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Morphological Templates in Reduplication

Suzanne Urbanczyk
University of Massachusetts/University of British Columbia

Reduplicative morphemes (RED) have two properties: they have an invariant shape and their segmental content varies with the neighbouring segments. The invariant shape of RED has been attributed to skeletal or prosodic templates (Marantz 1982; Levin 1982; Clements 1985; Mester 1986; McCarthy & Prince 1986). While prosodic templates can account for overall size, they do not explain certain observed shape properties such as being V-initial. Further, they say nothing about segmental quality. Any segmental identity or non-identity effects are attributed to the interleaving of morphological and phonological components (Kiparsky 1986) or to refinements of the copy mechanism (Clements 1985; Mester 1986).

Recently, McCarthy and Prince (1994a) proposed that the shape of RED follows from its morphological classification. Templatic properties emerge because RED is segmentally empty and can exhibit the unmarked morpheme shape -- Generalized Template Theory (henceforth GT). Defining RED morphologically eliminates templates per se from the grammar (cf. Steriade 1988; McCarthy and Prince 1994ab). Downing (to appear) has also observed that the final /a/ in CVCa reduplication in some Bantu languages, can be explained by referring to morphological category (in this case RED must be the canonical verb stem).

This paper will argue that both the shape and segmental content of RED follow from morphological classification, showing that GT has greater explanatory power than templatic theories of reduplication. Moreover, reduplicative morphemes which do not coincide with a prosodic category are explained because they exhibit the unmarked morpheme shape.

An analysis of two reduplicative affixes in Lushootseed (Southern Coast Salish) will
show that first, both the shape and segmental content are related to morphological category.\textsuperscript{2} The diminutive (DIM: 1-b) and out-of-control (OC: 1-c) morphemes are analyzed as affixes, the distributive (DIST: 1-d) as a root. DIM and OC will pattern together in a number of features. (RED is underlined.)

(1) Basic Reduplicative Patterns (Bates, Hess, and Hilbert 1994)

\begin{itemize}
\item[a] Root \textsuperscript{7}ib\textsuperscript{h}s 'walk, travel or journey over land by any means'
\item[b] Diminutive \textsuperscript{7}i\textsuperscript{7}ib\textsuperscript{h}s-tx\textsuperscript{w} 'walk a bit'
\item[c] Out-of-Control \textsuperscript{7}ib\textsuperscript{h}s 'pace back and forth, walk without ... a destination'
\item[d] Distributive \textsuperscript{7}ib\textsuperscript{h}\textsuperscript{h}s 'walk all about'
\end{itemize}

The prosodically incomplete -V\textsubscript{1}C\textsubscript{2} OC morpheme will be shown to have the unmarked suffix shape. In the first part of the paper I outline the framework, theoretical assumptions, and central predictions of GT. This is followed by an examination of the shapes of these affixes (§2) and some segmental properties (§3).

1. Generalized Template Theory

The primary feature of Generalized Template Theory (McCarthy and Prince 1994a; Urbanczyk in prep.) is that RED is a segmentally empty morpheme. It is defined as either being a Root or an Affix. So different reduplicative morphemes are represented in the input by RED\textsubscript{1}=Rt, RED\textsubscript{2}=Afx, RED\textsubscript{k}= Afx, etc. The phonological content of RED is present in the output, the reduplicant.

The reduplicant attains its segmental content from a neighbouring base via a correspondence relation.

(2) Correspondence (McCarthy and Prince 1995: 262)

Given two strings S\textsubscript{1} and S\textsubscript{2}, correspondence is a relation \( R \) from the elements of S\textsubscript{1} to those of S\textsubscript{2}. Segments \( \alpha \in S\textsubscript{1} \) and \( \beta \in S\textsubscript{2} \) are referred to as correspondents of one another when \( \alpha \in R \beta \).

The base (S\textsubscript{1}) is the adjacent string (the following string for prefix; preceding string for suffix) and the reduplicant (S\textsubscript{2}) is the phonological material comprising RED. Correspondence can also be extended to lexically specified morphemes (McCarthy and Prince 1995). The following model shows the correspondence relations which exist between base and reduplicant as well as the stem to which it attaches.

