CHAPTER 4

DERIVATION OF RIGHT EDGE EFFECTS

4.1 Introduction

The central prediction of the proposed theory is that there is no morphological reduplication that explicitly targets the right edge of the base. However, cases that appear to exhibit right edge reduplication exist. In order for the theory to be preserved, these cases must convincingly submit to an alternative account. In the previous chapter, we saw evidence that constraints can target both edges of the main stressed foot of the base for copying. In this chapter, I examine two sets of apparent counter-examples to the claim of inherent asymmetry. The first set is parasitic on right edge stress. In other words, main stress in these examples falls at the right edge of the base, and the stressed rhyme, syllable, or foot is the target of a Positional Anchoring constraint. Thus, right edge correspondence between base and reduplicant is coincidental.

I note several cases of stressed syllable targeting in both reduplication and truncation. The examples are given in order of increasing complexity of the role played by targeting of the stressed syllable, culminating with a detailed analysis of reduplication in Lakhota.

In the second class of exceptions, we will see that the prosodic morphology imposes a prosodic template, which forces augmentation by means of copying. When this copying occurs at the right edge, the result can be mistaken for a reduplicative morpheme (Ussishkin 2000). However, these are not cases of morphological reduplication at all, and thus do not involve base-reduplicant anchoring. Rather, they exhibit left anchoring of the root in the output. The cases examined include Yoruba and two Mayan languages (Tzotzil and Tzeltal).

4.2 Stress

If reduplicative anchoring is indeed a type of Positional Faithfulness, then we would expect other prominent positions besides the left edge to serve as targets for reduplication. Phonetic prominence grants stressed syllables a perceptual advantage in the processing system, as compared to unstressed syllables (Beckman 1998). Of particular interest to the issue of right edge copying are cases where main stress is on the right edge, and reduplication targets this material when seeking to anchor the RED morpheme.

Perhaps the most straightforward type of ‘exception’ to the ban on explicit right edge copying is the class of cases where what must necessarily be the target under this analysis is the main stressed foot (or a sub-component therein). Stress is known to independently be a target for anchoring in both reduplication and truncation, as the following examples show. Reduplicative patterns in Samoan and Chamorro as well as truncation in English target the stressed syllable even when it is word-internal, thus at neither edge.

In Samoan, the main stressed foot is a trochee at the right edge. The reduplicant is a CV syllable, copying the stressed syllable of the prosodic base.

(1) Samoan plural reduplication (McCarthy & Prince 1993:108)

táa	ta-táa	‘strike’
nófo	no-nófo	‘sit’
alófa	a-lo-lófa	‘love’
ʔalága	ʔa-la-lága	‘shout’
fanáu	fa-na-náu	‘be born, give birth’

(2) Chamorro continuative reduplication (Topping 1973:259, McCarthy & Prince 1996:44)[1]

sága	sá-saga	‘stay’
hugándo	hu-gá-gando	‘play’
táitai	tá-taitai	‘read’
éggaʔ	é-ʔeggaʔ[2]	‘watch’

Similarly, in English hypocoristic formation, the main-stressed syllable of a base name can serve as the target for copying, regardless of where it stands within the word.

(3) English hypocoristics (Weeda 1992)

Ríchard	Rich
Eugéne	Gene
Alexándra	Sandra, Sandy
Patrícia	Tricia
Rebécca	Becca, Becky
Elízabeth	Liz, Lizzie
Virgínia	Ginny

The argument then is that in cases where stress is at the *right* edge, the analysis is not ambiguous between targeting the right edge or the stressed constituent. Rather, it must necessarily target the stressed syllable. The following are some examples.

[1] Unfortunately, Topping gives no examples of this kind of reduplication with lexical stress.
[2] The first glottal stop is excrescent, appearing regularly to prevent VV hiatus.

In the case of Manam and Siriono, stress is on the penultimate mora. In both cases, reduplication targets the final foot of the base.

(4) Plural reduplication in Manam (Lichtenbirk 1983, McCarthy & Prince 1996, 1995)[3],[4]

salága	sa-laga-lága	'long'
moíta	mo-ita-íta	'knife'
ʔarái	ʔa-rai-rái	'ginger sp'.
láʔo	laʔo-láʔo	'go'
malabóŋ	mala-bom-bóŋ	'flying fox'

(5) Repetitive reduplication in Siriono (Moravcsik 1978, McCarthy & Prince 1996)

ñimbucháo	ñimbuchao-chao	'separate (intr.) = come apart'
achisía	achisia-sia	'I cut'
embúi	embui-mbui	'divide'
esiquío	esiquio-quio	'smash'

Unfortunately, I am not certain regarding the stress of the reduplicated form in the Siriono data. However, it is clear that stress, rather than right edge correspondence, is what drives these patterns.

In the following section, I argue that the principal source of prominence in a stressed constituent is the rhyme. Nancowry reduplication reveals the need to single out the rhyme in a Positional Anchoring constraint.

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[3] McCarthy & Prince (1996:31fn.) note that there are no examples given of reduplication with a base of the form CVN.CV, e.g. *lúnta*. Thus, we do not know whether it would reduplicate as *luntá-nta, lun-lúnta, lunta-lúnta*, or whether, alternatively, reduplication is avoided and the plural is expressed periphrastically.
[4] McCarthy & Prince analyze this pattern as suffixing, however assuming that the reduplicant is the unstressed string, the analysis leads to an infixed reduplicant.

4.2.1 Evidence for main stressed rhyme as target: Nancowry

At least two arguments can be made in favor of a rhyme-based positional anchoring constraint generally. First, it is well established that in quantity-sensitive stress systems, stress assignment is uniquely sensitive to the quality of the rhyme. It is standard to disregard the onsets of stressed syllables for stress-assessing purposes (Hayes 1995). Second, in some theories of prosody, only the rhyme (and not the syllable) is projected (Halle & Vergnaud 1987). Given this kind of theory, it follows that as far as prominence is concerned, the rhyme is the crucial domain.[5]

Assuming that only the rhyme of the stressed syllable is prominent, then the onset of the stressed syllable is not a 'privileged position' in Beckman's terms. This contrasts with the case of onsets as a class. Onsets generally are of course prominent; however, the onset of the stressed syllable cannot be singled out. We would thus not expect only the onset of a stressed syllable to be included under the scope of a Positional Faithfulness constraint.

The constraint proposed here is meant to reflect these claims about the prominence of the stressed rhyme:

(6) MAX-Ŕ (Base, Reduplicant): Each segment in the main stressed rhyme of the base must have a correspondent in the reduplicant.[6]

[5] In addition, it is worth noting that the onset of a stressed syllable is rarely, if ever, singled out as a position in which contrast is preserved. (Beckman (1998) cites Copala Trique as a possible example.) This general lack of contrast preservation suggests that that IDENT is similarly restricted to the stressed rhyme, as opposed to crucially encompassing the entire syllable.

[6] When it appears that the entire stressed syllable is copied, then we see the combined effect of stressed rhyme copying plus satisfaction of ONSET by faithful copying of the corresponding onset.

Nancowry (Radhakrishnan 1981, Steriade 1988, Alderete et al. 1999) provides evidence for this formulation of the constraint. I will show that the contents of the reduplicant depend crucially on the material in the main stressed rhyme. This will be the key to explaining why the reduplicant copies a right edge and not a left edge, e.g. *ʔit-sut* ‘to kick with the foot’.

4.2.1.1 Stress and the monosyllabic size restriction

Stress is final in roots (Radhakrishnan 1981:15). This is important, given the striking observation that reduplication is limited to roots that are monosyllabic.[7] By appealing to MAX-Ŕ, we can begin to understand the restriction.

The comparison is the following:

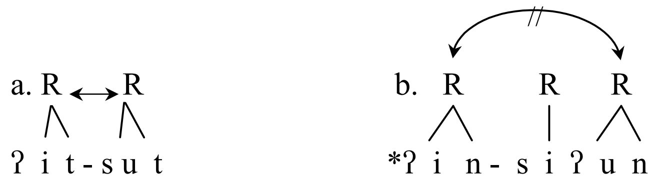
(7)	a. Monosyllabic roots:	ʔVC_n-CV́C_n	(e.g. *ʔit-sút*)
	b. Disyllabic roots:	*ʔVC_n-σCV́C_n	(e.g. **ʔin-siʔún*)

The form in (7a) successfully undergoes reduplication. In (7b), reduplication is not permitted.

The important observation is that like all other cases of stressed rhyme copying, this process is strictly local. Thus I claim that when the stressed rhyme is copied, the affected rhymes must be adjacent, with no other rhymes intervening. This is illustrated below:

[7] Examples of disyllabic roots that do not reduplicate include: *siʔún* ‘to bow’, *kawuí* ‘to be foolish’, and *taráp* ‘to trap’ (a borrowing from English).

(8)



In a purely segmental account using right anchoring, there is no such way to characterize the locality, and thus the restriction:

(9) Right anchoring is non-local in both cases

a. ʔ i t - s u t   b. *ʔ i n - s i ʔ u n

This contrasts of course with instances of final C copying in total reduplication. The difference is whether all material that is copied over is itself copied. Thus, total reduplication of *sut*, forming hypothetical *sut-sut*, can descriptively be seen as local:

(10) If the *t* copies over *u,s* it must copy *u,s*:   s u t – s u t   ✓Local

ʔ i t – s u t   *Local

Rhyme adjacency, where corresponding rhymes are adjacent at the level of the rhyme, clearly provides a reason to exclude reduplication of the type in (9b).

4.2.1.2 TETU

The reduplicant is severely reduced with respect to markedness when compared to the corresponding base in the ways outlined in (11). Alderete et al. clearly show the aspects of unfaithful copying to result from the Emergence of the Unmarked (TETU, McCarthy & Prince, 1994). Subject to TETU are the reduplicant's onset, vowel, and final consonant, with the following restrictions:

(11) Elements of TETU:

a. onset = ʔ
b. final consonant = stop (but not *ʔ*; palatals become plain coronals)
c. vowel = {i,u}
d. agreement in place of VC)$_{\sigma}$

Roots of the shape *CVh* are excluded from the discussion.[8] They are unpredictable, and do not invite a contrast between the two theories considered. Examples using stop-final roots are given in (12a-b). If the final stop is a coronal (or reduplicates as one, as is the case with palatal *ɲ*), then the reduplicant is *ʔiC*, with the vowel agreeing in place with the copied coda. With a non-coronal final stop, the reduplicant is *ʔuC*.

(12) Root-final stops

a. final stop = [+coronal] (t, ɲ); RED = *ʔiC*

sut	ʔit-sut	'to rub/ to kick with the foot'
kiɲ	ʔin-kiɲ	'to monkey/to show the teeth like a monkey'

b. final stop = [-coronal] (k,ʔ,m); RED = *ʔuC*

ɲiák	ʔuk-ɲiák	'binding/to bind'
yaʔ[9]	ʔu-yaʔ	'to leave something/to lay an egg'
rom	ʔum-rom	'flesh of fruit/to eat pandarus fruit'

Continuants are banned from the reduplicant's coda, which is why the root-final consonant is vocalized in the examples in (13).

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[8] Examples of some such reduplicated roots are: *ʔu-həh* 'to mourn using only words when crying'; *ʔu-koh* 'to murder'; *ʔi-cih* 'to stitch, embroider'; *ʔi-yoh* 'to pierce, stitch'.

[9] *ʔ* patterns with dorsal codas, in that the RED vowel is consistently *u*. However, unlike other dorsals, *ʔ* is disallowed by an emergent coda condition against *ʔ* and continuants in reduplicants.

(13) Root-final continuants (except *h*)

a. final continuant = [+coronal] (s,y); RED = *ʔi*

tus	ʔi-tus	'to fall off/to pluck out'
ruáy	ʔi-ruáy	'moving back and forth/to beckon'

b. final continuant = [-coronal] (ɬ,w); RED = *ʔu*

tow	ʔu-tow	'heart/to brood'
túał	ʔu-túał	'round/a knot'

Clearly, although the reduplicant does not correspond perfectly to the related base, we do not see complete emergence of the unmarked either. Alderete et al. show that the markedness constraints push in the direction of a reduplicant of the shape *ʔi*; a constraint requiring faithfulness to a portion of the base works against this neutralization, preserving as much of the base's qualities as the ranking allows. The reduplicant corresponds to the base in some way, with the rightmost elements of each morpheme in correspondence in these forms.

4.2.1.3 Background: Alderete et al.

In this section I begin by briefly reiterating the assumptions made by Alderete et al. that are adopted in this analysis. They argue that the reduplicant-initial consonant as well as the nucleus are default segments arising by TETU; the glottal stop satisfies ONSET with minimal violation of segmental markedness constraints. The hierarchy that they assume is the following:

(14) Place Markedness hierarchy

*PL/LABIAL,*PL/DORSAL »*PL/CORONAL »*PL/PHARYNGEAL

Pharyngeal, at the bottom of the hierarchy, includes the laryngeal *ʔ*. AGREE(Place) requires the reduplicant's V and coda C to agree in place. The reduplicant's vowel is either *i* or *u*. In the language generally, *a* is also possible in an unstressed syllable; however, REDUCE requires that vowels in an unstressed syllable must be short. Also, an emergent coda condition bans continuants and glottal stops from the coda position.

I accept all of the above from their analysis. The crucial difference is their claim that an undominated constraint requiring right anchoring of the final root consonant ensures copying of the coda C. The ranking they argue for is the following:

(15) R-ANCHOR » Place Markedness » MAX_{BR}

This is not possible in the proposed theory. Moreover, such an analysis requires that R-ANCHOR dominate L-ANCHOR, as the latter must be ranked below Place Markedness in order to allow for neutralization of the onset in the reduplicant. This ranking is problematic, since it makes the prediction that an unstressed right edge can be explicitly targeted for copying.

However, a reduplicant-specific faithfulness constraint forcing faithful copying of the rightmost segment of the root must dominate Place Markedness. This constraint cannot be E-ANCHOR, since onsets are neutralized, ultimately ruling out forms like *pum-pím*. Rather, I propose that Nancowry shows stressed rhyme copying.

