Reduplication in English Homeric Infixation

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1. Introduction

In the Base-Reduplicant Correspondence Theory (BRCT: McCarthy & Prince 1995) reduplication is induced by the presence of an abstract RED morpheme. The surface manifestation of this abstract RED morpheme is regulated by a set of faithfulness constraints (e.g., B(ase)-R(eduplicant) faithfulness, BR-anchoring etc.). However, recent work has suggested that purely phonologically-driven reduplication is also possible, that is, reduplication that has no semantic import (Kawahara 2001; Inkelas in press; Inkelas & Zoll 2000, Yu 2003, Zuraw 2002). I call such cases of non-morphological reduplication ***Compensatory Reduplication***.[1] In this paper, I argue for one such case of Compensatory Reduplication (CR), triggered by the Homeric infix in English. A novel theory of CR is advanced, which derives CR through the interaction between constraints on faithfulness and surface segmental correspondence within Optimality Theory, without resorting to stipulating the existence of parochial constraints in the grammar that induce reduplication by brute force (i.e. Zuraw 2002). Section 1 describes the phenomenon of the Homeric infix in English. I introduce the issue of CR in section 2, arguing that the Homeric infix is a genuine infix and that CR is derivative of the conflicting demands imposed by the bidirectional subcategorization of this infix. In the course of the discussion, an analysis of the Homeric infix is presented. Section 4 focuses on the proper treatment of CR. I propose an emergent approach to CR where CR falls out naturally as the result of the interaction between constraints on segmental faithfulness and the correspondence of similar segments. Section 5 summarizes the findings of this study and offers some preliminary thoughts on a general theory of CR.

[1] I refrained from using the term 'phonological reduplication' since its interpretation differs depending on the framework of reduplication under discussion. Thus, the term 'compensatory reduplication' is designed to be theory-neutral.

2. English Homeric infixation: The basic pattern[2]

Homeric infixation is a morphological construction that has recently gained currency in Vernacular American English. People who are familiar with this construction invariably credit the TV animation series, *The Simpsons*, particularly the speech of the main character Homer Simpson, for popularizing this construction. The basic pattern is best illustrated with words with stress on odd-numbered syllables. In words which bear input stress on the 1st and 3rd syllables only, the infix, *-ma-*, invariably appears after the unstressed second syllable, whether the main stress is on the first (1)a & b or the third syllable (1)c & d.

(1)						
	a.	ˈσσˌσ	ˈσσ-ma-ˌσ	c.	ˌσσˈσσ	ˌσσ-ma-ˈσσ
		saxophone	saxo-ma-phone		Mississippi	Missi-ma-ssippi
		telephone	tele-ma-phone		Alabama	Ala-ma-bama
		wonderful	wonder-ma-ful		dialectic	dia-ma-lectic
	b.	ˈσσˌσσ	ˈσσ-ma-ˌσσ	d.	ˌσσˈσσσ	ˌσσ-ma-ˈσσσ
		feudalism	feuda-ma-lism		hippopotamus	hippo-ma-potamus
		secretary	secre-ma-tary		hypothermia	hypo-ma-thermia
		territory	terri-ma-tory		Michaelangelo	Micha-ma-langelo

In odd-stressed words which are long enough to have stress on the 1st, 3rd and 5th syllables, infix placement varies; the infix can follow either the 2nd syllable or the 4th syllable. *-Ma-* may appear two trochaic feet away from the left edge of the word (see (2)a, & (2)c) also. Words with essentially the same syllable count and stress pattern, nonetheless, may have different infixation patterns (e.g., (2)a vs. (2)b).

(2)			
	a.	(ˌσσ)(ˈσσ)(ˌσ)	(ˌσσ)(ˈσσ)-ma-(ˌσ)[3]
		underestimate	underesti-ma-mate
	b.	(ˌσσ)(ˈσσ)(ˌσσ)	(ˌσσ)-ma-(ˈσσ)(ˌσσ)
		unsubstantiated	unsub-ma-stantiated
	c.	(ˌσσ)(ˌσσ)(ˈσσ)	(ˌσσ)(ˌσσ)-ma-(ˈσσ)
		onomatopoeia	onomato-ma-poeia

This distribution suggests that *-ma-* prefers to appear to the right of a disyllabic trochaic foot, as captured by the subcategorization constraint in (3).

(3) Homeric ma-infixation (First attempt)
ALIGN (L, *ma*, R, $FT_{\sigma\sigma}$) = L-ALIGN
'Align the left edge of *ma* to the right edge of a disyllabic trochee.'

[2] Thanks to David Peterson, Meg Grant, Emily Horner, Rachel Goulet and Jake Szamosi for sharing their intuitions on *ma*-infixation with me.

[3] Infixing after the initial foot, i.e. *under-ma-restimate*, is also possible here (i.e. *repa-ma-pellent* vs. *repella-ma-lent*), though with concomitant reduplication.

