Wrong-side reduplication in Koasati *

1 Introduction

Koasati (Muskogean, Kimball 1991) exhibits a reduplication process, exemplified in (1), that suffixes material copied from the left edge of the root. This violates Marantz's generalization (1982), which states that reduplicant material tends to be adjacent to the corresponding base material. In particular, Nelson (2003) has argued that apparent cases of "wrong-side reduplication" (WSR) are actually epiphenomenal and hence not true counterexamples. We argue that the Koasati case is in fact true WSR and not epiphenomenal.

(1) a. **l**apat- **l**o-
be.barren- RED-
'be barren (pl)'

b. **c**ofok- **c**o-
be.angled- RED-
'be angled (pl)'

Koasati thus behaves like Creek (also Muskogean), which Riggle (2004) argued has a reduplication process that is also truly wrong-sided. Together, these languages support a model of reduplication that can generate both wrong- and adjacent-side reduplication (ASR). We provide an analysis using the system from Nelson (2003) with the addition of a LINEARITY constraint enforcing rigid morpheme order. This analysis leads to a strong typological prediction: WSR should only ever be suffixing (i.e. copying from the left but affixing on the right), never prefixing (copying from the right but affixing on the left).

2 Wrong-side reduplication

The generalization given in Marantz (1982) states the prohibition against WSR as a trend, the 'unmarked case'. By contrast, Nelson (2003) argues that it is a strict prohibition, and that all apparent cases of WSR are epiphenomenal. She argues that all prior examples of allegedly-wrong-sided reduplication are either **non-reduplicative copying** or **full-copying plus deletion**. In the former case, the root is augmented to meet some prosodic template, with no reduplicative morpheme (RED) morpheme involved. In the latter case, an independently-attested deletion process reduces an adjacent-sided reduplicant in such a way as to make it appear wrong-sided.

2.1 Non-reduplicative copying

Non-reduplicative copying expands a root in order to satisfy a morphological template. Crucially, if the root already satisfies that template, no copying occurs. Yoruba ideophones are given as an example, shown in (2): Intensive ideophones are minimally four syllables long, so if a three-syllable root is used to form an intensive, the initial syllable is copied and suffixed, making it appear that WSR has taken place. Crucially, however, if the root ideophone is four syllables long, it already meets the template and so no copying occurs.

(2) **Four-syllable template in Yoruba ideophones (via Nelson 2003)**

a.	pepere	pepere-pe	‘of being very cute and robust’
	gogoro	gogoro-go	‘loftiness’
b.	haragbadu	*harabgadu-ha	‘very stout and bulky’
	porogodo	*porogodo-po	‘being completely used up’

If this were analyzed as true reduplication, it would require that ideophones receive a variable number of RED morphemes depending on the root shape. By contrast, Nelson proposes that no RED morpheme is involved at all, merely a prosodic template operating at the level of the word. Formally, the copied segments violate IO-INTEGRITY and BR-faithfulness is not active. Under this analysis, the Yoruba case and others like it are not reduplication proper and as such not in violation of Marantz's generalization.

2.2 Full copy plus deletion

Nelson gives Madurese plural reduplication as an example of full copy plus deletion, in which an independently-attested deletion operation renders total reduplication opaque. At least some Madurese nouns form the plural by apparently copying the final syllable of the root and prefixing it, which looks like WSR; this is illustrated in (3). However, there is an independently-attested deletion process active in Madurese compounds, illustrated in (4): The first syllable of noun-noun compounds is deleted. If plural formation is accomplished via total reduplication, and total reduplication is in effect compounding a noun with itself, then we expect first-syllable deletion to apply, yielding the forms observed in (3). Therefore, the apparent WSR can be understood as total reduplication obscured by further deletion.

(3) **Madurese plural (Stevens 1968, via Nelson 2003)**

/neat/	yat-neyat	'intensions'
/moa/	wa-mowa	'faces'

(4) **First syllable deletion in Madurese compounds:**

/**tu**zhuʔ/ 'finger' + /ənpul/ 'pinky' → [zhu-ʔənpul]

2.3 Nelson's analysis

Having argued that all apparent cases of WSR are either not true reduplication or are total reduplication obscured by a deletion process, Nelson (2003) proposes a formal mechanism to rule out WSR. This mechanism has three crucial components:

1. The RED morpheme is unordered with respect to the root in the input.

2. Correspondence is enforced by a constraint LEFT-ANCHOR: The left edge of the reduplicant must be in correspondence with the left edge of the base.

3. Ordering of reduplicants is controlled by LOCALITY: The copied portion of the base and the corresponding reduplicant must be adjacent.