4.2.1.4 Reduplication as stressed rhyme copying

Characterizing the reduplicant with MAX-Ŕ, and exploiting the generalization that stress is always final in the root, is preferable on several grounds. This analysis makes it possible to describe the restriction of the process to monosyllabic roots in terms of rhyme adjacency, which is not possible under the alternative approach. Also, the analysis is consistent with the proposed anchoring system, which is more restrictive than the symmetric L/R-ANCHOR theory. In addition, as we will see, only with the proposed MAX-Ŕ account can we explain the behavior of reduplication with *V*- and *h*- final roots with diphthongs.

The stressed rhyme MAX constraint defined in (6) applies here; the constraint is repeated below.

(16) MAX-Ŕ (Base, Reduplicant): Each segment in the main stressed rhyme of the base must have a correspondent in the reduplicant.

Each segment in the rhyme of the stressed syllable of the base is required to have a correspondent in the reduplicant. The descriptive generalization that characterizes the data is the following: the reduplicant copies the segment corresponding to the weak mora in the stressed rhyme of the base. In a case where there is no weak mora, as in a root of the shape *CV*, then we find neutralization to *ʔi*.

In the examples given thus far, the place of the rightmost segment of the root is maintained. However, additional data from reduplication with diphthongs in (17) show that in fact the situation is even more complex.

Either member of a diphthong can be stressed. (Unstressed vowels reduce to schwa).

(17) Reduplication with diphthongs

V_1 is stressed		*V_2 is stressed*		*both unrounded*	
ʔi-kúəh	'to shave'	ʔu-suáh	'to singe'	ʔi-fɯ̃́ə	'to blow a whistle'
ʔi-rúəh	'to pulverize'	ʔu-fuáh	'to open'	ʔi-líəh	'to get ready'

With these examples of *V*- and *h*- final forms with diphthongs, it is clear that the reduplicant's vowel reflects the rounding of the *unstressed* vowel of the base's diphthong, regardless of the proximity of this vowel to the right edge. This is a new discovery, and behavior that cannot be explained by R-ANCHOR. The data in (12) and (13) as well as the diphthong data in (17) are united here under the claim that the reduplicant shows stressed rhyme copying.

4.2.1.5 HEAD MATCH$_{BR}$

What remains to be explained, assuming the claim that MAX-Ŕ characterizes the reduplicant is correct, is why it is the place of the *coda* that is copied, and not that of the vowel. I argue that this is because a constraint requires that if two moras stand in a correspondence relation and the first mora is stressed, then the second mora must also be stressed (Pater 1995, Alderete 1996, McCarthy 1999):

(18) HEAD MATCH$_{BR}$: If μ_1 is stressed and $\mu_1 Y \mu_2$, then μ_2 must also be stressed.

When the stressed rhyme of the base is copied by a monosyllabic reduplicant, the reduplicant will be adjacent to this syllable.[10] The obvious threat posed by faithful copying of the head mora's stress is the resulting adjacency of the stressed syllables. Stress clash is not permitted in Nancowry. However, stressed rhyme copying should potentially lead to stress clash cross-linguistically, in cases where HEAD MATCH$_{BR}$ » *CLASH. Possible examples of this sort of stress clash creation can be found in West Tarangan: *daɔ́n-ɔ́n*, from *daɔ́n*, '3p. shoot' (Nivens 1992), and in monosyllabic reduplicated stems in Djinang (Waters 1980). However, if the constraint against stress clash is ranked high, then the only way to satisfy HEAD MATCH$_{BR}$ is to avoid copying the stressed mora. Thus, the reduplicant's vowel is unstressed, and violation of HEAD MATCH$_{BR}$ is avoided by the correspondence of the reduplicant's vowel to an unstressed element of the base. This is what happens in Nancowry. It is important to note that the proposal is *not* that a non-prominent position is targeted. Rather, the interaction of constraints determines that the weak element is this strong position in the optimal element to copy.

As mentioned above, the vowel of the reduplicant is limited to *i* and *u*. In the case of coda consonants then, the reduplicant prefers to reflect the place specification of the unstressed segment, as opposed to copying the stressed segment without copying its stress. In (19), I entertain only candidates that satisfy the emergent phonotactic constraint

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[10] In truncation, nothing compels violation of this constraint. So when MAX-Ŕ is satisfied, HEAD MATCH$_{BASE\text{-}TRUNCATUM}$ is as well: *Virgínia* → *Gínny* (English); *Alexandrá* → *Sandrá* (French), etc. If a correspondent of the stressed vowel of the base is present, then it is stressed in the truncated form. If it is not, then nothing penalizes stressing a vowel corresponding to a vowel that does not receive stress in the base form.

on the reduplicant, requiring that the V and coda C agree in place, thus ruling out *$ʔim_3$-*ɲím$_3$*.

(19) Motivation for HEAD MATCH$_{BR}$

/RED,ɲim/	HEAD MATCH	MAX-ŕ	*PL/LAB, *PL/DOR	*PL/COR	*PL/PHA
a.☞ʔum$_3$-ɲím$_3$		i	u,m,m	i,ɲ	ʔ
b. ʔi-ɲí$_2$m		im!	m	i,i,ɲ	ʔ
c. ʔi$_2$-ɲí$_2$m	*!	m	m	i,i,ɲ	ʔ

In candidates (b) and (c), AGREE(Place) is vacuously satisfied, since no coda appears in the reduplicant. Candidate (b) is maximally unmarked with respect to the Place Markedness hierarchy, but its failure to contain material from the stressed rhyme of the base proves fatal. While the stressed vowel is copied in (c), the stress is not. This violation of HEAD MATCH$_{BR}$ is fatal. In the winner (a), violation of HEAD MATCH$_{BR}$ is avoided by copying of the segment corresponding to the weak mora of the base's rhyme. This solution achieves maximal possible satisfaction of MAX-Ŕ. The candidate ʔu$_3$-ɲím$_3$ is ruled out by IDENT(vocalic), which requires that corresponding segments agree with respect to this feature. IDENT(vocalic) can be violated, as we see in *ʔi-tus*; however, nothing compels the violation here, as copying of stops is unmarked. Finally, the failure of the candidate **ɲum$_3$-ɲím$_3$* shows that the onset of the stressed syllable does not fall under the domain of MAX-Ŕ.

4.2.1.6 The revealing behavior of diphthongs

The MAX-Ŕ analysis differs from Alderete et al.'s in the predictions that it makes with respect to *V*-final and *h*-final roots. For these, they predict that the unmarked *i* will surface. With MAX-Ŕ as the relevant anchoring constraint however, the vowels are predicted to be in correspondence in both cases. The special case of CV roots is addressed below.

The unstressed vowel of the root is clearly in correspondence with the reduplicant vowel for *V*- and *h*-final roots, where the root vowel is a diphthong, as is predicted by MAX-Ŕ working in tandem with HEAD MATCH$_{BR}$. Correspondence between the vowels is determined by satisfaction of IDENT(round); *i* or *u* will occur in the reduplicant's vowel depending on the roundness value of the vowel corresponding to the non-head mora of the root diphthong.

(20) HEAD MATCH$_{BR}$ determines winner

/RED, suáh/	IDENT$_{BR}$(round)	HEAD MATCH$_{BR}$	MAX-ŕ
a. ☞ʔu$_2$-su$_2$áh			a
b. ʔi$_3$-suá$_3$h		*!	u
c. ʔi$_2$-su$_2$áh	*!		a

Under this analysis, we are able to unify the copying of the coda in the stressed rhyme and the copying of the unstressed vowel of a diphthong in *V*- and *h*-final forms. In both cases, a constraint against the stressed mora corresponding to an unstressed mora in the reduplicant will cause copying of the segment linked to the unstressed mora of the base rhyme. The ranking has the effect of targeting the weak part of a prominent position, but this is the result of the combined effect of the independently motivated constraints. In similar forms with a single vowel, almost all reduplicate with *ʔi* (Alderete et al. suggest that the exceptions are actually *w*-final). Under the analysis here, if we assume that HEAD MATCH$_{BR}$ » MAX-Ŕ, then the *i* vowel is explained under this account as well: the default vowel is epenthesized when correspondence to the base vowel is prohibited.

4.2.1.7 The weak mora

For completeness, I will illustrate how targeting the weak mora in the rhyme is effective in all the types of cases discussed above. My assumptions are the following: the rhyme branches into a strong and a weak mora, it is this level of *daughter of the rhyme* that is relevant to the analysis, and I assume *h* does not satisfy Weight by Position (Hayes 1995); *h* attaches directly to the syllable.

Thus, when the coda C (except *h*) is linked to the weak mora as in the examples below (and in diagram 22a), the weak mora is copied, not the weak vowel:

(21) Weak mora linked to coda C

a. ruáy	ʔi-ruáy	(*ʔu-ruáy)
b. ɲiák	ʔuk-ɲiák	(*ʔit-ɲiák)
c. túəɬ	ʔu-túəɬ	(*ʔi-túəɬ)

When the base coda C is *h*, the weak mora is a member of the diphthong; the weak V is then copied (22b):

(22) a. non-*h* coda b. *h* coda

The only consonant that is non-moraic is *h*. In all other cases where a coda appears, the place of the coda is copied by the reduplicant's coda C if the coda is a stop, and by its V otherwise.

4.2.1.8 Crucial rankings summarized

The following crucial rankings are required for Nancowry:

(23) a. AGREE(Place) » MAX-Ŕ: The phonotactic constraint that emerges in reduplication causes the reduplicant V and coda C to agree in place, with the result that only one segment of the stressed syllable rhyme will have a correspondent.

b. {HEAD MATCH$_{BR}$, MAX-Ŕ}» Place Markedness: Faithful copying of the unstressed mora of the stressed rhyme of the base occurs. However, the onset emerges as the unmarked *ʔ*, as it is subjected to the Place Markedness hierarchy.

c. HEAD MATCH$_{BR}$ » MAX-Ŕ: When the root contains a single V, the reduplicant vowel will emerge consistently as the unmarked *i*, rather than corresponding to the head mora of the base.

This goes to prove that the apparent right anchoring effects of Nancowry are parasitic on the main stressed rhyme. In the next section, independent evidence from French hypocoristics offers further support for this definition of MAX-Ŕ.

4.2.2 *Additional evidence in favor of main stressed rhyme as target: French hypocoristics*

Truncation in French hypocoristics also shows that the onset must be excluded from the domain of stress-sensitive faithfulness.

In the default case, when the base name is C-initial, the optimal hypocoristic is left-anchored and has no coda:

(24) Left-anchored hypocoristics

Base=base name	*Truncatum=hypocoristic*	
a. dɔminik	dɔmi	'Dominique'
b. dɔrɔte	dɔro	'Dorothé'
c. karolin	karo	'Caroline'

The failure of these forms to include a final coda, at the expense of copying more material from the base (and thus incurring additional violation of MAX(Base, Truncatum)), shows that NO CODA » MAX_{BT}. In addition, since the final syllable is stressed, we know that LEFT ANCHOR » MAX-Ŕ.

(25) *dɔminik → dɔmi, *dɔmin*

[dɔminík]	LEFT ANCHOR	MAX-Ŕ	NO CODA
a. ☞dɔmi		ik	
b. dɔmin		ik	*!
c. minik	*!		*

However, stressed material is targeted for copying when left anchoring cannot be satisfied, namely when the base name does not have an onset.

(26) Hypocoristics for V-initial base names

a. elizabɛt	zabɛt	'Elizabeth'
b. ɛrnɛstin	nɛstin	'Ernestine'
c. alɛksɑ̃dra	sɑ̃dra[11]	'Alexandra'

Thus, we see that hypocoristics must have onsets: ONSET » LEFT ANCHOR. Also, if the stressed syllable rhyme contains a C, the hypocoristic is C-final; thus, MAX-Ŕ» NO CODA. Given that MAX-Ŕ » NO CODA, if MAX-Ŕ were sensitive to onsets (MAX-σ́), then in a left anchored form, the onset of the stressed syllable would wrongly be copied. In other words, in (25), we would expect **dɔmin* to be optimal, since this candidate copies at least the onset of the stressed syllable. However, the stressed syllable onset-copying candidate is ruled out. Similarly in English, a name such as *Clèopátra* cannot map onto **Cleop*, even though this form copies the onset of the stressed syllable.[12] This is further evidence that MAX-Ŕ is the correct positional faithfulness constraint of rhyme as target.

4.2.3 Conclusion

Using the constraint MAX-Ŕ as opposed to R-ANCHOR to account for Nancowry reduplication, we see that the copied material necessarily comes from the stressed rhyme of the base. HEAD MATCH surfaces in this conflict situation: the reduplicant is required to copy material from the stressed rhyme, but the stressed vowel cannot be copied without

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[11] It seems that not all native speakers share the intuition that this is a valid nickname for the relevant form (Viviane Déprez, p.c.)

[12] Although FAITH STRUCTURE ROLE (McCarthy & Prince 1995) would also work for these cases, this constraint is violable (cf. *trab-trabaho* in Ilokano, for example). The prediction under the approach given here is that copying of the stressed syllable onset, by virtue of its being a member of the stressed syllable, is never permitted.

its stress. Instead, the reduplicant's vowel avoids correspondence with the stressed vowel of the base. The analysis accounts for the behavior of diphthongs in *V*- and *h*-final forms and allows explanation of the restriction to monosyllabic roots, thus broadening the coverage of the data with respect to previous analyses. The MAX-Ŕ account also allows the more restrictive, R-ANCHOR-less system of anchoring to persevere. Further evidence from French hypocoristics illustrates what seems to be a correct prediction of the theory: the onset of the stressed syllable of the base must necessarily be left out of the domain of the positional faithfulness constraint relating to stress.

Nancowry reduplication is an example of the parasitic nature of right edge copying. In this case, the apparent activity of RIGHT-ANCHOR is crucially reduced to a dependence on the stressed rhyme, following from the activity of MAX-Ŕ and HEAD MATCH$_{BR}$.

