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Serial directional evaluation of rhythmic reversal in Axininca

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Abstract. This paper updates the analysis of rhythmic reversal in Axininca with a more economical one using serial/directional evaluation that dispenses with alignment constraints. The serial/directional evaluation is more superior to a parallel/directional counterpart with respect to quantity-sensitivity, as adopting directionally evaluated constraints for parallelism cannot avoid overgeneration problems.

Keywords. directional constraints; Harmonic Serialism; quantity-sensitivity

1. Rhythmic reversal in Axininca. Axininca has a quantity-sensitive stress pattern with rightward iambs that always avoid the final syllable (Payne, Payne & Santos 1982). Therefore, in sequences of light syllables the stress pattern is straightforward with rightward iambs (1a). However, disyllabic words display rhythmic reversal that shifts the stress to the initial syllable (1b). Even more intriguing is that polysyllabic words ending in an even number of light syllables display rhythmic reversal that shifts the stress to the penultimate syllable (1c).

(1) Axininca (adapted from Pruitt 2010: 513)

a.	tʃʰoˈrina	‘species of palm’	iˈtʃʰikaˈkina	‘he has cut me’
b.	ˈsari	‘macaw’	ˈkito	‘shrimp’
c.	kiˈmiˈtaka	‘perhaps’	hoˈtiˈtana	‘he let me in

In the analysis below, we demonstrate that serial/directional evaluation can model the pattern without invoking the ALIGN family (McCarthy & Prince 1993).

2. Serial directional evaluation without ALIGN. We propose an analysis in *Directional Harmonic Serialism* (Lamont 2022), wherein constraints are evaluated by directionality, i.e., where the violations occur, instead of the number of violated loci (2). Therefore, as shown in (2), (σ)σσσ is more optimal than σ(σσ)σ for PARSE(σ)$^{⇒}$ and σσσ(σ) more optimal than σ(σσ)σ for PARSE(σ)$^{⇐}$. With revised TROCHEE (3) and IAMB (4), the derivation of the regular iambic stress pattern in an odd-parity word will proceed as shown in (5).[1] At each of the first two steps an iambic foot, (5a) and (5d) respectively, is chosen as optimal because TROCHEE$^{⇒}$ is ranked lower. The third step shows convergence (5e) because the only remaining stress candidate (5f) fatally violates NONFINALITY$^{⇒}$, which dominates PARSE(σ)$^{⇒}$ and rules out word-final stressed syllables.

(2) Directional evaluation of PARSE(σ) (Lamont 2022)

a. Violations vectors of PARSE(σ)$^{⇒}$:
1111 > 1110 > 1101> 1100 > 1011 > 1001 > 0111 > 0011
σσσσ ≺ σσσ(σ) ≺ σσ(σ)σ ≺ σσ(σσ) ≺ σ(σ)σσ ≺ σ(σσ)σ ≺ (σ)σσσ ≺ (σσ)σσ

b. Violation vectors of PARSE(σ)$^{⇐}$:
1111 > 0111 > 1011 > 0011 > 1101 > 1001 > 1110 > 1100
σσσσ ≺ (σ)σσσ ≺ σ(σ)σσ ≺ (σσ)σσ ≺ σσ(σ)σ ≺ σ(σσ)σ ≺ σσσ(σ) ≺ σσ(σσ)

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[1] In the analysis below, the directionalities of the constraints do not affect the outcome and are assumed to be rightward by default, except for PARSE(σ), whose directionalities determine where feet surface, rightward or leftward.

(3) TROCHEE (cf. Lamont 2022):
Assign one violation for a monomoraic syllable that is i) a foot-initial non-head, i.e., *(L'H), *(L'L), *(L), or ii) a foot-final head, i.e., *(L'L), *('L), *(H'L).

(4) IAMB (cf. Lamont 2022):
Assign one violation for a monomoraic syllable that is i) a foot-final non-head, i.e., *('HL), *('LL), *(L), or ii) a foot-initial head, i.e., *('LL), *('L), *('LH).

