

Opacity in Mojeño Trinitario Reduplication - A Harmonic Serialism Account

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Reduplication in MT: A Harmonic Serialism Account

- In Mojeño Trinitario, an Arawak language spoken in Trinitario, Bolivia, reduplication interacts with several phonological rules, such as stress assignment and vowel deletion
- The interaction of these rules yields an opaque reduplication pattern, which constitutes a problem for both serial rule-based approaches to reduplication (Frampton 2004) as well as parallel OT (Prince & Smolensky 1993).
- I will show that the opaque pattern can be accounted for in Harmonic Serialism (McCarthy 2016), a serial version of Optimality Theory.

Outline

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Reduplication in Mojeño Trinitario

- Reduplication in Mojeño Trinitario copies the last syllable of the verbal stem and attaches it to the stem:

(1) pi-sopo-**po**-xi-'ko-nu
 2SG-believe-**RED**-CLF-ACT-1 SG
 'You half-believe me.'

(2) ti-ko-xu'ma-**ma**-xi
 3F-VZ-sickness-**RED**-CLF
 'She is sickly.'

Vowel Deletion

Vowel deletion applies from the right to the left, deleting every odd-numbered vowel, starting with the first one. The vowel of the final syllable can never be deleted.

$$CV_1 CV_2 CV_3 CV_4 CV_5 CV_6 CV_7 \xrightarrow{\text{Voweldeletion}} CCV_2 CCV_4 CCV_6 CV_7$$

- (3) nomxiko
 nu₁-o₂mo₃-xi₄-ko₅
 1SG-carry-CLF-ACT
 'I am carrying it.'

Stress Assignment

Stress falls on the penultimate syllable.

- (4) tsokkox'kojre
 ti-soko-ko-xi-ko-jore
 3-defecate-RED-CLF-ACT-FUT
 '(S)he has diarrhea.'

Reduplication and Stress

- Stress targets the penultimate syllable.
- The reduplicant syllable is invisible for stress assignment
- If RED is the penultimate syllable, stress falls on the preceding syllable.

Reduplication and Vowel deletion

- Vowel deletion targets all odd-numbered syllables, starting with the first one.
- The vowel of the reduplicant, however, is always preserved, regardless of its numbering
- If this is this case, vowel deletion targets the next odd-numbered vowel

(5) $CV_T.CV_2.(CV_3.CV_4)_{\text{Stem}} - (CV_5)_{\text{RED}}, - CV_6.CV_7.CV_{\text{FIN}}$.

(6) tkox'mamaxi
 ti₁-ko₂-xu₃ma₄-**ma**₅-xi₆
 3F-VZ-sickness-RED-CLF
 'She is sickly.'

A rule-ordering Problem

- The reduplicant is not affected by vowel deletion, but it shifts the counting of the vowels to the right
- If the reduplicant was completely invisible for vowel deletion, vowel deletion would target V_6
- this implies that the vowel deletion rule can in fact “see” the reduplicant as part of the morphological structure.

A rule-ordering Problem

Serial rule-based accounts such as Distributed Reduplication (Frampton 2004) cannot account for the pattern, since ordering of reduplication and vowel deletion can predict the right form.

- (7)
 - a. Reduplication > Vowel Deletion
 - b. Vowel Deletion > Reduplication
- (7a) would predict a pattern in which vowels are deleted transparently; the reduplicant is deleted in case it is odd-numbered.
- (7b) predicts a form in which the reduplicant is always identical to the base, since the reduplication process applies to a form in which vowels have already been deleted.

Problems for parallel OT

- Idea: the problem could be solved by protecting the reduplicant by high-ranked faithfulness constraint
- Problem: There is no phonological material for the reduplicant present in the input which such a faithfulness constraint could refer to
- To prevent the reduplicant from being deleted, the system needs to have access to the intermediate representation of the reduplicated form

The solution: Harmonic Serialism

- Harmonic Serialism (McCarthy 2010) is a serial version of OT
- Candidates are derived and evaluated in a series of multiple steps
- GEN is limited to making one change at a time
- Each candidate must either be identical to the input or differ from the input by only a single operation
- The output of GEN and EVAL at each step is submitted as the input for a following step until no further changes can be made and the derivation converges
- Convergence occurs when the output at a step is identical to the input at that step

Why Harmonic Serialism?