4.2.4 Right edge stress in hypocoristics: Catalan

We also see stress-related apparent right edge targeting in truncation. In Catalan (Cabré and Kenstowicz 1996), the base name is shortened to a form that is at least two moras long, and never longer than two syllables. In all cases that follow this pattern,[13],[14] it is unstressed, left edge material that is deleted in the hypocoristic:

[13] There is a separate pattern of hypocoristic formation in Catalan, by which the left edge of the base is anchored (e.g. *Montserrat* → *Montse*). A similar duality of left edge preserving and stressed syllable retaining patterns is available in English, leading to variation in nicknames such as *Patrícia* → *Patty, Tricia*.

[14] The claim that stress is the driving factor would predict that in lexically marked forms, the main stressed foot would constitute the hypocoristic. Although the right-anchored candidate hypocoristic for a base name with antepenultimate stress is out (*Penèlope* → **Lope*), the foot-preserving candidate is out as well: **Nelo* (Cabré & Kenstowicz 1996:697). Apparently, such base names have no acceptable hypocoristic form. It is not immediately clear how lexical stress alone could derail hypocoristic formation.

(27) Catalan Hypocoristics

Ambrós	Brós
Joaquím	Quím
Montserrát	Serrát, Rát
Francísco	Císco
Teodóra	Dóra

Although it is descriptively accurate in this case to say that the right edge is targeted, a RIGHT-ANCHOR account of these data would clearly be missing the role that stress plays in this process.[15]

4.3 Lakhota: stressed syllable reduplication

Lakhota reduplication (Shaw 1980, Marantz 1982, Shaw 1985, Sietsema 1988, Patterson 1990) offers a challenging case of apparent suffixing/right-anchoring. I show that this pattern of reduplication must be analyzed as stressed syllable copying.[16] Thus, much as in the examples discussed above, the analysis hinges on an active MAX-σ́ constraint, which leads to the targeting of the stressed segments of the base for copying.[17]

(28) MAX-σ́: The segments in the stressed syllable of the base have a correspondent in the reduplicant.

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[15] Cabré and Kenstowicz duly note the crucial role of stress in their analysis.
[16] This intuition that the stressed syllable is the target was shared by Williamson (1992:xxiii), "The accented syllable is generally repeated".
[17] Earlier, it was argued that the stress-related BR constraint excluded the onset, MAX-Ŕ. The use here of MAX-σ́ is for simplicity; it represents the combined effect of MAX-Ŕ, ONSET, and DEP-IO.

This leads to the result that the reduplicant is always unstressed, a generalization that holds in all forms, although the expectation for the reduplicant to fall on a consistent edge relative to the base does not.

As presented in Chapter 1, the proposed theory of reduplication posits an inherent difference between fixed segment affixes and reduplicative affixes. Whereas fixed segment affixes are subject to alignment constraints for placement (cf. EDGEMOST McCarthy & Prince 1993:10), reduplicative affixes surface in order to satisfy a base-reduplicant positional faithfulness constraint. These constraints target privileged positions, such as the left edge, or stressed syllable. Locality considerations will force the reduplicant to be adjacent to the targeted material, however no constraint explicitly positions the reduplicant within the word. This leaves open the possibility that, under certain rankings, the reduplicant could occur to the left or right of the adjacent base, with this position determined by independently motivated constraints on the output. In Lakhota, we see an illustration of this prediction, yielding examples like the following:

(29) Inconsistent placement relative to base (epenthetic final vowels capitalized):

a. RED to left of base:	ksa-ksápA	'to be wise'
	xlo-xlókA	'to have holes'
b. RED to right of base:	čoká-ka	'empty'
	hã́ska-ska[18]	'be tall'

Although it may seem odd to find a system in which the position of the reduplicant will appear to the left or right of a given base depending on the structure of the output, this behavior is derived from familiar notions. Reduplicant placement is dependent on:

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[18] The copying of a superficially unstressed syllable in examples such as this one will be explained in section 4.2.2.

copying of the stressed syllable, normal application of stress on the output of reduplication, and correspondence of stressed syllables from one representation to another.

Reduplication can mark plurality of an inanimate subject, iterative or repetitive action, distributive action or state, or intensification.[19] Ambiguity of meaning may result in some cases, but the process of reduplication is the same. C-final stems must epenthesize a V, and are then uniformly disyllabic on the surface in the language generally; V-final stems are either mono- or disyllabic (Shaw 1980:117). In this pattern, stems that have one V underlyingly always stress the second occurrence of the sequence that is copied in reduplication; underlyingly bi-vocalic stems always stress the first occurrence.

(30) Lakhota

a. *one V underlyingly, V#*

/ksa/	ksá	ksa-ksá	'to cut'
/ži/	ží	ži- ží	'yellow'

b. *one V underlyingly, C#*

/sap/	sápA	sap-sáp-A	'to be black'
/yũk/	yṹkA	yũk- yṹk-A	'be in reclining position'
/ksap/	ksápA	ksa-ksápA	'to be wise'
/xlok/	xlókA	xlo-xlókA	'to have holes'

---

[19] Iterated numbers have previously been assumed to fall into this class. However, under the current analysis, they must be taken to be a separate class. They are isolated, in that they are exceptional in at least a couple of ways: they are a source of several lexically stressed roots (*yámni* 'three'; *záptã* 'five'), and they often exceed the canonical maximum root size (*šakówĩ* 'seven'; *šaglógã* 'eight' (White Hat 1999:30)). For lack of a better way to address isolated examples like *napčĩ́wãg-wãk-a* (**napčĩ́-čĩ-wãk-a*) 'by nines', I suggest that they are historically compounds, and that the rightmost member is targeted for reduplication: /napčĩ́+wag, RED/, where the compound is right-headed, → *napčĩ́wãg-wãk-a*.

c. *two V's underlyingly, V#*

/čoka/	čoká	čoká-ka	'empty'
/ia/	iá	iá-a	'speak'
/ũspe/	ũspé	ũspé-spe	'to learn'
/škokpa/	škokpá	škokpá-kpa	'hollowed out'

The driving force of reduplication is stressed syllable copying. This is an unproblematic claim for V-final monosyllabic bases (30a) and forms in which epenthesis occurs word-finally due to an underlying final C (30b). The last two forms are the ones that most clearly support such an analysis: /xlok/ → *xlo-xlókA, *x-lok-lókA, *xlokÁ-kA.*

Stress in Lakhota is peninitial, although several processes make this generalization opaque. For example, C-final roots receive an epenthetic final V, which is not stressed. Such words then exhibit initial stress on the surface: */puz/→ púzA* 'be dry'.

Lexically stressed forms have a striking quality, in that they reduplicate as if they received default stress (31). That is, although they exhibit lexical stress on the surface, their lexical marking is effectively ignored for the process of reduplication. I show this type of opacity to be severely restricted, in that it must lead to a regularization of some kind. By disregarding lexical stress, the grammar regularly obeys the stressed syllable copying constraint, as it would apply to forms that do not have lexical stress, for example: /hã́ska, RED/ → {hãská-ska} hã́ska-ska. We will return to this idea in §4.3.2.

(31) *two V's underlyingly, V#, lexically stressed*

/hã́ska/	hã́ska	hã́ska-ska	'be tall'
/yámni/	yámni	yámni-mni	'three'

The standard analysis takes this reduplication pattern to be uniform suffixing of the RED morpheme. In a theory in which the analyst is compelled to label the reduplicant as *prefix* or *suffix* it is clear that this choice is forced as the lesser of two evils. By opting for a suffixing analysis, one avoids having to claim for example that *čoká* in *čoká-ka* is a prefix, while merely *ka* is what is left of the root. The challenge for such a theory is however that so many forms appear to be prefixing, such as *sap-sápA, xlo-xlókA*. In fact I show (section 4.3.5) that the latter example can never successfully succumb to a suffixing account. I show first that the pattern must involve rather reduplication of the stressed syllable, and then illustrate why it cannot be due to suffixing of a RED morpheme. Isolated problematic examples exist, and these will be addressed in the course of the discussion.

Before turning to the details of the analysis, I will mention a slightly different pattern in verb reduplication that indicates active (vs. stative), which involves shifting of the stress "to the first syllable" (Shaw 1980:51): *yús-yuza* 'to take hold of' (vs. *pus-púza* 'be dry') . However, no forms are given where the root in the base has two vowels underlyingly. Thus there are no forms to give evidence of the stressed syllable analysis presented here which, barring opacity, predicts: *čók-čoka* in the active. Shaw's analysis predicts that stress will shift away from an otherwise stressed syllable to an unstressed syllable in this case, e.g. *[čoká]* → *čóka-ka*. This data is thus an important point of comparison. I am still in search of the data needed to shed light on this issue.

4.3.1 Stressed syllable copying: MAX-σ́

The core constraint that is operative in the analysis is MAX-σ́, which requires that the stressed syllable be targeted for copying:

(32) MAX-σ́: The segments in the stressed syllable of the base have a correspondent in the reduplicant.

An important aspect of the proposed system is that there is no alignment of a RED morpheme, rather only targeting of the prominent (stressed) syllable for the purposes of anchoring (see Chapter 1).

Stress in Lakhota is peninitial. A cover constraint abbreviating the relevant prosody 'PENINITIAL' is sufficient for present purposes. The tableau below also shows evidence of an output-output constraint requiring the prosodic head of the un-reduplicated output form (in brackets) and the reduplicated form to be in correspondence, 'HEAD MATCH'.

(33) a. PENINITIAL: Stress is peninitial.
b. HEAD-MATCH-OO: If μ_1 is stressed in output string S_1 and $\mu_1\Re\mu_2$, then μ_2 in output string S_2 must also be stressed.

The HEAD-MATCH constraint plays a crucial role, as it rules out an otherwise threatening competitor, as we see comparing the winner to candidate (b) in the tableau below.

(34)

/čoka, RED/ [čoká]	HEAD-MATCH$_{OO}$	MAX-σ́	PENINITIAL	L-ANCHOR
a. ☞ čoká-<u>ka</u>				*
b. <u>čok</u>-čóka	*!			
c. <u>čok</u>-čoká		*!	*	

The winner (a) shows that the stressed syllable is reduplicated, and stress is peninitial in the output (compare (c) on both counts). Also, the original stressed syllable of the unreduplicated word is preserved with its stress (b). Left anchoring to the base is necessarily foregone, given these over-riding concerns.

One might argue that the so-called 'inherent reduplication' forms, verbs that imply repetition of action, offer counter-evidence to the claim that OO-HEAD MATCH is active here, as these words are "generally used in their reduplicated form" (Riggs 1973:69). Examples are: *yuhuhuza* 'to shake'; *panini* 'to jog'; *kapsĩsĩta* 'to whip'. Without the unreduplicated *yuhúza*, e.g., we would expect both MAX-σ́ and L-ANCHOR to be satisfied: *yu-yúhuza*. It must be the case that although the unreduplicated form is not well attested, it is still the otherwise possible output of the underlying form for these words, and thus eligible for reference by output-output constraints. I do not know what to make of the non-canonicality of the underlying forms for *yuhuhuza* (presumably /yuhuz/) and *kapsĩsĩta* (/kapsĩt/).

4.3.2 Opacity of lexically stressed forms

As we have just seen, stress is assigned to reduplicated forms peninitially, while the surface stressed syllable is in correspondence with the stressed syllable in the nonreduplicated form. Opacity is involved in the case of lexically marked forms, (of which there are just a few (Chambers 1974:4, Shaw 1980:150)). I propose that when these words reduplicate, the syllable that is copied is the one that would have received stress in the unaffixed form by the *default* rules, i.e. as if stress were assigned without heeding lexical markings. In this section, evidence is presented that speakers can have access to default forms, even when these forms do not surface. I present a preliminary version of a system that could achieve this result. The potential of the idea is that this type of behavior, apparent exploitation of a non-surface default form, occurs elsewhere.

(35) Exploitation of "default" forms

- Derived French *h-aspiré* words (certain suffixes only) (§4.3.3.1)
- Chamorro shifting of stress to the penultimate syllable in lexically stressed words that are then suffixed
- Ọwọn-Afa reduplication (Ola 1995), in which allomorphy disappears in reduplication. Reduplication occurs only with the base formed from the input void of lexical marking. (§4.3.3.2)
- "Infixing" reduplication to a main stressed foot (Broselow & McCarthy (1983)). These known cases occur in languages which the canonical stem is a single foot.

We see the general relevance of a default form, in reduplication examples and non-reduplicative examples as well. Before proceeding with the analysis of Lakhota, I will present briefly two of these cases in which lexical faithfulness suppression can also be seen to apply.

4.3.3 Increased canonicality of derived forms

4.3.3.1 Default in French h-aspiré

Kiparsky (1973) observed that derived *h-aspiré* forms exhibit increased canonicality, as compared to non-derived forms.

(36) *h-aspiré*

a. *le Hitler* *le héros* (*l'Hitler, *l'héros)
b. *l'Hitlérien* *l'héroïne* (*le Hitlérien, *la héroïne)

V-initial nouns are usually preceded by the article *l'*, which forms the onset of the initial syllable, e.g. *l'heure* [lœr], 'the time/hour'. Nouns that contain *h-aspiré* however are preceded by the full article *le* or *la* in spite of the ONSET violation that doing so will cause.

Descriptively, lexical faithfulness is being suppressed in a derived form (36b).[20] This allows the markedness forces that normally enforce canonicality to show through. In the following tableau, the lexical faithfulness constraint, which here requires faithfulness to the lexical marking that leads to exceptional left-alignment of the *h-aspiré* word with the left edge of a syllable, is shaded. This is to facilitate considering the same competition

[20] Tranel (1996) captures this with variable ranking between ONSET and an alignment constraint requiring left alignment of the morphological word and a syllable. For *h-aspiré* words, the marked ranking ALIGN-LEFT >> ONSET leads to prohibition of resyllabification, even in the face of an onsetless syllable. The opposite ranking, ONSET >> ALIGN-LEFT, is assumed to hold in the default, non-*h-aspiré* cases. The analysis proposed here is very similar, differing only in the assumption that faithfulness rather than markedness (alignment) constraints are responsible for the exceptional forms.

in the absence of lexical faithfulness. Clearly, suppression of the lexical faithfulness constraint leads to a different optimum, one that better satisfies ONSET (b).

