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Reduplication in Southern Paiute and Correspondence Theory

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1. Introduction

McCarthy and Prince (1995) claim that a serial analysis of Southern Paiute phonology leads to an ordering paradox between reduplication and the morphophonemic alternation $w \sim \eta^w$: in some cases reduplication seems to precede the alternation while in others the alternation seems to precede reduplication. According to them, an optimality theoretic analysis of the interaction between reduplication and the morphophonemic alternation in the language, where identity constraints and phonological constraints are ranked with respect to each other and are evaluated simultaneously in the phonology, is able to account for the data. This analysis of Southern Paiute data, along with other examples in their work, is put forth by McCarthy and Prince as strong evidence in support of correspondence theory:

If such analyses prove correct, then we will have gained very strong evidence for Correspondence Theory as articulated here, and with it, for the claims of parallelist OT, particularly as contrasted with serialist theories of grammatical derivation. (1995:7)

In this paper I show that McCarthy and Prince's interpretation of the Southern Paiute data is erroneous. While I make no overt attempt to defend a serial approach, I show that the data does not pose an ordering paradox for such an account because the morphophonemic alternation in question never operates on forms that have undergone reduplication. In fact, no explanation for the alternation's failure to apply after reduplication is necessary: the triggering environment for the alternation is simply never the outcome of reduplication. I conclude that their optimality theoretic account adds no new insight, and instead, complicates the analysis of the Southern Paiute data.

* I am grateful to my advisor and friend Daniel Silverman for his help.

2. The Data as presented by McCarthy and Prince

In Southern Paiute word initial *w* is realized as η^w intervocalically if it finds itself in such an environment upon morphological concatenation, as exemplified in (1).

(1) Southern Paiute $w \sim \eta^w$ Alternations¹

- | | | | |
|----|--------|-----------------------------|---|
| a. | wa'aŋi | ti'ŋ ^w a'aŋi | 'to shout/to give a good shout' |
| b. | waiχa- | nta'vŋ ^w aiχap'ɪ | 'to have a council/council (of chiefs)' |

However, if the glide ends up in intervocalic position due to reduplication it does not alternate with the labiovelar nasal, as can be seen in (2).

(2) Southern Paiute Reduplication

- | | | | |
|----|----------|----------------|---------------------------------|
| a. | wayi- | wawa'x'ipĩ'ya' | 'several enter/all entered' |
| b. | wĩn'nai- | wĩwĩ'n'nai- | 'to throw/several throw down' |
| c. | wĩnt- | wĩwĩ'n'nĩq'u- | 'to stand/to stand (iterative)' |

In (3) McCarthy and Prince deviate from Sapir and provide a form that suggests reduplication does not always block the $w \sim \eta^w$ alternation. Note that, significantly, the symbols indicating morpheme boundaries were added by the authors, and are not present in Sapir's data.

(3) Reduplication and $w \sim \eta^w$ alternation in the same form

- | | | | |
|-------|-----|---|---------------------------------------|
| wĩnt- | ya- | ŋ ^w t'-ŋ ^w ĩntχa' | 'to stand/while standing and holding' |
|-------|-----|---|---------------------------------------|

The datum in (3) complicates matters: if the $w \sim \eta^w$ alternation can occur in cases where the glide finds itself in intervocalic position due to reduplication then why doesn't it occur in (2)? In §3 I provide McCarthy and Prince's answer to this question and in §4 I show that no answer is necessary because the datum in (3) is erroneously parsed.

3. McCarthy and Prince's Optimality Theoretic Analysis

In their analysis of the Southern Paiute data McCarthy and Prince perceive an ordering paradox between a morphophonemic alternation and reduplication. This problem is circumvented in their optimality theoretic approach because all the constraints are evaluated simultaneously in the

1. I follow McCarthy and Prince in copying Sapir's transcription as closely as possible.

phonology—in parallel, rather than in sequence. A vital component of correspondence theory, which in itself plays an important role in optimality theory, is the notion of Base-Reduplicant (B-R) identity. As the term suggests, B-R identity is a constraint that requires the base and reduplicant feature and segmental ordering to be identical, and hence to *correspond*. The B-R identity constraint plays an important role in the optimality theoretic account of the Southern Paiute data.

