Marshallese Suffixal Reduplication

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This paper will discuss suffixal reduplication in Marshallese, a Micronesian language of the Pacific. An understanding of Marshallese syllable structure will be important in understanding its reduplication process and the interaction of reduplication and eponthesis. Marshallese reduplication appears to have two distinct patterns. The reduplicative suffix added to words ending in CVC is of the form CVC while the reduplicative suffix added to words ending in CVVC is of the form VVC, apparently lacking an onset consonant. I will propose an analysis of Marshallese reduplication within the framework described by Steriade (1988) which explains both types of Marshallese reduplication as the result of a single process. I will show that Marshallese demonstrates a very unusual type of reduplication within the typology of reduplication outlined by McCarthy and Prince (1986) filling an otherwise unexplained but nonprincipal gap in this typology. The proposed analysis of Marshallese reduplication will be compared to a new analysis of Tzeltal verbal reduplication. Finally, I will describe Marshallese eponthesis which produces the surface forms of the reduplicated words.

1. Marshallese Syllable Structure

Marshallese is a Micronesian language spoken on the Marshall Islands of the Pacific. There are two main dialects of Marshallese, Ratak (eastern) and Ralik (western), which occasionally differ in pronunciation. The data in this paper will be from a native speaker of the Ratak dialect.¹

The consonant inventory of Marshallese is shown in (1):

¹All data included in this paper are taken from transcriptions made by Ian Maddieson and the author while working with a native Marshallese speaker, Dinah Young. Many thanks are due to Professor Maddieson and Mrs. Young for their time and effort. Additionally, I thank Dovis Steriade for much advice, discussion, and insight regarding the analysis of the Marshallese data. Of course all errors are my own responsibility.
The Marshallese language has 12 surface vowel qualities: four front and four central unrounded vowels and four back round vowels. The transcription used in this paper is shown in (2) below.

The front vowel occurs in the neighborhood of light consonants; the central in the neighborhood of heavy consonants, and the back in the neighborhood of round consonants. The exact distribution of these surface qualities and their underlying phonological analysis is not clear, and the reader is encouraged to see Bender (1969) and Choi (in preparation).

Marshallese contrastive vowel and consonant length. Minimal pairs of these alternations are given in (3) and (4).²

²Lips (3) and (4) are partially due to Bender (1969).

³Such words may derive historically from compounding and place assimilation.

⁴Ian Maddieson, personal communication.

⁵Ian Maddieson, personal communication.
collected, and they are not relevant to the reduplication data or analysis described below.

I suggest that the word final extra heavy syllables be represented as bimoraic, having the coda consonant share the final mora of the syllable template. This structure is shown in (8).

\[ \begin{array}{ccc} 
\text{C} & \text{V} & \text{C} \\
\mu / \mu & / & \mu \\
\mu & \mu & \mu \\
\end{array} \]

\( \sigma \)

Cross-linguistic evidence suggests that a syllable may be maximally bimoraic (see Hyman, 1985), in the unmarked case. As will be shown, a trimoraic structure for this syllable would prevent the possibility of a unified analysis of reduplication patterns in the language. We will see that a proposal suggesting that the final consonant is extrametrical is also untenable.

While all other syllables in the language have a one-to-one or many-to-one to one (in the case of long vowels assuming a single root node) mapping of moras to segments, the CVVC syllable type has a one-to-many mapping. Consonant clusters in coda would also produce a one-to-many mapping; however, Marshallese does not allow tautosyllabic consonant clusters. I will suggest that this one-to-many mapping is a non-optimal syllable type whose limited distribution in Marshallese is relevant to our understanding of reduplication in the language.6

2.0 Reduplication

Reduplication in Marshallese is used to form the causative and the intensive. The process is fairly clear but not entirely productive. There are two patterns of reduplication. In the first, a suffix is added which has the melody and syllable structure of the final stem syllable. Examples of this type are shown in (9). (A [+] indicates the addition of a grammatical marker prefixally.)