(37) Suppression of FAITH-LEX

/lœ, l+Hitler *h-aspiré*/	FAITH-LEX	ONSET
a. ☞lœ Hitler		*
b. {☞l'Hitler}Default	*!	

The tentative proposal is that the default form is retained by the grammar. In the case of subsequent optimization that makes reference to the results of an earlier calculation, appeal to the earlier 'default' winner can be made. This is shown below, where rather than output-output faithfulness comparing the candidates to the earlier optimum, it compares them to the earlier *default* optimum, contained in the input here in curly brackets.

(38)

/lœ, l+Hitler *h-aspiré*, +ien/ {l'Hitler}Default	FAITH-OODEFAULT	FAITH-LEX	ONSET
a. lœ Hitlerien	*!		*
b. ☞l'Hitlerien		*	

Once FAITH-LEX is subverted in a grammar (for example, if the ranking in (37) were reversed: ONSET >> FAITH-LEX), then there is no possibility to introduce exceptionality: the output form and default form will be identical: *l'Hitler*.

4.3.3.2 Default in Ọwọn-Afa reduplication

In Ọwọn-Afa distributive reduplication (Ola 1995), expressing 'every X', the reduplicant surfaces as a VCV- prefix; the final vowel of the reduplicant assimilates to the initial vowel of the base.

(39) V-initial nouns

oʃù	oʃo-oʃu	*month*
ɔrũɣɔ́	ɔrɔ-ɔrũɣɔ́	*morning*
ɛrɛtɛ̃	ɛrɛ-ɛrɛtɛ̃	*afternoon*

(40) C-initial nouns

bàtà, ɪbàtà	ɪbɪ-ɪbàtà	*shoe*	(cf. **bata-bata*)
kòkó, ɪkòkó	ɪkɪ-ɪkòkó	*cocoa*	
kpákó, ɪkpáko	ɪkpɪ-ɪkpákó	*wood*	

C-initial nouns are in variation with forms in which [ɪ] is epenthesized initially. I will take this to indicate that a lexical faithfulness constraint applies to C-initial nouns, and that these nouns bear some optional lexical feature 'α'. Thus, DEP-V_{α} (or L-ANCHOR-IO_{α}) is active, and ranked above the markedness constraint that would otherwise force epenthesis in C-initial nouns:

(41) FAITH-LEX » *#C_{NOUN}

In reduplication however, being lexically faithful to the extent that the markedness constraint *#C_{NOUN} is violated is not an option.

(42) FAITH-OO$_{DEFAULT}$ » FAITH-LEX » *#C$_{NOUN}$

Although *#$_{NOUN}$[C is dominated in this case, it is assumed to be crucial in the analysis, given that it emerges in reduplication, and that it is surface-true in the related language of Yoruba. FAITH-LEX here is an anchor constraint that applies only to nouns that bear lexical marking indicating membership to this class of exceptional cases (here, 'α').

(43) FAITH-LEX » *#$_{NOUN}$[C

/bàtà$_{α}$/	FAITH-LEX	*#$_{NOUN}$[C	MAX-IO	DEP-IO
a.☞bàtà		*		
b. àtà	*!		*	
c. {☞ɪbàtà}$_{Default}$	*!			*

This ranking is based on a 'worst case scenario' for deriving the reduplicated form ɪbɪ-ɪbàtà; in reality, variation is found in these forms (Ola 1995), which would require variable ranking between FAITH-LEX and *#$_{NOUN}$[C.

Here again, lexical faithfulness is suppressed upon derivation.

(44) Default visible in reduplication

/b̀atà$_{α}$/ {ɪbàtà}$_{Default}$	FAITH-OO$_{DEFAULT}$	FAITH-LEX	*#$_{NOUN}$[C
a.☞ ɪbɪ-ɪbàtà		*	
b. bàtà-bàtà	*!		*

Unlike the un-reduplicated forms, there is no variation in reduplication of C-initial nouns.

4.3.3.3 Default in Lakhota reduplication

I argue that stressed-syllable copying is the objective in Lakhota reduplication. This generalization is obscured by lexically stressed forms, which copy the syllable that would be stressed if lexical faithfulness were ignored; that is, reduplication occurs as if stress had been assigned according to the default pattern.

Descriptively, reduplication in lexically stressed forms behave as outlined in (45).

(45) Lexically-stressed words

hã́ska	*lexically-stressed underlying form*
hãská	*the "default" stress-assigned candidate*
hãská-ska	*stressed-syllable targeting reduplication performed on the "default" form*
hã́ska-ska	*stress realized on the lexically marked vowel*

Here, FAITH-LEX is HEAD-MATCH-IO.

(46)

/hã́ska/	FAITH-LEX	PENINITIAL
a. ☞hã́ska		*
b. {☞hãská} Default	*	

Candidate (a) is the winner, but (b) has the status of ‘default’. The default is never realized, and yet it serves as the base for reduplicative copying.

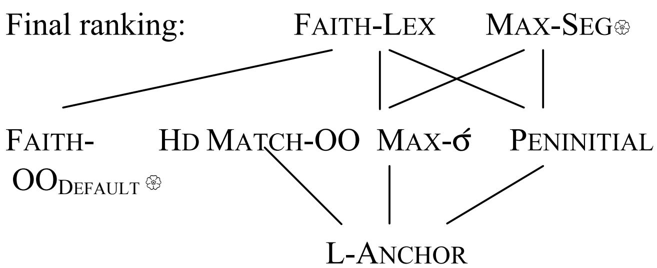
In Lakhota reduplication, we see that there is an additional layer of complexity. The ‘default’ form does not surface in reduplication. Rather, the optimal candidate reduplicates *as if* it were stressed like the default form. This intermediate candidate (b) serves as a ‘flower candidate’ of Sympathy Theory.

(47)

/hã́ska, RED/ [hã́ska] { hãská }$_{Default}$	❀MAX-SEG	FAITH-LEX	PENINITIAL	MAX-σ́	FAITH-OO$_{DEFAULT}$ ❀
a. ☞hã́ska-ska			*	*	*
b. ❀hãská-ska		*!			
c. hãs-hã́ska	*!**				*

The final ranking for Lakhota then can be summarized as in (48)

(48) Final ranking:



4.3.3.4 Problems with unrestrained Sympathy Theory

An account using Sympathy Theory (McCarthy 1999) that was not limited to suppression of lexical faithfulness (and which did not include this innovation) would be problematic on two levels. First, the Selector constraint would be an anti-faithfulness constraint, and not one that would be easy to motivate independently. It would need to require the candidates to actively be unfaithful to lexical stress: ¬HEAD-MATCH$_{IO}$❀.

(49) Opaque faithfulness to output form that exhibits default stress

/hã́ska, RED/ [hã́ska]	❀MAX-SEG	HEAD-MATCH$_{OO}$	MAX-σ́	PENINITIAL	¬HEAD-MATCH$_{IO}$❀
a. ☞ hã́ska-<u>ska</u>			*	*	*
b. <u>hãs</u>-hã́ska	s!ka				*
c. ❀ hãská-<u>ska</u>		*!			

Sympathy would not constrain the predictions in the same way.[21] In the envisioned account, only "default" candidates could influence the selection of the winner. However, Sympathy could allow for any constraint, for instance ALIGN-R (σ́, PrWd), to be the Selector. In a language that never stressed the final syllable on the surface, this could lead to unstressed right edge reduplication, precisely what is argued here not to be possible.

In the majority of Lakhota forms, the generalization regarding copying of the stressed syllable holds true on the surface. The argument here is that, indeed, it holds true of all forms at some level. But in lexically stressed words, restoration of lexical stress masks this uniformity.

The final class of cases to be examined involves tri-consonantal clusters, which are simplified in all cases, including reduplication.

4.3.4 Tri-consonantal clusters

Tri-consonantal clusters are ruled out generally in Lakhota. No mono-morphemic forms contain a CCC sequence. When compound formation would create such a sequence, the final C of the first member is then deleted:

(50) Compound formation (Shaw 1980)

/phet + šniž/ → [phešnižA] 'coals, embers'
fire to fade

/šũk + blok/ → [šũblokA] 'stallion'
horse male

---

[21] I am not claiming that the approach proposed here can account for all of the cases that led to the development of Sympathy Theory; this requires further investigation.

This is evidence of a constraint against tri-consonantal clusters, *CCC, dominating MAX. Positional Faithfulness to initial onsets of morphemes leads to the selection of the final C for deletion in these cases.

Words that are simplified due to tri-consonantal clusters that arise in reduplication behave as expected under this analysis. In addition, these cases exhibit emergent LEFT-ANCHOR. When satisfaction of MAX-σ́ is not at risk, LEFT-ANCHOR (see Chapter 2) is free to exert its effects. LEFT-ANCHOR is evaluated with respect to the base, which in this case is the entire stem; there is no reason to assume that the base contracts to satisfy *CC, as is evident from forms like *ksa-ksá*, (**k-sa-sa*). In Chapter 2 we saw various examples where markedness concerns could cause minimal shrinkage of the base. However, the constraint MAX ROOT-BASE (MAX Rt-B) prefers that the base contain at least the root. (The left edge of base is indicated by a left bracket):

(51) MAX ROOT-BASE: Each segment in the root must have a correspondent in the base.

(52)

/ksa, RED/ [ksá]	LEFT-ANCHOR	MAX ROOT-BASE	*CC
a. ☞ <u>ksa</u>-$_B$(ksá			**
b. $_B$(k-<u>sa</u>-sá	*!		*
c. k-<u>sa</u>- $_B$(sá		*! (k)	*

With *CC subordinated, both LEFT-ANCHOR and the base-maximizing constraint MAX Rt-B are necessarily satisfied for all inputs that have one vowel. We also see activity of a constraint against three consecutive consonants, *CCC. This constraint will be discussed further in the following section.

(53) *CCC: A sequence of three consonants is forbidden.

(54) Emergent LEFT-ANCHOR

/ksap, RED/ [ksápA]	*CCC	ANCHOR-σ́	PENINIT	LEFT-ANCHOR	MAX RT-B	*CC
a. ☞<u>ksa</u>- B(ksáp-A						**
b. k-<u>sap</u>- B(sáp-A					*!	*
c. B(k-<u>sap</u>-sáp-A				*!		*
d. B(ksápA-<u>pA</u>		*!	*	*		*
e. ✖<u>ksap</u>- B(ksáp-A	*!					**

A markedness constraint against CC clusters could potentially prefer candidate (b) or (c), in which the base would be minimized (b) or left anchoring would be forsaken (c), in order to reduce the number of *CC violations in the reduplicant. As shown above however, with *ksa-ksá, *k-sa-sá*, *CC violations are freely tolerated in reduplication (as they are elsewhere). Candidate (e) is harmonically bounded according to the constraints shown, however if maximal base-reduplicant parsing were valued over satisfaction of *CCC (MAX-BR » *CCC), then this candidate would be optimal.

4.3.5 Alternative analysis

Using the most charitable means of converting the standard suffixing analysis of Lakhota reduplication into Optimality Theory, I show that suffixing of a RED morpheme is not a possible explanation for the system. The standard analysis of Lakhota reduplication claims that the pattern is suffixing, "…copies the entire final syllable" (Shaw 1980:332); "…simply and straight-forwardly copies the last maximal syllable as a suffix" (Patterson 1990:95). However, a study of the data, in particular roots beginning with a *CC* cluster, shows that this cannot be analyzed as suffixation of RED plus right anchoring. Note that in a suffixing analysis, sometimes the suffixed RED is stressed, sometimes it is not (*pus-<u>púz</u>A* vs. *čoká-<u>ka</u>*). Considering that stress is not appealed to in the suffixing analysis, I have not marked it in the examples below.

In order to maintain a suffixing analysis of reduplication, both Shaw and Patterson assume a rule of consonant deletion after suffixation of the entire final syllable of the stem, as in the following (affix is in italics):

(55) C-deletion in CCC clusters:

C → ∅/ __CC

UR	/ksap/
Reduplication	ksap + *ksap*
C-deletion	ksa *ksap*
Stem formation	ksa-<u>*ksap*</u>-A

The C-deletion rule has independent support from the formation of compounds, repeated from (50) above :

(56) Compound formation

/phet + šniž/	→	[phešnižA]	'coals, embers'
fire to fade			
/šũk + blok/	→	[šũblokA]	'stallion'
horse male			

The markedness constraint that is at work is clearly one and the same, essentially '*CCC', analogous to the rule Shaw suggests (55). However, there is no indication that the means by which the markedness constraint is satisfied need be the same. That is, in the compound cases, it seems that a constraint requiring root-initial faithfulness would dictate that the final C of the first root will be the one to delete. The rule-based analysis in fact seems to profit unduly from the fact that Lakhota has no roots that end in CC#. If there were such roots, then the proposed rules would lead to the following mapping: hypothetical $pan_3t_4 \rightarrow pat_4\text{-}pan_3t_4\text{-}A$. This prediction represents, to the best of my knowledge, and to the detriment of such an analysis, an unattested general solution to simplifying CCC clusters.

In the reduplication cases, it is far from obvious that the markedness constraint is negotiated in the same way as with compounds. Note that already in disyllabic stems, it is the second syllable that copies, not the first, e.g. *čoka-<u>ka</u>*. Thus, any constraint requiring left edge BR-faithfulness (here, LEFT-ANCHOR), must be dominated by constraints deriving the monosyllabic size of the reduplicant, as well as the constraints that determine the target. If we assume for the sake of argument that the constraint is RIGHT-ANCHOR, then we get the following ranking: {RIGHTMOST, RIGHT-ANCHOR, 'RED=σ'}>> L-ANCHOR.

(57) Constraints

a. LEFT-ANCHOR: The left edge of the reduplicant corresponds to the left edge of the base.

b. RIGHT-ANCHOR: The right edge of the reduplicant corresponds to the right edge of the base.

c. 'RED=σ': This is a stand-in constraint, representing the ranking that must be in place for a syllable-sized reduplicant to emerge.[22]

d. RIGHTMOST (RED, Stem): The morpheme RED is rightmost; is a suffix. (McCarthy & Prince 1993a:10).[23]

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[22] If we use ALL-σ-LEFT (Ito and Mester 1997), then the ranking is: MAX-IO » ALL-σ-LEFT » MAX-BR.

