Integrity and Correspondence in Manam Double Reduplication

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0. Introduction

In this paper I argue that the nature of apparent haplology in Manam foot reduplication supports two claims:

(1) a. Stems of the type *ragogo*, ending in two identical syllables, are underlyingly a shorter stem (i.e. /rago/) with lexicalized reduplication of a syllable.

b. Words with multiple reduplication are analyzed with a single set of correspondence indices, so that more than one copy of a segment is penalized by the constraint INTEGRITY (Rose 1997).

The analysis is couched in Optimality Theory (Prince and Smolensky 1993). The paper is organized as follows. In §1 I outline the basic facts of reduplication in Manam, including the special status of stems like *ragogo*, which I suggest is inherently reduplicated. In §2 I discuss double reduplication in Salish, and the theoretical conclusions that have been drawn from it by Urbanczyk (1995). In §3 I discuss other cases of double reduplication in Ethiopic languages, which point to a somewhat different analysis as proposed by Rose (1997). In §4 I apply these conclusions to the Manam facts, which support Rose's analysis. In §5 I pursue some implications of the inherent reduplication analysis, and give a general conclusion.*

1. Manam reduplication

Manam has productive reduplication of a final bimoraic foot, which forms adjectives, nouns, and continuative verbs (Lichtenberk 1983: 598-613).[1]

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[1] In (3), nasals assimilate in place to a following consonant, and /n/ becomes [ŋ] word-finally.

(2)	a.	salága	‘be long’	salaga-lága	‘long (sg.)’ 599
	b.	móita	‘knife’	moita-íta	‘cone shell’ 599
	c.	dára	‘blood’	dara-dára	‘red’ 599
	d.	láʔo	‘go’	laʔo-láʔo	‘go (CONTIN)’ 599
(3)	a.	malabóŋ	‘flying fox’	malabom-bóŋ	‘flying fox sp.’ 602
	b.	ʔulan-	‘desire (v.)’	ʔulan-láŋ	‘desirable’ 602
	c.	zíŋ	‘black ashes’	zin-zíŋ	‘black’ 610

When the two final syllables of the base word are identical, however, only one is copied.

(4)	a.	ragógo	‘be warm’	ragogó-go	‘warm’ 601
	b.	ʔóʔo	‘be plentiful’	ʔoʔó-ʔo	‘many, much’ 345
	c.	rére	‘like’	reré-re	‘like (CONTIN)’ 601
	d.	léle	‘look for’	lelé-le	‘look for (CONTIN)’ 601
	e.	wáwa	‘discolored skin’	wawá-wa	‘white’ 610

That is, while the pattern in (2) leads us to expect **ragogo-gogo,* we find incomplete reduplication.

(5)	a.	*expected*	*ragogo-gogo
	b.	*attested*	ragogo-go

What is wrong with expected **ragogo-gogo*? One approach is haplology, formalized by some constraint against identical strings in sequence. For example, we might rule out four adjacent identical syllables.

(6) * σ_i σ_i σ_i σ_i

A restrictive theory of phonology should not, however, be able to count beyond two, much less distinguish between three and four (cf. McCarthy and Prince 1986).

An alternative is to focus on the foot level. In Manam what has to be ruled out is two identical feet which consist of two identical syllables: a kind of layered identity.

(7)	a.	*identical **feet** are permitted*	sa(làga)(lága)
	b.	*identical **syllables** are permitted*	ra(gógo)
	c.	*but **both** at the same time are not*	*ra(gògo)(gógo)

The relevant constraint might look something like the following.

(8) * Ft_j Ft_j

σ_i σ_i σ_i σ_i

However, a constraint of the form shown in (8) has several disadvantages. First, it still requires reference to four syllables: a requirement against two identical feet is insufficient, since basic reduplication (*salaga-laga*) generates precisely that configuration (7a).

Second, the statement is not surface-true, since the same restriction holds under different foot structure. If (8) is right, why doesn't full reduplication win in precisely cases like the following?[2]

(9)	a.	baba-bá-ŋ		'you are clumsy' 319
		attested	(bàba)(báŋ)	
		rejected	*ba(bàba)(báŋ)	
	b.	wáwa-wa-Ø		'(it is white' 409
		attested	(wáwa)<wa>	
		rejected	*wa(wáwa)<wa>	
	c.	moamoá-mʷa		'roasted' 314
		attested	(mòamo)(ámʷa)	
		rejected	*moa(mʷàmo)(ámʷa)	

It is possible, of course, to add paradigm uniformity or a similar effect to the analysis (cf. Kenstowicz 1996 and others), but this is a further complication.

