

Theoretical Implications of Olo Verb Reduplication

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This paper examines the process of reduplication in Olo,¹ a language of Papua New Guinea. For most verbs, describing the reduplication process is amenable to a prose statement. In spite of its apparent simplicity, however, its formalisation has impact on various theoretical phonological models. In this paper I will compare CV phonology and two versions of moraic phonology. It will be shown that one is clearly better than the others to account for the data in Olo.

1 The General Outline of the Problem

In Olo the last CV of a verb,² excluding suffixes, is copied and inserted before the copied material. Semantically this marks the continuous or repetitive aspect. Examples (1-3) illustrate the reduplication.

- | | |
|---|---|
| 1) <i>ailo</i> 'to call out' | <i>ailolo</i> 'calling' |
| 2) <i>a<p>lei³</i> 'eat<3p>' | <i>a<p>lelei</i> 'eating<3p>' |
| 3) <i>a<l>fo</i> 'put inside<3m>' | <i>a<l>fofo</i> 'keep putting inside<3m>' |

The reduplication is not a case of just reduplicating the last syllable, as could appear from (1) and (3). Notice that in (2) the final *i* is not reduplicated. It is not the case that this is a syllable reduplication and then a reduction of the glide, because glides are found before consonants in nonfinal positions as shown in (4).

- 4) *einei* 'go around' *einenei* 'going around'

¹ The Olo language is spoken in the Sandaun (West Sepik) province of Papua New Guinea by approximately 13,000 speakers. It is divided into three main dialects (Staley 1985) and further grouped into subdialects. Olo is a member of the Wapei family of the Torricelli phylum (Laycock 1975).

² There are verbs in Olo which follow different patterns. The largest group of these are the *r*-initial verbs. These reduplicate the first CV of the root and any consonantal prefix. There are also a few irregular verbs. Finally, about 30% of the verbs insert *e* instead of copying the V. This will be discussed in more detail below.

³ The consonant in angle brackets is an infixed object marker, and is obligatory in the third person. If a word contains angle brackets with no consonant (i.e., <>) it indicates that the actual infix is deleted for phonological reasons such as constraints on gemination. For more information on this see Staley (1989).

Furthermore, reduplication is not a case of final syllable reduplication. If the final syllable is just a vowel, it is not reduplicated; rather the last CV sequence is reduplicated. An example of this is given in (5).

5) $a \langle \rangle lo.i$ 'cut<3m>' $a \langle \rangle lolo.i$ 'cutting<3m>'

2 Reduplication and CV Phonology

Since the prose description of reduplication in Olo includes reference to the final CV of a verb, it seems reasonable to assume that the data could be accounted for theoretically within the theory of CV phonology. Unfortunately, CV phonology does not account for the facts of Olo reduplication in anything approaching an elegant way.

Working within a CV phonology framework, Marantz (1982) proposes that the whole word is first reduplicated and then only the part that is actually needed is attached to the word. In this way, a skeleton approach is used. This will account for some of the data in Olo. One of the words that it works for is given in (6).

6) *otopa* 'blow' $o t o p a + o t o p a \rightarrow o t o p a p a$ 'blowing'
 VCVCV+VCVCV VCVCVCV

Unfortunately, this analysis quickly runs into problems. The first is that Marantz has no mechanism for infixing the reduplicated parts. As can be seen in (2, 4, 5), the final vowels are not reduplicated. This means that the reduplicated part must be infixing. While this may not be an unsurmountable problem, it would need to be dealt with. The second problem is more serious. As can be seen from (6), Olo uses Right to Left scanning. For CV phonology to work with words like *otopa* 'blow', the pattern must be VC. This scanning pattern will not work with words that have final glides, or final syllables that are just a vowel. One possible solution is to scan Right to Left for a C and then reverse the scan direction to Left to Right. This solution is demonstrated in (7).