The analysis makes an interesting, though erroneous, prediction regarding the following forms, however:

(4)	σ̀σσ́σ	σ̀σσ-ma-σ́σ	*σ̀σ-ma-σσ́σ
	multiplication	multipli-ma-cation	*multi-ma-plication
	Mediterranean	Mediter-ma-ranean	*Medi-ma-terranean
	delicacy	delica-ma-cy	*deli-ma-cacy

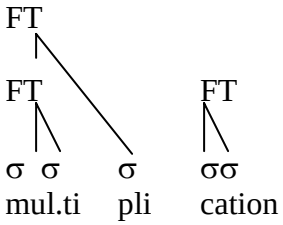
Here, the input contains a ternary pretonic string. Secondary stress is on the initial syllable. Since most theories of English stress do not admit ternary feet, a word like *multiplication* is often parsed as (*mul.ti*)*pli*(*ca.tion*) (e.g., Pater 2000). The problem with this foot-parse is that the current analysis would predict the infix to appear after the second syllable, rather than the third (e.g., *(*mul.ti*)-*ma-pli*.(*ca.tion*)).

(5) Evaluation of /multiplication, ma/

(*mul.ti*)*pli*(*ca.tion*), ma	L-ALIGN	R-ALIGN
a. ☞(*mul.ti*)*pli-ma*-(*ca.tion*)	*!	
b. 💣(*mul.ti*)-*ma-pli*.(*ca.tion*)		
c. (*mul.ti.pli*)-*ma*-(*ca.tion*)	*!	

Following Hayes 1982, McCarthy 1982, Ito & Mester 1992, and Jensen 1993 & 2000, the third syllable is assumed to be adjoined to the initial foot, giving the following structure:

(6)



The advantage of assuming this foot representation is that the binary character of the pivot, that is, the unit to which an infix attach, can be maintained, which in turns allows the formulation of an alignment constraint that holds across the board without exception.

(7) Revised L- ALIGN
ALIGN (L, *ma*, R, FT_{max}) = L-ALIGN
'Align the left edge of -*ma*- to the right edge of a maximal binary-branching syllabic foot.'

The notion of a *maximal foot* refers to a foot that is not dominated by another foot, which means that it must be directly dominated by a Prosodic Word. A *minimal foot*, on the other hand, refers to a foot that does not dominate another foot. By appealing to the notion of the maximal foot, the alignment constraint not only captures the infixation

pattern in words like *multiplication*, but also excludes unattested patterns such as **multi-ma-plication*.[4]

Turning to the disyllabic stems, the analysis presented in (7) predicts that *ma-* should surface after the second syllable, giving the appearance of a suffix.

(8)

oboe	*oboe-ma	purple	*purple-ma
opus	*opus-ma	scramble	*scramble-ma
party	*party-ma	stinky	*stinky-ma
piggy	*piggy-ma	table	*table-ma

Curiously, this prediction is not borne out, as evidenced by the ungrammaticality of the examples in (8). Disyllabic stems must be expanded in order to host the Homeric infix. The nature of the expansion is described in the next section.

3. Motivating Compensatory Reduplication

Two types of expansion patterns are found. When the stressed syllable is closed, a schwa is inserted to create a disyllabic stressed foot (9). This strategy is referred to as *schwa-epenthesis*. The epenthetic schwa is underlined below.

(9)

careful	ˈkʰɛɹə̲-mə-fəl	lively	ˈlajvə̲-mə-lɪ
grapefruit	ˈgɹejpə̲-mə-ˌfɹut	lonely	ˈloʊnə̲-mə-lɪ
graveyard	ˈgɹejvə̲-mə-ˌjaɹd	Orwell	ˈɔɹə̲-mə-wəl
hairstyle	ˈhɛɹə̲-mə-ˌstajl		

However, when the first syllable is open, in addition to schwa epenthesis, a consonant identical to the onset of the following syllable appears before the schwa (10). I refer to this as *partial reduplication*.

(10)

oboe	oba-ma-boe	washing	washa-ma-shing
opus	opa-ma-pus	water	wata-ma-ter
party	parta-ma-ty	wonder	wonda-ma-der
piggy	piga-ma-gy	aura	aura-ma-ra
purple	purpa-ma-ple	music	musa-ma-sic
scramble	scramba-ma-ble	Kieran	Kiera-ma-ran
stinky	stinka-ma-ky	joking	joka-ma-king
table	taba-ma-ble	listen	lisa-ma-sten
tuba	tuba-ma-ba		

[4] The main problem of this understanding of the prosodic organization of words like those in (6) is that it violates the Strict Layer Hypothesis (Selkirk 1984:26, Nespor & Vogel 1986:7). However, violations of the Strict Layer Hypothesis seem to be independently motivated regardless of the case discussed here (see Hayes 1982, Jensen 1993, Jensen 2000).

At this point, the question of why the Homeric infix cannot appear word-peripherally naturally presents itself. The non-peripherality of the Homeric infix cannot be attributed to general properties of infixation in English; expletive formation in English, for example, allows both infixing and 'prefixing' variants.

(11)			
	fantástic	*bloody* fantástic	fan-*bloody*-tástic
	Minnesóta	*bloody* Minnesóta	Minne-*bloody*-sóta
	Alabáma	*bloody* Alabáma	Ala-*bloody*-báma

Neither can non-peripherality be attributed to general rhythmic considerations of English. The rhythmic pattern of the illicit output **opus-ma* [ˈoʊpʰəsmə] (–∪∪), for example, is identical to that of *cinema* [ˈsɪnəmə] or *venomous* [ˈvɛnəməs]. Moreover, Homericized forms such as *Cána-ma-da* (–∪∪∪) and *véno-ma-mous* (–∪∪∪) are clearly acceptable to speakers despite the fact that there is a string of three unstressed syllables on the surface.

