Stress Assignment in Omagua: Evidence for Cyclicity

Clare S. Sandy
Zachary J. O'Hagan
University of California, Berkeley

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1 Introduction

Goal: In this talk we describe stress assignment in Omagua, a highly endangered language of the Peruvian Amazon, and investigate how this system may best be formally modeled. Work of this type is important for an accurate typological picture of the world's prosodic systems, and for evaluating theoretical predictions about the interaction of phonology and morphology. For this reason, it is especially important to document the prosodic systems of endangered languages as language diversity is being lost. There is a dearth of detailed prosodically oriented phonological descriptions in Amazonia in particular. It is essential to pursue this type of research with living speakers because this type of data is often unrecoverable from published data and wordlists.

Omagua shows different patterns of stress assignment in morphologically complex words derived from roots of differing parity. Secondary stress in these stems reflects the placement of root secondary stress, while primary stress seems to be assigned in another cycle following derivation. Stress assignment patterns of this type are problematic in classic optimality theory (Prince and Smolensky, 1993; McCarthy and Prince, 1995), although stratal optimality theory approaches (Rubach, 1997; Kiparsky, 2000; Ito and Mester, 2003) allow for the application of different stress assignment rules at various stages of derivation. We will ask whether the Omagua pattern provides evidence for cyclicity.

Road Map:

- Theoretical background (§1.1)
- Language background (§1.2)

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- Methodology (§2)
- Basic Omagua stress patterns (§3)
- Additional pattern and future work (§3.3)
- Conclusions (§4)

1.1 Approaches to Stress Assignment

1.1.1 Lexical Phonology

Metrical phonology in the classical derivational approach (Kiparsky, 1982, 1985; Halle and Vergnaud, 1987).

- Cyclic rules apply successively to each level of derivation
- Accounts for rule-ordering paradoxes, non-derived environment effects
- Non-cyclic rules apply post-derivation
- Requires intermediate representations
- Restrictive predictions about when rules should apply

1.1.2 Optimality Theory

Metrical approaches in classic Optimality Theory (OT) framework (Kenstowicz, 1995, 1996; Pater, 1995)

- No intermediate stages
- Parallel interaction of constraints explains phenomena
- Opacity, reference to intermediate form needed – problematic
- Could use output-output identity constraint to base form (i.e., other word, not underlying representation), but does not work in all cases of opacity

Multi-stratal models of OT use differently ranked constraints at different levels

1.1.3 Specific Questions

Does Omagua stress provide evidence supporting cyclicity/levels or a parallel model?

- Completely transparent, surface-consistent metrical pattern would look postcyclic, and best modeled by parallel OT approach
- Inconclusive case would look like cyclic rule application but could be explained by either derivational or parallel approach
- A case of opacity where recourse to a base-identity constraint does not help would be good evidence for cyclicity. Different affixes may be expected to have different effects.
- Without a base-identity constraint, does cyclicity require different constraint rankings or multiple applications of the same constraint ranking?

1.2 Language Background

- Omagua is a highly endangered Tupí-Guaraní (TG) language spoken by ∼10 elderly residents or natives of San Joaquín de Omaguas (Amazon River), Loreto, Peru.

  i. Current known speakers range in age from 75 to 92 years old.

  ii. Reports of speakers in nearby San Salvador de Omaguas (Amazon river) date from as recently as the late 1950s (Girard, 1958, pp. 163-185), though it is not known if any speakers live there.