(3) Reduplication Model (McCarthy and Prince 1995)

\begin{align*}
\text{Input:} & \quad \text{RED-stem} \\
\text{Output:} & \quad \text{Reduplicant = Base}
\end{align*}

IO-Correspondence relates input stem (S\textsubscript{1}) and output base (S\textsubscript{2}) and BR-Correspondence

\textsuperscript{2} The bulk of data are taken from the extensive corpus in Bates, Hess, and Hilbert (1994) Lushootseed Dictionary (BHH). Special thanks to Dawn Bates for providing a complete listing of reduplicated forms.
relates reduplicant and base in output (input RED is segmentally empty).

The reduplicative model is set within Optimality Theory -- henceforth OT (Prince and Smolensky 1993; McCarthy and Prince 1993 et seq.). The fundamental feature of OT is that constraints are ranked and violable, where higher ranked constraints have precedence over lower ranked ones. See Prince and Smolensky (1993) for a containment-based model of OT and McCarthy and Prince (1995) for a correspondence-based model of OT.

We now turn to the mechanics of determining the shape and segmental content of reduplicative morphemes. The segmental content of RED is achieved via a correspondence relation between base (S₁) and reduplicant (S₂). A set of Faithfulness constraints evaluates the identity of correspondent strings. Two of these faithfulness constraints that will figure in the analysis are MAX and DEP.

(4) Basic Faithfulness Constraints
MAX: All elements of S₁ are in S₂ (total copy; no deletion)
DEP: All elements of S₂ are in S₁ (no epenthesis)

Faithfulness constraints are ranked and violable. So, the lack of identity between base and reduplicant is the consequence of some higher ranked constraint. MAX is violated when a segment of the base is not in the reduplicant, resulting in partial reduplication. DEP is violated when there is a segment of the reduplicant which is not in the base, resulting in an epenthetic segment.

The 'templatic' properties associated with a particular reduplicative morpheme are achieved via constraint ranking. The structural conditions on the shape of RED are the phono-constraints which dominate BR-Faith. Furthermore, because all aspects of the phonological string are mediated by the correspondence relation, segmental properties (such as a default segment) will be determined by constraint interaction as well.

A central feature of the model is that Faithfulness is sensitive to morphological category (root or affix), with the following fixed ranking.

(5) Universal Ranking Schema (McCarthy and Prince 1994a; 1995)
Root-Faith >> Affix-Faith

Evidence for the ranking in the IO domain comes from the observation that roots are often more marked phonologically than affixes. For example Sanskrit has complex onsets in roots, but not affixes (McCarthy and Prince 1994ab). In Lushootseed some affixes have an echo of the root vowel.

(6) Lushootseed Echo Vowel (Bates, Hess, and Hilbert 1994)
d'ak*-ad shake it; rock it
cil-id serve food; dish it up
yuh-ud notice it

The echo of the root-vowel in the affix is a consequence of Root-Faith dominating Affix-Faith. If the ranking were reversed we would expect the root vowel to echo the affix vowel. It is important to note that with correspondence sensitive to morphological category, the relevant Faithfulness constraints evaluates the entire class of morphemes.
where a class is either the set of affixes or the set of roots. In other words, all morphemes specified as RED=Afx will be evaluated by BR-Faith-Affix, and all RED=Root will be evaluated by BR-Faith-Rt.

Applying the ranking in (5) to the BR domain yields two predictions for GT. First, reduplicative morphemes specified for a particular MCat should exhibit similar structural features. If a phono-constraint dominates BR-Faith-Afx, then all reduplicative affixes will obey that phono-constraint. In § 2 I will show that the shape of DIM and OC are derived by the same basic constraints dominating BR-MAX-Afx. The difference in shape comes from the fact that DIM is a prefix and OC is a suffix. Also strikingly, § 3 shows that both DIM and OC have a default segment under the same conditions. The unmarked shape and segmental content are linked to morphological category and are expected for affixal reduplicants. A second prediction is that root RED is expected to be more marked than affixal RED. This will be manifest in both the shape and segmental content. Space limitations preclude a thorough analysis of DIST -- a root -- but a brief discussion at the end of § 3 will show a difference in markedness between the affixes and the root.