(9) Pattern 1

<table>
<thead>
<tr>
<th>jëj</th>
<th>slippery</th>
<th>jëj-jëj</th>
<th>bragging, very slippery</th>
</tr>
</thead>
<tbody>
<tr>
<td>nará</td>
<td>bite</td>
<td>nará-nará</td>
<td>bite hard</td>
</tr>
<tr>
<td>laaq</td>
<td>most recent</td>
<td>laaq-laq</td>
<td>far away, long ago</td>
</tr>
<tr>
<td>lvøøq</td>
<td>fear</td>
<td>lvøøq-lvøøq</td>
<td>very afraid</td>
</tr>
<tr>
<td>mok</td>
<td>tired</td>
<td>e-mok-e-mok</td>
<td>very tired</td>
</tr>
<tr>
<td>ebøk</td>
<td>to make full</td>
<td>e-bøk-e-bøk</td>
<td>sandy</td>
</tr>
<tr>
<td>bøk</td>
<td>sand</td>
<td>ebøk-bøk-bøk</td>
<td>she is a gossip</td>
</tr>
<tr>
<td>røj</td>
<td>ear</td>
<td>ja-røj-røj</td>
<td>deaf</td>
</tr>
<tr>
<td>ennon</td>
<td>aroused</td>
<td>ennon-annon</td>
<td>(sexually)</td>
</tr>
<tr>
<td>enno</td>
<td>delicious</td>
<td>enno-no</td>
<td>very delicious</td>
</tr>
</tbody>
</table>

(10) Pattern 2

<table>
<thead>
<tr>
<th>baat</th>
<th>smoke</th>
<th>e-baat-aat</th>
<th>smokey</th>
</tr>
</thead>
<tbody>
<tr>
<td>jook</td>
<td>ashamed</td>
<td>e-jook-ook</td>
<td>shy, bashful</td>
</tr>
<tr>
<td>naan</td>
<td>talk, word</td>
<td>ky-kven-naan-naan</td>
<td>talkative</td>
</tr>
<tr>
<td>kqøq</td>
<td>piglet</td>
<td>ka-kqøq-qøq</td>
<td>to own a piglet</td>
</tr>
<tr>
<td>kvjeek</td>
<td>fire</td>
<td>ka-kvjeek-qøq</td>
<td>firey, blazing</td>
</tr>
<tr>
<td>teaŋ</td>
<td>popular</td>
<td>tøa-teaŋ</td>
<td>popular very</td>
</tr>
<tr>
<td>jituuul</td>
<td>steel</td>
<td>jituuul-uuul</td>
<td>magnetic burning</td>
</tr>
<tr>
<td>meaŋ</td>
<td>burn, warm</td>
<td>e-meaŋ-eaŋ</td>
<td>he is a fireer</td>
</tr>
<tr>
<td>meaer</td>
<td>lie, fib</td>
<td>e-meaer-meer</td>
<td></td>
</tr>
</tbody>
</table>

Long vowels do not surface in word final position due to a process of word final vowel shortening. The reduplicated form of a CVV final stem surfaces with a short vowel in word-final position. For example, the reduplicated form of 'baat:qad 'father' is realized as [baata] and will surface in its reduplicated form as baataa:ta 'priestly'.

3. Reduplication Analysis

Adopting the above syllable structure and Steriade's (1988) theory of reduplication, a unified account of Marshallese reduplication becomes possible. Recall that Steriade proposes that "templates are not strings of concrete, fillable slots, but rather abstract conditions on the prosodic weight and syllabic organisation of strings" (Steriade, 1988, p. 146). If the weight parameter of the reduplicative suffix is specified as a bimoraic syllable both patterns of reduplication can be explained as the result of a single process. The analysis of the CVC pattern of reduplication, Pattern 1, is straightforward. The entire word with its accompanying syllable structure is copied, suffixed, and trimmed to a bimoraic syllable. The derivation is shown in (11).