Some might argue that non-peripherality might be derivable from extrametricality in English. The final syllable of nouns and suffixed adjectives is said to be extrametrical, thus exempted from foot-parsing, hence stress assignment (Hayes 1982). Thus, a word such as *cinema* is parsed as (ˈ*cine*)<*ma*>. Disyllabic words receive similar treatment. For example, *lively* is given the following foot parse: (ˈ*live*)<*ly*>. Since the input to Homeric infixation is assumed to contain metrical information[5], the fact that *-ma-* cannot appear as a suffix falls out naturally from this assumption of foot assignment. Consider the following evaluation:

(12) Evaluation of /lively, ma/

(ˈlajv)lɪ, mə	L-ALIGN
a. ☞(ˈlajv̲ə)-mə-lɪ	
b. (ˈlajv)lɪ-mə	*!

Here, candidate (12)b fails because *-ma-* is to the left of an unparsed syllable. This violates the dominating L-ALIGN constraint, which demands *-ma-* to appear after a maximal disyllabic foot. While such an analysis is appealing since one only has to invoke an independently-needed mechanism of English metrical phonology, namely,

[5] The input to Homeric infixation must already be parsed metrically. Consider, for example, the word ˈ*Canada*. Following the parametric approach to English stress assignment (cf. Hayes 1995), the main stress foot, which is trochaic, is built from right to left. The reason why this word has initial main stress, rather than penultimate, is due to the fact that the final syllable is extrametrical (e.g., (ˈ*Cana*)<*da*>). Now, consider the infixed version of this word ˈ*Cana-ma-da*. Primary stress remains initial. Yet, if stress placement occurs concomitant with infixation, antepenultimate stress (e.g., *Ca*(ˈ*na-ma*)-<*da*> similar to *A*ˈ*merica*) is predicted. This illustration points to the fact that *ma*-infixation must have access to pre-existing foot structures. That is, the reason one finds ˈ*Cana-ma-da*, not **Ca*ˈ*na-ma-da*, is because the Homeric infix takes (ˈ*Cana*)*da* as the input. The outcome of infixation is (ˈ*Cana*)*-ma-da*.

extrametricality, it is unfortunately flawed. The above analysis relies on the fact that the final syllable is extrametrical, thus not footed in the input. Consider the following:

(13) Evaluation of /listen, ma/

(ˈlɪsn̩), mə	L-ALIGN
a. ☞ (ˈlɪsə)-mə-sn̩	
b. 💣(ˈlɪsn̩)-mə	

The final syllable of underived verbs in English is generally not extrametrical. Words such as *listen* are parsed as a disyllabic foot. The extrametricality analysis erroneously predicts that the infix can appear both medially (13)a and finally (13)b since the final syllable is footed. Only (13)a is possible, however. In sum, the fact that *-ma-* never realizes as a suffix suggests that the proper placement of *-ma-* is contingent on its appearance as a ***genuine infix*** in the output; it must appear before *and* after something.[6]

The non-peripheral distribution of *-ma-* is derived here through the interaction of two phonological subcategorization constraints. The first constraint has already been introduced earlier; it requires the infix to appear to the right of a maximal disyllabic foot. The second constraint demands that the infix appear before a syllable. These constraints exert quite different, though not necessarily incompatible, demands on the Homeric word construction.

(14) ALIGN (L, *ma*, R, FT_{max}) = L-ALIGN
'Align the left edge of *-ma-* to the right edge of a maximal binary-branching syllabic foot.'

ALIGN (R, *ma*, L, σ) a.k.a. R-ALIGN
'Align the right edge of *-ma-* to the left edge of a syllable.'

Couched within Optimality Theory (Prince & Smolensky 1993, McCarthy & Prince 1993), these alignment constraints must be undominated and unranked with respect to each other. Their combined effect rules out any candidate with the improper placement of the *-ma-* infix (see (15)b & (15)c). The tableau below shows the evaluation of the Homeric word *tele-ma-phone*.

(15) Evaluation of /telephone, ma/

(ˈtɛlə)(ˌfoʊn), mə	L- ALIGN	R- ALIGN
a. ☞(ˈtɛlə)-mə-(ˌfoʊn)		
b. (ˈtɛ.-mə-)lə(ˌfoʊn)	*!	
c. (ˈtɛlə)(ˌfoʊn)-mə		*!

[6] This property of the Homeric infixation is quite unique in comparison to the majority of infixes across the world's languages. 'Infixes' without a non-peripherality requirement are better analyzed as *phonological affixes*, that is, affixes that subcategorize for a phonological rather than a morphological constituent (see Yu 2003 for further discussions).

Candidate (15)b loses since it violates L-ALIGN due to the fact the material to the left of *-ma-* does not constitute a foot. Candidate (15)c fatally violates R-ALIGN since no syllable follows the 'infix'.