- As we have seen before, serial rule-based approaches fail to provide a rule ordering that could derive the pattern.
- It is, however, necessary to have operations apply serially, since vowel deletion needs to refer to the intermediate representation of the reduplicated form
- Harmonic Serialism is able to combine the advantages of parallel OT with serial rule application.

Harmonic Serialism: Assumptions

- syllabification and foot structure does not require a separate step in the derivation (cf. Elfner 2016)
- Feet in MT are lambs which are left-aligned
- If the number of syllables is odd-numbered, the last foot is monosyllabic, which derives fact that the vowel is never deleted (since it can never be part of a weak syllable)
- Following Kager (1997), I interpret vowel deletion as reduction of vocalic features in weak vowels (triggered by REDUCE), so that syllabicity is preserved and vowel deletion does not affect foot parsing:

(8) (pisò)(xikó)(nù) → (p●sò)(x●kó)(nù)

- Main stress is assigned to the rightmost foot, but can never fall on the final foot.

Constraints on Reduplication

MAXBR	Elements of the base have correspondents in RED.
RED=SYL	The reduplicant is a syllable.
ANCHORINGBR-RIGHT	The right peripheral element of R corresponds to the right peripheral element of B
ALIGNRED-RIGHT	Align the right edge of the reduplicant with the right edge of the PRWD.
REDFORM	Cover constraint (ANCHORINGBR-RIGHT, ALIGNRED-RIGHT)

Constraints on Stress and Foot Structure

- \neg **FIN**(F, ω) The word-final foot must not bear main stress.
- PARSESYL** Syllables must be parsed into feet.
- ***RED**_{STRESS} No main stress on RED.
- RIGHTMOST** The head foot is rightmost in PrWd.
- FTBIN** Feet are binary.
- RHTYPE=1** Feet are right-headed.
- FTFORM** Cover constraint (**RIGHTMOST**, **FTBIN**, **RHTYPE=1**)

Constraints on Vowel Deletion

- MAX(F)V-IO** Input features of vowels must be represented in the output.
- REDUCE** Weak syllables dominate no vocalic features.

Derivation I

(9) tkox'mamaxi
ti₁-ko₂-xu₃'ma₄-ma₅-xi₆
3F-VZ-sickness-RED-CLF
'She is sickly.'

- The reduplicant syllable is odd-numbered (and thus a potential target for vowel deletion).
- The reduplicant is the penultimate syllable of the output form, so it would be expected to be stressed.

Derivation I

(10) Step 1 of *tkox'mamaxi*: Reduplication

/RED, ti-ko-xuma-xi/	\neg FIN(F, ω)	PARSESYL	RED=SYL	MAXBR	*RED _{STRESS}	FTFORM	REDFORM	REDUCE	MAX(F)V-IO	ALLFTL
a. (tikò)(xumá)(xi)				***!*		***		**		**
b. ^{ESP} (tikò)(xumá)(maxi)				**		***		***		**
c. (tikò)(xumà)(maxí)	*!			**		**		***		**
d. ((tikò)(xumà)(xumá)(xi)			*!		*	***		***		**
e. (t●kò) (x● má)(xi)				***!*		**			***	**

Derivation I

(11) Step 2 of *tkox'mamaxi*: Vowel Deletion

		-FIN(F, ω)	PARSESYL	RED=SYL	MAXBR	*RED _{STRESS}	FTFORM	REDFORM	REDUCE	MAX(F)/V-IO	ALLFTL
	/(tikò)(xumá)(maxi)/										
a.	(tikò)(xumá)(maxi)				**		***		*!***		**
b.	(t●kò)(x●má)(màxi)				**		***			***	**
c.	(t●kò)(x●má)(m●xi)				***!		***		*	**	**