[23] In Chapter 1, it was argued that constraints like RIGHTMOST cannot be used to apply to reduplicative morphemes. In the analysis constructed here as an equivalent of the earlier suffixing claims of Shaw and

(58) LEFT-ANCHOR is subordinated

/čoka RED/	RIGHTMOST	R-ANCHOR	'RED=σ'	L-ANCHOR
a. ☞ čoka-<u>ka</u>				*
b. čok-<u>čok</u>-a	*!			
c. čoka-<u>čo</u>		*!		
d. čoka-<u>čoka</u>			*!	
e. ✖čo-<u>ka</u>-ka	*!*			

Candidate (c) shows that R-ANCHOR must dominate L-ANCHOR. Thus, when '*CCC' comes into play, L-ANCHOR will be irrelevant, as R-ANCHOR would necessarily dominate it, and nothing would compel violation of L-ANCHOR to make the grammar seek further for an anchoring constraint to satisfy.

An analysis of suffixing reduplication then under the standard assumptions of OT would involve suffixation of a RED morpheme, as well as right-to-left mapping from the RED morpheme to the base, in observation of RIGHT-ANCHOR. Also necessary is an undominated constraint that requires that the reduplicant contain only root material, RED ≤ ROOT:

(59) RED ≤ ROOT: The Reduplicant contains only the root. (McCarthy & Prince 1993a:76)

(60) RED ≤ ROOT » {RIGHTMOST, RIGHT-ANCHOR}

/sap, RED/	RED ≤ ROOT	RIGHTMOST	R-ANCHOR
a. ☞sap-<u>sap</u>-A		*	
b. ✖sa-<u>sa</u>-p-A		**!	
c. sapA-<u>pA</u>	*!		

Patterson, RIGHTMOST can be replaced by LOCALITY and IO-CONTIGUITY (the constraint against intrusion), which would have the same effect.

However, this analysis runs into a problem with CCVC forms, such as *ksa-ksapa*. A ranking paradox results:

(61) L-ANCHOR » R-ANCHOR (paradox)

/ksap, RED/	*CCC	RED ≤ ROOT	RIGHT MOST	R-ANCHOR	L-ANCHOR
a.☞ desired winner ksa-ksa.p-A			*	*!	
b.❽ wrong winner ksap.-sa.p-A			*		*
c. ksa-ksap-A			**!***	*	
d. ksa-ksa-pA			**!		
e. ksapA-pA		*!			
f. ksap-ksapA	*!		*		

Although it would be reasonable to think in this case that NO CODA was forcing the infixation (NO CODA >> RIGHTMOST), this ranking would lead to the wrong winner for /sap, RED/ → **sa-sa-pA*, rather than *sap-sapA*. The problem is, whether we assume that the stem-final *p* is structurally part of the base (c,d) or part of the reduplicant (a), the lack of a correspondent for this edgemost segment in the other leads to a fatal violation for the actual winning candidate. Given the ranking thus far, we would expect candidate (b), which is as well aligned as possible and perfectly right-anchored, to emerge as optimal. However, this result is incorrect; the actual attested form is (a).

We have seen that a stressed syllable reduplication analysis accounts more or less straightforwardly for this complicated system, in which the appearance of the reduplicant can vary from right to left, depending on the other constraints involved. A special innovation was required to derive the generalization regarding targeting the stressed syllable in words with lexical stress. However, the claim that the default form has a status in the grammar, even when it does not surface, is one that is apparently widely exploited and is worth studying further. The standard suffixing analysis however results in a ranking paradox, which fails to generate the attested system.

4.3.6 Conclusion

The proposed solution accounting for lexically stressed words in Lakhota reduplication, although perhaps not the last word on the matter, suggests an approach that both allows us to preserve the underlying intuition that reduplication copies the stressed syllable, and that relates the reference to a default form to a situation that occurs generally in optimizations in which canonicality is transparently increased upon derivation.

4.4 Non-reduplicative copying as a right edge effect

Some examples of right edge copying that have been argued to involve a suffixed RED morpheme in the past are argued here not to involve a reduplicative morpheme at all. Rather, in these cases, augmentation to a prosodic target results in augmentative copying.

4.4.1 Recent literature

In this section, I review the discussion in the recent literature regarding phonological copying, and argue that a sub-class of cases that appear to be right edge morphological reduplication are really just cases of expansion to fill a template, by means of copying output segments. Augmentative copying is shown to simply be an alternative to insertion when expansion to fill a prosodic template is required. I focus on cases from

Mayan languages (Tzotzil and Tzeltal), and also from Yoruba. (See also Beckman 1995, Alderete et al 1999 for the use of spreading as the optimal repair for reasons of markedness).

4.4.1.1 All reduplication is morphological

Gafos (1998a) predicts the restrictive typology of consonant harmony systems (Gafos 1998b) by constraining the operation of consonantal spreading so that consonants must spread though an intervening vowel. He finds that only consonantal features that do not significantly alter the acoustic quality of vowels are the ones that are found to spread. He further argues however that all apparent cases of long distance consonantal spreading, as in the following example from Temiar: */a + kɔɔw/* → *kakɔɔw*, are necessarily *reduplicative* in nature, that is, due to an underlying RED morpheme. This is a problematic assumption on several grounds. First, it loses the parallel nature of augmentation by copying, versus augmentation by epenthesis. I will briefly illustrate these two types of augmentation.

Non-reduplicative copying is one way to augment /CV/ so that it becomes bi-moraic.

(62) Yoruba copying of CV stem to satisfy [μμ] requirement for adjectives (Awoyale 2000:296)[24]

/dò/	dòdò	'of being deeply red'
/jɔ/	jɔjɔ	'very, very much'
/gan/	gangan	'in particular'
/ko/	koko	'of being extremely hard'
/pà/	pàpà	'of running hurriedly along'
/rà/	ràrà	'of hovering above'

The above examples would all violate IO-INTEGRITY, the constraint against multiple correspondence. In the epenthesis examples below, it is alternatively DEP that is sacrificed in order to achieve the minimal bimoraic template in Axininca Campa.

(63) Axininca Campa minimal word epenthesis to [μμ]

/p/	pAA	'feed'
/na/	naTA	'carry'
/t^ho/	t^hoTA	'kiss, suck'

In addition, Gafos's proposal that all reduplication is morphological leads to a problematic situation when copying occurs to satisfy an output template. It must be the case in the example constructed below that the number of RED morphemes is a direct consequence of the output size: (This hypothetical example is a slight variation on the attested case of Cupeño (Crowhurst 1994)).[25]

(64) Forms containing between zero and two REDs in Cupeño′:

čál$[al]_{RED}[al]_{RED}$	
páčik$[ik]_{RED}$	
pínəʔwəx	*no RED morpheme*

[24] Awoyale claims that these stems are ideophones. Akinlabi (p.c.) however disagrees, and suggests that they are simply adjectives.
[25] As it is, Cupeño is a mixed system that copies vowels, but epenthesizes consonants when needed to satisfy the disyllabic post-tonic template (Crowhurst 1994).

Such a case would be necessarily morphological in Gafos's system. However, genuine examples like this one, in which the number of reduplicants depends on the output prosodic shape are unknown in the literature.[26] And finally, this analysis does not capture the generalization about the locus of copying. In Gafos's theory, cases such as Yoruba, as well as Temiar, are all due to a RED morpheme. Thus, there is nothing to be said about a prediction of side preference.

Gafos does not in fact confront the possibility that copying is neither due to a RED morpheme nor to multiple association lines, but rather to multiple correspondences in the output. As a result his approach, in which MAX-BR is responsible for reduplication, says, "reduplicate unless you can't"; segmental markedness rules out reduplication in the cases where it is not needed. However, a better theory of copying, given that copying in the cases that he discusses seems to be compelled by the global markedness needs of the output form, would say, "do not reduplicate unless you must". This stance has been advanced by authors since though, as in the approach explored by Smith (1998).

4.4.1.2 'Split-output' copying

Smith (1998) argues that "split-output" copying is possible in Correspondence Theory, a kind of copying that is distinct from reduplication. In this case, one input correspondent can have more than one output correspondent. However, there is no reduplicative morpheme, and thus no BR-correspondence between the two output segments. In the case that she examines (the language game *May-ka*, based on the

[26] Cases of full satisfaction varying with non-satisfaction are well-attested, however. See Chapter 3.

Chinese Fanqie spelling system), highly-ranked CONTIGUITY forces doubling. Smith claims that LEFT-ANCHOR and RIGHT-ANCHOR are undominated in the hierarchy, and these compel the faithfulness violations. It looks like May-ka thus exhibits a type of edge anchoring of the base.

(65) a. OUTPUT-CONTIGUITY: The portion of S_2 standing in correspondence form a contiguous string. ("No Intrusion"). (McCarthy & Prince 1995)

b. INTEGRITY: No element of S_1 has multiple correspondents in S_2. ("No Breaking"). (McCarthy & Prince 1995)

Thus, */xwey+ayk/ → xway-kwey, *xay-kwey*.

(66)

/xwey+ayk/	OUTPUT-CONTIGUITY	INTEGRITY
a. ☞ xway-kwey		w
b. xay-kwey	*xw	

The winning candidate violates the constraint against doubling output segments, INTEGRITY, but the latter candidate fares worse on O-CONTIGUITY.

4.4.1.3 Markedness-driven copying

In gerundive "reduplication" in Yoruba (Akinlabi 1985, Ola 1995, Alderete et al. 1999, Kawu 2000 and others), the prefix *í-* is added, and the adjacent consonant copies to provide an onset for this syllable:

(67) Gerundive formation: C_1í+C_1V_1

jó	jíjó	'dance'
kú	kíkú	'die'
mɔ̀	mímɔ̀	'know'
là	lílà	'split'

Kawu (2000) argues that this is not a case of morphological reduplication, but rather an example of phonological copying in which the consonant is copied simply to provide an onset. He further notes that there is an independent markedness constraint in the language against onsetless high-toned vowels in particular. Thus in this case, *H&ONSET compels the violation of INTEGRITY. Kawu also goes on to highlight the parallel nature of epenthesis and copying. What determines the choice between the two is simply the relative ranking of INTEGRITY and DEP, the constraint against epenthesis.[27]

4.4.1.4 Augmentation

Arguing against the existence of consonantal roots in Modern Hebrew, Ussishkin (2000) promotes a "prosodic template" analysis of the forms imposed on the binyanim. Using output-output correspondence, he claims that the binyanim are formed relative to the basic *paʕal* binyan. The *paʕal* then is the only form to be influenced by IO-Faithfulness. Emergent prosodic restrictions witnessed in other binyanim are said to follow from the TETU ranking, which affects derived words only:

[27] It is doubtful that the situation is quite this simple. McCarthy (1997) notes that spreading of a consonant across a vowel is thought by some to be something that does not occur in any language. The Yoruba case above is a counter-example. However, it does seem likely that spreading is more constrained than epenthesis, in a way not captured by the mere relative ranking of these two constraints.

(68) Derived word TETU

FAITH-IO » PHONO-CONSTRAINT » FAITH-OO

A crucial component of the analysis is the separation of minimality vs. maximality constraints. Although I will not be implementing Ussishkin's articulated system of a branching requirement enforcing minimality, and prosodic alignment yielding maximality, I will briefly sketch the approach here.

(69) Minimality and maximality

a. σ-ALIGN: "Every syllable must be aligned to the edge of some prosodic word containing it". (Maximality: limit $[\sigma\sigma]_{PrWd}$)

b. PROSODIC WORD BRANCH: "A prosodic word must branch at the level of the prosodic word or foot". (Minimality: bans $*[\sigma]_{PrWd}$)

Faithfulness constraints negotiate the effects of these constraints in the following way:

(70) Fixed prosody in Modern Hebrew (Ussishkin 2000:144)

ranking	result
FAITH AFFIX » σ-ALIGN	*only morphologically complex words can be larger than [σσ].*
σ-ALIGN » FAITH-IO	*paʕal forms are never larger than [σσ].*
FAITH-IO » PRWDBRANCH	*paʕal forms may be smaller than [σσ].*
PRWDBRANCH » FAITH-OO	*derived forms must be [σσ] or smaller.*

Thus, both minimality and maximality act on the OO-derived forms, which leads to fixed prosody for this class of words.

Ussishkin also claims that there is a right edge bias in prosodic template satisfaction, which is consistent with asymmetric, left edge relativized STRONG ANCHOR:

(71) STRONG LEFT-ANCHOR: if *x* is at the left edge of the input, and *x* and *y* stand in correspondence, then *y* is at the left edge of the output.

This constraint penalizes e.g. /$k_1$atab/ → **k_1ak_1atab* e.g., but not *$k_1atabab$*. Thus, it is an example of a right edge effect following from a left edge requirement. There is some question though as to whether this asymmetry is authentic (cf. Javanese *babot, *batot*, (Mester 1986), epenthesis in Mohawk: */k+ek+s/* → *í:keks* (McCarthy & Prince 1996), and also Shona (Myers 1987)). If the asymmetry can be upheld, then we would expect that, all other things being equal, copying in longer forms would always default to the right edge, as CONTIGUITY would force this, for example in hypothetical *badupikik, *badupipik*. STRONG RIGHT ANCHOR could challenge this result, leading to a preference for internal copying when OO-CONTIGUITY is ranked below the anchoring constraints. Regardless, it is still clear that since these cases do not involve a morphological RED morpheme, the fact that segments at the right edge of the word are copied does not present a problem for the asymmetric BR-Anchoring theory, as no BR-Anchoring is in fact occurring.

An important question is however: could STRONG LEFT ANCHOR force reduplicative suffixing? Ussishkin's constraint must be modified slightly, in order to preserve the asymmetric results achieved thus far. Note that STRONG LEFT ANCHOR could actually work *against* left edge reduplication, as a left anchored form would violate it: *b_1a-b_1adupi*. Thus, the constraint should be changed to require the segment at the edge of the input to stand in correspondence with the leftmost segment in the *corresponding morpheme* in the base.

(72) STRONG LEFT-ANCHOR (revised): if *x* is at the left edge of morpheme α in the input, and *x* and *y* stand in correspondence, then *y* is at the left edge of the corresponding morpheme α in the output.