Let us now consider a disyllabic input. *Ma-* can never appear finally because it would fatally violate the R-ALIGN constraint ((16)b). It cannot appear prefixed since it fails to satisfy the L-ALIGN requirement ((16)d). Infixing *-ma-* without expansion would not work either since the L-ALIGN requirement ((16)c) is still not satisfied. Thus, this evaluation illustrates the fact that expanding the root through CR provides a means to satisfy both the L-ALIGN and the R-ALIGN requirements simultaneously.

(16) Evaluation of /listen, ma/

(ˈlɪsn̩), mə	L-ALIGN	R-ALIGN
a. ☞ (ˈlɪsə)-mə-sn̩		
b. (ˈlɪsn̩)-mə		*!
c. (ˈlɪ-mə)-sn̩	*!	
d. mə-(ˈlɪsn̩)		

As illustrated in (17), however, root expansion may be accomplished by means of schwa-insertion as well. (17)b demonstrates the fact that *-ma-* cannot appear after a bimoraic foot in English because this infix left-subcategories for a *disyllabic* foot. The correct selection of *liva-ma-ly* is given below:

(17) Evaluation of /lively, ma/

(ˈlajv)lɪ, mə	L-ALIGN	R-ALIGN
a. ☞(ˈlajv̩ə)-mə-lɪ		
b. (ˈlajv)-mə-lɪ	*!	

The analysis presented thus far offers an account of *why* root expansion is needed to host the Homeric infix, namely, it is needed to satisfy the bidirectional subcategorization requirement of the infix. This analysis is silent, however, with respect to the question of why expansion is accomplished through CR with certain types of disyllabic roots but schwa-epenthesis with others. The answer to this question is explored in detail in the next section.

4. The Nature of a Compensatory Reduplicant

As noted earlier, *ma*-infixation induces root expansion when it is necessary to satisfy its bidirectional subcategorization requirements. Two expansion strategies are possible: schwa-epenthesis and partial reduplication. This section focuses first on the nature of partial reduplication. As will be demonstrated in due course, the present analysis of reduplication has serious implications on the interpretation of schwa epenthesis as well.

Partial reduplication has two variants. Variant A shows the copying of the syllable following the infix; Variant B shows a similar pattern, though the vowel of the reduplicant is reduced to a schwa.

(18)

	Variant A	Variant B
piggy	pi<u>gy</u>-ma-gy	pi<u>g[ə]</u>-ma-gy
table	ta<u>ble</u>-ma-ble	ta<u>b[ə]</u>-ma-ble
listen	li<u>[sn̩]</u>-ma-[sn̩]	li<u>s[ə]</u>-ma-sten
oboe	o<u>boe</u>-ma-boe	o<u>b[ə]</u>-ma-boe
purple	pur<u>ple</u>-ma-ple	pur<u>p[ə]</u>-ma-ple
scramble	scram<u>ble</u>-ma-ble	scram<u>b[ə]</u>-ma-ble
stinky	stin<u>ky</u>-ma-ky	stin<u>k[ə]</u>-ma-ky
party	par<u>ty</u>-ma-ty	par<u>t[ə]</u>-ma-ty

When the stressed syllable is closed there is no variation in the realization of the reduplicant. Only schwa-epenthesis is allowed.

(19)

lively	ˈlajv<u>ə</u>-mə-lɪ	*ˈlajv<u>ɪ</u>-mə-lɪ
lonely	ˈloʊn<u>ə</u>-mə-lɪ	*ˈloʊn<u>ɪ</u>-mə-lɪ
grapefruit	ˈkɹejp<u>ə</u>-mə-ˌfɹut	*ˈkɹejp<u>u</u>-mə-ˌfɹut
graveyard	ˈkɹejv<u>ə</u>-mə-ˌjaɹd	*ˈkɹejv<u>aɹ</u>-mə-ˌjaɹd
hairstyle	ˈhɛɹ<u>ə</u>-mə-ˌstajl	*ˈhɛɹ<u>aj</u>-mə-ˌstajl

Why is reduplication not possible without the copying of the onset consonant as well? Is the schwa that appears in the reduplicant of Variant A in (18) the "same" schwa that appears in (19)? To answer these questions, one must first answer a different question: why does the reduplicative copy always come from the syllable after the infix, rather than the one before? That is, why are there only examples such as *tu<u>ba</u>-ma-ba*, but never *tu<u>ta</u>-ma-ba*?

4.1. 'Copying' within RED

Compensatory Reduplication, by definition, affords no morphological representation in the underlying representation. This property of CR raises problems regarding the nature of the relationship between the 'duplicate' and the materials duplicated. Traditional theories of reduplication assume that a reduplicant copies from one of the edges of the stem or that of a stressed constituent (e.g., a stressed foot). Neither option is available here since the 'base' is neither morphologically nor prosodically coherent. Related is the issue of how identity between the reduplicant and the base is defined. Within BCRT, the direction of 'reduplicative copying' is regulated by the family of ANCHOR constraints that demand the edges of the reduplicant and the base correspond in a particular fashion. Such an analysis is not available here since there is no reduplicative morpheme in the

usual sense.[7] To this end, I adopt the output segmental correspondence approach to CR, following the suggestions laid out in Bat-El 2002 and Inkelas In press. The idea behind this approach is that output identical segments stand in a correspondence relationship (Rose & Walker 2001; Hansson 2001). In particular, following Rose & Walker 2001 and Hansson 2001, I propose that directionality be stated as a correspondence relationship.[8] The particular constraint needed is defined below:

(20) Correspondence-S_iS_j (SCORRI$_L$)
'If S_i is a segment in the output and S_j a correspondent of S_i in the output, S_j must precede S_i in the sequence of segments in the output (j > i).'

