ka*	2	(ba.[na.**ká**]).me	([ba.**ná**]).([ka.hè])	ba.(na.**ká**).me	ba.(**ná.**ka).he
	3	([i.**shé**]).(['a.kà]).me	([**í**.she]).(['à.ka]).he	(i.**shé**).('a.kà).me	(**í**.she).('à.ka).he

SAG 1 therefore results in an initial three syllable window, while SAGs 2/3/4 result in an initial two syllable window.[8]

Both of these analyses are compatible with the current corpus of data. We choose our analysis because it does not make the additional assumption that words need to be left-aligned with a foot which requires ternary footing, a much rarer structure cross-linguistically. Due to space and data limitations, we leave this debate aside in the present paper.[9]

4.4 Rhythmic metrical window

One major difference between the Ese'eja initial 3-σ metrical window and the discussion of windows in Kager (2012) is the role that rhythm plays in determining the location of primary accent in our analysis. This is seen most clearly when accent is assigned to a position outside of the metrical window, which we refer to as 'window external accent'. Because primary accent must be realized within this window, there is need for a 'repair' under these circumstances.

We discuss two types of repair. 'Default repair' refers to cases where accent falls on a default position within the window when accent is assigned to a window-external position. Default repair is most common and is explicitly modeled in Kager (2012). For example, Standard Literary Macedonian has a final three syllable window within which primary prominence must fall. The word *konzumator* 'consumer' has lexical accent on the penultimate syllable /konzu**má**tor/, which in isolation falls within this metrical window and therefore aligns with primary prominence. In contrast, when the word is inflected with suffixes, the lexical accent may no longer be within the metrical window. In this case, lexical accent and primary prominence do not align and primary prominence falls on the default position, in this language being the antepenult, e.g. *konzumator-ite* 'the consumers' [konzuma**tó**rite] (*[konzu**má**torite]).

In contrast, we argue that Ese'eja demonstrates a novel type of repair which we call 'rhythmic repair'. Under this type, when lexical or morphologically assigned accent appears outside of the designated metrical window, primary prominence does not appear on a default position but rather appears on a position within the window which is rhythmically dependent on the window external accent, e.g. being two syllables away under binary rhythm. Under 'rhythmic repair', it is predicted that primary prominence within the window will co-vary with the position of the window external accent, whereas with default repair the position of prominence has no dependence or relationship with the window external accent.

These two types are schematized below in Table 12. The input in both these types involves accent falling outside of a metrical window (designated in dashed lines). The middle columns illustrate grammars with different types of default repairs, e.g. Grammar 1 puts default on the initial syllable, whereas Grammar 3 puts it on the third syllable. Importantly, in all such grammars the position of default accent is identical whether the window external accent falls on the fourth or fifth syllable. In contrast, under rhythmic repair the position of accent varies according to the position of window external accent, falling on a position which is rhythmically dependent. In Grammar 1, primary accent is realized on the second syllable when window external accent is on the forth syllable but on the third syllable when it is on the fifth. In Grammar 2, primary accent is realized on the second and first syllables in these contexts.

[8] We are indebted to René Kager for discussion on these ideas.

[9] Under an extrametrical analysis, extrametricality would only be enforced with SAG 1 suffixes but not with SAGs 2/3/4. This is attractive in eliminating trochaic/iambic dual rhythm patterning, having uniform trochaic feet. We do not entertain it here given the problems with extrametricality approaches laid out in Kager (2012).

Table 12: Window external accent ‘repairs’

Repair types	**Default**		**Rhythmic**	
Position of window-external accent	4th σ	5th σ	4th σ	5th σ
Input	σσσσ́σ	σσσσσ́	σσσσ́σ	σσσσσ́
Grammar 1 Output	**σ́**σσσσ	**σ́**σσσσ	σ**σ́**σ̀σ	σσ**σ́**σ̀
Grammar 2 Output	σ**σ́**σσσ	σ**σ́**σσσ	σ**σ́**σ̀σ	**σ́**σσσ̀
Grammar 3 Output	σσ**σ́**σσ	σσ**σ́**σσ		
Accent position in window	Uniform		Variable	

Rhythmic repair in Ese’eja is seen above in Table 10 and example (7). To reiterate, after accent resolution the form /ishe’a-ká-me/ has morphological accent outside the initial three syllables. Primary accent surfaces in a rhythmically dependent position two syllables away, [(i.**shé**).(‘a.kà).me]. Rhythmic patterns were also shown with the form /ishe’á-nahe/, which surfaces on the rhythmically dependent initial position [(**í**.she).(’à.na).he].