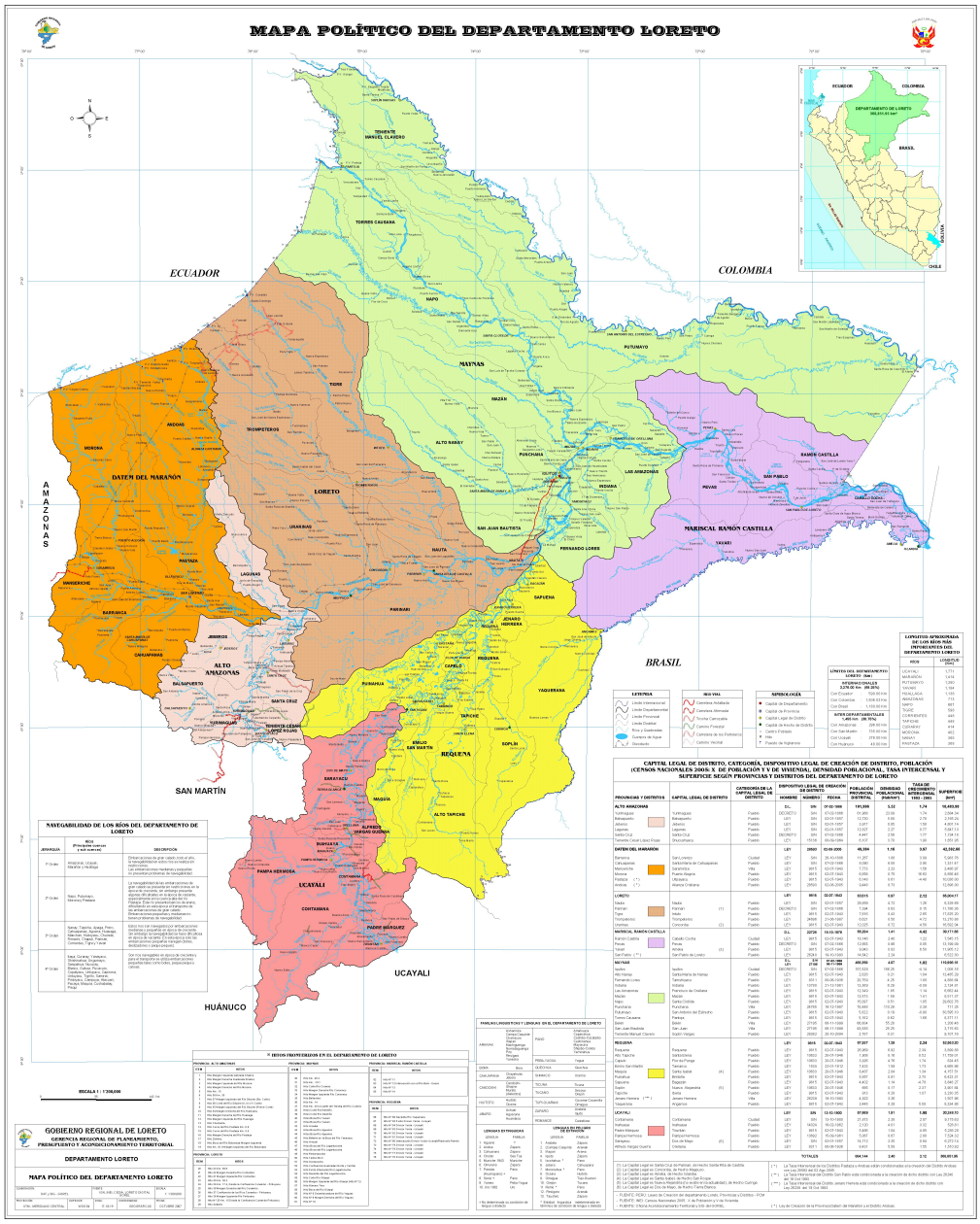


Figure 1: Peruvian State of Loreto

- The language is isolating with little bound verbal or nominal morphology.

  i. Person-marking is achieved via two formally related series of independent pronouns and reduced, phonologically bound proclitics.

  ii. Bound verbal morphology includes aspectual (-*aɾi* PROG), pluractional (e.g., -*ka* ITER, -*katu* REG) clause-linking (-*taɾa* and -*miɾa* PURP), valence-changing (-*ta* CAUS), constituent-negating (e.g., -*ɨma* PRIV) and derivational (e.g., -*waɾa* AGT.NOMZ) suffixes.

  iii. Tense, mood and clause-level phenomena (e.g., clause-linking and clausal negation) are achieved via sentence-initial, second-position or verb-/VP-final clitics.[1]

  iv. Bound nominal morphology is predominantly limited to evaluative (e.g., -*kɨɾa* DIM) and derivational (e.g., -*yaɾa* VBLZR) suffixes.

  v. Nominal enclitics encode number (e.g., =*kana* PL.MS), focus (=*puɾa*) and spatial relations (e.g., =*kati* ALL); there is no case or agreement (word order encodes S, A & P).