(73) a. /$\{katab\}_{\alpha}$/ → $\{$**k**$akatab\}_{\alpha}$ (*STRONG LEFT-ANCHOR)
b. /$\{katab\}_{\alpha}$, RED_{β}/ → ka_{β}-$\{katab\}_{\alpha}$ (✓STRONG LEFT-ANCHOR)

What is crucial to rule out is the possibility that a left-anchored reduplicative morpheme could violate STRONG LEFT-ANCHOR. If it could, then this constraint could actually compel right edge reduplication (regardless of the relative prominence of the last syllable of the base), which is argued not to be possible. With this assumed structure of morpheme correspondence, however, reduplicative copying will not violate STRONG ANCHOR, and thus STRONG-LEFT ANCHOR will not compel right edge reduplication. This assumption then will preserve the results in the cases where there is a sole morpheme in the output, and it will eliminate the possibility that a left-anchored segment in the reduplicant would cause a violation of this constraint.

4.5 Right edge effects in IO-anchoring

The essential argument for a left/right asymmetry in reduplication is that the desire to access the root has a reflex in the grammar by which prefixing is ultimately preferred, because this does not impede root access, while introducing the additional morpheme as early as possible. Hawkins and Cutler (1988) argue that in the case of fixed segment affixes, *suffixing* is preferred, sometimes even when this conflicts with otherwise obeyed morphological head order, using the same essential motivation: early access of the root.

Given the over-arching theme of 'root first' in these two realms, we would expect that IO-anchoring would also exhibit an edge asymmetry, with a left edge bias. Thus, rather than arbitrary anchoring to one edge or the other, we would expect to find cases of apparent right edge root anchoring only when IO-LEFT ANCHOR is not possible, due to a highly ranked constraint. Examples exhibiting IO-LEFT-ANCHOR violations due to compelled epenthesis are given below. Such cases must be addressed, to determine whether they would support the existence of a RIGHT-ANCHOR constraint. The result is that all cases are consistent with an asymmetric system, in which violation of LEFT-ANCHOR is compelled by a yet higher-ranked constraint. The examples mainly fall into two classes, as noted by Broselow (1982): violation compelled by syllable structure markedness, or by prosodic requirements.

4.5.1 Spanish initial epenthesis

Spanish (Harris 1987): initial epenthesis in #sC clusters. Initial *s*, as in many languages (Attic Greek, among others) is extra-syllabic. The result in Spanish is that a syllable is created by epenthesizing *e* to support the *s*. Examples follow:

(74)	Esclerosis	cf.	arteriosclerosis	*sEclerosis
	Esperma		zoospermo	*sEperma
	Esfera		hemisferio	*sEfera
	Eslavo		Yugoslavo	*sElavo

There are two issues here. The first is simply to recognize that this is of course not right anchoring, but rather epenthesis to resolve markedness at the left edge of the word. However, we must explain why epenthesis is initial, when **seperma* for example with epenthesis after the initial consonant would serve the same purpose.

(75) a. M-CONTIGUITY: Contiguity is respected within morphemes. (Landman 1999, Kisseberth 1970)

b. *#sC: Word-initial consonant clusters that begin with *s* are marked.

(76) {M-CONTIGUITY, *#sC} » LEFT-ANCHOR

/sclerosis/	M-CONTIGUITY	*#sC	LEFT-ANCHOR
a. ☞Esclerosis			*
b. sclerosis		*!	
c. sEclerosis	*!		

The answer appears to be that CONTIGUITY in this case dominates IO-LEFT ANCHOR. Supporting evidence for this answer comes from the behavior of final epenthesis:

(77) Final epenthesis (Harris 1987:108)

adelantE	(*adelanEt)	cf.	adelanto
padrE	(*padEr)		padrino

In order to save an otherwise unsyllabifiable root-final segment, an *e* is epenthesized. Notably however, it appears morpheme-finally, thus not violating the CONTIGUITY of the root.

The relevance of MORPHEME CONTIGUITY, which forces epenthesis to be at morpheme edges, can be seen when comparisons are made to “plural epenthesis”. Monomorphemic *embalse/*embales*, but the plural form of *azul* is *azules*, not **azulse*. Thus, when MORPHEME CONTIGUITY does not apply, the effect of FINAL-C (McCarthy & Prince 1994) can be seen.

(78) M-CONTIGUITY » NO CODA (word-internal)

/embals/	MORPHEME CONTIGUITY	FINAL-C	NO CODA
a. ☞ em.bal.sE		**	**
b. em.ba.lEs	*!	*	**

(79) M-CONTIGUITY inactive; epenthesis is word-internal

/azul + s/	MORPHEME CONTIGUITY	FINAL-C	NO CODA
a. azulsE		*!	*
b. ☞ azulEs			*

It is clear that LEFT-ANCHOR is not undermined by a putative RIGHT-ANCHOR constraint here. Rather, L-ANCHOR is dominated by independently motivated markedness and faithfulness constraints: *#sC, M-CONTIGUITY » L-ANCHOR.

4.5.2 Augmentation via epenthesis

Augmentation can either take the form of epenthesis of unmarked material, or else copying of (usually adjacent) segments, shown in the previous section to depend on the relative ranking of DEP and INTEGRITY. In terms of the apparent right anchoring that is the focus of the discussion, Tzotzil (Mayan) is a language that I claim exemplifies augmentation to satisfy an emergent morphological template. The closely related language Tzeltal is an example where affixation imposes a template on the output.

In (80) below, we see that a full range of cases, combining the two types of templates and the different means of satisfying them in the case of augmentation.

(80) Typology of augmentation to satisfy a template

	insert	copy	mixed
[σσ]	Iraqi Arabic Axininca Campa Lardil Mohawk	Tzotzil	Cupeño (…σ́[σσ]) (copy V, epenthesize C) Ethio-Semitic[28] (copy C, epenthesize V))
CVCVC+affix	Miwok[29]	Tzeltal	Yokuts[30]

Returning to the examples involving augmentation, there are several cases where epenthesis is used to augment a sub-minimal base.

(81) Epenthesis

a. Mohawk (verbs must contain two syllables)

/k+ek+s/	íːkeks	'I eat'

b. Iraqi Arabic (minimal word = μμ)[31]

*drus	ʔídrus	'study!'

c. Axininca Campa (minimal word = μμ)

/p/	pAA
/na/	naTA
/tʰo/	tʰoTA

d. Lardil (minimal word = μμ)

Underlying	Uninflected	Accusative	
/maan/	maan	maanin	'spear gen.'
/parŋa/	parŋa	parŋan	'stone'
/wik/	wikA	wikin	'shade'
/wun/	wunTA	wunin	'rain'

[28] See Rose (to appear).
[29] Ulwa *-ka-* infixation is a related example, exhibiting suffixing to the initial iamb in the base. The difference is that extra material is not deleted in Ulwa: *bas → (bas)ka; karasmak → (karas)-ka-mak.*
[30] See Arcangeli (1983).
[31] Epenthesis is optional (ʔidrúus ~ drúus 'lessons'), except in the case where a monosyllabic word is sub-minimal, in which case it is obligatory. This example is notable also for the fact that it violates both weak and STRONG-LEFT-ANCHOR and HEAD-DEP, leaving one to wonder why epenthesis is not final: **drúsi*. See below for speculation.

In the first two examples, epenthesis occurs at the left edge, which is not expected under this analysis. Looking more closely at these cases however, it appears that the additional material is in fact not epenthetic, but rather prefixal. The prefix disappears when the verb is already at least minimal size. Evidence to this effect is offered below.

Mohawk initially appears to be an example of metrically conditioned epenthesis where the epenthetic vowel is initial. Verbs in Mohawk must be disyllabic; an *i* is inserted when needed to achieve disyllabicity.

(82) Initial *i* in Mohawk (Piggott 1995:294, Michelson 1988)

a. k-yʌ-s	í̲kyʌs	‘I put it’
b. k-tat-s	í̲ktats	‘I offer it’
c. k-ek-s	í̲ːkeks	‘I eat’
d. s-riht	í̲se̲riht	‘cook!’
e. t-n-her-ʔ	í̲te̲nehre̲ʔ	‘you and I want’

However, further investigation of this vowel reveals that its behavior is quite different from the other two epenthetic vowels in the language, *e* (inserted for phonotactic reasons) and *a* (the “joiner” inserted between certain morphemes). These two vowels are often overlooked for stress assignment, whereas the *i* is invariably stressed. Thus, it appears that *i* is rather a verbal prefix; it surfaces only when the output would otherwise fail on prosodic minimality. The ranking that would yield this result is one where left-alignment of the root usually dominates realization of the *i* prefix; the highly-ranked disyllabicity requirement on verbs can then compel the *i* to surface just in case it will provide the crucial second syllable: FOOT BINARITY(σ)$_{Verb}$ » ALIGN L(root, stem) » REALIZE MORPHEME (*i*), ALIGN L(*i*, stem).[32]

The case of Iraqi Arabic is a bit more complicated. Epenthesis happens in the case of mono-moraic verb stems (the final C is extra-metrical): *drus* → *ʔídrus* 'write'. Additionally, epenthesis may occur optionally when a stem has an initial CC cluster (presumably, it may not occur otherwise, but this is not made explicit): *ʔidrúus* ~ *drúus* 'lessons'. It is not possible to argue that CONTIGUITY drives the initial epenthesis, because final CC clusters are broken up medially: C**V**C, *CC**V**. I must suggest that the prefixes occur by analogy to similar verbal prefixes in a closely related language. However, this clearly requires further research.

4.5.3 Appalachian English a-*prefixation*

One additional case of disappearing prefixes is worth mentioning: participial *a*-prefixation in Appalachian English (Wolfram & Christian 1976). This case is different from the two mentioned above however; instead of a highly ranked markedness constraint compelling the realization of the prefix, in this case, the prefix disappears when its realization would violate specific markedness constraints.

This prefix is observed in participial forms of verbs with initial stress:

[32] Thanks to John Alderete for discussion of these data.

(83) *a*- prefixation[33]

a-wálking e.g. *Jenny went a-walk-/wander-/hunting in the woods*
a-wándering
a-húnting
a-tálking

There is no prefix when the participial verb begins with a relatively unstressed syllable, **a-discóverin', *a-retírin'*, e.g. **He was a-discoverin' a bear in the woods*. There is also no prefix when the verb begins with a vowel, **a-eatin', *a-askin',* e.g. **He was a-eatin' the food.* I take this to indicate that the Morpheme Realization constraint for the verbal participial prefix is relatively low ranked, below both *LAPSE ("do not have two adjacent unstressed syllables" (Selkirk 1984)) and ONSET.

Wolfram and Christian point out that this prefix appears only in the participial form, as the following gerund forms are ungrammatical.

(84) No *a*- prefixation in gerunds

*He watched their a-shootin'
*A-sailin' is fun.

A-prefixation is also ruled out when the *–ing* form functions adjectivally.

(85) No *a*- prefixation in adjectives

*The movie was a-shocking.
*Those a-screamin' children didn't bother me.

[33] According to Wolfram and Christian (1976:70), most sources consider *a*-prefixing to be historically derived from prepositions, especially *on*, e.g. *he was on hunting*.

Thus, only the verbal forms allow the prefix. This supports the relativization of a realize morpheme constraint to only the verbal prefix ranked high enough to surface in forms where its presence would do no harm, and disappear otherwise.

In the case of fixed segment affixation accompanied by an imposed template, we do see an example of augmentation by means of epenthesis in Southern Sierra Miwok.

4.5.4 Epenthesis to fulfill a template: Southern Sierra Miwok

Southern Sierra Miwok (Sloan 1991) offers an interesting example of epenthesis to fulfill a template. A variety of templates can be imposed by a suffix. That is, in isolation, the stem need not conform to a particular size; the same is true with certain concatenating morphemes that do not impose a templatic requirement on the stem. However, with suffixes that subcategorize for a certain templatic size, a monomorphemic stem conforms to the requisite *CVCVC*, *CVCV*, *CVCCV* or '*CVCVX'* shape.

The C-final CVCVC is typically filled by epenthesis of {Y,[34] ʔ} when the stem is too small and/or not C-final.[35] The underlying segmentism of the root is evident in forms that have 'concatenating' suffixes, i.e. suffixes that do not impose a template on the stem to which they affix.

(86) CVCVC-imposing suffixes

a. -kuH-

alteration	*UR*	*affixed form*	
∅→V	/wyks/	wykUs-kuH	'to go/someone evidently went'
∅→V, ∅→C	/loːt/	lotUʔ-kuH	'to catch, to grasp, to grab/capture'

[34] /Y/ varies between {y~u~o} (where *y* is the central high vowel), depending on the preceding vowel.
[35] In some cases of both native Miwok and Spanish loan words, deletion to fit the template is necessary, e.g. *saruːca-* 'crosscut saw' → *sarus-nY-* 'to saw' (cf. Spanish *serrucho*)

b. -peH-

C: → C	/liw:a/	liwaʔ-peH	‘to talk, tell something/speechmaker’
CV → VC	/hal+ki/	halik-peH	‘to hunt/hunter’

These examples show several different means of accommodating the template. The first is epenthesis of a consonant and/or vowel, even within the stem, (at the cost of CONTIGUITY). The length of an underlying segment can be neutralized for the sake of template satisfaction. Also, there are cases with CVC roots where the root is reanalyzed in the event of suffixation, to incorporate the suffix. The combination of the two then functions as a root for the sake of the template. This is seen in the last example in (86b), where metathesis occurs (violating LINEARITY). Additional segments, when needed, are epenthesized rather than copied.

4.6 Examples of copying to fulfill a template

In the following examples, I propose that a template is imposed on the output form, which leads to copying to fulfill the template. In each case, independent evidence suggests that the copying witnessed is augmentative rather than reduplicative, which supports the striking result that these apparent counter-examples to the asymmetric theory of reduplication advanced here instead offer further evidence in favor of Positional Anchoring.

4.6.1 Yoruba

In Yoruba, there is a class of ideophones that appears to exhibit right edge reduplication.