2. Templatic Properties as Unmarked Morpheme Shape

In GT the templatic properties of RED are the result of the unmarked morpheme shape emerging in reduplication. There are no constraints which evaluate the shape of RED (such as RED=σ, RED=xFt, etc.), there are only phono-constraints which interact with BR-Faith. As a consequence, the burden of explanation falls on determining the universal ways that prosody and morphology interact, rather than delimiting the set of prosodic categories that can serve as templates. First, I will provide an analysis of the OC -V,C\textsubscript{2} suffix followed by the DIM C\textsubscript{1}V\textsubscript{1}- prefix. The same structural conditions will derive both shapes.

2.1 Out-of-Control as a Suffix

Out-of-control reduplication (OC) is used to indicate "activities that are performed randomly, ineffectively or inconclusively and for languid states" (Hess and Hilbert 1976; Pt 2, 161).

(7) Out-of-Control (OC) Data

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>?a\textsuperscript{+}</td>
<td>ha?k\textsuperscript{w}</td>
<td>yub-il</td>
</tr>
<tr>
<td>d\textsuperscript{aq}</td>
<td>kaw\textsuperscript{4}-ød</td>
<td>s+\textsuperscript{+}ad\textsuperscript{ø}y?</td>
</tr>
<tr>
<td>ñ\textsuperscript{X}</td>
<td>split</td>
<td>starve</td>
</tr>
<tr>
<td>d\textsuperscript{aq}\textsuperscript{aq}</td>
<td>ha?\textsuperscript{a}k\textsuperscript{w}</td>
<td>yub\textsuperscript{3}-il</td>
</tr>
<tr>
<td>s-\textsuperscript{0}\textsuperscript{X}ø\textsuperscript{X}</td>
<td>kaw\textsuperscript{3}aw\textsuperscript{4}-ød</td>
<td>s+\textsuperscript{+}ad\textsuperscript{ø}y?</td>
</tr>
<tr>
<td>hurry up!</td>
<td>a little while ago</td>
<td>woman</td>
</tr>
<tr>
<td>totter; stagger</td>
<td>improvise</td>
<td></td>
</tr>
<tr>
<td>cracked to pieces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>woman (living) alone</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With simple CVC roots, it is a pure suffix as in (a). But with cluster-final roots (b) or polymorphic and polysyllabic stems (c) it is a -V\textsubscript{1}C\textsubscript{2} infix. The -V\textsubscript{1}C\textsubscript{2} infix suffix is lexically represented as a segmentally empty affix. That is, RED-OC=Afx.

The VC shape for OC is derived because affixes in general obey the constraint NoCoda, which penalizes syllables which have a coda.
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(8) NoCoda (Prince and Smolensky 1993: 34)
Syllables do not have codas.

Because OC is a reduplicative affix, the relevant constraint for determining overall size is BR-MAX-Afx, which only evaluates affixal reduplicants.

(9) BR-MAX-Afx
Every element of $S_1$ has a correspondent in $S_2$.  
\[ \text{Domain}(\phi) = S_1 \]

BR-MAX-Afx ensures that every segment of the base ($S_1$) is in the reduplicant ($S_2$). For suffixing reduplication the base is the string immediately preceding the reduplicant (to be discussed more fully below). BR-MAX-Afx evaluates each RED that is morphologically an affix. The following tableau shows that NoCoda is the dominant constraint.

(10) NoCoda $>$ BR-MAX-Afx

<table>
<thead>
<tr>
<th>s-andidate-OC</th>
<th>NoCoda</th>
<th>BR-MAX-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a$</td>
<td>$\Rightarrow s\alpha.X-aX$</td>
<td>*</td>
</tr>
<tr>
<td>$b$</td>
<td>$s\alpha.X.-\alphaX$</td>
<td>*!</td>
</tr>
</tbody>
</table>

NoCoda is evaluated over the entire word, so even though -VC itself has a coda consonant, by being vowel-initial it does not add further codas. In (a) the root-final consonant is the onset of the final syllable (indicated with periods). In suboptimal (b) the reduplicant comprises its own syllable, but incurs a fatal violation of NoCoda.

In cluster-final roots, the infixed OC is an instance of edge-oriented infixation (see Prince and Smolensky 1993; McCarthy and Prince 1993a for analyses of Tagalog -um-infixation). Under ideal prosodic circumstances (as above), the affix is at the edge of the position in the stem. However, under prosodic pressure (for example, cluster-final stems) the affix migrates inwards. Edgemostness is sacrificed in order to satisfy some prosodic constraint.