  (1) 'muɾa uɾi tanaʃikwaɾaɾa,' nani akia uɾupu sunimai kumɪsa ɨwatimaikanasupi.

muɾa	*uɾi*	*tana=*	*=ʃikwaɾaɾa,*	*nani*	*akia*	*uɾupu*
3SG.MS	come	1PL.EXCL.MS=	=behind,	QUOT	DEM.PROX.MS	vulture

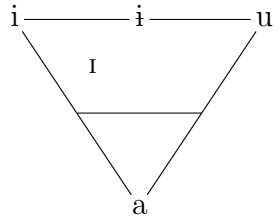
suni	*-mai*	*kumɪsa*	*ɨwati*	*-mai*	*=kana*	*=supi*
be.black	-CL.NOMZ	say	be.high.up	-CL.NOMZ	=PL.MS	=GOAL

  "'He came behind us," said the black vulture to those that were high up.' (MCT:C4.S1)

- A typologically unusual genderlect system (i.e., encoding speaker, and not referent, gender) pervades the person-marking, deictic and plural-marking systems (e.g., *ta* 1SG.MS & *tsɪ* 1SG.FS).

- There are 5 phonemic vowels (Figure 2) and 13 phonemic consonants (Table 1).[2]

Figure 2: Omagua Vowels



2 Methodology

- The analysis of Omagua stress is delimited by five broad facts about the language:

[1] VP-final clitics differ from verb-final clitics in attaching to a pronominal object (SVO), and not the verb directly.

[2] We grant only marginal phonemic status to /ts/, which appears in one high-frequency form *tsɪ* 1SG.FS. Forms containing /tʃ/ are all explainable via isolated historical palatalization processes (i.e., **ti*) or borrowing from Kokama-Kokamilla and Quechua.

Table 1: Omagua Consonants

	Bilabial	Alveolar	Alveo-Palatal	Palatal	Velar
Stop	p	t			k kʷ
Nasal	m	n			
Fricative		s	ʃ		
Affricate		(ts)	(tʃ)		
Flap		ɾ			
Glide	w			y	

i. Verbal and nominal roots are limited to one, two, three or four syllables.[3]

ii. There is no bound morpheme longer than two syllables.

iii. Sequences of more than two bound morphemes or enclitics are rare in the language.

iv. Bound suffixes and enclitics affect stress placement identically.[4]

v. There are very few words of more than four syllables, and most of those are morphologically complex, at least historically (e.g., *yawaɾawasu* 'jaguar' < *yawaɾa* 'dog' + *-wasu* AUG). The ones shown here are among the most lexicalized.

- Stress data consists of 2-3 tokens of nominal and verbal roots of differing parity, in addition to stems with a one- and two-syllable suffix and/or clitic.

- Each token was uttered in the frame in (2) by speaker Amelia Huanaquiri Tuisima.

  i. Nominal stems consisted of the root and either the feminine- or masculine-speech plural markers *=na* and *=kana*, respectively.[5]

  ii. Verbal stems consisted of the root and either *-ta* CAUS or *-taɾa* PURP.

  (2) tsí kumísa ____ nɪsúpi.

tsɪ	*kumɪsa*	____	*nɪ=*	*=supi*
1SG.FS	say	____	2SG=	=GOAL

  'I say ____ to you.'

- The frame avoids stress clashes between the root/stem and either of the immediately preceding or following syllables in adjacent words.

[3] All nominal roots are constrained by a bimoraic minimum-word requirement. A small subset of CV.V words exhibit identical vowels; in the singular, this sequence is realized as length (e.g., [ˈkuː] 'farm'), whereas in the feminine-speech plural, stress is readily perceptible on the second vowel (e.g., [ku.ˈu.na] 'farms').

[4] That is, criteria for distinguishing suffixes from clitics are chiefly syntactic, not phonological.

[5] To elicit a nominal stem with *=kana*, we asked our consultant to repeat the entire utterance as if she were quoting a man speaking, in which case *tsɪ* 1SG.FS in (2) became *ta* 1SG.MS.