(87) Yoruba ideophones; ‘partial reduplication’ (emphasis, increased intensity) (Akinlabi 1985, Awoyale 1974, 1989, 2000)[36]

rogodo	rogodo-do		‘of being very round and small’
lɔ̀kɔ̀tȉ	lɔ̀kɔ̀tȉ-tȉ		‘of being very sticky’
gbàgȉďȉ	gbàgȉďȉ-ďȉ		‘of being very bulky’
gɛ̀gɛ̀rɛ̀	gɛ̀gɛ̀rɛ̀-gɛ̀	(~gɛ̀gɛ̀rɛ̀-rɛ̀)	‘of being very stout and bulky’
pepere	pepere-pe	(~pepere-re)	‘of being very cute and robust’

Ideophones are roughly characterized as providing “vivid vocal images or representation of visual, auditory, and other sensory or mental images” (Awoyale 1974 and references therein).

Awoyale (1974) provides examples from English that he calls “suspected ideophones”. The comparison to English is used in part to highlight the difference between ideophones and onomatopoeias.

(88) Possible English ideophones (Awoyale 1974:137)

wishy-washy	tick-tock	fuzzy-wuzzy
hurly-burly	higgledy-piggledy	hanky-panky
roly-poly	criss-cross	flip-flop
tip-toe	zig-zag	riff-raff

McCarthy & Prince (1996) note that these words (‘echo words’ in their terms) observe severe prosodic restrictions. Each member is no longer than one foot, and also necessarily has initial stress, leading to the ungrammaticality of examples like hypothetical **banána-*

[36] There is also a productive process of total reduplication with ideophones, “distributive reduplication”, (e.g. *kɛ́rɛ́/kɛ́rɛ́-kɛ́rɛ́* “of moving quickly/of moving several times quickly”; *gbàgȉďȉ/gbàgȉďȉ-gbàgȉďȉ* “of being big/of several things being big”, etc.).

cabána.[37] They note that an echo word must be a compound of exactly two metrical feet, i.e. two minimal words.[38]

I propose that Yoruba ideophones undergo augmentation by means of augmentative copying at the right edge. The target size is four syllables (i.e. two disyllabic feet). Ola (1995) notes several cases of a four-syllable upper limit on prosodic size in Yoruba (among them, root size, clefted nouns, number of prefixes, and hypocoristics). Citing earlier work by Bagemihl, she proposes a "maximum prosodic word" that is binary at the level of the foot and the prosodic word.

In preparation for the comparison of these English examples with the quadrisyllabic forms in Yoruba, I would like to highlight the similarity that these forms have to a compound structure. Anywhere from zero to both members of the form can be an attested word in English: *fuzzy, burly, flip, flop*. However, even in the case of two independent words coming together, there is no obvious compositional meaning. The words are prosodically similar to compounds, with a main stress for each member of the "ideophone". Semantically however, they are less transparent, in most cases being composed of what must be considered two cranberry morphs.

Prosodically, these ideophones are highly restricted, with a template of two disyllabic feet, as mentioned above. They also must exhibit uniform tone height.[39] In this way, they are similar to Yoruba hypocoristics, which also have a restriction on the tonal

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[37] Alan Prince (p.c.) however provides isolated exceptions to the generalization above: *banána-ráma* and *Durán-Durán*.

[38] They make a similar observation for Pig Latin, which they claim is a case of reduplication ("with extensive prespecification"). Pig Latin involves word reduplication, resulting in two phonological words, with the second one being minimal, (a monosyllabic foot), e.g. *onology-phay*.

[39] In fact, the tones are generally associated with prescribed meanings: low tones suggest heaviness, large size, coarseness of sound; mid tones average or medium proportion and high tones indicate high pitch in sound, smallness, light weight, or fast speed (Awoyale 1974:286).

contour: it must be HHML (Ola 1995). A further restriction appears to be that three identical syllables in a row are prohibited (Awoyale 2000:297).[40]

4.6.1.1 Four syllable template

The first task at hand is to derive the four syllable template. Ola (1995:219) achieves this by first of all positing the constraint for hypocoristics : Hypocoristic template = PrWd-Bin Ft^{max}, which results in a bipodal template. Rather than stipulate this, a better approach is to have the size emerge by Ussishkin's "Derived word TETU", discussed in §4.2.1.3 above. The constraints that emerge to impose a four-syllable size are given below:

(89) a. FOOT-ALIGN: Every foot must be aligned to the edge of some prosodic word containing it. (Maximality: limit $[(\ldots)_{Ft}(\ldots)_{Ft}]_{PrWd}$) (Ito, Kitagawa & Mester 1996)

b. PROSODIC WORD BRANCH: A prosodic word must branch at the level of the prosodic word. (Minimality: bans $*[(\ldots)_{Ft}]_{PrWd}$) (Ito & Mester 1992)[41]

c. FOOT BRANCH: A foot must branch. (Minimality: bans *(σ))

Both minimality and maximality act on the OO-derived forms, which leads to fixed prosody for this class of words.

[40] The exception that he cites is the case of tonally polarized triplication, (e.g. *kúú-kùù-kúú*, 'of several short pieces'), which is a different process than the one with which we are concerned.
[41] This constraint is a revision of the original constraint proposed by Ito & Mester, which was satisfied by branching at either the prosodic word or foot level. Perhaps a better alternative would be to appeal to NONFINALITY, with the requirement that the head foot be footwise non-final (Ito, Kitagawa & Mester 1996, McCarthy 1997).

(90) Derived template:

```
   PrWd
   /  \
  Ft   Ft
 / \   / \
σ   σ σ   σ
```

The ranking then that imposes a four-syllable template on this class of ideophones is the following:

(91) FAITH-IO >> FOOT-ALIGN, PRWD BRANCH, FOOT BRANCH >> FAITH-OO_{IDEO}

4.6.1.2 /CV/ Ideophones

All four-syllable forms that originate from an underlying /CV/ ideophonic stem would be of the shape $C_1V_1C_1V_1rV_1$-C_1V_1 ($C \neq r$), or else $C_1V_1C_1V_1rV_1$-rV_1.[42] I make two assumptions in my analysis. The first is that the underlying form for these examples is /CV/. The other however is that these four-syllable forms are derived from ideophones that have already been derived from this underlying form, to trisyllabic size: *CVCVrV*. This step obviously deserves attention, but I take it for granted in this discussion.

The forms in (91) are at least partly in free variation, according to Awoyale (1989:26); both can have a 'metaphorical' sense. Only the second variants can express a literal sense. In my analysis, I will offer an account of the free variation.

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[42] The second-syllable onset can apparently be optionally deleted (Akin Akinlabi, p.c.).

(92) Four-σ ideophones: copied syllable appears at the right edge; it appears that copying may be non-local [43]

pepere	pepere-pe	~	pepere-re	'of being very cute and robust'
gɛ̀gɛ̀rɛ̀	gɛ̀gɛ̀rɛ̀-gɛ̀	~	gɛ̀gɛ̀rɛ̀-rɛ̀	'of being very stout and bulky'
gbàgbàrà	gbàgbàrà-gbà	~	gbàgbàrà-rà	'of being heavy and strong'
gogoro	gogoro-go	~	gogoro-go	'loftiness'

The necessary constraints are given below.

(93) a. *3σ: Bans three identical adjacent syllables bearing the same tone.[44]

b. LOCALITY: The copied portion of the base and the corresponding reduplicant must be adjacent.[45]

c. INTEGRITY: No element of S_1 has multiple correspondents in S_2. (McCarthy & Prince 1995)

The data in fact support a further distinction in INTEGRITY constraints: in particular, we need a constraint is sensitive to *r* only (INTEG(r)). As we see in the tableau below, violation of INTEG(r) is more highly ranked than the other more general version of INTEGRITY.[46] The ranking illustrated in the tableau in (90)

[43] There is one exception, gégéré-gé/*gégéré-ré. This is the only example of the form #$C_1V_2C_1V_2$ … so the unavailability of * rV́rV́ might indicate emergent markedness of rV́, suggesting that additional forms from underlying /CV/ would also be limited.
[44] As with *2σ mentioned below, I assume that this constraint is related to the OCP. Another way to express this restriction is through local self-conjunction (Smolensky 1995) of the constraint against adjacent identical syllables, *2σ. Mandarin exhibits a similar ban on three consecutive identical syllables (Feng 2002).
[45] See Chapter 1, §1.2 for references and formalization.
[46] This predicts that in any three syllable ideophone ending in *rV*, the possibility exists to copy the second CV, as in hypothetical *bogoro-go*. I have no data to confirm this prediction. In addition, there is apparently the possibility to copy over *l* in a non-local fashion as well, e.g. *bèbèlè-lè* ~ *bèbèlè-bè*. Apparently, *-lV* indicates the diminutive (Awoyale 2000:304). Thus, it must be that INTEG(l) is also separately ranked, higher than the general constraint.

(94) DEP >> INTEG

[bàbàrà] [+ideophone]	*3σ	INTEG (r)	LOCALITY	INTEG
a. ☞(bàbà)(ràbà)			**	**
b. (bàbà)(ràrà)		*!		**
c. (bàbà)(bàrà)	*!			**

Free variation between bàbàrà-bà and bàbàrà-rà occurs assuming the ranking between INTEG(r) and LOCALITY is crucially unranked (see Anttila & Cho 1998 for discussion of free variation through crucially unranked constraints).

4.6.1.3 /CVCV/ Ideophones

With disyllabic bases, it appears that the ideophone will double. Given the ban of three like syllables, this is the best possible solution, as triplication of the final syllable (e.g. **hábábábá*) is independently ruled out.

(95) σσ bases that double to fill four-syllable template

hábá-hábá	‘of humans: wobbling, clumsy movement’
gáɗí-gáɗí	‘of a network: completely filled up’
fata-fata	‘of talking fast at a high pitch’
gule-gule	‘of responding hurriedly’
bȉr̃ȉ-bȉr̃ȉ	‘of a sizeable object rotating swiftly’

The additional constraint needed to account for these forms appear below:

(96) DEP: No insertion. (McCarthy & Prince 1995)

(97)

[gádí] [+ideophone]	*3σ	DEP	LOCALITY	INTEGRITY
a. ☞ gádígádí				****
b. gádídírí		*!		***
c. ✖ gádídígá			*!***	****
d. gádídídí	*!			****

The candidate *gágádídí* in fact ties with the winner on all of the above constraints. However, this type of augmentative copying is unknown to me and may be unattested. I suggest that in this case it is ruled out by a low-ranked *2σ constraint against 'echo' in adjacent syllables.[47] The *r* in candidate (b) is epenthesized, thus violating DEP. Candidate (c) is harmonically bounded, as its violations of LOCALITY are in addition to all of the violations that it shares with candidate (a).

4.6.1.4 /CVCVCV/ Ideophones

Underlyingly /CVCVCV/ ideophones augment simply by copying the final syllable. This is predicted by the constraint ranking as it has developed thus far.

(98) Final syllable copying only: /CVCVCV/ ideophones

rogodo	rogodo-do	'of being very round and small'
lɔ̀kɔ̀ɗì	lɔ̀kɔ̀ɗì-ɗì	'of being very sticky'
gbàg̀iɗi	gbàg̀iɗi-ɗi	'of being very bulky'
lɔ́kósán	lɔ́kɔ́sán-sán	'of being very slim and agile'
sánpɔ́nná	sánpɔ́nná-ná	'of being very blunt or plain'

[47] Such a constraint ("*REPEAT" in Yip 1995 e.g.) has been argued by Yip to be related to the OCP.

(99) copying of final syllable

[bàkàtà] [+ideophone]	DEP	STRONG LEFT ANCHOR	INTEG	LOCAL
a. ☞(bàkà)(tàtà)			**	
b. ✗(bàbà)(kàtà)		*!	**	
c. ✗ (bàkà)(tàkà)			**	*!*
d. (bàkà)(tàrà)	*!			

In this example, we see that the STRONG LEFT-ANCHOR constraint is once again needed to explain why augmentative copying occurs at the right edge of the word (b). We also see an argument that DEP is ranked above INTEGRITY, as only one form of augmentation need occur, and copying is the unique attested solution (d). Also, we see that the non-local copying candidate is harmonically bounded. Non-local copying could be forced in order to satisfy *3σ in the CV examples. Here, there is no threat to the OCP, so non-local copying is uniformly banned.

4.6.1.5 Comparison with a morphological reduplication analysis

A morphological reduplication account would be hard-pressed to explain why non-identity of ideophone-internal vowels would have such a direct effect on the edge from which a segment may be copied. The divide falls plainly between ideophones that originate from underlying /CV/ on the one hand, and the trisyllabic ideophones (with probable further internal structure) on the other. For the /CV/ examples, copying of either that CV or the *rV* augment is possible. However, the longer ideophones allow augmentation to copy the adjacent CV sequence only. Under an augmentation analysis, the divergent structures of these ideophones dictates the options in terms of phonological copying. If a RED morpheme were responsible for the copying however, then there is no way to explain why anchoring is strict in the one case and can vary in the other. It is also worth noting that there is no productive suffixing in Yoruba (Awoyale 1974:151). Thus, under a right-aligned RED, right-anchoring account, this would be the lone suffixing morpheme. Under the proposed analysis however, augmentation by phonological copying is unsurprising, given the independently imposed prosodic template.

A final class of apparent, systematic exceptions is given below. These are potentially damaging to the proposal at hand, as they are *five* syllables long. If the template is two disyllabic feet, it is not immediately clear how to justify their excessive length, as these words already meet the required size. These would turn the tables in favor of an analysis with suffixed RED.

4.6.1.6 /CVCVCVCV/ Ideophones

If the template is four-syllables, it is not immediately clear how to justify the excessive length in these forms, as they already meet the required size.

(100) five-syllable forms[48]

hàràgbàdù-dù	*hàràgbàdù-hà	'very stout and bulky'
porogodo-do	*porogodo-po	'being completely used up'

Predictably, it is not possible to copy from the "wrong-side" in these cases; there is no *rV* augment to inhibit copying of adjacent material. How is it though that the five-syllable forms are allowed? These exceptional forms all have one thing in common, in fact:

[48] Additional forms which behave the same way but for which I lack glosses are: *bàràkàtà-ta* and *fárágádá-dá*.