The haplology approach also ignores the fact that this is a restriction on reduplication rather than, say, on affixation in general: I have found no evidence for a general haplology constraint in Manam. The nature of the existing affixes makes it difficult or impossible to test cases of four identical syllables (most promising is the prefix *tata-* 'by throwing'), but certainly adjacent identical syllables often arise in affixation, and are uncorrected.

(10)	a.	aleti-tína	'real white man' 366
	b.	ta-táno	'we (INCL) will plant' 396
	c.	ŋa-ŋára	'he (will) swim' 441
	d.	i-al-alale-la-múa	'he walks ahead' 207

Example (10d) is the closest I have found to a word with four identical syllables in sequence. One could imagine a constraint against two identical adjacent syllables which is violated twice by *ragogo-go*, three times by *ragogo-gogo.* This approach avoids the problem of counting four syllables (by instead making use of gradient violation), but again there is no motivation for such a constraint outside of the reduplication context, and such an analysis bears no relation to the similar Amharic case discussed below.[3]

To avoid these problems, I propose an analysis that ties forms such as *ragogo-go* directly to reduplication, and argue that fuller **ragogo-gogo* is ruled out by a constraint minimizing the occurrence of double reduplication.

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[2] In (9b), the zero suffix induces extrametricality of the preceding syllable (Lichtenberk 1983: 54, Buckley 1998). In (9c), a general rule changes morpheme-final /moa/ to [mʷa] (Lichtenberk 1983: 16). Also, the vowel sequence /oa/ behaves as monomoraic for purposes of reduplication (Lichtenberk 1983: 600, McCarthy and Prince 1986: 38).

[3] An alternative to the formulation in (6) is to use local constraint conjunction (Smolensky 1993), where a form counts as a violation only if it simultaneously violates two constraints. In this case they would be OCP-style constraints on the foot and on the syllable. While this would presumably have the effect of ruling out (7c), it has the disadvantage that the individual constraints are blatantly violated throughout the language, as illustrated by (7a,b).

2. Double reduplication

Northern Lushootseed (Puget Salish) is an example of a language which exhibits two occurrences of reduplication in the same word (11d-e).

(11)	a.	bədá?	'child, offspring'	
	b.	bí-bəda?	'small child'	(DIMINUTIVE)
	c.	bəd-bədá?	'children'	(DISTRIBUTIVE)
	d.	bí-bəd-bəda?	'dolls; litter'	(DIM–DIST)
	e.	bí-bi-bəda?	'young children'	(DIST–DIM)

Urbanczyk (1995) shows that such double reduplications can be given a parallel analysis in OT, with advantages over a cyclic approach (Broselow 1983). In her analysis she assumes that each base-reduplicant relationship has its own correspondences, i.e. set of indices.

(12) bí-bəd-bəda?
1 123 45678 *correspondences for* [RED[bəd[bəda?]]]
abc abcde *correspondences for* [RED[bəda?]]

As a result of this assumption, no segment in (12) has more than one (coindexed) correspondent. Such multiple indexation ensures that INTEGRITY (McCarthy and Prince 1995: 372) is evaluated separately for each reduplicant.

(13) INTEGRITY No element of S_1 has multiple correspondents in S_2.
For $x \in S_1$ and $w,z \in S_2$, if $x \Re w$ and $x \Re z$, then $w=z$.

INTEGRITY requires a single correspondent for each segment, and in input–output situations prevents the 'breaking' of one segment into more than one (as in diphthongization). It is unviolated in (12), since the two tokens of [b] outside the original base /bəda?/ are related by independent correspondences.

3. Unified indexation

Rose (1997), on the other hand, shows that double reduplication is disfavored in Amharic and related languages. First, notice that simple quadriliteral verbs form the Frequentative with infixed /a/ and a reduplicated consonant.

(14)	a.	fʌrʌkkʌs	'crack'	fʌrʌkakkʌs	'crack in pieces'
	b.	gʌnʌt'tʌl	'tear off'	gʌnʌt'at'tʌl	'disassemble'

But quadriliterals which are inherently reduplicated — i.e. as a lexical property of the root — permit no further reduplication.

(15)	a.	sʌbʌssʌb	'gather'	sʌbassʌb	
				*sʌbʌsassʌb	'gather here and there'
	b.	mʌrʌmmʌr	'research'	mʌrammʌr	
				*mʌrʌmammʌr	'do a cursory study'

This prohibition will result from the effect of INTEGRITY if only one set of indices exists, even in the presence of multiple base-reduplicant relationships. Excess correspondences (i.e. those in violation of INTEGRITY) are marked with double underlining.