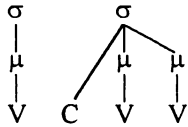
7)	$a \langle \rangle lo.i$ 'cut<3m>'
RL scan for C	$a \langle \rangle l o.i$
	C
now reverse scan and look for V	$a \langle \rangle l o.i$
	CV
reduplicate and infix	$a \langle \rangle lolo.i$ 'cutting<3m>'

This solution is clumsy, however, and does not seem to be well motivated. Furthermore, it violates the idea of directional scanning. For this reason, CV phonology as presently constituted can be safely rejected as a theoretical approach that can handle Olo reduplication.

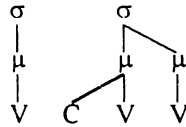
3. Moraic Phonology and Reduplication in Olo

There are currently two variants of moraic phonology, one proposed by Hyman (1985) and the other by Hayes (1989). One difference between the two concerns the node that a syllable initial consonant is attached to. Hayes attaches the consonant onset directly to the syllable tier, Hyman conversely attaches the onset to the first mora of the syllable. The differences are shown in (8), substituting 'μ' for Hyman's 'X' to make the notations comparable.

8) Hayes

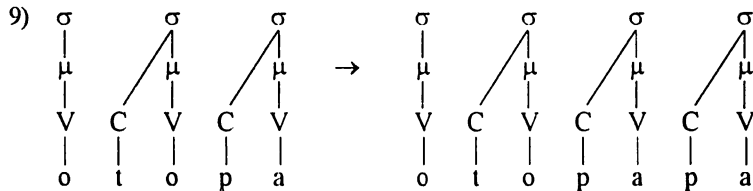


Hyman



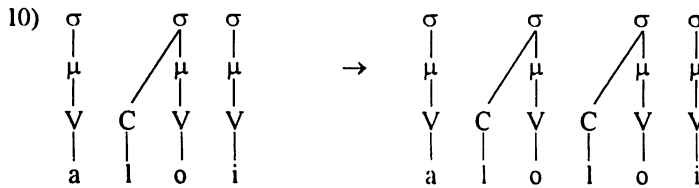
This difference may appear to be notational. However, the two are not simply notational variants, since they make different predictions.

In comparing how the two versions of moraic phonology handle Olo verb reduplication, the basic question is if either version gives us a node which can be reduplicated. In examining the data, we find that Hayes' model can account for the same set of data that is handled well by CV phonology, namely the verbs which have a final CV. In this model the node that would be reduplicated is the final syllable. The reduplication of (6) is shown in (9) using Hayes' model.

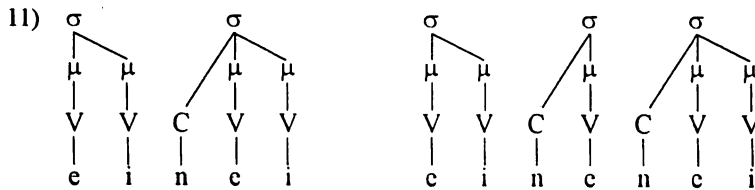


We are again dealing with Right to Left scanning. In this case the only thing that we can copy is the final syllable. That is the only node which has the actual material collected in one place.

When we attempt this approach with words that have final syllables that are composed of only a V, we find that the scanning rule must be changed from the final syllable to the final syllable with an initial consonant. An example of this is given in (10).



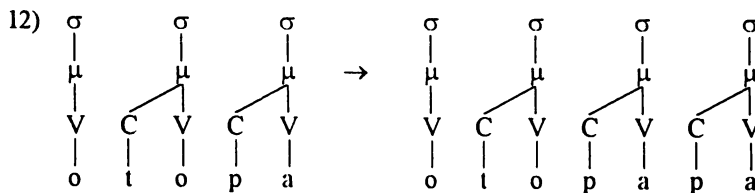
The third type of data that the model must handle involves a final glide. The theory needs to be able to correctly pick the final CV with Right to Left scanning. It should further be able to do it by finding a node that fits the criteria and which includes all and only the segments that should be reduplicated. Example (11) gives the analysis of the unreduplicated and reduplicated forms of *einei* 'go around' according to Hayes' model.