(11) Edgemost-R
\[ \text{Align(Afx, R, PrWd, R)} \]

Edgemost-R requires the right edge of an affix to coincide with the right edge of some prosodic word. The following tableau shows that NoCoda is obeyed at the expense of edgemostness.

(12) NoCoda $>$ Edgemost-R

<table>
<thead>
<tr>
<th>ha?k*-OC</th>
<th>NoCoda</th>
<th>Edgemost-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a$</td>
<td>$\Rightarrow ha.?a2k^w$</td>
<td>*</td>
</tr>
<tr>
<td>$b$</td>
<td>$ha?.k^w.a2k^w$</td>
<td>**!</td>
</tr>
<tr>
<td>$c$</td>
<td>$ha?.k^wakw$</td>
<td>**!</td>
</tr>
</tbody>
</table>

By being infixed, candidate (a) incurs fewer NoCoda violations. Candidate (b), which is a reduplicative affix, violates NoCoda, and candidate (c) which skips a segment
of the base is also suboptimal because of NoCoda.

A crucial assumption is that the base is the string immediately preceding the reduplicant: it does not include following material. There are no morphological limitations on the base.\(^4\) A consequence of this string-based definition of the base is that there is an interaction between the placement of a reduplicative affix and the number of BR-MAX-Afx violations. As the affix migrates, the size of the base reduces. With a smaller base, the number of MAX violations reduces.

The analysis of polysyllabic roots makes critical use of base adjacency. BR-MAX-Afx violations are minimized by migration. Gen is free to place OC anywhere in the word. The following tableau shows that BR-MAX-Afx compels affixal migration. The base is indicated with double underlining.

\[
\begin{array}{|c|c|c|}
\hline
& \text{BR-MAX-Afx} & \text{Edgemost-R} \\
\hline
s^{+}\text{adəy?}-\text{OC} & \text{BR-MAX-Afx} & \text{Edgemost-R} \\
\hline
a & s^{+}\text{ad-}\text{ad-əy?} & ** & *** \\
b & s\text{adəy-əy?} & *** & * \\
\hline
\end{array}
\]

With Edgemost-R low-ranking, the position of OC is determined by minimizing BR-MAX-Afx violations.

Disyllabic candidates are ruled out because affixes are preferentially monosyllabic. McCarthy and Prince (1994a) propose that affixes are subject to size and weight restrictions, citing evidence from Yidiny that suffixes which are greater than a syllable are phonologically treated as stems (Hewitt 1992). In order to account for these and similar facts, they propose the following general constraint.

\[
\text{(14) Affix≤σ (McCarthy and Prince 1994a)}
\]

The phonological exponent of an affix is no larger than a syllable.

The unique status accorded monosyllabic affixes is also evidenced in Lushootseed, where virtually every grammatical suffix is mono- or sub-syllabic.\(^5\)

---

\(^4\) An alternate way to characterize the base is that it is delimited morphologically, so it is bound on both edges by some morphological domain. Even so, in Lushootseed the base and reduplicant must be anchored at the right edge, i.e. they must share correspondents at the right. The suboptimal OC form /səʊXo/ has no coda consonants, but is not anchored at the right edge. Compare with /səʊXoX/ which has one coda and is anchored. For languages which only copy root material or are sensitive to morphological edges see Mutaka and Hyman (1990) on Kinande and Carrier-Duncan (1984) on Tagalog.

\(^5\) This does not include lexical suffixes. Salish languages have two classes of suffix: grammatical and lexical. Lexical suffixes usually have root-like semantic content, and Urbanczyk (in prep) presents evidence that they pattern phonologically with roots. Over half the lexical suffixes are greater than a syllable, while a large number of grammatical suffixes (grammatical suffixes do not have glottalized segments) and they have clusters, resulting in the addition of codas.
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(15) -a+ ‘ordinal’
-b ‘agent-oriented suffix’
-dx -du ‘transitive suffix’
-il ‘reach or achieve a state or position’
-d ‘action performed on s.o. or s.t. else’

The following tableau shows that Afx≤σ must dominate Edgemost-R.