(16) a. fʌrʌ**ka**kkʌs
1 2 3 3 4

b. sʌb**a**ssʌb
1 2 1 2

* sʌbʌ**sa**ssʌb
1 2 1 1 2

The multiple indexation in (12) provides no means of penalizing double reduplication, as needed for Amharic. In other words, if indexation of each reduplicant is independent, the existence of one reduplicant cannot inhibit the creation of another.

(17) * sʌbʌ**sa**ssʌb
1 2 1 2
a a b

The unified indexation illustrated in (16) provides such a means, and still can permit the Lushootseed pattern by low ranking of INTEGRITY.

(18) bí-bəd-bəda?
1 123 12345

The fact that Amharic prohibits double reduplication, while Lushootseed permits it, indicates distinct constraint ranking, where MAX-BR is the constraint that ensures copying of segments in the reduplicant.

(19) *Amharic* INTEGRITY » MAX-BR
Lushootseed MAX-BR » INTEGRITY

The difference can be captured in this way only if a single set of indices is present.[4]

4. Manam double reduplication

Rose's approach to Amharic and other Ethio-Semitic languages provides an answer for the Manam "haplology" problem. First we must take seriously the observation that words such as *ragogo* have two identical syllables. I propose that such apparent reduplication is formally real: a stem like *ragogo* is represented with inherent reduplication, i.e. with the underlying form /rago + RED=σ/.

A note on the morphemic status of inherent reduplication is appropriate. In essence, a word like *ragogo* contains a reduplicative suffix added to the base *rago*. The base does not exist by itself, just as English *aggress* is found only in derived words such as *aggression*. As for the suffix, I follow Aronoff (1976: 15) in "what is essential about a morpheme: not that it mean, but rather merely that we be able to recognize it." The English morpheme *mit* is identifiable by its distribution (it occurs with prefixes such as *per, trans, sub*) and allomorphy (*permit, permission*). In Manam, the reduplicative suffix is recognizable by its identity with the preceding syllable. A further analogy from English is bound rhyme reduplications such as *hodge-podge, helter-skelter, fuddy-duddy* (cf. Marchand 1969: 432ff).

The inherent (lexicalized) reduplication proposed for *ragogo* and other words which exhibit one-syllable "foot" reduplication is supported by words of similar shape — i.e. with two final identical syllables — which are related to other words without reduplication.

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[4] Other constraints do dominate MAX-BR in Lushootseed, such as AFFIX≤σ. Also, MAX-BR is particularized for each reduplicant morpheme to account for their different relations to NOCODA, but both instantiations dominate INTEGRITY.

(21)	a.	aríri	‘post’ 479	ári	‘fence’ 136
	b.	panána	‘run’ 442	pána	‘chase’ 241
	c.	wabúbu	‘night’ 479	wabúna	‘morning’ 534

Such pairs establish precedent in the language for a derivational process of reduplication; *ari-ri* motivates the morphological analysis *rago-go* in the way that English *impress-ion* motivates the analysis *aggress-ion.*

According to this approach, Manam has simple reduplication in *ragogo* and double reduplication in *ragogo-go.*

(20) a. rago-go = [[rago]RED]
b. rago-go-go = [[[rago]go]RED]

The lexicalized reduplication in (20a) is by nature just one syllable in length (like prefixing reduplication in Manam, e.g. *sa-salaga* ‘long (pl.)’); no special explanation is necessary. The productive reduplication in (20b) is expected to be a foot in size, however, and the fact that it is just one syllable is what requires explanation.[5]

Following Rose’s claim that there is a single set of indices for both reduplications, we arrive at the following candidates.

(22) a. rago-go
1234 34

b. rago-go-go
1234 34 34

c. rago-go-gogo
1234 34 3434

The additional foot reduplication creates an INTEGRITY violation, which can be minimized by creating a smaller reduplicant: (22b) vs. (22c).

The (minimal) violation is forced by the need to express the foot-reduplication morpheme, i.e. to give it an explicit exponence in the surface form (Rose 1997).[6]

(23) MORPHEXPR An input morphological category is expressed in the output.

Following general results in OT, lower-ranked INTEGRITY favors the smallest reduplicant that will satisfy MORPHEXPR.