Based on the $w\sim\eta^w$ alternation, exemplified in (1) in the previous section, McCarthy and Prince posit the following two context-sensitive constraints: $*VwV$ (i.e., w is banned intervocalically) and $*[\eta]^w$ (i.e., η^w is banned word-initially). The data in (4) show that the first of these two constraints is violated in reduplicated words.

(4) Reduplication where $*VwV$ is violated²

/Red + wĩ ɣi / 'vulva/vulvas (obj.)'	B-R Identity	*[η] ^w	*VwV	
a. $wĩwĩ'xiA$			*	(under-application)
b. $\eta^w\eta^w'xiA$		*!		(over-application)
c. $wĩ\eta^w'xiA$	*!			(normal-application)

The first syllable of the stem, $wĩ-$, is reduplicated and prefixed to the base $wĩɣi$. The base-initial glide w finds itself in intervocalic position as a result. The existence of the $w\sim\eta^w$ alternation in the language would predict the realization of the base-initial glide as a labiovelar nasal, as is the case in the unattested (4c). A serial ordering of the two processes is bound to result in an incorrect prediction: if reduplication precedes the $w\sim\eta^w$ alternation, (4c) is incorrectly predicted; if reduplication follows the alternation, (4a) is correctly predicted. The data in (3)—where the alternation does surface in a reduplicated form—should not be, but is, attested.

Following Wilbur (1973) McCarthy and Prince term the forms in (4 a-c), respectively, as under-, over- and normal-application of the phonological alternation. Simply put, the case of under-application in (4a) results from the alternation not applying to the base where it should have, in order to preserve B-R identity. The case of over-application in (4b) results from the application of the alternation to the base as expected, and to the reduplicant, where it is not required, in order to preserve B-R identity. Normal

2. This tableau was not provided by McCarthy and Prince.

application in (4c) is the case of the alternation applying only where it is phonologically triggered by the environment. The optimality theory-friendly conclusion is, therefore, that B-R identity is indeed a higher ranking constraint than *VwV, and thus the intervocalic glide is allowed to remain in the attested (4a), that is, in order to preserve this identity. In addition to this, *VwV is ranked lower than *[ŋ]^w, because it is the constraint violated in order to preserve B-R identity.

Based on these data, and crucially relying on the example in (3) that seems to show a reduplicated form undergoing the $w \sim \eta^w$ alternation, McCarthy and Prince conclude that the correspondence theoretic constraint of B-R identity is the motivating factor behind the varied results of the interaction between reduplication and the $w \sim \eta^w$ alternation in Southern Paiute. Since no serial ordering can account for these results, the OT parallelist approach seems to indeed offer an advantage.

4. The Data Re-examined

For my analysis I consult the same data source used by McCarthy and Prince: Sapir's work on Southern Paiute.³ I begin by investigating an issue on which McCarthy and Prince depart from their data source, whether the $w \sim \eta^w$ alternation ever takes place in a reduplicated form. In §4.1 I show that, in accordance with Sapir's report, this is never the case. The ordering paradox that supposedly exists in a serial account of the Southern Paiute data is thus eliminated, and a more fundamental question is posed: why is the alternation seemingly blocked upon reduplication? I take this issue up in §4.2.

4.1. Does the $w \sim \eta^w$ alternation ever operate on a reduplicated form?

In his discussion of the $w \sim \eta^w$ alternation, Sapir notes that "This rule does not operate, however, when *w* becomes intervocalic by reduplication" (1930a:67). In direct contradiction to their source, McCarthy and Prince cite a sole datum ((3) above) that "...serves to establish that the reduplicant is not simply exceptional with respect to the process of interest" (1995:102). This datum, which provides crucial evidence for the supposed paradoxical ordering between reduplication and the $w \sim \eta^w$ alternation, is simply misrepresented. It is not a reduplicant of the stem $w\dot{i}nt$ prefixed by *ya-* at all. According to Sapir's dictionary, the word $ya\eta^w t\eta^w i n\dot{x}a'$, glossed as

3. No other original work on Southern Paiute, that wasn't just citing Sapir's data on reduplication, was found. Moreover, works on related languages based reduplication analyses on Sapir's work as well.