An alternative analysis using only default repair would not capture these rhythmic patterns. First, it would remain unclear why primary prominence surfaces on the initial syllable in [(**í**.she).(’à.na).he] given that the morphological accent is not outside of the metrical window. Further, the default repair analysis would require the language to have three distinct default positions. The default position for forms with SAG 1 would be the second syllable (/ishe’a-ká-me/ → [(i.**shé**).(’a.kà).me]), while the default for SAGs 2/3/4 would be the initial syllable (/ishe’á-nahe/ → [(**í**.she).(’à.na).he]). Further, for nouns in isolation primary prominence falls by default on the penult which would constitute another default, as shown in (8)

(8)

1-σ	2-σ	3-σ	4-σ
ké ‘field’	**dá.**ki ‘clothes’	ba.**wí.**cho ‘rat’	i.ña.**wé.**wa ‘dog’

It is not unreasonable for a language to have three defaults conditioned by morphology and part of speech, e.g. multiple defaults in Choguita Rarámuri (Caballero 2011). We reject this approach because it makes no explicit link between the position of window-external input and the surface position of primary prominence, and renders any rhythmic effects a coincidence.

Further, the initial 3-σ window is also found in nouns and show evidence for rhythmic repair (Vuillermet 2012: 200-204). Nouns can be modified with various suffixes and enclitics which alter the position of accent, shown in Table 13. When case enclitics *=ho* Locative, *=a* Instrumental, and *=a* Ergative adjoin to the noun, they shift accent to the final position of the noun with 1/2/3-syllable nouns. With the 4-σ noun, however, primary accent appears on the second syllable. A different pattern is seen with the privative suffix *-ma* PRIV ‘X-less/with no X/have no X’. With 1/2-σ nouns, primary accent appears on the suffix *-ma* itself. We interpret this as *-ma* having inherent accent. In contrast, with 3-σ nouns primary accent falls on the second syllable, and with 4-σ on the third syllable. We show below that the position of primary accent can be understood if we employ iterative iambic feet, which is only consistent with rhythmic repair.

Table 13: Accent changes with nouns

	Isolation	Noun + case clitic		Noun + *-ma* PRIV	
1-σ	**ké**	/**ké**=ho/	(**ké**.ho)	/ke-**má**/	(ke.**má**)
2-σ	**dá**ki	/da**kí**=a/	(da.**kí**).a	/daki-**má**/	da.(ki.**má**)
3-σ	ba**wí**cho	/bawi**chó**=a/	ba.(wi.**chó**).a	/bawicho-**má**/	(ba.**wí**).(cho.mà)
4-σ	iña**wé**wa	/iñawe**wá**=a/	(i.**ñá**).(we.wà).a	/iñawewa-**má**/	i.(ña.**wé**).(wa.mà)

Further, no additional inflectional material appears between the root and the indexical *–ka*, restricting testing our theory with longer stems attached to SAG 1 suffixes which assign morphological accent to the ultima of the stem and enforce the creation of iambs. However, transitive roots may be reduplicated to form intransitives, e.g. *dawa* 'grill X' (trans.) > *dawa-dawa* 'grill' (intr.), which result in longer stems (Vuillermet 2012: 436-443). When a reduplicated root appears with a SAG 1 suffix and is assigned accent to the ultima of the stem, rhythmic repair results in the second syllable of the word receiving primary accent if the stem is 4 syllables, and on the third syllable if the stem is 5 syllables, shown in (9).