(16) Afx≤σ >> Edgemost-R

<table>
<thead>
<tr>
<th>s-tadaʔy?-OC</th>
<th>Afx≤σ</th>
<th>Edgemost-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a stad-ad-ʔy?</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>b stadəy-adəy-?</td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

Both candidates fare equally well on NoCoda and BR-MAX-Afx violations, but candidate (a) is optimal because it is monosyllabic.

Maximal migration, as in *ʔi-ʔi-bə$,$ is blocked because roots must be consonant-final. If OC were to migrate as far left as possible, there would be a string of the root which ends with a vowel, as in (b). With consonant-final roots the most harmonic suffix is vowel-initial.

(17) Morphological Structure of Infixed Root

INPUT: [ʔiba$]root-[OC]affix
OUTPUTS:

a) Rt Afx Rt

b) Rt Afx Rt

ʔib ib a$ * ʔi ʔi bə$

Infixedes normally result in discontiguous morphemes. The analysis will utilize the discontiguity, requiring every root constituent in the output to end in a consonant.

Evidence that VC suffixal reduplicants are found with consonant-final roots comes from the following two languages.

(18) Cross-Linguistic evidence for VC suffixal reduplicants with C-Final Roots

a) Tzeltal (Berlin 1963; McCarthy and Prince 1986, 1994b)

nih $-nihh-ɛt ‘in a crouched position’
peč $-peecɛ-ɛ ‘sailing through the air’

b) Agta Diminutive Reduplication (Healey 1960: 10; Davis 1988)
hutug hutuʔug ‘bow’
gilat gilelat ‘barbed steel arrowhead’

The Agta example is particularly revealing because it closely resembles the Lushootseed
pattern. The mid vowel in the reduplicant shows that it is suffixal rather than prefixal. VC is the least marked suffix shape with consonant-final roots.

Many languages require consonant-final roots or stems (see McCarthy 1993 on English and Arabic; Peng 1992 on Bantu - cited in Downing to appear). I propose that the following constraint is active in Lushootseed.

(19) Consonant-Final-Root
Align[Rt, R, C, R] (edges determined over S₂)

Evidence for C-Final-Rt comes from an examination of the roots in in the Lushootseed Dictionary, in which virtually every root is consonant final.⁷

The following tableau shows that C-Final-Rt is ranked higher than BR-MAX-Afx. This ranking will block total migration because each root constituent must be consonant-final.⁸ Root constituents are enclosed in curly brackets {..}.

(20) C-Final-Root > > BR-MAX-Afx

<table>
<thead>
<tr>
<th>s-ṭadəyʔ-OC</th>
<th>C-Final-Rt</th>
<th>BR-MAX-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>=r s{ṭad}ad{əyʔ}</td>
<td>**</td>
</tr>
<tr>
<td>b</td>
<td>s{ṭa}ṭa{dəyʔ}</td>
<td>*!</td>
</tr>
<tr>
<td>c</td>
<td>s{ṭadəyʔ}əyʔ?</td>
<td>**<em>!</em></td>
</tr>
</tbody>
</table>

Candidate (a) is optimal because it obeys C-Final-Rt and minimizes BR-MAX-Afx violations. Given the assumptions about the morphological structure of the output, C-Final-Rt evaluates the edges of roots present in the output only. If the edge of the root were evaluated over the input, all candidates would obey C-Final-Rt. The following representation shows how the input root morpheme [ʔibəθ]ᵣᵣᵣᵣ can correspond to two root

---

⁷ Most vowel-final roots are recent loans. Also, there are 183 optional-vowel roots. The vowel only occurs with /-d/ 'patient oriented transitivizer' and its /-t/ variant.

a) baŋ""(a) 'move rapidly'
   baŋ""ad 'make s.t. run all about'
   baŋ""-tx" 'get a glimpse of s.t.'

b) c'ib(i) 'lick, dip into'
   c'ib-d 'lick it'
   də-n"-c'ib = wfl 'lick it!'

Because the quality of the vowel is predictable (an echo of the root), and it is lost with other suffixes it is analyzed as part of the transitivizing suffix, not the root. See Urbanczyk (in prep.) for details.