3 Omagua Stress Assignment

- Primary stress in Omagua is penultimate, with a small number of lexical exceptions.
- In morphologically simplex roots, secondary stress is assigned to alternating syllables to the left of the primary stress, as shown in Table 2.
- Nouns and verbs behave the same in relation to stress.

Table 2: Stress Patterns in Roots

a.	ˈkai	'monkey'
b.	ˈpan	'rot'
c.	ˈka.ɾa	'potato'
d.	ˈku.pɪ	'cultivate'
e.	ta.ˈpa.ka	'piranha' (*Pygocentrus palometa*)
f.	ku.ˈɾa.ta	'drink'
g.	ˌta.ma.ˈkɨ.ʃi	'*gamitana*' (*Colossoma macropomum*, fish sp.)
h.	ˌpa.ɾi.ˈsa.ɾa	'invite'
i.	tɪ.ˌpu.ti.ˈʃi.ɾu	'entrails'
j.	ya.ˌwa.ɾa.ˈwa.su	'jaguar'
k.	ˌsa.sa.ˌwa.ka.ˈtu.pa	'bridge'
l.	ˌya.ɾa.ˌka.nu.ˈa.ɾa	'ribs'

3.1 Phonetic Correlates

- Primary stress is signaled by vowel length, intensity and high pitch.
- Greater vowel length and intensity on the syllable bearing primary stress is most noticeable in longer words where overall average syllable length tends to be shorter.
- Secondary stress is signaled by high pitch, although not as high as that of the primary-stressed syllable.
- Syllables bearing secondary stress have greater intensity and length than unstressed syllables.[6]
- Unstressed syllables display vowel reduction, both in length and in centralization of the vowel; at times, unstressed vowels may undergo syncope.

[6] At the beginning of a phonological phrase, the nucleus of the first syllable of a word is lengthened and often carries greater intensity, sometimes as much as the syllable carrying primary stress.