‘while standing and holding’, is composed of the verb $ya\eta^{w_1}$ ‘to carry’ and the verb w_1nt ‘to stand’ (Sapir 1931:722)⁴:

(5) $ya\eta^{w_1} + w_1nt$ ‘to carry’ + ‘to stand’

The stem-initial glide of w_1nt , finding itself in an intervocalic context upon the concatenation of the morpheme $ya\eta^{w_1}$, is, just as expected, realized as a labiovelar nasal. (5) is a simple example of the $w \sim \eta^w$ alternation observed throughout Southern Paiute. It is not, as claimed by McCarthy and Prince, an example of the $w \rightarrow \eta^w / V_V$ alternation applying to a reduplicated form. The simple answer to this subsection’s titular question is, therefore, “No”: there is no evidence that the $w \sim \eta^w$ alternation ever operates on a reduplicated form.

4.2. Why is the $w \sim \eta^w$ alternation blocked in reduplication?

Since there is no evidence for the $w \sim \eta^w$ alternation operating on a reduplicated form in Southern Paiute, the ordering paradox within a serial account of the data is also rendered nonexistent. This state of affairs clears the road for a more interesting question: why is the alternation in question seemingly blocked in reduplicated forms?

The nature of reduplication in the language is shown to account for the apparent blocking of the $w \sim \eta^w$ alternation. Reduplication in Southern Paiute actually requires some change to the base (hence, even theory-internally McCarthy and Prince err: the grammar does little to preserve B-R identity), and this change does not result in the triggering environment for the alternation in question. I also discuss possible reasons why Sapir’s notation does not make this situation clear.

4.2.1. The Nature of Southern Paiute Reduplication

Sapir reports several types of reduplication in Southern Paiute. He notes: “The process [of reduplication] is freely used both in nouns and, especially, in verbs. It is frequently accompanied by glottalization or consonantal gemination or both.” (1930a:256). One type of reduplication involves nasalization (referred to by Sapir as CV^{-n} , the superscript ‘n’ standing for nasalization). In this type of reduplication, if a stem has a nasal following the initial CV-, the reduplicant includes the nasal. Note that (6c) is an example of a CV^{-n} reduplication of a stem without an internal nasal.

4. This word is found in “Iron-Clothes” of the “Texts of the Kaibab Paiutes and Uintah Utes” (Sapir 1930b:400).

(6) Examples of CV-ⁿ reduplication

- | | | | |
|----|---------|-----------------------------|---------------------------|
| a. | qa'nɪ | qaŋqa'nɪ | 'house/houses' (I) |
| b. | tɔna'i' | tɔntɔ'n'A ^x qai' | 'stabs/several stab' (II) |
| c. | | pɔmpɔ'tsats' | 'lizard' (var) (III) |

Also, "The consonant following a reduplicating CV- may be either spirantized or geminated, according to type." (Sapir 1930a:256). These types of reduplication are identified as CV-^s and CV-^g, respectively.

(7) Examples of CV-^s reduplication

- | | | | |
|----|------------|--------------------------|---|
| a. | pɔ' | pɔvɔ'ɔ | 'trail/trails' (I) |
| b. | qwi | qwiɣwi- | 'to take one object/several take one object' (II) |
| c. | tɔɣɔ'q-wi' | tɔrɔ ^x .ɔqwi' | 'runs/runs several times' (IV) |
| d. | qa-- | qaya'- | 'to sing/to sing (momentaneously)' (V) |

(8) Examples of CV-^g reduplication

- | | | | |
|----|------------|----------------|--|
| a. | naɣa'mi.' | nan-a'xa'mi' | 'is sick/is sick several times' (IV) |
| b. | maŋwa'vai' | mam'ma'ŋwawai' | 'creeps/creeps in starts' (IV) |
| c. | pA'qa'ŋU | pA'pa'q-aŋU | 'to kill one person/several kill one' (II) |
| d. | n̄ntciɣa- | n̄n-i'ntciɣa- | 'to shake/to start in shaking' (V) |
| e. | w̄n-i'- | w̄wi'n-i'- | 'to stand, be standing/to stand up' (V) |
| f. | w̄i'yi' | w̄wi'yi' | 'dances/dances repeatedly' (IV) |

The Roman numerals that follow each example identify the function of the reduplication in that form as one of the following: (I) Distributive reduplication in nouns; (II) Distributive reduplication in verbs; (III) Constantly reduplicated nouns (these nouns occur only in reduplicated form); (IV) Iterative reduplication in verbs; and (V) Momentaneous Reduplication in verbs.