(5) Odd-parity words parsed into iambs: Convergence at 3rd iteration

/itʃʰikakina/	NONFIN⇒	PARSE(σ)⇒	IAMB⇒	TROCHEE⇒
☞ a. (i'tʃʰi)kakina		00111		11000
b. ('itʃʰi)kakina		00111	11000W	L
c. (i'tʃʰi)kakina		00111W		11000L
☞ d. (i'tʃʰi)(ka'ki)na		00001		11110
☞ e. (i'tʃʰi)(ka'ki)na		00001		11110
f. (i'tʃʰi)(ka'ki)('na)	00001W	L	00001W	11111W

In contrast, the derivation of a word with an even number of light syllables builds iambs from the left until there are two syllables remaining, at which point it will choose to build a trochee on the two remaining syllables (6e) for both NONFINALITY⇒ and PARSE(σ)⇒ rank higher than IAMB⇒.

(6) Rhythmic reversal: Convergence at 3rd iteration (not shown)

/hotitana/	NONFIN⇒	PARSE(σ)⇒	IAMB⇒	TROCHEE⇒
☞ a. (ho'ti)tana		0011		1100
b. ('hoti)tana		0011	1100W	L
c. (ho'ti)tana		0011W	L	1100
d. (ho'ti)(ta'na)	0001W		L	1111W
☞ e. (ho'ti)('tana)			0011	1100

Without resorting to the ALIGN family, the analysis is more parsimonious than a serial evaluation of the same phenomenon that employs alignment constraints (cf. Pruitt 2010).

3. Serialism versus parallelism. Note that directional constraint evaluation cannot prevent a parallel analysis from generating an unattested non-local rhythmic reversal when I/TL (a cover constraint for those obeying the Iambic/Trochaic Law, Hayes 1995), which favors ideal iambs (L'H) and trochees ('LL), is ranked higher than IAMB⇒ (cf. Pruitt 2010). In that case, global rhythmic reversal will change foot structure throughout the entire word and cause odd and even parity words to obey different stress generalizations (7)-(8) (i.e., iambs and trochees, respectively). A serial evaluation, in contrast, will avoid such lookahead effect to ensure rhythmic reversal is local before lengthening and shortening of syllables apply (9).[2]

[2] The directionalities of DEP-μ and MAX-μ matters as they will determine which segment undergoes lengthening/shortening first. We assume rightward applications here as they will not change the stress generalization.

(7) Lengthening of stressed light syllables in odd-parity words to perfect iambs

/LLLLL/	NONFIN⇒	PARSE(σ)⇒	I/TL⇒	IAMB⇒
☞ a. (L'H)(L'H)L		00001		
b. (L'L)(L'L)L		00001	01010W	
c. ('LL)('LL)L		00001		1111W

(8) Shortening of stressed heavy syllables in even-parity words to idealize trochees

/HLHL/	NONFIN⇒	PARSE(σ)⇒	I/TL⇒	IAMB⇒	MAX-μ⇒
☞ a. ('LL)('LL)				1111	1010
b. (L'L)('LL)			0100W	0011L	1010
c. ('HL)('HL)			0101W	0101L	L
d. (L'L)(L'L)	0001W		0101W	0011L	1010
e. (L'H)(L'H)	0001W			L	1010
f. (H'L)(H'L)	0001W		0101W	L	L

(9) Local rhythmic reversal

/HLHL/	NONFIN⇒	PARSE(σ)⇒	I/TL⇒	IAMB⇒	MAX-μ⇒	DEP-μ⇒
a. ('HL)HL		0011	0100	0100W		
☞ b. (H'L)HL		0011	0100			
c. H(L'H)L		1001W	L			
d. (H'L)HL		0011W	0100L	L		
e. (H'L)(H'L)	0001W		0101	L		
☞ f. (H'L)('HL)			0101	0001		

4. Conclusion. This paper demonstrates that a serial directional evaluation can successfully capture Axininca's typologically notable rhythmic reversal without the aid of alignment constraints heavily relied upon by previous (non-directional) work. Moreover, we also show that a parallel alternative cannot save itself from the overgeneration problem. By using fewer constraints and avoiding typologically unattested patterns, the current analysis is proved more elegant than previous work in both serialism and parallelism.

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