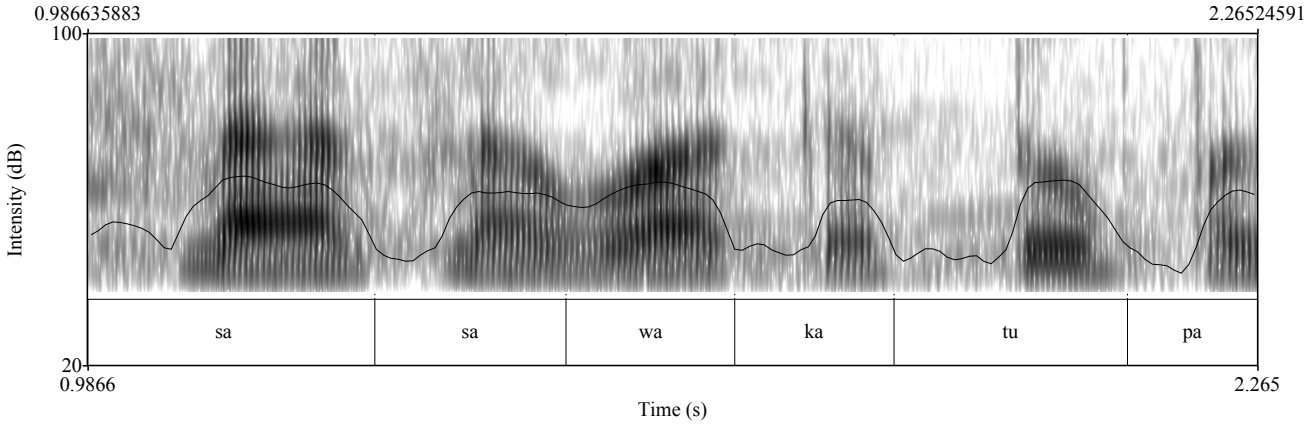


Figure 3: Spectrogram showing intensity in *sàsawàkatúpa*

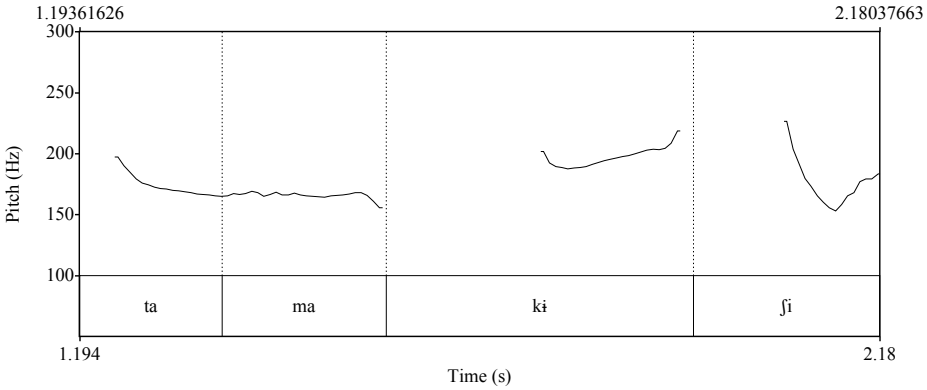


Figure 4: Pitch trace of *tàmakɨ́ʃi*

3.2 Basic Pattern & Footing

- An alternating pattern of stressed and unstressed syllables indicates binary feet.
- Penultimate syllables are always stressed, and leftmost syllables in odd-parity words are unstressed.
- We analyze this as right-aligned trochaic feet (Table 3).
- This footing is obtained with the constraint ranking shown in (3).

  (3) GrWd=PrWd ≫ Ft-Bin ≫ Parse-Syl ≫ All-Ft-Right

- The tableau in (4) shows that to obtain the correct footing in four-syllable words Parse-Syl must outrank All-Ft-Right.

Table 3: Footing in Simplex Roots

a.	(kái)
b.	(kára)
c.	ta(páka)
d.	(tàma)(kɨ́ʃi)
e.	tɪ(pùti)(ʃíru)
f.	(sàsa)(wàka)(túpa)

(4)

	/σσσσ/	GrWd=PrWd	Ft-Bin	Parse-Syl	All-Ft-Right
a.	σσσσ	*!		****	
b. ☞	(σσ)(σσ)				**
c.	(σσ)σσ			*!*	**
d.	σσ(σσ)			*!*	
e.	σ(σσ)σ			*!*	*

- The tableau in (5) shows that All-Ft-Right ensures that the unfooted syllable in an odd-parity word is at the left edge.
- Example (f) in tableau (5) shows that Ft-Bin outranks Parse-Syl.
- A violation of foot binarity is acceptable only in a one-syllable word, in order to satisfy GrWd=PrWd.

(5)

	/σσσσσ/	GrWd=PrWd	Ft-Bin	Parse-Syl	All-Ft-Right
a.	σσσσσ	*!		*****	
b. ☞	σ(σσ)(σσ)			*	**
c.	(σσ)σ(σσ)			*	***!
d.	σσσ(σσ)			**!*	
e.	(σσ)(σσ)σ			*	*, **!*
f.	(σσ)(σ)(σσ)		*!		**, ***

- As seen in Table 3, feet are trochaic and primary stress always falls on the head of the rightmost foot.
- To obtain these results, we use the foot-form constraint in (6) and the alignment constraint in (7). Based on this data, these constraints are undominated.

(6) RhType=T
Feet are left-headed

(7) Rightmost
Align (Hd-Ft, Right, PrWd, Right)
The head foot is rightmost in PrWd.

3.2.1 Basic Stress Pattern in Complex Forms

- When a one-syllable suffix or enclitic is added to roots of three syllables or less, the same alternating pattern found in morphologically simplex roots occurs (8a-b).

- This pattern also accounts for the stress assignment in all words where roots of even parity are combined with suffixes or enclitics of even parity (8c).

(8) (a) ˌta.pa.ˈka.na
‘piranhas’ (FS)

(b) ta.ˌpa.ka.ˈka.na
‘piranhas’ (MS)

(c) ˌta.ma.ˌkɨ.ʃi.ˈka.na
‘*gamitanas* (fish sp.)’ (MS)

- When a one-syllable enclitic is added to a four-syllable root, stresses do not occur in a regular, alternating pattern.

- Primary stress is penultimate, as expected, but secondary stress occurs on the same syllable as in the morphologically simple form, as in (9).