Derivation I

(12) Step 3 of *tkox'mamaxi*: Convergence

		-FIN(F, ω)	PARSE SYL	RED=SYL	MAXBR	*RED _{STRESS}	F _T FORM	REDFORM	REDUCE	MAX(F)/V-IO	ALLFTL
	/t ●kò)(x●má)(màxi)/										
a.	^{ESP} (t ●kò)(x●má)(màxi)				**		***			***	**
b.	(t●kò)(x●má)(m●xi)				***!		***		*	**	**

Derivation II

(13) psoppox'konu
pi₁-so₂po₃-po₄-xi₅-'ko₆-nu₇
2SG-believe-RED-CLF-ACT-1 SG
'You half-believe me.'

- The reduplicant syllable is even-numbered and thus not affected by vowel deletion
- The stem-final vowel is odd-numbered and thus a target for deletion

Derivation II

(14) Step 1 of *psoppox'konu*: Reduplication

/RED, pi-sopo-xi-ko-nu/	\neg FIN(F, ω)	PARSESYL	RED=SYL	MAXBR	*RED _{STRESS}	FTFORM	REDFORM	REDUCE	MAX(F)V-IO	ALLFTL
a. (pisò)(poxí)(konù)				***!*	**		***		**	
b. ^{ESP} (pisò)(popò)(xikó)(nú)				**		**	***		***	
c. (pisò)(popò)(xikò)(nú)	*!			**		*	***		***	
d. (pisò)(posò)(poxí)(konù)			*!		*	**	****		***	
e. (p●sò)(p●xí)(k●nù)				***!*					***	**

Derivation II

(15) Step 2 of *psoppox'konu*: Vowel Deletion

		-FIN(F,ω)	PARSESYL	RED=SYL	MAXBR	*RED _{STRESS}	F _T FORM	REDFORM	REDUCE	MAX(F)V-IO	ALLFTL
	/ (pisò)(popò)(xikó)(nù) /										
a.	(pisò)(popò)(xikó)(nù)				**		**		*! **		***
b.	^{ES} (p•sò)(p•pò)(x•kó)(nù)				**		**			***	***
c.	(p•sò)(p•pò)(xikó)(nù)				**		**		#!	**	***
d.	(pisò)(posò)(poxí)(konù)			*!			**		****		***

Derivation II

(16) Step 3 of *psoppox'konu*: Convergence

		-FIN(F, ω)	PARSESYL	RED=SYL	MAXBR	*RED _{STRESS}	F _T FORM	REDFORM	REDUCE	MAX(F)V-IO	ALLFTL
	/(p•sò)(p•pò)(x•kó)(nù)/										
a.	(pisò)(popò)(xikó)(nù)				**		***		*!***		***
b.	(pisò)(posò)(poxí)(konù)			*!			***		****		***
c.	^{ESP} (p•sò)(p•pò)(x•kó)(nù)				**		***			***	***

Why does it work?

- Foot parsing and stress assignment is extrinsically ordered before reduplication and vowel deletion, since it comes 'for free' in Harmonic Serialism and can happen in the very first step
- Reduplication is ordered before vowel deletion, which is ensured by the high-ranked MAXBR
- Vowel deletion applies to the intermediate representation of the reduplicated form in a transparent way
- MAXBR prevents the reduplicant vowel from being deleted, whereas it is not violated when the vowel of the base is deleted

Summary and Conclusion

- I have proposed an analysis for reduplication in Mojeño Trinitario in the framework of Harmonic Serialism
- By having optimization operating sequentially, it is possible to have vowel deletion ordered after reduplication, where the constraint triggering reduplication initially (MAXBR) at the same time protects the reduplicant vowel from being deleted in the second step
- This can neither be achieved in parallel OT nor in a serial, rule-based approach.

References

References

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