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[5] Under Generalized Template Theory (McCarthy and Prince 1994), the shape of reduplicative and other templates is not stated as a prosodic category such as syllable or foot; rather, the size and shape of the template is derived from more general properties. For Manam, inherent (and prefixing) reduplication is a syllable in size because the morpheme is classified as an AFFIX, optimally no greater than a syllable, due to AFFIX≤σ. By contrast, “foot” reduplication can be classified as a STEM, which is optimally a prosodic word and therefore also a foot. For present purposes I have found it simpler to stipulate the size of the reduplicants.

[6] In the alternative approach of Orgun and Sprouse (1997), INTEGRITY would be located in the CONTROL component for Amharic, so that (otherwise) optimal *kʌsassʌs* is rejected and the null parse prevails; in Manam and Lushootseed, INTEGRITY is not located in CONTROL and surface forms which violate it are permitted.

(24)

/rago + RED=σ + RED=Ft/	MORPHEXPR	INTEGRITY
a. rago + go + gogo 1234 34 3434		***!*
b. ☞ rago + go + go 1234 34 34		**
c. rago + go + Ø 1234 34	*!	

Syllable structure constraints prevent **ragogo-g*; ANCHOR (McCarthy and Prince 1995: 371) prevents **ragogo-rago* as well as **ragogo-ra*.

(25)

/rago + RED=σ + RED=Ft/	ANCHOR	CODACOND	INTEGRITY
a. rago + go + rago 1234 34 1234	*!		**
b. ☞ rago + go + go 1234 34 34			**
c. rago + go + g 1234 34 3		*!	*

Crucially, no analysis of this type can be maintained with multiple indexation (cf. (12)), which freely permits full foot reduplication.

(26) * rago-go-gogo
1234 56 3456 *correspondences for* [[[rago]go]RED]
abcd cd *correspondences for* [[rago]RED]

The same failure to prevent **ragogo-gogo* obtains if the underlying form is "coincidentally" reduplicated /ragogo/, supporting the formal reality of inherent reduplication.

(27) * ragogo-gogo
123456 3456

An interesting analogy for inherent reduplication in Manam *ragogo* is the pattern found in Amharic biliteral roots (Rose 1997). First recall the quadriliteral pattern from (14) and (15).

(28) a. fʌrʌkkʌs 'crack' fʌrʌkakkʌs 'crack in pieces'

b. sʌbʌssʌb 'gather' sʌbassʌb 'gather here and there'
*sʌbʌsassʌb

Biliteral roots do not have three syllables in the basic form, so a new onset consonant would have to be created when Frequentative /a/ is inserted. But since that onset would be a copy of the second consonant, which itself is already reduplicated, by high-ranking INTEGRITY these verbs do not permit any Frequentative.

(29) a. kʌssʌs 'accuse' *kʌsassʌs
b. sʌddʌd 'banish' *sʌdaddʌd

(30) a. kʌssʌs
1 2 2

b. * kʌ**sa**ssʌs
1 2 2 2

This gap shows, in fact, that in Amharic the ranking is INTEGRITY » MORPHEXPR (Rose 1997). Contrast this with Manam, where (24) demonstrates that the opposite ranking holds and INTEGRITY is violated — albeit minimally — in order to express the reduplication in (4).

5. Conclusion

While positing /rago + RED=σ/ rather than /ragogo/ is segmentally parsimonious, in that the surface repetition of the segments [go] is accomplished without repeating them in the underlying form, it involves a certain amount of abstraction. It is significant that the analysis presented here forces us to take this position, and counters potential arguments against the inherent reduplication approach based, for example, on the absence of unreduplicated *rago*. This analysis stands with similar proposals for inherent reduplication motivated by other criteria, such as the canonical shape of roots (cf. Broselow 1983), and suggests that Universal Grammar may predispose the child to the more abstract inherent reduplication analysis in all cases, quite independent of whether the reduplicant can be identified with a productive morphological category. Possibly the predisposition toward treating repetition as reduplication is triggered by productive reduplication elsewhere in the language, which is certainly present in Manam. This is an interesting question which deserves further study.

The fact that words such as *ragogo* reduplicate as *ragogo-go* rather than **ragogo-gogo* motivates treating the stem as inherently reduplicated *rago-go*. This complex stem then is subject to a restriction on double reduplication, enforced by INTEGRITY and the use of a single set of correspondence indices rather than independent indices for each reduplicative morpheme. The single-indexation analysis in (22) is not only simpler than the multiple indexations in (26) but offers superior empirical coverage: by the fundamental mechanism of constraint ranking, it accounts for languages that freely permit (Lushootseed), discourage (Manam), and prohibit (Amharic) double reduplications.

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