(9) ˌta.ma.kɨ.ˈʃi.na
‘*gamitanas* (fish sp.)’ (FS)

- Table 4 summarizes the stress patterns found in Omagua, showing bare roots, and corresponding complex forms with one-syllable and two-syllable enclitics added, respectively.

Table 4: Stress in Complex Words

	Root	+ 1 (=*na* PL.FS)	+ 2 (=*kana* PL.MS)	Gloss
a.	ˈkai	ˈkai.na	kai.ˈka.na	‘monkey(s)’
b.	ˈka.ɾa	ka.ˈɾa.na	ˌka.ɾa.ˈka.na	‘potato(es)’
c.	ta.ˈpa.ka	ˌta.pa.ˈka.na	ta.ˌpa.ka.ˈka.na	‘piranha(s)’
d.	ˌta.ma.ˈkɨ.ʃi	**ˌta.ma.kɨ.ˈʃi.na**	ˌta.ma.ˌkɨ.ʃi.ˈka.na	‘*gamitana(s)* (fish sp.)’
e.	tɪ.ˌpu.ti.ˈʃi.ɾu	**tɪ.ˌpu.ti.ʃi.ˈɾu.na**	tɪ.ˌpu.ti.ˌʃi.ɾu.ˈka.na	‘entrail(s)’
f.	ˌsa.sa.ˌwa.ka.ˈtu.pa		ˌsa.sa.ˌwa.ka.ˌtu.pa.ˈka.na	‘bridge(s)’

- A single round of stress assignment could not account for the two patterns seen in five-syllable words, given that words of identical phonological shape are found in each group.

- It appears that stress is being assigned in multiple levels. Using a derivational approach, these patterns can be accounted for relatively straightforwardly.

3.2.2 Derivational Account

- The consistent pattern of penultimate stress indicates that a trochaic foot must be built at the right edge of a word at the end of derivation.
- Complex forms as in (10) show that secondary stress assigned to the bare root must be retained throughout the derivation.

  (10) tɪ(pùti)(ʃíɾu) + na
  tɪ(pùti)ʃi(ɾúna)
  *(tìpu)(tìʃi)(ɾúna)

- Stress in the "regular" complex forms such as those shown in (11) is also consistent with this account.
- Trochaic feet built at the end of derivation would line up with trochaic feet built on a bare root, making it impossible to distinguish retained root secondary stress from secondary stress assigned later.

  (11) (a) ta(páka) + kana
  ta(pàka)(kána)
  (b) (tàma)(kɨ̀ʃi) + kana
  (tàma)(kɨ̀ʃi)(kána)

Stress Clashes

- In stems with three-syllable roots, final trochaic stress clashes with original root stress.
- Clash is resolved by shifting stress one syllable leftward, creating a second trochee to the left of the final one, as seen in (12).

  (12) ta(páka) + na
  *ta(pá)(kána)
  (tàpa)(kána)

- In stems with five-syllable roots, final trochaic stress similarly clashes with original root stress.

  (13) tɪ(pùti)(ʃíɾu) + na
  *tɪ(pùti)(ʃí)(ɾúna)

- Here, a trochee cannot be built to the left of the final trochee because this would conflict with retained secondary stress, as in (14).

  (14) tɪ(pùti)(ʃíɾu) + na
  *tɪ(pù)(tìʃi)(ɾúna)

- Thus retained primary stress deletes, as in (15).

  (15) tɪ(pùti)(ʃíɾu) + na
  tɪ(pùti)ʃi(ɾúna)

- Note that two syllable words combined with a one-syllable suffix/enclitic exhibit the same pattern of deletion obligatorily, since the word is not long enough for leftward shift.

Summary of Basic Stress Derivation

- Basic stress assignment in Omagua can be summarized as follows:

  1. Assign right-to-left syllabic trochees to morphologically simple roots.
  2. Add morphology.
  3. Build a trochee at the right edge of the word.
  4. Resolve stress clashes.
     - If possible to resolve clash by moving an old (i.e., Step 1) stress, do so.
     - Otherwise, delete root primary stress.
     - Moving or deleting penultimate stress is never possible.

3.2.3 OT Account

- Is it possible to obtain the same results using a parallel account?