In this system, inputs for reduplication consist of /RED, ROOT/ with no order specified – reduplicants are not inherently either prefixes or suffixes. LEFT-ANCHOR forces reduplicants to copy from the left edge, while LOCALITY insists that reduplicants must be as close to the their base material as possible; the combination forces reduplicants to be prefixes. Crucially, no hypothetical constraint RIGHT-ANCHOR exists as extra faithfulness to the left edge of the word is well-attested. (Nelson also proposes a constraint EDGE-ANCHOR which anchors both left and right edges, but not necessarily of the entire word. This constraint is not relevant to our analysis here but allows for suffixed adjacent-side reduplication.)

The combination of these three components makes all WSR candidates harmonically bounded: No wrong-sided candidate can win under any ranking. As such, Nelson (2003) predicts that WSR is impossible, unlike Marantz (1982).

3 Koasati pluractional reduplication

Koasati verbs are morphologically marked for pluractionality[1] by a reduplicative suffix to the root, as illustrated by the forms in Table 1. The verb forms given in Table 1 are not monomorphemic, but rather have the morphological breakdown illustrated in (5). The formative is a suffix indicating the semantic class of the verb and is lexically-specified. Changes in formative yield changes in lexical meaning, but most roots can take only one formative. By contrast, the outermost suffixes are tense and agreement (in the citation form given here, infinitive with null agreement).

(5) **l**apa -t (-**l**o:) -ki -n
ROOT -FORMATIVE -RED -TENSE -AGR
'to be barren'

Because of the lexical nature of the formative, we will assume this enters the derivation with the root, while the inflectional material applies at some later cycle. Reduplication applies before the inflectional material is added. Vowel length is associated with penultimate syllable stress (Kimball, 1991). The reduplicant in these examples is coincidentally penultimate, but will not be under all inflections. Stress (and lengthening) is calculated at a later cycle, after reduplication has applied. Factoring out all of the morphophonology that occurs after reduplication results in the forms in Table 2.

The reduplication process adds a suffix /-Co/, where /C/ is a copy of the first consonant in the root. This is true WSR, contra Nelson (2003): Neither non-reduplicative copying nor full copy plus deletion will predict these forms.

(6) a. **c**ofok- **co-**
ROOT RED
'be angled (pl)'

b. **p**ak- **po-**
ROOT RED
'have many blisters'

To see that this is not non-reduplicative copying, we must consider monosyllabic stems. While most Koasati verb roots are disyllabic, some monosyllabic ones undergo the same reduplication process, as illustrated in (6)[b]. Non-reduplicative copying by definition augments roots to meet a specified prosodic template, but there is no single prosodic template that Koasati reduplication generates – it operates just the same on monosyllabic roots as disyllabic ones. This is consistent with the affixation of a RED morpheme rather than non-reduplicative copying.

Neither are pluractional stems formed by full copy plus deletion. The reduplicant consists of the first consonant in the root plus a fixed segment /o/. There is no independently-attested process that reduces verbs to only their first consonant plus a fixed segment; such a process would be highly unlikely. Again, the Koasati data is more consistent with WSR than with full copy plus deletion.

3.1 Creek reduplication

The Koasati data is very similar to data provided by Riggle (2004) from the related language Creek, illustrated in Table 3. Riggle argues that this is also true WSR which cannot be explained by filling a prosodic template or full copy plus deletion. The Koasati data thus provide additional evidence that true WSR exists. The Koasati process differs from the Creek process in that the Creek reduplication is infixing, which leaves open the possibility of other analyses for the placement of the reduplicant. In paticular, the reduplicant in Creek is always the stressed syllable; as such, an alternative analysis would be that the reduplicant is left-aligned then later infixed as the stressed syllable to satisfy a requirement that the affix be aligned with stress. The Koasati data, by contrast, is fully suffixing and so provides a clearer case of WSR.

4 Analysis

We have shown that Koasati is a case of true WSR. The analysis of reduplication proposed in Nelson (2003) predicts that WSR should not be possible; given the Koasati case, however, our grammatical model should allow it. In this section, we propose such a model by making minimal additions to Nelson's system; in particular, we add the constraint LINEARITY (McCarthy & Prince, 1995), which prevents re-ordering of elements. We also allow RED morphemes to have a specified order in the input. In this system, as in Nelson (2003), copying is demanded by MAX-BR and L-ANCH, while the base-shrinkage in vowel-initial roots is mediated by MAX-RTB.