The effect of SCORRI$_L$ is to rule out structures like (21)b where the copied material comes from the syllable before, rather than the one after the infix. The reduplicative copy is indicated with the subscript 'C'.

(21)

($'C_1V_1$)$C_2V_2C_3$, mə	SCORRI$_L$
a. ☞($'C_1V_1C_{2C}V_{2C}$)-mə-$C_2V_2C_3$	
b. ($'C_1V_1C_{1C}V_{1C}$)-mə-$C_2V_2C_3$	*!

Let us now return to the earlier dilemma. The fact that words like *lively* Homerize as ['lajvə̲-mə-lɪ], never *['lajvɪ̲-mə-lɪ] suggests that partial reduplication is not possible without the copying of the onset consonant as well. In light of the present analysis, a solution to this problem is now in sight, which I refer to as ***Surface Correspondence Percolation***.

(22) Surface Correspondence Percolation
'If syllable σ_i contains a segment S_i that is in surface correspondence with segment S_j in syllable σ_j, all segments in syllable σ_i must be in correspondence with segments in syllable σ_j.'

CR without the copying of an onset consonant is not possible in cases like *lively* because the syllable hosting any surface corresponding segments must also be in correspondence. That is, if syllable σ_i contains a segment S_i that is in surface correspondence with segment S_j in syllable σ_j, all segments in syllable σ_i must be in correspondence with segments in syllable σ_j. Such a correspondence relationship can be captured using the theory of Prosodic Anchoring advocated in McCarthy 2002. Two syllable-anchoring constraints are posited.

[7] Notice that the Morphological Doubling Theory of Reduplication (MDT; Inkelas and Zoll 2000) is also unavailable here since the reduplicant serves no morphological purpose, thus no morpho-semantic identity between the base and reduplicant (see also Inkelas In press).

[8] The idea that directionality is crucial in a correspondence relationship has been pointed out previously for the input-output relationship (i.e. IDEN-IO vs. IDEN-OI; Pater 1999) and in other applications of surface segmental correspondence, for example, in consonant harmony (Rose & Walker 2001, Hansson 2001).

(23) L-ANCHOR$_\sigma$
'The initial position of two syllables in a surface correspondence relationship must correspond.'
R-ANCHOR$_\sigma$
'The final position of two syllables in a surface correspondence relationship must correspond.'

The compliance of these two constraints is asymmetric; L-ANCHOR$_\sigma$ must dominate R-ANCHOR$_\sigma$. Below is an example of an infixed disyllabic input.[9] The analysis predicts the reduplicant to be a CV syllable when the pivot is expanded by reduplication. While the copying of the nucleus from the syllable after the infix would be sufficient to satisfy the disyllabic requirement of the pivot, as illustrated by (24)b, such a candidate fatally violates L-ANCHOR$_\sigma$, which demands the initial segments of the corresponding syllables to match.

(24)

[ˈC$_1$V$_1$][C$_2$V$_2$]$_j$, mə	L-ALIGN	L-ANCHOR$_\sigma$	R-ANCHOR$_\sigma$	SCORRI$_L$
☞a. [ˈC$_1$V$_1$][C$_2$V$_2$]$_j$-mə-[C$_2$V$_2$]$_j$				
b. [ˈC$_1$V$_1$][V$_2$]$_j$-mə-[C$_2$V$_2$]$_j$		*!		

This constraint hierarchy also predicts that no reduplication is possible when the initial syllable is closed. As illustrated below, (25)a is ruled out by virtue of the fact that the onsets of the corresponding syllables do not match. The syllables before and after the infix in (25)a are in correspondence due to the fact that the reduplicative vowel is in a correspondence relationship with the final vowel. (25)b prevails even though it contains an epenthetic schwa. The syllables before and after the infix are not in correspondence in this candidate since none of the segments of the respective syllables invoke surface correspondence.

(25)

[ˈC$_1$V$_1$C$_2$][C$_3$V$_3$]$_j$, mə	L-ANCHOR$_\sigma$	R-ANCHOR$_\sigma$	SCORRI$_L$
a. [ˈC$_1$V$_1$][C$_2$V$_{3C}$]$_j$ -mə-[C$_3$V$_3$]$_j$	*!		
b. ☞ [ˈC$_1$V$_1$][C$_2$ə]-mə-[C$_3$V$_3$]$_j$			

So far, the discussion has concentrated on understanding the mechanism of 'reduplicative copying' in phonological reduplication. In the next section, I return to the issue of what motivates the reduplicative copying in the first place.