⁸ In pre-OT terms, the CVC base could be derived via positive prosodic circumscription (McCarthy and Prince 1990; Kirkham 1992). The initial CVC of the base, a trochaic foot, would be parsed out as the base. Also, though CVCV is not a trochaic foot, it is not trochaic in the output because CVCV is also a trochaic foot.
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constituents in the output.°

(21) Correspondence and Morphological Structure

\[ [?\text{ib} \text{a}s]\text{Root} - [\text{OC}]_{\text{Af}} \]

\[
\text{OC} \quad \text{Rt} \quad \text{Af} \quad \text{Rt}
\]

OC shows the unmarked suffix shape: it is mono-syllabic and has a harmonic syllable structure with respect to coda consonants. In GT, the shape and position of the affix are related. If a language has consonant-final roots, the most harmonic reduplicative suffix will be shaped -VC. The position of the affix is determined by minimizing BR-MAX-Afx violations. A summary ranking is provided below.

(22) C-Final-Rt NoCoda Afxsø

\[
\text{BR-MAX-Afx}
\]

Edgemost-R

No ranking could be determined between Afxsø and BR-MAX-Afx.

2.2. Diminutive: Another Affixal Reduplicant

Diminutive reduplication indicates "smallness, diminished action, endearment" (BHH94: xvii).

(23) Data: DIM = C₁V₁

?uq“u-d pull out 2u?uq“u-d pull part way out
hiw-il go ahead hîhiwil go on ahead a bit
s-k“uy mother k“uk“uy poor dear mother
q’ix“ upstream q’iq’ix“ a little upstream

The diminutive morpheme is invariantly shaped CV, and is frequently stressed. It is morphologically an affix. That is, RED-DIM=Afx.

CV shape is optimal because NoCoda and Afxsø dominate BR-MAX-Afx.

---

9 Defining the edge of the root to hold of S₂ (the output) has the formal advantage, that C-Final-Rt will evaluate all root reduplicants (also S₂). This plays a role in determining the CVC shape of DIST.

10 Compare with previous analyses (Broselow and McCarthy 1983; Ter Mors 1984; Clements 1985; Davis 1988; Kirkham 1992; Urbanczyk 1993).
(24)  NoCoda >> BR-MAX-Afx

<table>
<thead>
<tr>
<th>DIM-hiw-il</th>
<th>NoCoda</th>
<th>BR-MAX-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>a =⇒ hihiwil</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td>b =⇒ hihiwil</td>
<td>**!</td>
<td>**</td>
</tr>
</tbody>
</table>

The optimal candidate (a) fares better on NoCoda than suboptimal (b). In the following tableau, a disyllabic candidate (b) is ruled out (even though it lacks a coda) because it is marked for affixes to exceed monosyllabicity.

(25)  Afx≤σ >> BR-MAX-Afx

<table>
<thead>
<tr>
<th>DIM-hiw-il</th>
<th>Afx≤σ</th>
<th>BR-MAX-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>a =⇒ hihiwil</td>
<td></td>
<td>***</td>
</tr>
<tr>
<td>b =⇒ hihiwil</td>
<td>*!</td>
<td>*</td>
</tr>
</tbody>
</table>

While the structural conditions on the templatic target are not couched in terms of prosodic templates, they evaluate the entire word: no reduplication specific constraints are required. With OC and DIM both being reduplicative affixes, they are subject to the same structural conditions: to obey NoCoda and be monosyllabic.

3.  Morphological Templates get Default Segmentism

Morphological category can also explain the pattern of default segmentism in Lushootseed. Under specific conditions a fixed segment appears in the nucleus of DIM and OC.

(26)  Diminutive (BHH 94)

<table>
<thead>
<tr>
<th>C₁-i-</th>
<th>tələw-il</th>
<th>run</th>
<th>ti:pəlaw'-il</th>
<th>jog</th>
</tr>
</thead>
</table>
| X =⇒ bid | afraid | Xi? Which-bid | a little afraid of it
| s-duuk^* | knife | s-ði:duuk^* | small knife |
| buus | four | bi?buus | four little items |
| ć'λ'a? | rock | ć'ćë'λ'a? | little rock |
| b =⇒ C₁V₁- | čáləs | hand | čá:oləs | little hand |
| hiwi-l | go ahead | hiihiwil | go ahead a bit |
| s-duk^* | bad | s-ðu?duk^* | riff-raff |
| súq^*a? | younger sibling | sú?suq^*a? | little younger sibling |

The choice between C₁V₁- and C₁-i- is predictable: C₁-i- when the root contains schwa, a long vowel or begins with a consonant cluster (a), and C₁V₁- elsewhere (b). (See Hess 1966; Bates 1986.)