(9)

a.	/dawa-dawá-kwe/	(da.**wá**).(da.wà).kwe	[da**wá**dawakwe]
b.	/dawa-dawa-ká-me/	da.(wa.**dá**).(wa.kà).me	[dawa**dá**wakame]
c.	/dawa-dawa-ká-chana/	da.(wa.**dá**).(wa.kà).cha.na	[dawa**dá**wakachana]

This data is consistent under rhythmic repair but unexpected under default repair. We note, however, that Ese'eja has rich derivational morphology and over 50 distinct verbal suffixes spread over more than a dozen morphological slots. This results in a number of complex prosodic patterns, many of which are not strictly predicted from our analysis and need further investigation.

Finally, there are a number of factors conspiring against determining a default prosodic position and make evaluating rhythmic repair versus default repair problematic. These include: (1) inflectional material between the root and tense/mood suffix is limited to 1-σ indexical *-ka*, preventing comparison to 2-σ medial inflectional material; (2) native roots above 2 syllables are extremely rare and above 4 not attested, eliminating potential critical evidence; (3) uninflected verbs are rare, and when they do appear (e.g. in certain verb + auxiliary constructions), they often exhibit deaccentuation (Vuillermet 2012: 531); (4) when uninflected verbs appear, they appear with other non-inflectional morphology which can also cause accent changes; and (5) clitics which adjoin to prosodic words are highly frequent, and additionally alter the position of primary accent, for all lexical domains.

5 Conclusion

We have argued that Ese'eja verbal accent demonstrates an initial three syllable metrical window, a cross-linguistically rare type. From a corpus of 2,000 verb forms, verbal accent is shown to vary according to (1) stem syllable count, (2) root transitivity, and (3) the type of suffix added. We captured this by positing for four types of 'morphological' accent: transitive accent on transitive roots, dominant accent with the indexical suffix *-ka*, recessive accent with one set of tense/mood suffixes, and rightmost-preserving accent with another set of such suffixes. Tense/mood suffixes trigger either the creation of iterative trochaic or iambic feet which interact with a leftmost constraint, resulting in primary accent on the first, second, or third syllable of a verb. We called the Ese'eja window a 'rhythmic metrical window' and contrasted it with met-

rical windows discussed in Caballero (2011) and Kager (2012) which involve 'default repair'. Because iterative footing is established prior to primary accent delegation, we understood Ese'eja accent as a 'count system', and see it as challenging the Primary Accent First model (van der Hulst 1996). Furthermore, unlike approaches in Caballero (2011) and Kager (2012), our decomposition of the Ese'eja window did not involve either ternary feet with weak layering or a constraint which aligns the left edge of a prosodic word and such a metrical foot. Ese'eja therefore demonstrates the possibility of a metrical window emerging without the use of ternary feet (or extrametricality for that matter), and one without a prosodic default position.

As a final note, given the role which languages of South America have contributed to the typology of initial 3-σ windows, we see these present efforts as championing the need for continued careful analysis of South American prosodic systems. A brief comparison to the other languages related to Ese'eja in the Takanan family reveals a diversity of prosodic types. This ranges from Tacana with penultimate accent on words in isolation, but words dividing into three classes of stress patterns when affixes are added (van Wynen & van Wynen 1962, Key 1968: 29), to Araona with default second syllable stress with minimal reference to morphologically conditioned alternations (Pitman & Pitman 1978), to Cavineña with uniform H^n(M)M prosodic pattern on all prosodic words and no mention of morphologically conditioned accent patterns (Guillaume 2008a: 42). Additionally, comparison to non-Takanan languages of the area reveal many morphologically conditioned prosodic patterns such as in Mosetén (unclassified - Sakel 2004: 44) and in several Tupí-Guaraní languages (Wetzels & Meira 2010: 327) such as Chiriguano (Dietrich 1986: 56-57), as well as complex prosodic patterns found in the Panoan family (Bennett 2013, Tallman 2014, González 2016). Widespread morphologically conditioned prosodic patterns may reveal areal diffusion in this region, furthering efforts towards a full areal typology of South American phonological systems (Michael et al. 2014).

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