Clearly, the type of reduplication (CV-ⁿ, CV-^s, or CV-^g) does not depend on the morphological function of the reduplication itself. In some circumstances the morphological function does play a role in the type of reduplication a form may undergo. For example, "momentaneous reduplication differs radically from distributive and iterative reduplication in that there is no accompanying stem gemination or glottalization." (Sapir, 1930:261). However, even a cursory look at the data shows that nasalizing, spirantizing and geminating types of reduplication are not selected based on function alone.

Sapir refers to reduplication types as phonetically conditioned. The type of reduplication that involves nasalization does seem to be phonetically conditioned, except for the case of the fossilized ‘lizard’ (6c). However, for most other forms there does not seem to be a way to predict which stems will undergo CV^{-s} or CV^{-g} reduplication. Based on this, it is not unlikely that reduplication in Southern Paiute was lexically-conditioned: if there is no way for a learner of the language to determine which phonetic type of reduplication a form should undergo because there is no distinguishable triggering environment for either spirantization or gemination, only memorization of the already existing reduplicated forms in the language is possible.⁵

Reduplicated words with base-initial w’s are reported by Sapir as having undergone CV^{-g} reduplication⁶ (Sapir 1930a:256-280). This suggests that what really happens to the data in (2) is similar to what is illustrated in (9):

- (9) base-initial w after CV^{-g} reduplication
 wayi- wawwa’x’ip̃ɣa’ ‘several enter/all entered’

According to Sapir, upon CV^{-g} type reduplication the base-initial glide is geminated. As a result, the V_V environment that triggers the w~ŋ^w alternation is simply not present in these forms (reduplication results in VwwV, not VwV). In other words, upon reduplication the alternation is not *blocked*, but simply is never *triggered*.

Finally, I address Sapir’s transcription and possible reasons the above situation was not made clear. Note that in CV^{-g} type reduplication, exemplified in (8), Sapir transcribes the geminated base-initial consonant in various ways. In (a) and (d) the geminate is written as a long consonant (i.e., n-), in (b) it is transcribed as a geminate (i.e., m’m)⁷, and in (c), (e) and (f) the geminate is not transcribed at all. The case of (8c), where the base-initial p fails to geminate as expected in CV^{-g} type reduplication, might be explained in the following way: Sapir reports some phonological conditioning on the presence of gemination in unaspirated stops and

5. It is important to note that whether the process of reduplication is lexically-conditioned or not does not make or break my case. However, if true, it does add to the theoretic problems with the OT analysis, as suggested in the conclusion.

6. Note that glide initial forms join nasalized forms in undergoing a type of reduplication that can be determined based on phonetic environment. This, however, does not detract from the fact that the triggering phonetic environment for most other forms is not discernable.

7. The glottalization is phonologically conditioned (see Sapir 1930a:§15,2,b).

affricates, depending on the adjacent vowels (1930a:§15,2,b). The geminate glides, however, are *never* present in the transcription.

One possible motivation for the lack of geminate glides in Sapir's transcription is that a long intervocalic *w* never contrasts with a short intervocalic *w*, due to the now familiar *w~ŋ^w* alternation in the language. Hence, since *w* and *ww* never contrast in this context, Sapir may have simplified his transcription, allowing *w* to represent a phonetically geminate glide. While it seems strange that Sapir would take such a shortcut in his transcription, and I certainly do not suggest that he must have done so, this explanation is supported by Sapir's classification of the reduplicated forms with base-initial glides as CV-^g, indicating that these glides are not of singleton status, which in turn, of course, suggests that there is no reason to expect these glides to alternate with the labiovelar nasal.⁸