4.2. Why reduplication?

Traditional theories of reduplication assume that reduplication happens only when it is called for by the presence of an abstract RED morpheme in the input (e.g., McCarthy & Prince 1995; Alderete et al 1999) or a COPY constraint in the constraint ranking (e.g., Yip 1998). These analytical devices are inadequate in dealing with cases where

[9] The angled brackets indicate syllable boundaries.

'reduplication' is required solely in order to satisfy the size requirement of the pivot and there is no evidence for positing an underlying RED morpheme in the input. What then motivates the recruitment of a reduplicative copy over fixed consonant epenthesis? Zuraw (2002) claims that reduplication without semantic import is a matter of Aggressive Reduplication, which is forced by the constraint, REDUP, in the grammar. In this section, I argue that no such constraint is needed since CR can be derived straightforwardly through the interaction of constraints that are already independently needed in the grammar. In particular, I argue for an emergent approach to CR where CR falls out naturally as the result of the interaction between constraints on segmental faithfulness and the correspondence of similar segments. CR is favored over default segment insertion because it does not introduce segments that are not already in the input. The impetus of this approach comes from the nature of epenthesis itself as it is understood within OT.

In OT, epenthesis is regulated by DEP, a constraint that requires a segment in the output to have a correspondent in the input. The constraint, * FISSION, penalizes output candidates that realize multiple exponents of an input string. Thus, a candidate with epenthesized fixed segments, such as (26)b, would fatally violate DEP_{IO} when DEP_{IO} is ranked above *FISSION. This allows the candidate with reduplicative epenthesis (26)a to emerge as the winner.

(26)

$(p^hɪ)g_ii_j$, mə	DEP_{IO}	*FISSION
a. ☞$(p^hɪ.g_ii_j)$-mə-g_ii_j		**
b. $(p^hɪ.ʔə)$-mə-g_ii_j	*!*	

This analysis explains why the epenthetic syllable is a reduplicative copy rather than some fixed segments: reduplication does not introduce segments that are not already in the input. This analysis also illuminates the difference between the schwa of the partial reduplicant and that of schwa-epenthesis. As illustrated in (27), the schwa in the reduplicant must stand in correspondence with the final vowel, otherwise, the candidate would fatally violate R-ANCHOR_{σ} (see (27)b).

(27)

$(ˈp^hɪ)g_ii_j$, mə	L-ANCHOR_{σ}	R-ANCHOR_{σ}	DEP_{IO}	*FISSION
a. ☞$([ˈp^hɪ][\underline{g_i}\underline{ə_j}]_k)$-mə-$[g_ii_j]_k$				**
b. $([ˈp^hɪ][\underline{g_i}\underline{ə}]_k)$-mə-$[g_ii_j]_k$		*!	*	

On the other hand, when a schwa appears alone without an accompanying reduplicative onset, the ranking predicts that such a schwa must be genuinely epenthetic. The correspondence between the schwa and the final vowel would have required the respective syllables to stand in correspondence also.

(28)

$(ˈlajv)lɪ$, mə	L-ANCHOR_{σ}	R-ANCHOR_{σ}	DEP_{IO}	*FISSION
a. $([ˈlaj][v\underline{ə_j}]_k)$-mə-$[l_iɪ_j]_k$	*!			*
b. ☞ $([ˈlaj][v\underline{ə}])$-mə-$[l_iɪ_j]_k$		*	*	

As illustrated by (28)a, such a candidate would fatally violate L-ANCHOR$_\sigma$ since the onsets of the corresponding syllables do not match. The remaining question is why the reduplicative vowel reduces some of the time but not others (see (18)).

4.3. Variation in the reduplicant

The variation to be dealt with in this section concerns the vowel quality of a reduplicant. Such a vowel may appear as a full vowel or a reduced vowel, namely, schwa. This variation follows straightforwardly from the phonotactics of English. Full vowels in English are generally found in syllables with some degree of stress. The epenthesized syllable under infixation always occupies the weak position of a trochaic foot, thus must be stressless. Consequently, candidates such as (29)b can be ruled out by a dominating constraint against unstressed full vowels in English, called 'REDUCE'.

(29)

$(p^hɪ)gi$, mə	REDUCE	DEP$_{IO}$
a. $(p^hɪ.g_1i_2)$-mə-g_1i_2	*!	
b.☞$(p^hɪ.g_1ə_2)$-mə-g_1i_2		

The introduction of REDUCE alone prevents any variation in output selection, however, as shown by the failure of (29)a, an attested output. Thus, some additional force must counteract the effect of REDUCE. The key is in the evaluation of (29)b. The partial reduplicant in (29)b contains a schwa that is in correspondence with the final syllable. However, the two nuclei are not identical, thus should not have entered into a surface correspondence relationship. Following Walker 2000, Rose & Walker 2001 and Hansson 2001, I amend the earlier analysis and propose that correspondence is established in terms of similarity, rather than absolute identity. The following correspondence constraints that hold of pairs of similar vowels are posited:

(30) Similarity-based Surface Correspondence Hierarchy
CORR- $V_i \leftrightarrow V_i$ >> CORR-V$\leftrightarrow$ə

The faithfulness between these corresponding segments is regulated by featural IDEN-VV constraints. In this case, I posit a IDEN-VV$_{[reduced]}$ which demands that surface corresponding vowels must have identical [reduced] specification.

(31)

a.