(11) input: ebbøk to make full
| copy: ebbøk-ebbøk |
| prosodic weight: ebbøk-bøk |
| output: ebbøkøk | puffy |

---

6I thank Donca Steriade for her discussion of such structures with the author.
Furthermore, the reduplication of words ending in CVVC syllables which seems to affix an onsetless suffix can now be given a straightforward explanation. This structure is represented in (12).

\[
\begin{align*}
(12) & \quad CVCC + CVCC \\
& \quad \mu\mu\mu\mu \quad \mu\mu\mu\mu \\
& \quad \vert / \quad \vert / \quad \vert / \quad \sigma \sigma
\end{align*}
\]

Recall that we suggested that the one-to-many mode of association of moras to segments, i.e. the extra heavy syllable, is less preferable than a one-to-one or many-to-one mapping. Such syllables are in fact only allowed in Marshallese finally or as parts of geminate structures internally. In the case of a reduplicated stem with a final CVVC syllable, the sequence must resyllabified after affixation in such a way as to make a regular heavy syllable out of the now word internal extra heavy stem syllable. The final stem consonant reassociates as an onset to the suffixal reduplicated syllable. Here, it becomes relevant that Marshallese does not permit complex onsets (or any tautosyllabic consonant clusters). This forces the original suffixal onset to delete to yield a simplex onset. The original coda consonant is now the onset of the reduplicated syllable. The derivation is shown in (13).

\[
\begin{align*}
(13a) & \quad jituwul + jituwul \quad \rightarrow \quad jituwulwul \\
& \quad CVCC - CVCC \\
& \quad \mu\mu\mu\mu \quad \mu\mu\mu\mu \\
& \quad \vert / \quad \vert / \quad \vert / \quad \sigma \sigma
\end{align*}
\]

(13b)

a. input: jituwul
b. copy: jituwul-jituwul
c. prosodic weight: jituwul-nuwul
d. get rid of extra heavy syllables: jituwul, nuwul
e. no complex onsets: jiguwul, nuwul
f. output: jituwulwul

Resyllabification, creating an illicit onset, occurs to remedy the illicit word internal occurrence of an extra heavy syllable rather than deletion of the offending stem final coda consonant. It seems likely that a rule deleting the second consonant in complex onsets is a less marked rule than one deleting (word internal) coda consonants. Steriade (1988) states that complex onsets appear to simplify systematically by eliminating non-initial consonants. Marshallese corrects the illicit syllable structure created by the reduplication of CVVC forms by resyllabification. Then a common rule of onset simplification occurs.

Steriade’s (1988) framework for reduplication is adopted here over a copy-and-associate framework as introduced by Marantz (1982) and developed in the work of Yip (1982), Broselow and McCarthy (1983), Levin (1983), Kiparsky (1986), and others which considers the shape of reduplicated affixes to be independent of their base as are normal affixes (Steriade, 1988). In Steriade’s reduplication framework, the template has no independent existence and arises as a result of weight and syllable markedness parameter settings which are satisfied independently of one another using a full copy of the base and its syllable structure. This framework is preferred here, a copy-and-associate framework, for reduplication whereby a template is affixed and the melody copy then associated or mapped to it does not have a mechanism to account for the transfer of vowel length from the stem to the reduplicated affix. (Note that the proposal of McCarthy and Prince (1987), however, does account for length transfer by adopting the insertion of the lexical specification of the base in lieu of copying and assuming that “all and only the lexically specified properties of the input are available for association.”)

Steriade comments that Clements (1983), Davis (1985) and Kiparsky (1986) have “noted that many instances of reduplication cannot be derived [by a copy-and-associate model] unless the first step is to link a syllabic segment to the V slot of the template.” (1988, p. 86) Steriade suggests that these instances actually demonstrate “not the need to give priority to association to Vs but rather the fact that partial reduplication copies not just segments but also syllable structure.” (1988, p. 87) This is the position adopted in the analysis presented below.