- Using the constraints that gave us the monomorphemic forms above produce the incorrect results ((a) in the tableau in (16)) for a five-syllable root plus a one-syllable suffix, rather than the attested form (b).

(16)

	/σσσσσ-σ/	GrWd=PrWd	Ft-Bin	Parse-Syl	All-Ft-Right
a. ☹	(σσ)(σσ)(σσ)				**,****
b. ☞	σ(σσ)σ(σσ)			*!*	***
c.	σ(σσ)(σσ)σ			*!*	*,***
d.	σ(σσ)(σ)(σσ)		*!	*	

- A parallel OT account requires an output-output correspondence constraint relating the output of the polymorphemic form to the output of the compositionally related monomorphemic form, which we call Ident-OO. A violation is assigned for each stress that does not correspond with a stress in the base form.

- Ident-OO is ranked above Parse-Syl but below and Ft-Bin to avoid retaining root stress in forms where it would cause clash.

- Rightmost is ranked above Ident-OO, ensuring penultimate primary stress in all forms.

(17)

Input: /σσσσσ-σ/ Base: (σσ)(σσ)		Rightmost	Ft-Bin	Ident-OO	Parse-Syl	All-Ft-Right
a.	(σσ)(σσ)(σσ)			***!		**,****
b. ☞	σ(σσ)σ(σσ)			**	**	***
c.	σ(σσ)(σσ)σ	*!			**	*,***
d.	σ(σσ)(σ)(σσ)		*!	*	*	**,***
e..	σ(σσ)(σσ)(σ)		*!		*	*,***

- Without a constraint that assumes identity with a base form, a cyclic OT account is necessary, in which the output of one constraint evaluation passes through a second evaluation.

- Stress on the root form is determined by the constraint ranking shown in (3) above. Upon affixation, the entire form is evaluated again. In this case, two options are possible:

a. A faithfulness constraint for input stress takes the place of the output-output identity constraint of the parallel analysis, with the same end result. Using this constraint, the same ranking could be used for each level of the derivation because no violations of this faithfulness constraint would be incurred by added stresses.

b. A different constraint ranking is used for the cyclical stress assignment in which only RIGHTMOST is active, leaving the other input stresses unaffected.

3.3 Additional Pattern & Future Work

- Certain morphologically complex six-syllable Omagua words exhibit an unexpected stress clash between the antepenult and penult, as in (18).

  (18) sɪmùtakápáɾi

- This data is problematic in either the derivational approach or the optimality theoretic approach discussed above.

- Crucially, this pattern only occurs when the final morpheme -*aɾi* PROGRESSIVE appears after at least two other one-syllable suffixes (-*ta* CAUSATIVE, -*ka* ITERATIVE, or -*pa* COMPLETIVE):

  i. Two-syllable root and three one-syllable suffixes (Table 5).

  ii. Three-syllable root and two one-syllable suffixes (Tables 6 & 7).

- Spontaneous exemplars of this pattern are highly limited due to the level language attrition of remaining Omagua speakers.

- Most tokens arose in constructed elicitation work on affix ordering and scope.

Table 5: Stress Clash in *sɪnu* 'listen' Stem

a.	(sínu)	'listen'
b.	sɪ(núta)	'make listen'
c.	(sìnu)(táka)	'make listen iteratively'
d.	sɪ(nùta)(kápa)	'make listen distributively'
e.	sɪ(nùta)(ká)(páɾi)	'progressively make listen distributively'
	*(sínu)(táka)(páɾi)	

Table 6: Stress Clash in *yapana* 'run' Stem

a.	ya(pána)	'run'
b.	(yàpa)(náta)	'make run'
c.	ya(pàna)(táka)	'make run iteratively'
d.	ya(pàna)(tá)(káɾi)	'progressively make run iteratively'
	*(yàpa)(nàta)(káɾi)	

Table 7: Stress Clash in *warika* ‘climb’ Stem

a.	wa(ɾíka)	‘climb’
b.	(wàɾi)(káka)	‘climb iteratively’
c.	wa(ɾìka)(kápa)	‘climb distributively’
d.	wa(ɾìka)(ká)(páɾi)	‘progressively climb distributively’
	*(wàɾi)(kàka)(páɾi)	

- A number of analyses have proven problematic in the explanation of this pattern:

  1) It cannot be explained in terms of overall stem length, as the pattern does not occur on a stem of a four-syllable root and one-syllable suffix plus -*aɾi* (Table 8).

