Reduplication in Kihehe: The Asymmetrical Enforcement of Phonological and Morphological Principles

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Abstract

As reduplication is both a phonological and a morphological process, it is subject to the constraints and principles holding of both domains. In this paper I formally analyze data from Kihehe, discussed in Odden and Odden (1985) and Aronoff (1988), in which phonological and morphological principles make conflicting demands on a derivation, resulting in their asymmetrical enforcement. Further data, from Fijian, is presented in support of the various hypothesized phonological and morphological principles argued to hold of reduplicative processes.

0. Introduction

As reduplication is both a morphological and a phonological process, it is subject to constraints and principles holding of both domains. In this paper I argue along with Aronoff (1988) that certain instances of superficially anomalous patterning in reduplication may be explained when the proper phonological and morphological principles are considered.

In Section 1, I will introduce three choices which every reduplicative process must make. First, will affixation be to the head of a form or to the whole of a form? Second, will affixation apply at the stem-level or at the word-level? These two choices are presented by Aronoff. The third choice is not considered by Aronoff, as it is relevant only to prosodic morphology, and not morphological operations in general: will the affix be prosodically conditioned (partial copy) or not (full copy)? Here, I will rely on the theory of prosodic morphology introduced in McCarthy and Prince (1986). These three choices combine to form eight types of reduplication predicted to exist.

In Section 2, I will present Aronoff's analysis of Kihehe, in which phonological and morphological principles make conflicting demands on a derivation, resulting in these principles' asymmetrical enforcement.

I will flesh out Aronoff's analysis by providing derivations indicating how and when particular phonological and morphological principles interact, producing the attested output.

In Sections 3 I will analyze reduplicative processes in a language not considered by Aronoff, Fijian. Reduplication here will be argued to support Aronoff's general conclusions regarding head/whole and stem-level/word-level choices in reduplication.

1. Choices

Aronoff (1988) argues that the concatenation of morphemes normally requires two choices to be made regarding affixation. The first of these choices is presented in (1).

(1) Will the morpheme affix to the whole of the form or the head of the form?

Aronoff observes along with Hoeksema (1985) (also discussed in Hammond 1991) that certain apparent ordering paradoxes are explainable within a theory which allows affixal material access to the head of a morphologically complex form, through a process of "morphological circumscription".

The second choice that every process of affixation must make is the following:

(2) Will the morpheme affix at the stem-level or at the word-level?

Aronoff relies on the hypothesis that there are two types of affixes, stem-level and word-level (Chomsky and Halle 1968). He assumes that stem-level affixes may trigger cyclic rules, while word-level affixes undergo post-cyclic processes. Aronoff assumes that unlike stem-level affixes, word-level affixes induce "prosodic closure" on the stem, resulting in the stem being treated as a phonological word. Prosodic closure may be informally defined as a condition on lexical rule application whereby operations applied to a prosodized string may not disrupt existing prosodic structure.

In addition to the head/whole, stem-level/word-level options available to any given affix, there is a third

choice to which reduplicative operations in particular are subject, which is not considered by Aronoff:

> (3) Will reduplication be prosodically conditioned (partial reduplication), or not (full reduplication)?

With these three choices to made (head/whole, stem-level/word-level, partial copy/full copy), we expect the following eight types of reduplication:

(4)
I. Stem-level rule; whole operation; partial
II. Stem-level rule, whole operation; full
III. Stem-level rule; head operation; partial
IV. Stem-level rule; head operation; full
V. Word-level rule; whole operation; partial
VI. Word-level rule; whole operation; full
VII. Word-level rule; head operation; partial
VIII. Word-level rule; head operation; full

A Type I process is partial reduplication which targets the whole of a form, and in which the syllable structure of the base may be disrupted. For example, Aronoff notes that in Oykangand a vowel-initial base may acquire an onset from the reduplicant: *eder -> ededer* (McCarthy and Prince 1986).

A Type II process is one in which the full copy and base form a single stress domain. As stress is not normally indicated in analyses of reduplication, specific examples are not readily available, though are sure to exist.