$(p^hɪ)gi$, mə	REDUCE	IDEN-VV$_{[reduced]}$	DEP$_{IO}$
a. $(p^hɪ.g_1i_2)$-mə-g_1i_2	*!		
b.☞$(p^hɪ.g_1ə_2)$-mə-g_1i_2		*	

b.

$(p^hɪ)gi$, mə	IDEN-VV$_{[reduced]}$	REDUCE	DEP$_{IO}$
a. ☞ $(p^hɪ.g_1i_2)$-mə-g_1i_2		*	
b. $(p^hɪ.g_1ə_2)$-mə-g_1i_2	*!		

This IDEN-$VV_{[reduced]}$ constraint is assumed to be co-ranked with respect to the constraint, REDUCE (e.g., Anttila 1997). At the time of evaluation, a particular ranking permutation of these two constraints is selected, producing a unique winning output. The permutation of the two constraints produces, in this case, two possible outcomes, both of which are attested (see the winning candidates in (31)).

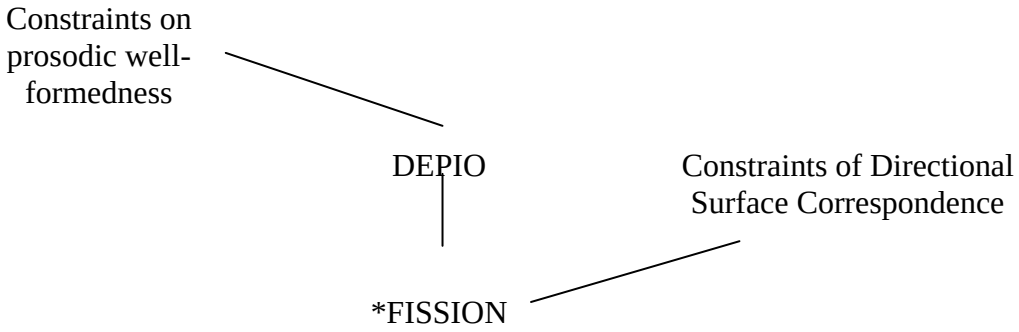
In this section, I argue that, while the Homeric infix induces foot-expansion to provide a suitable pivot for infix alignment, CR is motivated by the constraint schema DEP_{IO} >> *FISSION and by surface segment correspondence. The final constraint hierarchy of the co-phonology associated with the Homeric infix is given below:[10]

(32) Summary of the Homeric Infixation Constraint Hierarchy
R-ALIGN, L-ALIGN >> I-ANCHOR, $SCORRI_L$, $L\text{-}ANCHOR_\sigma$ >> {REDUCE <<>> IDEN-$VV_{[reduced]}$} >> $R\text{-}ANCHOR_\sigma$, F- ANCHOR >> DEP_{IO} >> *FISSION

5. Conclusion

In this paper, I introduce the construction of Homeric infixation, arguing that *-ma-* is a genuine infix given its requirement of non-peripherality. This property of the Homeric infix gives rise to the situation of CR where it is employed to expand the base for the purpose of proper infixation. In the course of articulating the treatment of CR in Homeric infixation, a general theory of CR, schematized in (33), emerges.

(33) A General Theory of Compensatory Reduplication



A theory of CR must consist of three major components: (i) the high ranking of some constraints demanding prosodic well-formedness of the output. They may be constraints

[10] The Homeric infixation construction is associated with its own co-phonology, given the fact that non-peripherality is an idiosyncratic and intrinsic property of the Homeric infix and that the Homeric infixation construction must take a metrically parsed input. To this end, I adopt a Sign-Based Morphology (henceforth SBM) approach to co-phonological phenomenon. SBM is a declarative, non-derivational theory of the morphology-phonology interface which utilizes the basic tools one finds in any constituent structure-based unificational approach to linguistics originally developed by Orgun (1996, 1998, 1999). It assumes that both terminal and non-terminal nodes bear features and that non-terminal nodes also include the phonological information along with the usual syntactic and semantic information (i.e. co-phonology: Orgun 1996, Inkelas, et. al 1997, Inkelas 1998, Inkelas & Zoll 2000, Yu 2000, Orgun & Inkelas 2002; similar co-phonological approaches: Antilla 2001, Kiparsky To appear).

on morpheme well-formedness (e.g., minimality, templatic constraints, or a phonological subcatgerization requirement) or constraints of prosody (e.g., *CODA, ONSET etc.). The high ranking of such a constraint creates scenarios where phonological compensation or expansion is needed; (ii) a directional surface correspondence constraint that specifies the 'source' of the reduplicated material; (iii) the constraint schema, DEP_{IO} >> *FISSION, which favors CR over default segmental insertion when additional phonological materials are needed to satisfy some dominating prosodic requirement. All three components of the theory are independently motivated. This approach contrasts favorably with the Aggressive Reduplication model argued in Zuraw 2002 where CR is encoded in the grammar in the form of a constraint, called REDUP. I contend that no such constraint is needed since CR can be derived straightforwardly through the interaction of constraints that are already independently needed in the grammar.

References

Alderete, John, Jill Beckman, Laura Benua, Amalia Gnanadeskian, John McCarthy, and Suzane Urbanczyk. 1999. Reduplication with fixed segmentism. *LI* 30: 327-364.