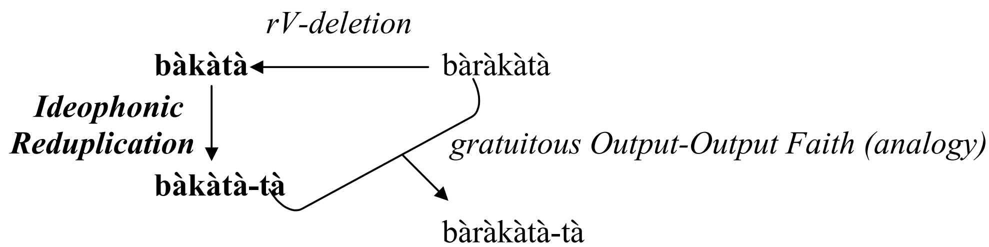
second syllables that begin with *r*. It turns out that for each of these forms, there is a corresponding form of four syllables, minus the *–rV-* syllable (Akin Akinlabi, p.c.):

(101) corresponding four-syllable forms

hàgbàdù-dù
pogodo-do

Necessary for the ‘exceptional’ forms in (99) then is a system of analogy. This is not an easy task, and one that certainly goes beyond the scope of the investigation at hand. However this system were to work, it would have to allow the *rV* syllable to get re-inserted to the ideophone formed in accordance with the standard four-syllable template. Below, I offer a sketch of how analogy might be structured. The examples in (100) arise when gratuitous OO-FAITH is observed between the four-syllable original ideophone and the augmented ideophone derived from a base that has undergone *rV*-deletion.

(102) Analogy in case of five-syllable ideophones



Finally, I offer some additional evidence of a four-syllable template.

4.6.1.7 Further evidence of four-syllable template

Additional examples showing evidence of four-syllable template for intensifying ideophones are given below.

(103) Diminutive suffix –lV (/-nV) fulfills template requirement[49]

jáńjá[50]	jáńjá-lá	'small shapeless piece/ very small shapeless piece'
tóńtó	tóńtó-ló	'small roundish piece/ very small roundish piece'
béńbé	béńbé-lé	'small handy object/ very small handy object'
tínńtín	tínńtín-ní	'tiny particle/ very tiny (almost invisible) particle'

These forms need undergo no further derivation to form the intensifying ideophone; with the presence of the diminutive suffix *–lV*, they already satisfy the four-syllable requirement.

Finally, I will note that the proposed type of augmentation, primarily through copying, receives support from the independently motivated C- and V-copying found in the language, illustrated below.

4.6.1.8 C-copying: gerundive formation

In gerundive "reduplication" in Yoruba, the prefix *í-* is added, and the adjacent consonant copies to provide an onset for this syllable (Akinlabi 1985, Ola 1995, Alderete et al. 1999, Kawu 2000 and others):

[49] [l] and [n] are in complementary distribution in Yoruba; [n] occurs only after nasal vowels.
[50] The *n* here is syllabic.

(104) Gerundive formation: C_1í+C_1V_1

jó	jíjó	'dance'
kú	kíkú	'die'
mɔ̀	mímɔ̀	'know'
là	lílà	'split'

Kawu argues that this is not a case of morphological reduplication, but rather an example of copying in which the C is copied simply to provide an onset. An independent markedness constraint against onsetless high-toned Vs, *H&ONSET, compels the violation of INTEGRITY.

(105) a. INTEGRITY: No element of the input has multiple correspondents in the output. (McCarthy & Prince 1995).

b. *H&ONSET: An onsetless syllable may not contain a H tone.

Kawu also highlights the parallel nature of epenthesis and copying. What determines the choice between the two is simply the relative ranking of INTEGRITY and DEP, the constraint against epenthesis.[51]

4.6.1.9 V-copying: simplifying Cr clusters in loan words (Akinlabi 1993)

Loanwords with C clusters are re-syllabified, following permissible structures in Yoruba.

[51] It is doubtful that the situation is quite this simple. McCarthy (1997) notes that spreading of a consonant across a vowel is thought by some to be something that does not occur in any language. The Yoruba case above is a counter-example. However, it does seem likely that spreading is more constrained than epenthesis, in a way not captured by the mere relative ranking of these two constraints.

(106) *i* or *u* may be inserted to break up such onset clusters

síléèt̃ì	'slate'
sítóòfù	'stove'

(107) Inserted V may be *u* in two cases:

a. *u* inserted if the initial C is labial /b,f,m/.

b. *u* inserted as a final V because of the tendency for front/back vowels to exclude each other in the last two syllables of polysyllabic nouns ('Back Harmony').

The following cases illustrate when neither *i* nor *u* surface as the created nucleus.

(108) Insertion with Cr clusters

k**e**reyɔ́ɔ̀nù	'crayon'	/e/
t**ɛ**rɛlîinì	'trellis'	/ɛ/
sák**á**ráméńt̀i	'sacrament'	/a/
t**ɔ́**rɔ́fì	'trophy'	/ɔ/
p**ò**ròpɛ́là/p**ù**ròpɛ́là	'propeller'	/o/

There is a clear distinction between Cr clusters and other clusters entering the language: only Cr clusters are "split up" by these five Vs.

(109) Effects of Cr clusters in loan words

- The V used for onset cluster simplification is identical with the following V; these cases require a rule of vocalic spreading (i.e. copying).[52]
- Even though all sonorants (and coronals) can occupy C_2 position in these CC clusters, only /r/ is transparent to spread.

[52] Other cases of regressive vocalic spreading exist in the language (Akinlabi 1993:156); this is not particular to the loan word phonology. Examples are: *owó-adé* → *owáadé* 'Ade's money'; *owó ɛmu* → *owɛ́ɛmu* 'wine money'. Postlexically, *r* blocks regressive spreading like every other C in the language.

This case is relevant for the discussion of ideophones as it again shows the potential for the grammar to exploit copying to satisfy a highly-ranked markedness constraint against consonant clusters. What is also interesting about the loan word data is that they exhibit copying over *r*, as we saw was possible for consonants and vowels alike in the underlyingly CV forms. Proclivity of *r* to be copied over is not captured by the account proposed above, in which rather it was claimed that *r* would not itself copy locally due to a constraint against multiple correspondence that applied to *r* alone.

4.6.1.10 Conclusion

In spite of the superficial resemblance that these intensive ideophone examples bear to morphological reduplication, we have seen that Yoruba ideophone formation necessarily involves augmentation to a bipodal template rather than suffixation of a RED morpheme and subsequent right-anchoring. Only with an augmentation analysis can we explain why the resulting form is consistently four syllables long. It also offers a unified analysis of the intensification of both two syllable and three syllable ideophones; a suffixed RED would make the wrong prediction (hábáhábá vs. *hábá-bá). It is also only this account that accurately predicts when insertion of a CV syllable that copies material non-locally is possible.

4.6.2 Tzotzil

Another example of apparent right edge reduplication that, upon closer inspection, seems to involve rather right edge augmentation is the case of 'affect' verbs in Tzotzil (Ringe 1981). Affect verbs are a special class of aspect verbs that take only neutral aspect and exhibit the prefix *x-*. These are formed from CVC roots, the basic root form in Tzotzil (Sarles 1966:32)), copying the final *-VC* to yield $C_1VC_2VC_2$. I propose that rather than reduplication, as Ringe claims, this is a case of augmentation to disyllabic size by copying. Roots of the form CV, CVVC, or CVCV do occur; many of the CVCV roots are direct loans from Spanish. Any longer forms are either derived from CVC forms, Spanish loans, or perhaps in the case of a few, due to either a derivation which is no longer functional in the language, or else due to dialect mixture and influence from nearby Tzeltal speakers (Sarles 1966:32). However, there is no evidence that longer forms undergo copying. Ringe notes one (onomatopoetic) exception: *korok* → *korokok* 'cluck'. Short of this however, what we do not see are examples such as *rason* 'sense, wisdom' → **rasonon* 'suddenly realizing'. Only a templatic analysis could capture this restriction.

(110) Tzotzil affect verbs

a. bek'	bek'ek'	'brush into a pile, sweep up/ being wafted'
b. sak	sakak	'white/ moving palely and rapidly; in darkness'
c. kal	kalal	'brimming suddenly with tears'
d. kev	kevev	'running with twisted mouth (drunk)'
e. kot	kotot	'feeling cramp or stomachache'
f. kech	kechech	'flooding'
g. kuj	kujuj	'ducking down'

In a symmetric system, this pattern could potentially be analyzed as right-anchored, with a suffixed reduplicant. The unavailability of such an account is an advantage here, as it leads unambiguously to a templatic analysis. A templatic analysis is shown to be superior, in that it can easily explain why the size of the roots targeted by this constraint is restricted to CVC; the CVCVC output then fulfils the target template. Morphological reduplication involving the introduction of a RED morpheme and BR anchoring, would entail no such restriction.

Affect verbs have an emergent prosodic template requirement that they be disyllabic. The problem in enforcing this restriction is that not all of the forms in (110) have a bare output form. However, I must tentatively claim that this non-existent output is one that is available for output-output correspondence. If the output-output constraint is ranked above INTEGRITY, which we know to be independently ranked above FOOT BINARITY, then augmentative copying is the optimal way for affect verbs to fulfill their prosodic template: INTEGRITY-IO >> FOOT BIN >> INTEGRITY-OO.

(111) a. INTEGRITY: No element of S_1 has multiple correspondent in S_2. (McCarthy & Prince 1995)

b. FOOT BINARITY: Feet are binary at the level of the syllable. (McCarthy & Prince (1993a,b)

(112) INTEGRITY-IO » FOOT BIN

/sak/	INTEGRITY-IO	FOOT BIN
a. ☞ sak		*
b. $sa_1k_2a_1k_2$	*!	

When there is no *[+affect]* specification for the input, then we see that faithfulness prohibits compliance with foot binarity.

The affect is however formed in relation to an output (or at least possible output, as must be claimed here). This opens the door to satisfaction of FOOT BIN, if we employ Ussishkin's "Derived word TETU".

(113) Derived word TETU
FAITH-IO » PHONO-CONSTRAINT » FAITH-OO

(114) FOOT BIN >> INTEGRITY-OO

[sak] $_{[+affect]}$	INTEGRITY-IO	FOOT BIN	INTEGRITY-OO
a. sak		*!	
b. ☞ $sa_1k_2a_1k_2$			**

In order to rule out the candidate s_1as_1ak, we need to invoke STRONG LEFT-ANCHOR, which will decide in favor of $sa_1k_2a_1k_2$.

Copying of the final *-VC₂* of the root is not the only means by which affect verbs can be formed. There are several fixed-segment suffixes that can lead to an affect verb: *-et, -laj, -luj/-lij*, and *-C₁on,* which copies the first C of the root. In all of these cases, the affix attaches to a root of the shape CVC. This is consistent with the analysis; if a fixed-segment affix is supplied, then nothing more than concatenation must be done in order for the affect verb to satisfy FOOT BIN. For example, *[kop], et*$_{[+affect]}$ → *[kopet]* 'pouring rain'.

(115) Foot binarity is satisfied by affixation

kop, et$_{[+affect]}$	INTEGRITY-IO	FOOT BIN	INTEGRITY-OO
a. kop		*!	
b. ☞ kopet			
c. kopopet			*!*

The winner (b) in fact satisfies all of the constraints under discussion.

I will now turn to the closely-related case of Tzeltal, where the base of affixation is what must satisfy FOOT BIN.

4.6.3 Tzeltal

Tzeltal (Slocum 1948, Berlin 1963) exhibits a similar pattern in certain verb or attributive stems. The differences are that the affix is consistently an overt, fixed-segment one, and that it is the base, as opposed to the resulting form, that satisfies FOOT BIN. The result is an output that is trisyllabic.

The affect verbs/attributive words formed by suffixation of *-et* are always preceded by the prefix *š-*, which indicates the incompletive aspect. This affix has been omitted from the examples below, for the sake of focusing on only the relevant details:

(116) Tzeltal affect verbs/attributive

-níhihet	'(walking about), head downwards, in a crouched position'
-péčečet	'sailing high in the air'
-máčačet	'(walking about) grasping about in the dark, or eyes closed'
-ʔúmumet	'(walking about) face in a fixed smile'
-túčučet	'(walking about) tallest person in crowd'

These examples suggest that, in addition to FOOT BIN, NONFINALITY is emerging in the derived form. The version of NONFINALITY employed here requires the head foot to be syllable-wise non-final in the prosodic word.

(117) FAITH-IO >> FOOT BIN, NONFINALITY >> FAITH-OO

(118)

/nih, et/	INTEGRITY-IO	FOOT BIN	NONFINALITY	INTEGRITY-OO
a. ☞ [-níhi]het				**
b. [-níhet]			*!	

To put this pattern in the context of the language, I will mention that Tzeltal has two patterns of morphological reduplication: total reduplication, and left-anchored partial reduplication. These are types predicted by the proposed theory.

4.7 Conclusion

In spite of the appearance of right edge copying in the various examples above, this chapter shows that in none of these cases is it necessary to appeal explicitly to a constraint that targets the right edge for morphological copying. Some examples were shown to reduce to targeting of stressed material, in which stress coincidentally appeared rightmost in the base. In Lakhota, this was complicated by the fact that lexically stressed forms behaved as if they received default stress. I suggested that this regularization, although at the cost of opacity, leads to uniformity of the overall paradigm. IO-anchoring was shown to behave consistently with the theme of asymmetric left edge faithfulness; it seems that unless a language is compelled violate left anchoring of the root to the output, left anchoring will always occur. Also, cases of augmentative copying were explored. In Yoruba, it was argued that an augmentation analysis for intensifying ideophones has several advantages over the alternative reduplication analysis. Two Mayan languages were argued to exhibit slightly different templates in the formation of affect verbs, with the effect in each being that augmentation to satisfy emergent phonological requirement imposed a resulting "prosodic template”, leading to augmentative copying at the right edge. Crucially, no RED morpheme was present in any of the above cases, and no reference to the right edge for purposes of BR-anchoring was required. These examples all offer further support for the proposed theory of asymmetric anchoring.