Types III and IV are predicted to exist, but are argued by Aronoff to be "difficult to detect", requiring subtle judgments of semantic and syntactic scope.

Types V and VI are those processes in which both syllabification and stress of the base are preserved under affixation to the edge of the base. For example, Ilokano would be classified as Type VI, as vowel-initial bases are not provided with onsets from the copy, but instead are provided with an epenthetic glottal stop: *agad -> agad?agad* (McCarthy and Prince 1986).

Finally, Fijian will be argued to possess an example of type VII, while Kihehe will be shown to be of type VIII.

2. Kihehe

Odden and Odden (1985) state that in Kihehe, "what is reduplicated [prefixed]... is the stem -- that is, the root, any following extensions, and the so-called final vowel morpheme" (p.500). Non-stem material is copied as well, just in case this material is syllabified with the stem. Examples are in (5).

(5)	kú-haáta	->kú-haata-haáta
	(to ferment)	(to start fermenting)
	ku-ita [kwíita]	->kwíita-kwiíta
	(to pour)	(to pour a little)
	ku-lu-ita [kúlwíita]	->kú-lwiita-lwiíta
	(no gloss)	(to pour it (11) a bit)
	kú-gohomóla	->kú-gohomola-gohomóla
	(to cough)	(to cough a bit)
	mi-oolofu [myóolofu]	->myoolofu-myóolofu
	(no gloss)	(fairly plentiful (4))
	ku-i-eenda [kwiiyeenda]	->kwiiyeenda-yeenda
	(to love each other)	(no gloss)

Now consider the three choices to be made by this process.

First, is the process a whole operation or a head operation? Only the stem is targeted for copy. so, for example, we get *ku-haata-haata*, and not *ku-haata-ku-haata*. We may thus conclude with Aronoff that we are dealing with a head operation.

Second, does the process apply at the stem-level or at the word-level? As Aronoff observes, reduplication respects syllabification of the base: the syllables which compose the stem are not disrupted by the reduplicative process. In other words, we are dealing with a word-level process, as affixation has induced "prosodic closure", and so prosodic constituency of the base, i.e., its syllable structure, may not be affected by the process. Therefore, reduplication of *my-oolofu* results in *myoolofu-myoolofu*, as the prefix (*mi-*) is syllabified with the head of the form at the point in the derivation where prosodic closure is induced, i.e., when word-level reduplication applies. Were prosodic closure not induced on the base at the point where reduplication applies, head reduplication might result in **myoolofu-woolofu* (glide insertion presumably would provide an onset for the initial base syllable: *my-oolofu -> my-oolofu-oolofu -> my-oolofu-woolofu* (Odden

and Odden 1985)).

Third, is the process one of full copy or partial copy? The entire head (stem) is copied without prosodic conditioning. Reduplication here is thus a process of full copy.

Aronoff argues that the facts from Kihehe can be motivated by assuming both stem/word and head/whole choices are made, yet does not provide derivations indicating exactly how and when particular morphological and phonological principles crucially interact to produce the attested surface forms. I will thus attempt to derive the output of Kihehe reduplication, considering the two choices argued by Aronoff to hold of all morphological operations, as well as adding the third choice, peculiar to prosodic morphological operations, presented herein.

Kihehe reduplication is a head operation, applying at the word-level, and is not prosodically conditioned. The process thus proceeds as follows (where syllable boundaries are indicated by"."):

(6)

UR: /ku/+/haata/	/ku/+/lu/+/ita/	/ku/+/i/+/eenda/
input: ku.haa.ta	ku.lwii.ta	kwii.yee.nda

(a) morphologically circumscribe the head (indicated by "<...>"):

ku.<haa.ta>	ku.lwi<i.ta>	kwii.y<ee.nda>

(b) insert the (word-level) reduplicative morpheme (not prosodically conditioned) linearly adjacent to the domain circumscribed in (a) (indicated by "*"):

ku.*<haa.ta>	ku.*lwi<i.ta>	kwii.*y<ee.nda>

(c) copy the base (indicated by italics):

ku.*haata*#<haa.ta>	ku.*lwiita*#lwi<i.ta> kwii.*yeenda*#y<eenda>	
surface: kuhaata-haata	kulwiita-lwiita	kwiiyeenda-yeenda