To continue the description of Marshallese reduplication, recall the cases of the vowel-final words and the process of final vowel shortening. The relevant derivation is given in (14).

\[
\begin{align*}
(14) & \quad \text{input:} \quad \text{baataa} \\
& \quad \text{copying:} \quad \text{baataa-baataa} \\
& \quad \text{prosodic weight:} \quad \text{baataa-ta} \\
& \quad \text{final-vowel shortening:} \quad \text{baataa} \\
& \quad \text{output:} \quad \text{baataa}
\end{align*}
\]

The reduplicated forms of true CV-final words like ‘awa/ look like syllable copying resulting in ‘ka-aawawa/ (shown in (15)) but in fact are due to a combination of the requirement of template satisfaction and the rule of word final vowel shortening. The final vowel in ‘kaawawa/ is lengthened in order to maximally satisfy the template, but then undergoes word final vowel shortening.

\[
\begin{align*}
(15) & \quad \text{input:} \quad \text{awa} \\
& \quad \text{copying:} \quad (ka+) a-wa-a \\
& \quad \text{prosodic weight:} \quad \text{kaawawa} \\
& \quad \text{template satisfaction:} \quad \text{kaawawa} \\
& \quad \text{final vowel shortening:} \quad \text{kaawawa} \\
& \quad \text{output:} \quad \text{kaawawa}
\end{align*}
\]

Although there is no empirical evidence to show that this vowel lengthening occurs to fill the template, arguments by McCarthy and Prince and others suggest that a reduplicative template must be satisfied if possible in the language. As Marshallese does have long vowels, we infer that the template is satisfied but that this final long vowel doesn’t surface due to the independently motivated rule of word-final vowel shortening.

Although sequences of unlike vowels are uncommon in Marshallese, there are a few examples of reduplication in such words. These forms are shown in (16).
An explanation for the presence of glides in the reduplicated forms is available if the final syllabic stem vowel is analyzed as having a glide in onset position. This follows the line of Bender’s (1969) analysis in which he posits a light glide, [y], and a round glide, [w], in the language noting that the glides are “often heard mainly in [their] effect on the neighboring vowels” (p. xviii). Clearly, a glide must exist as an onset in the second syllable of the stem because it appears in the reduplicated affix and is an unrounded glide rather than the rounded glide which would be predicted by a rule of glide insertion between two round vowels. The choice of a 1V or 2VV transcription was rather arbitrary in most cases because of its contextually predictability after the first vowel of the stem. No phonological contrast between VV and VGV exists. The glide in the suffix is copied from phonological material in the base; however transcription of the glide in the stem final syllable was somewhat arbitrary due to the natural acoustic transitions after a front vowel. The stem internal glide appears to be transcribed more reliably when followed by an affix in which the glide is clearly present.

4. Marshallese Fills an Unexplained Gap

Marshallese is very unusual with respect to its weight parameter for reduplication. McCarthy and Prince (1986) state that they have found no cases of bimoraic syllable suffixation (p. 41). They do cite examples of suffixal minimal word/foot reduplication in Manam, bisyllabic reduplication in Sirituno, and monosyllabic reduplication in Kamaunu (with an onset) and in Tzeltal (purportedly without an onset). They comment regarding the lack of any bimoraic syllable suffixation that “this gap does not appear to be a principled one; the relative rarity of suffixing reduplication, joined with the relative rarity of bimoraic reduplicative affixes, is sufficient to account for it.” (McCarthy and Prince, 1986, p. 41) Under the proposed analysis, Marshallese appears to fill an otherwise unexplained gap in reduplication typology. A bimoraic syllable weight parameter for the reduplicative suffix in Marshallese then appears theoretically economical in that two apparently different patterns of reduplication are given a unified analysis, as well as being of interest as an example of a rare type of suffixal reduplication.

5. A Note on Tzeltal Reduplication

Tzeltal, a Mayan language of Mexico has a reduplication process which is similar in certain ways to that of Marshallese. McCarthy and Prince (1986) offer an example of reduplication in Tzeltal in which the reduplicated suffix has the form VC. They say, “Tzeltal appears to add only a rhyme, deriving its onset from phonological material already present in the base” (McCarthy and Prince, p. 41, 1986) Several examples are given in (17).