4.1 Input form

We will propose that the Koasati reduplicant morpheme takes the form $[\mu]_{\text{RED}}$<o>. That is, the reduplicant is lexically specified to have one mora and (contra Nelson) to be a suffix, attaching to the right edge of the base in the input. This prosodic template is followed by a floating segment <o>, where the floating status is indicated with angle brackets.[2]

4.2 Constraint set

Our system uses of the following set of constraints:

- L-ANCH: The left edge of the reduplicant corresponds to the left edge of the base (Nelson, 2003). (Assign one * if the left edge of the base is not in correspondence with the left edge of reduplicant.)

- LOCALITY: The copied portion of the base and corresponding reduplicant must be adjacent (Nelson, 2003). (Assign one * for each non-copied segment between base and reduplicant.)

- LINEARITY: Don't reorder elements (McCarthy & Prince, 1995). (Assign one * if *x* precedes *y* in the input and the correspondent of *x* does not precede the correspondent of *y* in the output.)

- MAX: Every segment in the input has a correspondent in the output.

- DEP-μ: Every mora in the output has a correspondent in the input.

- PARSE: Input material must be parsed into prosodic structure.

- ONSET: Syllables must begin with a consonant.
- DEP-BR: Every segment in the reduplicant has a correspondent in the base.
- MAX-BR: Every segment in the base has a correspondent in the reduplicant.
- MAX-RTB: Every segment in the root has a correspondent in the base (Downing, 1998).

4.3 No reordering

The rankings disallowing reordering of the reduplicant are showing in Tableau 4. The constraint L-ANCH forces the reduplicant to copy from the left edge. Because LINEARITY outranks LOCALITY, the reduplicant cannot be reordered to be closer to the copied material in the base.

4.4 Consonant-initial case

With consonant-initial roots, ranking PARSE and MAX over MAX-BR causes the floating segment <o> to link to the reduplicant instead of remaining unparsed or getting deleted. The ranking DEP-$\mu \gg$ MAX-BR prevents extra material from getting copied into the reduplicant. L-ANCH ensures that the reduplicant is in correspondence with the leftmost segment. These rankings are shown in Tableau 5.[3]

4.5 Vowel-initial case

In vowel-initial roots, the reduplicant skips the vowel and copies the first consonant. This is a case of 'base shrinkage': The base for reduplication purposes is not the entire root, but rather skips the initial vowel. Following Downing (1998), we model this with Optimized

Base constraints: The base for reduplication purposes is constructed on the surface, constrained by Root-to-Base (RtB) faithfulness.

In vowel-initial roots, base shrinkage allows joint satisfaction of L-ANCH, ONSET, and PARSE: Candidates which fail to shrink the base will create a syllable with no onset, fail to parse the floating <o>, fail to have correspondence between the reduplicant and the left edge of the base, or some combination of these. MAX-RTB, which demands that every segment in the root has a correspondent in the base (Downing, 1998), prevents the base from shrinking too far. Ranking L-ANCH over MAX-RTB in a system which includes ONSET will cause the optimal candidate to have base shrinkage. These rankings are illustrated in Tableau 6.

4.6 Ranking summary

The rankings shown in this section are summarized in Table 7.

5 Conclusion

We have shown that wrong-sided pluractional reduplication in Koasati is not epiphenomenal and have provided an analysis which uses Nelson's system with the addition of LINEARITY. The combination of Nelson's system (which does not allow for WSR) with commonly-assumed faithfulness constraints allows for the existence of true WSR. Since Koasati presents such a case, our grammatical models should allow for it.

Our model makes a strong typological prediction. Because there is no RIGHT-ANCHOR in either Nelson's or our systems, we predict WSR to always be suffixing. With a prefixed reduplicant, WSR is harmonically bounded; only adjacent-side reduplication (ASR) is possible. This harmonic bounding is illustrated in Tableau 8. The result is that we predict the three-way typology outlined in Table 9.

In sum, Koasati pluractional reduplication is true wrong-side reduplication. Our analysis makes a concrete typological prediction: Prefixing reduplication is always adjacent-side, never wrong-side. To our knowledge, this prediction is borne out.[4]

References

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Notes

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[1]Pluractional verbs denote multiple events. This can either indicate iterativity or a plural direct object.

[2]There is a closed-set of roots which are lexically specified to take an allomorph of the reduplicant without the floating <o>.

[3]For simplicity, we are not showing candidates which differ in root-base correspondence. These candidates are not relevant to the ranking arguments here.

[4]To our knowledge, the only apparent counter-example to this prediction is Nancowry (Radhakrishnan, 1981), in which the reduplicant consists of /ʔVC/ where C is the coda of a monosyllabic root. Alderete et al. (1999) analyzes this as a case of full copy with fixed segmentism; Nelson (1998) uses a similar analysis with the constraint requiring anchoring to both the left and right edges of a stressed syllable. Under both analyses this phenomenon is not true WSR and so is not a counterexample to our prediction.