Antilla, Arto. 1997. *Variation in Finnish Phonology and Morphology*. Ph.D. dissertation. Stanford University.

Antilla, Arto. 2002. Morphologically conditioned phonological alternations. *NLLT* 20: 1-42.

Bat-El, Outi. 2002. Hebrew reduplication: the interpretation of forms with identical consonants. Handout of a talk presented at UCSC, April 26.

Hansson, Gunnar. 2001. *Theoretical and typological issues in consonantal harmony*. Ph.D. dissertation, UC Berkeley.

Hayes, Bruce. 1982. Extrametricality and English stress. *LI* 13: 227-276.

Hayes, Bruce. 1995. *Metrical stress theory: Principles and case studies*. Chicago: University of Chicago Press.

Hyman, Larry M., Sharon Inkelas, and Galen Sibanda. 1999. *Morphosyntactic correspondence in Bantu reduplication*. Ms. University of California, Berkeley.

Inkelas, Sharon. 1998. The theoretical status of morphologically considered phonology: a case of dominance effects. *Yearbook of morphology* 1997: 121-155.

Inkelas, Sharon. 1999. Exceptional stress-attracting suffixes in Turkish: representations vs. the grammar. In H. van der Hulst, R. Kager, and Wim Zonneveld (eds.) *The Prosody-Morphology Interface*. Cambridge University Press. 134-187.

Inkelas, Sharon. In press. Morphological Doubling Theory I: Evidence for morphological doubling in reduplication. In Bernhart Hurch (ed.) *Studies in reduplication*. Mouton.

Inkelas, Sharon, and Cheryl Zoll. 2000. *Reduplication as morphological doubling*. Ms. UC Berkeley and MIT.

Inkelas, Sharon, Cemil Orhan Orgun and Cheryl Zoll. 1997. Implications of lexical exceptions for the nature of grammar. In Iggy Roca (ed.) Constraints and Derivations in Phonology. Oxford: Clarendon Press. 393-418.

Ito, Junko, and Armin Mester. 1992. Weak layering and word binarity. In Linguistic Research Center, LRC-92-09, University of California, Santa Cruz.

Jensen, John T. 1993. *English phonology*. Amsterdam: Benjamins.
Jenson, John T. 2000. Against ambisyllabicity. *Phonology* 17(3):187-235.
Kawahara, Shigeto. 2001. Reduplication not driven by a RED morpheme. Ms. University of Massachusetts, Amherst.
Kiparsky, Paul. To appear. Paradigm Effects and Opacity. CSLI monograph.
McCarthy, John J. 2000. Faithfulness and prosodic circumscription. In J. Dekkers, F. van der Leeuw, J. van de Weijer (eds.) *Optimality Theory: phonology, syntax, and acquisition*. 151-189. New York: Oxford University Press.
McCarthy, John J. and Alan Prince. 1993. Generalized alignment. In Geert Booij and Jaap van Marle (eds.) *Yearbook of morphology* 1993. 79-153. Dordrecht: Kluwer Academics.
McCarthy, John & Alan Prince. 1995. Faithfulness and reduplicative identity. *UMOP 18: Papers in Optimality Theory*. 249-384.
Orgun, C. Orhan. 1996. *Sign-based morphology: a declarative theory of phonology-morphology interleaving*. PhD dissertation, University of California, Berkeley.
Orgun, C. Orhan. 1998. Cyclic and noncyclic phonological effects in a declarative grammar. *Yearbook of morphology* 1997. 179-218.
Orgun, C. Orhan. 1999. Sign-Based Morphology: a declarative theory of phonology-morphology interleaving. In Ben Hermans & Marc van Oostendorp (eds.), The derivational residue in phonological Optimality Theory. Amsterdam: John Benjamins. 247-67.
Orgun, C. Orhan and Sharon Inkelas. 2002. Reconsidering Bracket Erasure. *Yearbook of morphology 2001*: 115-146.
Pater, Joe. 2000. Non-uniformity in English secondary stress: the role of ranked and lexically specific constraints. *Phonology* 17(3):237-274.
Prince, Alan, and Paul Smolensky. 1993. *Optimality Theory: Constraint interaction in Generative Grammar*. Ms. Rutgers University, New Brunswick, and University of Colorado, Boulder.
Rose, Sharon and Rachel Walker. 2001. A typology of consonant agreement as correspondence. Ms. UCSD & USC.
Walker, Rachel. 2000. Long distance consonant identity effects. *WCCFL* 19: 532-545.
Yip, Moira. 1998. Identity avoidance in phonology and morphology. In S. Lapointe, D. Brentari, and P. Farrell (eds.) *Morphology and its relation to phonology and syntax.* Stanford, CA: CSLI. 216-263.
Yu, Alan C. L. 2000. Stress assignment in Tohono O'odham. Phonology 17(1): 117-135.
Yu, Alan C. L. 2003. The morphology and phonology of infixation. PhD dissertation. UC Berkeley. http://home.uchicago.edu/~aclyu/dissertation.html
Zuraw, Kie. 2002. Aggressive reduplication. *Phonology* 19(3): 395-440.

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