<table>
<thead>
<tr>
<th>(17)</th>
<th>Pattern A</th>
<th>(Berlin, 1963)</th>
</tr>
</thead>
<tbody>
<tr>
<td>nit</td>
<td>niiutam</td>
<td>p'ik</td>
</tr>
<tr>
<td>net'</td>
<td>net'et'an</td>
<td>to touch lightly</td>
</tr>
<tr>
<td>haa</td>
<td>haasann</td>
<td>p'ikp'ik</td>
</tr>
<tr>
<td>col</td>
<td>cololan</td>
<td>to touch it lightly, repeatedly</td>
</tr>
<tr>
<td>p'uy</td>
<td>p'uyuyan</td>
<td>c'al</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to make ready for carrying</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c'al'can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to continue carrying cargo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(final n unspecified)</td>
</tr>
</tbody>
</table>

The only two desinences which have a reduplicative suffix lacking the stem onset are the classes of verbs which require an additional -VC suffix after the reduplicative suffix (Berlin, 1963). This is the type shown in (17). The
grammatical suffix is -an for the transitive verbs (shown above) and -et for intransitive verbs. Whenever this grammatical suffix is not present, the final syllable reduplication retains the same onset consonant which is seen in the stem. Under the McCarthy and Prince (1986) account, the verbs which take a -VC grammatical suffix after the reduplicative suffix (Pattern A) would have a transparent morphological boundary between stem and the reduplicated affix over which syllabification may operate, while the verbs which do not have this grammatical suffix (Pattern B) would have to have an opaque boundary between stem and reduplicative affix so that the association process would be prevented from reaching into the stem to map the stem final consonant to the onset position of the suffix. The suggestion that the transparency of this boundary may vary within a language's verbal reduplication process is unattractive, and a better explanation should be sought.

I suggest that, as in Marshallese, prosodic requirements of the language can be called upon to explain the lack of an onset in the Pattern A Tzeltal case. Under Steriade's (1988) framework adopted in this paper, reduplication proceeds normally producing an affix by copying the melodic and prosodic structure of the stem. The addition of the final -VC grammatical suffix, however, alters the prosodic structure of the word. Resyllabification makes the coda of the reduplicative suffix the onset for the grammatical suffix. Tzeltal mainly has CV and CVC syllables. VC and V syllables occur word medially in words like ha.e.tik and ins.še.l (Berlin, 1962). After creation of an onset for the grammatical -VC suffix, a reduplicated CVC form will have the form CVC.CV.Can. The derivation to this point appears in (19):

(19)
a. input: nit
b. copy and grammatical suffix: nit-nit-an
c. onset rule: nit.ni.tan

A consideration of prosodic structure in Tzeltal is relevant here. While neither Berlin (1962) nor Kaufman (1971) offer a systematic description of stress in Tzeltal. Berlin states that two main patterns of primary stress or accent exist: sometimes stress is on the final syllable and sometimes on the penultimate. An examination of Berlin (1962) and Kaufman (1971) shows that stress falls on the penult in words ending in vowels. These words are mostly borrowed from Spanish:

(20) kirímu Christian
kawáyu horse
báka cow
kálu sou (sic Kaufman 1971, p.13)
kostümpe custom

Stress falls on the final syllable in the native forms, which generally end in a closed syllable, and in those borrowed forms that end in a closed syllable:

<table>
<thead>
<tr>
<th>(21)</th>
<th>winfk</th>
<th>man</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yafiňk</td>
<td>today</td>
</tr>
<tr>
<td></td>
<td>ganär</td>
<td>earning</td>
</tr>
<tr>
<td></td>
<td>migdil</td>
<td>Michael</td>
</tr>
</tbody>
</table>

Kaufman and Berlin use the orthographic <h> to denote a voiceless non-syllabic vowel with the same articulation as the adjacent tautosyllabic vowel (Kaufman, 1971, p. 8). These syllables also appear to count as heavy with respect to stress:

| (22) | kahpēh | coffee |
|------| lasmahmah | they fight |
|      | hulukāh | each |

When primary stress is on the final syllable, secondary stress falls on the antepenultimate and on alternating syllables before that in longer words, apparently without regard to weight. If only one syllable precedes the primary stress (whether it is on the penult or final) the secondary stress falls on that syllable (Berlin, 1962). Berlin's examples include: yāṭhik, t'ifahik, and h-posfañwanēh. In words ending in a light syllable (generally borrowed), primary stress falls on the penult and secondary stress two syllables before it on the antepenult. Berlin's examples include: t'a-pinka, hín-wári, and ta-tenehōpā.