Tables

Table 1: Pluractional reduplication

Verb	Pluractional	Gloss
lapa:tkin	lapat**lo:**kin	be barren
cofo:knan	cofok**co:**nan	be angled
alo:tkan	alot**lo:**kan	be full
pa:kkon	pak**po:**kon	have a blister
copo:ksin	copok**co:**sin	be a hill
polo:hkin	poloh**po:**kin	be circular
taha:spin	tahas**to:**pin	be light in weight
tala:sban	talas**to:**ban	to be thin
limi:hkon	limih**lo:**kin	to be smooth

Table 2: Pluractional reduplication (stems)

Verb stem	Pluractional stem	Gloss
lapat-	lapat**lo**-	be barren
cofok-	cofok**co**-	be angled
alot-	alot**lo**-	be full
pak-	pak**po**-	have a blister
...		

Table 3: Creek reduplicated stems

Verb stem	Pluractional stem	Gloss
lisk-	lis**li**k-	‘old’
polok-	polo**po**k-	‘round’
holwak-	holwa**ho**k-	‘ugly, naughty’

Table 4: /lapat-[μ]$_{\text{RED}}$<o>/ → $\text{l}_1\text{apatl}_1\text{o}$

	/lapat-[μ]$_{\text{RED}}$<o>/	LINEARITY	L-ANCH	LOCALITY
→ 1.	lapatlo			****
2.	lolapat	* W		L
3.	lapatpo		* W	** L

Ranking: LINEARITY, L-ANCH ≫ LOCALITY

Table 5: /lapat-[μ]$_{\text{RED}}$<o>/ → $\text{l}_1\text{apatl}_1\text{o}$

	/lapat-[μ]$_{\text{RED}}$<o>/	L-ANCH	MAX	DEP-μ	PARSE	DEP-BR	MAX-BR
→ 4.	$\text{l}_1\text{apatl}_1\text{o}$					*	****
5.	$\text{l}_1\text{a}_2\text{patl}_1\text{a}_2$<o> *<o> unlinked*				* W	L	*** L
6.	$\text{l}_1\text{a}_2\text{patl}_1\text{a}_2$ *<o> deleted*		* W			L	*** L
7.	$\text{l}_1\text{a}_2\text{p}_3\text{a}_4\text{t}_5\text{l}_1\text{a}_2\text{p}_3\text{a}_4\text{t}_5\text{o}$ *full copy, <o> linked*			** W		L	L
8.	lapat-[μ]$_{\text{RED}}$<o> *faithful*	* W			* W	L	**** W
9.	$\text{lap}_1\text{atp}_1\text{o}$ *not L anchored*	* W				*	****

Rankings: PARSE, MAX ≫ DEP-BR, MAX-BR

Table 6: /alot-[μ]$_{\text{RED}}$<o>/ $\rightarrow$ a(l$_1$ot)l$_1$o

	/alot-[μ]$_{\text{RED}}$<o>/	PARSE	L-ANCH	ONSET	MAX-RTB
$\rightarrow$ 10.	a.(l$_1$ot).l$_1$o			*	*
11.	(a.l$_1$ot).l$_1$o *no base shrinkage*		* W	*	L
12.	(a.$_1$lot).a$_1$-<o> *<o> unlinked*	* W		** W	L
13.	alo(t$_1$).t$_1$o *too much shrinkage*			*	*** W

Ranking: L-ANCH $\gg$ MAX-RTB

Table 7: Summary of rankings

LINEARITY, L-ANCH $\gg$ LOCALITY	Tableau (10)
PARSE, MAX $\gg$ DEP-BR, MAX-BR	Tableau (11)
DEP-μ $\gg$ MAX-BR	Tableau (11)
L-ANCH $\gg$ MAX-RTB	Tableau (12)

Table 8: WSR is harmonically bounded when RED is a prefix

	RED-bopomo	L-ANCH	LINEARITY	LOCALITY
$\rightarrow$ 14.	bo-bopomo			
15.	mo-bopomo	* W		**** W

Table 9: Typology of L-ANCH, LOCALITY, & LINEARITY

Type	Input	Output	Crucial Rankings
Suffixing ASR	bopomo-RED	bopomo-mo	LOCALITY, LINEARITY $\gg$ L-ANCH
Suffixing WSR	bopomo-RED	bopomo-bo	L-ANCH, LINEARITY $\gg$ LOCALITY
Prefixing ASR	RED-bopomo	bo-bopomo	Any