5. Discussion and Conclusion

5.1. Empirical Problems with the OT Analysis

McCarthy and Prince's analysis is based on inaccurate data and therefore leads to unsupported and potentially erroneous predictions. The sole datum they produce as evidence that the *w~ŋ^w* alternation can affect a reduplicated word is simply incorrectly analyzed, and thus, the problem they perceive with the serialist approach to analyzing the data is nonexistent. Most importantly, their analysis would predict that reduplicated forms may undergo the *w~ŋ^w* alternation (in situations where B-R identity would not be violated, e.g., if a prefix triggered the alternation in the reduplicant, which in itself triggers the alternation in the base). Not only is there no empirical support for this, but it is specifically reported in their data source to never occur.

5.2. Theoretic Problems with the OT Analysis

A closer look at the reduplication process in Southern Paiute reveals that McCarthy and Prince's analysis encounters a theory-internal problem. According to Sapir, the language actually requires some change to the base

8. Note that this is merely a possible reason why the geminating aspect of the glides in question—something that Sapir specifically describes—is not transcribed as such. I may very well be oversimplifying this case, and there could be other processes involved that influenced Sapir's transcription of the labiovelar glides. However, the impossibility of getting an exact answer to why Sapir didn't transcribe the glides as geminated does not detract from the significance of the fact that he clearly specifies the base initial glides underwent gemination upon reduplication.

upon concatenation of the reduplicant, which suggests that if B-R identity constraints did exist in the grammar, they would be easily violable ones. For this reason, it seems rather inconsistent to rank the relevant B-R identity constraints, which are easily violable, above the *VwV constraint, which is abided by everywhere else in the language.

I also suggest that reduplication in Southern Paiute might have been a lexically-conditioned, rather than a phonologically-conditioned, process at the time of Sapir's data gathering. If this is true, as the lack of a discernable environment that might trigger each distinct phonetic type of reduplication would suggest, positing the fossilized B-R identity constraint as higher ranking than any still operational constraint seems theoretically unsound.

5.3. Is there Evidence in Favor of Parallelistic Correspondence Theory?

At the beginning of their paper McCarthy and Prince outline their argument in favor of correspondence theory. First, they argue against basic ordering theory and for the parallel approach.

The basic Ordering Theory gives an appealing account of reduplicative phonology: either phonology precedes reduplication, or reduplication precedes phonology. ...we will show that the theory is deeply flawed in empirical predictions, and that it cannot, in fact, comprehend the range of phonology/reduplication interactions, even when subject to further refinements. Its fundamental defect, we suggest, is that it cannot reckon appropriately with the notion of **identity**. (1995:8, bold in original)

Instead, I have shown that the empirical predictions of basic ordering theory are not flawed with respect to Southern Paiute, whereas the empirical predictions of correspondence theory are.

McCarthy and Prince claim that the evidence for the existence of B-R identity constraints in the grammar can only be found when such constraints somehow interfere with the application of some other constraint. My findings show that Southern Paiute provides no evidence for such a phenomenon: nothing interferes with the application of the $w \sim \eta^w$ alternation upon reduplication because the triggering environment for this alternation is simply not created. This is not a case of under- or over-application of the structural constraint (i.e., *VwV), but a case of normal application—the type that does not constitute evidence, according to McCarthy and Prince, for correspondence theory.

Crucial evidence distinguishing serialist from parallelist conceptions is not easy to come by; it is therefore of great interest that reduplication-phonology interactions supply a rich body of evidence in favor of parallelism. Malay nasal harmony (§3.6), Axininca Campa epenthesis and augmentation (§3.7), Chumash, Kihehe, and Tagalog coalescence (§3.8), and Klamath and Southern Paiute (§5.3) either cannot be analyzed serially or can be analyzed only in formally-problematic and conceptually-flawed recastings of conventional serialism. (1995:119)

Indeed, crucial evidence is not easy to come by. McCarthy and Prince's analysis of Southern Paiute is rejected on the grounds that it is inconsistent with the data in the language. Other analyses in McCarthy and Prince's work, even when more consistent with the data in the relevant languages, are not the only, or even most attractive, approaches to explaining the phenomena in question (Choi 1998, Holland 1998, Kim 2000, Prieto 1998, and Silverman 2000).

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