The data has clear gaps but the account that seems compatible with all available examples would be that Tzeltal creates bimoraic left-headed feet from right to left. This would explain the pattern of primary stress being final in words ending in a heavy syllable, and penultimate in words ending in a light syllable. This being the case, the form resulting from step c in (19), [nit.ni.tan], will yield a final bimoraic foot of the form CVC and a preceding unfooted monomoraic syllable trapped word internally between two acceptable bimoraic feet.

(23)

\[ \begin{array}{c|c|c|c}
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\end{array} \]

\[ \begin{array}{c|c|c|c}
CVC & CV & CVC \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\end{array} \]

\[ \begin{array}{c|c|c|c}
nit & ni & tan \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\ell & \ell & \ell \\
\end{array} \]

If the first two syllables here were incorporated into a single foot, the foot would be trimoraic rather than bimoraic. In order to make an acceptable bimoraic foot out of the sequence, the final moraic stem coda consonant is resyllabified. As in Marshallese, this consonant is prosodically incorporated into a following onset which is then simplified. The complete derivation appears in (24):

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7I thank Donna Steriade for her discussion of this possibility with me.

8 Note that when a grammatical suffix of the form -CV is added to a reduplicated form, Pattern B results, and the original onset consonant is not lost. So, pas 'to make it' reduplicates with the grammatical suffix -ta to yield pas.pasta 'to continue to make it' (Berlin, 1962). Final light syllables occur in the language and are allowed presumably by exotransfitionally when preceded by heavy syllables; i.e., unfootable, or extrametrical, syllables are allowed peripherally.

9 There is some 'morphophonemic' variation between final and penultimate stress in the words which Berlin describes as penultimately stressed (Berlin, 1962).
reduplicated forms given in (9) where adjacent closures are created by reduplication are realized after epenthesis as shown in the following examples:

\[
\begin{align*}
(25) & \quad \text{mok} \rightarrow \text{mokamok} \\
& \quad \text{ebbok} \rightarrow \text{ebbokbok}
\end{align*}
\]

Stop clusters having the same primary place of articulation but differing in their secondary place of articulation do not give rise to a mediating epenthetic vowel. While such clusters are unusual in Marshallese, epenthesis is impossible for the native speaker.

\[
\begin{align*}
(26) & \quad \text{epenthesys prohibited in:} \\
& \quad \text{jentyn lantern palatalized alveolar+velarized alveolar} \\
& \quad \text{bujentyma balloon palatalized alveolar+velarized alveolar} \\
& \quad \text{ellalala a down-to-earth person velarized lateral+palatalized lateral}
\end{align*}
\]

Recall that the Marshallese consonant inventory includes only stop consonants with the exception of the lateral and glides.12 Lateralts appear to behave irregularly with respect to the epenthesis process. This fact is not surprising in light of the somewhat ambiguous status of constriction degree, ie. stop vs. continuant, which lateral liquids often have. In light of the fact that the consonant inventory includes only stops, Marshallese epenthesys can be described in the following way: two adjacent closure gestures are disallowed.13 Phrase-final consonants are allowed without a following epenthetic vowel as no closure gesture follows them, and stop sequences differing only in secondary place also surface without epenthesys as the secondary constriction is not a closure.