In (a), the head of the morphologically complex form

is circumscribed. In (b), the reduplicative affix (which is not prosodically conditioned in Kihehe) is consequently prefixed to the morphologically circumscribed head. If reduplication were a stem-level process, syllabification of the base could be disrupted, and thus the inserted morpheme would affix directly to the (left or right) edge of the head. However, as reduplication in Kihehe is a word-level process, syllabification of the base may not be disrupted. Therefore, while morphological circumscription of the head has isolated a specific morphological domain, phonological constraints on word-level operations prohibit affixation from gaining immediate access to this domain, and thus the reduplicative morpheme affixes to the first available prosodic juncture. Consequently, phonological material not morphologically circumscribed may intervene between the reduplicative morpheme and the morphologically circumscribed head (specifically, the underlined portions of the following forms intervene between head and affix: *ku.*<u>*lwi*</u>*<i.ta>*, *kwii.*<u>*y*</u>*<ee.nda>*). At this point, in (c), intervening material (<u>*lwi*</u>, <u>*y*</u>) is subject to copying.

Kihehe reduplication may consequently be characterized as word-level full reduplication of a morphologically circumscribed head (Type VIII).

3. Fijian

Another language that displays word-level, head reduplication is Fijian (Milner 1956, Schutz 1985, Dixon 1988). In Fijian, reduplication normally (but not exclusively) consists of the prefixation of a bimoraic template, and thus is a prosodically conditioned process. The language displays several patterns of template filling. In one pattern, the first two moras of the base are copied (prefixed) with their tautosyllabic material.

(7)	caka (doing)	->	cakacaka	(working)
	va: (four)	->	va:va:	(all four)
	yaqona (kava)	->	yaqoyaqona	(a plant related to kava)
	vinaka (good)	->	vinavinaka	(thanking)

Evidence suggesting the word-level status of reduplication becomes available when the Fijian stress

system is considered. Dixon reports that primary stress falls on the syllable containing the penultimate mora. Secondary stress falls on the syllable containing the pre-antepenultimate mora. We may conclude that binary, left-headed feet are constructed right-to-left over moras.

Analyzing the stress pattern of reduplicated forms suggests the word-level status of reduplication:

(8) búta-butáo (steal several times)
túi-tuía (hammer it a lot)

In these forms, the copied base is treated independently for the purpose of stress assignment: primary stress is present on the copy, suggesting that reduplication is a word-level process.

Conclusive evidence for the word-level status of reduplication comes from patterns of glide formation. Dixon reports that a non-high vowel - high vowel sequence will trigger glide formation within the phonological word: *ta+isi -> taysi*. However, glide formation is blocked across a phonological word boundary. Note that *ilo* reduplicates as *ilo-ilo*, and not **iloylo*, indicating the reduplication's word-level status.

We now consider data indicating that Fijian possesses a reduplicative process involving head affixation. In trisyllabic, bimorphemic forms, all three syllables may be reduplicated, the first separately from the second and third (Schutz 1985):

(9)

ta+basu	(broken (by itself))	->	tatabasubasu (freq)
ca+lidi	(crackling noise)	->	cacalidilidi (freq)
ca+kuvu	(explode)	->	cacakuvukuvu (freq)
ta+buki	(knotted)	->	tatabukibuki (freq)

Dixon reports that these are special cases of a bisyllabic base reduplicating with a stem-level prefix of the "spontaneous" (mimetic) class (including *ta-*, *a-*, *ca-*, and *ra-*).

Evidence for the stem level status of the spontaneous class of verbal prefix is available from analyzing patterns of glide formation. Recall that glide formation may apply across a stem boundary, but is blocked from applying across a word boundary. In fact, the affixation

of spontaneous class prefixes to high vowel-initial roots does trigger glide formation: *ta-uru -> tawru* (become slack). This class of prefix is thus stem-level, and therefore its affixation precedes word-level root reduplication.