Table 8: No Stress Clash in *timisama* ‘be full’ Stem

a.	(tìmi)(sama)	‘be full’
b.	(tìmi)sa(máta)	‘fill’
c.	(tìmi)(sáma)(táɾi)	‘progressively fill’
	*(tìmi)sa(má)(táɾi)	

  2) It cannot be that the morphemes -*ka* and -*ta* are inherently stressed but just do not surface as such word-finally (their most common position), because of forms like (d) in Table 5 where -*ta* appears non-finally.

  3) It cannot be that the third level of morphological derivation simply carries a different constraint ranking (or rule ordering) which permits clash, as the pattern does not arise when the three morphemes are not -*aɾi* (again (d) in Table 5).

  4) It is also difficult to posit particular rules governing stress with the co-realization of -*aɾi*, because clash does not occur in cases where -*aɾi* attaches directly to a root or to a stem with only one one-syllable suffix, as in Table 9.

Table 9: Stress Clash in *yapana* ‘run’ Stem

a.	ya(pána)	‘run’
b.	(yàpa)(náɾi)	‘progressively run’
	*ya(pá)(náɾi)	

- We hope to explore this pattern across a wider number of speakers in future work, though the level of attrition of remaining speakers likely precludes a full prosodic analysis of Omagua words of this length.

4 Conclusions

- The basic stress patterns seen in Omagua can be accounted for in a derivational approach.
- A parallel OT approach is possible, but requires reference to stress in a related base form.
- A multi-stratal OT approach could also also be employed to explain the stress patterns seen. In a multi-stratal OT account, it is not clear from the basic examples whether different constraint rankings for each level are required.
- The basic pattern and the pattern displaying stress clash both indicate cyclicity in stress assignment in Omagua. However, our current formal mechanisms cannot account for all the observed patterns.

References

Girard, R. (1958). *Indios selváticos de la Amazonía peruana*. Mexico City: Libro Mex.

Halle, M. and J.-R. Vergnaud (1987). *An Essay on Stress*. Cambridge: Massachusetts Institute of Technology (MIT) Press.

Ito, J. and A. Mester (2003). Lexical and Postlexical Phonology in Optimality Theory. *Linguistische Berichte 11*, 183–207.

Kenstowicz, M. (1995). Cyclic vs. Non-cyclic Constraint Evaluation. *Phonology 12*(397-436), 397–436.

Kenstowicz, M. (1996). Base-Identity and Uniform Exponence: Alternatives to Cyclicity. In J. Durand and B. Laks (Eds.), *Current Trends in Phonology: Models and Methods*, pp. 363–393. University of Salford Publications.

Kiparsky, P. (1982). From Cyclic Phonology to Lexical Phonology. In H. van Der Hulst and N. Smith (Eds.), *The Structure of Phonological Representations*, Volume 1, pp. 131–175. Dordrecht: Foris Publications.

Kiparsky, P. (1985). Some Consequences of Lexical Phonology. In C. Ewen and E. Kaisse (Eds.), *Phonology Yearbook*, Volume 2, pp. 85–138. Cambridge: Cambridge University Press.

Kiparsky, P. (2000). Opacity and Cyclicity. *The Linguistic Review 17*(2/4), 351–366.

McCarthy, J. J. and A. Prince (1995). Faithfulness and Reduplicative Identity. In J. Beckman, S. Urbanczyk, and L. Dickey (Eds.), *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*, pp. 249–384. Amherst: Graduate Linguistics Student Association.

Pater, J. (1995). On the Non-Uniformity of Weight-to-Stress and Stress Preservation Effects in English.

Prince, A. and P. Smolensky (1993). *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford: Blackwell.

Rubach, J. (1997). Extrasyllabic Consonants in Polish: Derivational Optimality Theory. In I. Roca (Ed.), *Derivations and Constraints in Phonology*, pp. 551–582. Oxford: Oxford University Press.