Recalling that the CVC syllables will always receive stress, one might wonder whether a rule of epenthesys is a stress conspiracy preventing two clashing stresses. This does not appear to be the case, however, as all heavy syllables are stressed, including CVV syllables which can immediately precede or follow other heavy syllables thereby yielding adjacent stresses. Given that the language systematically releases even phrase final consonants and that there is no prohibition on adjacent stresses, a more accurate explanation of the data is offered by an analysis prohibiting two adjacent closure gestures. Such underlying sequences surface with an intervening epenthetic vowel.

Itô (1989) has suggested that cases of epenthesys similar to that of Marshallese can be explained by the existence of a Coda Filter which prevents a Place node from being singly linked to a coda consonant (Itô, 1989; Itô, 1986), shown here in (27).

12 The trills behave like the full stops with respect to epenthesis and are sometimes phonetically prestopped.
13 Thank Donca Steriade for her discussion of this analysis with the author.

In support of the requirement of cluster simplification in step (d), we note that no more than one coda consonant is allowed before a morphological boundary, and native morphemes have no onset clusters (Kaufman, 1971). (s and § may create clusters when prefixed to a root.) Kaufman (1971) lists three possible forms for native roots: CV, CVC, and CVhC. (Geminate consonants do not occur.) While loans from Spanish retain all or most consonant clusters, Berlin notes that onset clusters in these words are broken up by the insertion of an epenthetic vowel (Berlin, 1962). This limited distribution of consonant clusters motivates the delinking of the original onset consonant of the reduplicative suffix after resyllabification creates a new onset from the stem final consonant. Since Tzeltal does not generally allow C1C2 onsets, the output of (20d) must be fixed. This is accomplished by deleting C2.

Under this analysis, the two patterns of reduplication, whole syllable suffix and onsetless syllable suffix, in Tzeltal can be understood as a single process. An appeal to the Pattern A type of reduplication to support the rhyme as the reduplicative template accompanied by the postulation of a "transparent" morphological juncture does not appear to be a fully explicit account of the Tzeltal verbal reduplication. Both patterns of Tzeltal reduplication must be examined, and both can be considered to form a suffix of the entire final syllable of the stem. Foot structure requirements of the language account for the loss of the original onset in the reduplicative affix in the verbs which require a grammatical -VC suffix in this form. We see that apparent differences in the surface prosodic structures of the base and the copy in both Marshallese and Tzeltal can be accounted for by considering the prosodic requirements of each language. The stem coda becomes an onset in Marshallese because a tritomoric syllable is impossible and in Tzeltal because a trimoramic foot is impossible.11 In both cases the onset clusters then simplifies losing the second consonant. Seemingly different patterns of reduplication within each of the languages whereby an onsetless reduplicative suffix appears in some cases and a complete syllable in others can be unified under a single analysis when requirements of prosodic structure are considered. These facts support the general conclusion that no VC or VVC templates are necessary.

5. Marshallese Vocalic Epenthesys

In order to derive the final surface forms of the Marshallese reduplicated words, a description of epenthesys in Marshallese is required. An epenthetic vowel is inserted, both within and across words, between two stops which differ in their primary place of articulation, ie. between heterorganic consonants. The

11 A comparable phenomenon is encountered in Ibibio where a long vowel shortens in a CVVC verbal stem before a CV suffix in order to satisfy footing requirements in the language (Akinbi & Urua, 1992).
When the Coda Filter is violated because the coda consonant has an independent place component epenthesis occurs to resolve the violation by turning the consonant into an onset for an epenthetic vowel. While the Coda Filter might appear to explain epenthesis in Marshallese word-internal closed syllables, there are several problems with posulating a Coda Filter for Marshallese. First, closed syllables are allowed word finally; no final epenthetic vowel is inserted. A Coda Filter with no special conditions would predict that word final consonants should be prohibited. Secondly, there are no cases of epenthesis between extra heavy CVVC syllables and a following consonant. When such syllables are derived word internally due to the reduplication process, resyllabification, not epenthesis, occurs.