What is crucial to note in these forms is that here, the word-level reduplicative prefix does not simply target the first two moras of the stem (cf. **tabatabasu* vs. *yaqoyaqona*). Instead, the root is targeted. In other words, the head of the complex morphological constituent is reduplicated. As Aronoff notes, "...in all cases where reduplication must take place internally to an affix ... the base of reduplication is the morphological ... head of the whole"(p.3). Thus, in the case of *tatabasubasu*, "(R)eduplication [of the head], which is internal to prefixation, nonetheless follows it in an ordered derivation"(p.3). Derivations follow.

(10)

UR:	/yaqona/	/ca/ + /lidi/
input	ya.qó.na	lí.di
Stem Level		
prefixation:	-------	ca+lí.di
phonology:		ca.lí.di
reduplication:		
whole operation:	--------	<ca.lí.di>
affixation:		*$_{ó}$<ca.lí.di>
copy/truncation:		*ca*+.ca.lí.di
phonology:		cà.ca.lí.di
Word Level		
reduplication:		
head operation:	<ya.qó.na>	cà.ca.<lí.di>
affixation:	*$_{ö}$<ya.qó.na>	cà.ca*$_{ö}$<lí.di>
copy/truncation:	*yaqo*#ya.qó.na	cà.ca*lidi*#lí.di
phonology:	yá.qo.ya.qó.na	cà.ca.lí.di.lí.di
surface:	yáqoyaqóna	càcalídilídi

I will assume that spontaneous class prefixes reduplicate at the stem level, although nothing crucial rests on this assumption: the prefix (reduplicated or not) is present when head reduplication applies. Furthermore, while stress patterns for trisyllabic bases that include spontaneous class prefixes are not provided in any of the consulted grammars, I will assume that output forms indeed possess the stress pattern indicated, as such a pattern

is fully consistent with the Fijian stress rule. This assumption results in a maximally unified treatment of Fijian reduplication: reduplication with a foot-sized template is always a word-level process.

The present theory predicts that trisyllabic bases with high vowel-initial roots will display a distinct pattern of reduplication. A form like tawru (>ta-uru), in which the prefix is presumably syllabified with the root at the point where reduplication applies, should perhaps reduplicate as tatawtawru (*ta+u.ru -> taw.ru -> ta.+taw.ru -> ta.#taw.#taw.ru*). Among the consulted grammars there is only a single example of a high vowel-initial root undergoing this process. /ka+isi/ in fact reduplicates as *ka-ka-isi-isi* (**kakaykaysi*). Kang Hyun Sook (p.c.) suggests that this unpredicted output is an instance of rule underapplication, an ill-understood phenomenon in which certain rules are blocked from applying under reduplication. We may thus relegate this unpredicted output to an independent phenomenon, which has yet to be satisfactorily accounted for within any theoretical framework.

We may conclude that Fijian possesses a process of partial reduplication which is a word-level, head operation (Type VII). It is a word-level rule based on evidence from stress placement and glide formation. It is a head operation in that only the head is targeted for copy. These findings support a theory of reduplication like Aronoff's in which both head/whole, and stem-level/word-level choices are available for the morphological process of reduplication.

4. Conclusion

In this paper I have argued along with Aronoff (1988) that certain reduplicative processes require a process of morphological circumscription, in which the head of a morphologically complex stem is targeted for copy, and that reduplicative morphemes pattern identically with normal affixes, in that they may affix either at the stem level or at the word level. While stem-level affixation may disrupt existing prosodic structure, word-level affixes may not. Finally, reduplication may either be full or partial.

We may thus conclude that reduplicative operations pattern with other phonological operations in that they

are subject to either cyclic or post-cyclic rule application, while also patterning with other morphological operations in being either whole- or head-operations. When phonological and morphological principles make conflicting demands on a derivation, as in Kihehe, we may witness their asymmetrical enforcement: word-level constraints may require that strict morphological circumscription be overridden, so that "prosodic closure" is abided by.

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