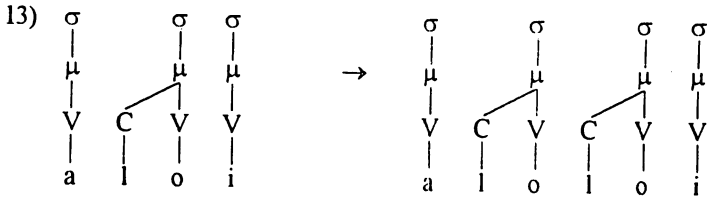
This model is clearly inadequate to handle the Olo data. There are no nodes that can be reduplicated that only contain the material needed. The only candidate for reduplication is the final complex syllable. However there is an extra mora in this syllable that does not get reduplicated. While Hayes' model handles more of the Olo data than does CV phonology, it does not give any mechanism to account for reduplication of the type found in (11).

3.1 Hyman's model

Now we will turn to the final model under consideration and see how it fares with the same data. We will use Right to Left scanning and predict that the reduplicated item will be the first complex mora found. Example (12) shows this with a final CV pattern.

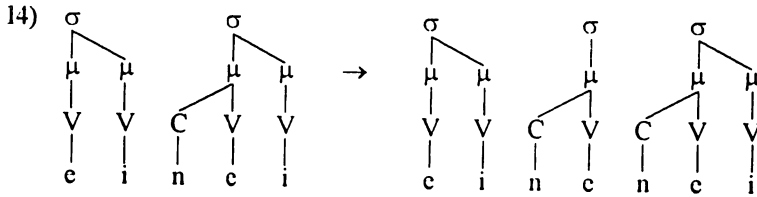


The data could be interpreted to be either a reduplication of the final syllable or the final mora, but as long as the final mora is a possibility, our prediction is valid. The second type of data that needs to be accounted for is when the final syllable is just a vowel as shown in (13).



The Right to Left scanning for the first complex mora works for the data given in (13). Notice that the search cannot be for a complex syllable, as was the case with Hayes' notation. This is because in Hyman's notation all the syllables in this word have single line inputs from the moraic tier.

The final data is crucial, since it is the data that the model developed by Hayes failed to account for. This is data with a final glide, one in which the final syllable has the pattern CVV. The application of Hyman's model to these forms is given in (14).



We can see that using Right to Left scanning the prediction of reduplicating the first complex mora works. For this reason Hyman's model is clearly preferable over Hayes'. Hayes' model gives us no node that contains all and only the elements that need to be reduplicated, while Hyman's model provides what is needed to account for the Olo data.

4 Unresolved Problems

Not all Olo verbs work as outlined above. The main type of deviation that is problematic is when the vowel seems not to be reduplicated, but rather an *e* is substituted. The problem is compounded due to uncertainty about the phonetics. Olo has a three-way vowel distinction for both front and back vowels. It is only the front vowels that concern us in this problem. The vowels are: /i ɪ e/. However /i/ and /ɪ/ are phonetically very close and difficult to distinguish.

It is possible that some of the data is inaccurate. However it is clear in some of the data that *i* becomes *e* when the V is reduplicated. An example of this is given in (15).

- 15) *aisi* 'send' *aisesi* 'sending'

If *e* was substituted for *i* whenever the last mora is complex mora and the vowel is *i*, the problem would be fairly simple. However, if the data in hand is correct, then the problem is not simple. The variations involve consonant initial roots versus vowel initial ones, roots which take object infixes versus object suffixes, and whether the initial consonant is *n* or a different consonant. It is possible that these variations could be due to incorrect data. More field work is planned in the near future to clear up this problem. If the data is correct, it may need to be handled in some other way.⁴

5 Conclusion

In this paper, we have looked at three different theories of phonology and applied them to reduplication data from Olo verbs. CV phonology is clearly inadequate to account for the data. Hyman's model of moraic phonology is clearly superior over Hayes' model, since it provides a node which includes all and only the material needed for reduplication. This is something Hayes' model failed to do in some instances. The problematic data given in section 4 would affect both models equally and so does not affect the basic conclusion concerning the superiority of Hyman's model of moraic theory.

References

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⁴ Currently underspecification and privative features look the most promising.