In order to explain the reduplication and epenthesis facts, one might postulate that the final consonant in extra heavy syllables is extraprosodic and that final consonants are licensed only word finally. This approach combined with a Coda Filter leads to incorrect predictions. Recall that these extra heavy syllables are separated from a following consonant across word boundaries by an epenthetic vowel such as that formed in the reduplicated form of [ebbok] which surfaces as [ebbokobok]. A Coda Filter wouldn’t predict this as the extraprosodic final consonant should not be seen by a Coda Filter. Additionally, Steriade (1982) shows that languages having a Coda Filter and final extrametricality will allow two consonants at word edges (li6, 1989 and li6, 1986). Marshallese does not allow such sequences.

Although these above objections to postulating a final stray consonant in the extra heavy syllables rely on an interaction with a Coda Filter, there are problems with an analysis postulating final extrametricality of the coda consonants of extra heavy syllables, even without the assumption of a Coda Filter. Such an analysis would assert that coda consonants in the language are extrasyllabic just in case they are in a syllable with a bimorphic vowel. Syllables with a short vowel and a coda consonant would be bimorphic, not having extrasyllabic coda consonants. The final consonant in an XCVVC sequence cannot be extraprosodic since it carries weight as indicated in the stress pattern; i.e., closed syllables receive primary stress, regardless of their position, just as do syllables containing a long vowel.

Because of the inadequacies encountered in postulating a Coda Filter or final extrametricality or both to describe the Marshallese epenthesis and reduplication data, I have proposed an analysis of these facts which describes both patterns of reduplication and the surface forms created by epenthesis as a result of prosodic requirements of the language which limit the distribution of extra heavy syllables and prohibit two consecutive closure gestures. Phrase final consonants, geminate consonants, and consonants differing only in secondary place may surface without epenthesis occurring.

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14This leaves aside the word internal CVVC syllables where the final C is part of a geminate consonant.
word internally (excepting in the case where the final consonant is geminate) and because complex onsets are prohibited. Marshallese fulfills prosodic requirements by resyllabification of the coda consonant making it an onset and deletion of the second consonant in the resulting complex onset. Epenthesis does not occur. Thus, the surface forms shown in (31) are produced.

(31) Pattern 2—surface forms

| baat  | smoke  | e-baataat | smokey |
| jook  | ashamed | e-jookook  | shy |
| naan  | talk, word  | ky-kyn-naan | talkative |
| koon  | piglet  | ka-koon | to own a |
| kyjeek  | fire  | ka-kyjeek | piglet |
| teaz  | popular | teaz|very popular |
| jituul  | steel  | jituululu | very magnetic |
| meaz  | burn, warm | e-meaz | burning |
| mezer  | lie, fib | e-mezer | he is a fibber |

Thus we see the following distribution of epenthesis and deletion in creating acceptable syllables in reduplicated forms.

(32)

<table>
<thead>
<tr>
<th>Pattern 1</th>
<th>Pattern 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ron-ron</td>
<td>jook-jook</td>
</tr>
<tr>
<td>ronaron</td>
<td>jookajook</td>
</tr>
</tbody>
</table>

The prohibition of two adjacent closure gestures appears to be satisfied through epenthesis in the case of a heterosyllabic cluster, i.e. an adjacent coda and onset, and by deletion in a derived tautosyllabic cluster, i.e. a complex onset. These processes and the distributional restrictions placed on extra heavy syllables serve to determine the prosodic realization of words in this Marshallese morphological process.

6. Conclusion

In conclusion, I have described how both patterns of Marshallese suffixal reduplication are the result of a single process of affixation with a bimorphic syllable weight parameter. This analysis unifies the two apparently different patterns of reduplication in the language: the apparently onsetless reduplicative suffix in one pattern and the more common suffixation which retains an onset in the other. I have compared the proposed analysis of Marshallese reduplication with a new analysis of the facts of Tzeltal verbal reduplication. I have explained the process of epenthesis which creates the surface realization of the Marshallese reduplicated forms as a restriction against two adjacent closure gestures. Finally, I have noted that Marshallese bimorphic syllable suffixation demonstrates a very unusual type of reduplication within the typology of reduplication outlined by McCarthy and Prince (1986) filling an otherwise unexplained but nonprincipled gap in this typology.

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