In the following schwa-voweled roots, the OC suffix is stressed and has the fixed segment /i/. This pattern shows that DIM and OC pattern together as a class.

---

11 The glottal stop is analyzed as an infix, attracted to the stressed syllable.
MORPHOLOGICAL TEMPLATES IN REDUPLICATION

(27) OC forms with Non-Initial Stress (BHH 94)

?-X1d what happened          ?u-?X1X-?d What's he done?
k""?eq fall backwards          s-k""?eqIQ robin (tilts head back)

There are no long vowel stems with OC reduplication to verify whether the default occurs and we have already seen that OC migrates with cluster-final stems. However, as I will show below, stress and schwa provide the requisite environment for the default segment.

The general approach is that the default segment occurs whenever the base would supply marked structure: emergent unmarkedness.

(28) Emergence of the Unmarked (McCarthy and Prince 1994b, 1995)

IO-Faith > > Phono-constraint > > BR-Faith

Markedness is measured in OT by the violation of some phono-constraint. With IO-Faith ranked higher, the phono-constraint may be violated in the base. With BR-Faith ranked the lowest, identity is forgone in order to eliminate the marked structure.

While schwa is normally the unmarked epenthetic vowel, it is marked when stressed. Every diminutive form with initial stress and a schwa has the fixed segment /i/.

(29) Roots with Schwa

b?c fall down                  b?b?c drop in from time to time

?k""?ad-il sit down           g""?k""?ad-il sit down briefly

s-k""?ob?ad animal hide d-s-k""?ob?ad small hide

s-qi?lik* blanket            s-qi?lik* small blanket

t""?il lie in bed              t""?il lie down for a little while

b?i?X"" go by, pass           b?i?b?i?X"" pass a little

s-?d\""?ex*"" hunting canoe    s-?d\""?ex*"" model canoe

s-X""?X+df? bullhead (fish) s-X""?X+df? small bullhead

A second correlation between stress and schwa is that when DIM is not stressed, the nucleus is schwa. In the following forms, schwa is not expected because stress falls later in the word.11

(30) Diminutives with Non-Initial Stress

a qa+qsl? favourite uncle    c? ?a+t?q"" =áci? hands broken off

b ?a+?e+?l =ádi? little noise

In the Northern Lushootseed dialects schwa is only stressed when there are no full vowels in a word.13 Hess (1977) observes that stress falls on the first full vowel, otherwise

11 Presumably these are cases in which inherent stress over-rides the regular initial stress. Bianco (1995) identifies a number of inherently stressed lexical suffixes.

13 The Southern Lushootseed dialects differ because stress is generally initial, regardless of the vowel quality (Hess 1977: 404).
the first schwa.

(31) Northern Lushootseed Stress (Hess 1977; BHH94)
   a 
   ?itut  sleep
   čúgʷ-ud  to whittle s.t.
   k̕áxʷ-šad  spiritual help
   pásəd  white person [based on English Boston]
   b 
   čəgʷás  wife
   tə́y-fl  to go upstream
   də́čú?  one
   c 
   pə́xʷ-əd  to scatter s.t.
   jə̱d  foot
   Xə̱lə́d  a man's brother-in-law

The stress facts for schwa provide the relevant conditions for emergent unmarkedness. Stressed schwa is tolerated in the IO-domain (31-c), but not with the affixal reduplicates (26-a & 27). The following phono-constraint bans schwa from being stressed.

(32) *Stressed-ə
   Schwa cannot be in the nucleus of the stressed syllable.

A similar constraint has been proposed by Roberts (1994) for St'át'imcets (Interior Salish) and reflects a cross-linguistic tendency to avoid stressing schwa (Dutch, English, Indonesian, East Cheregis, French).

Having established the relevant phono-constraint, we now turn to the relevant faithfulness constraints. Long-voweled diminutives provide evidence that the fixed segment is epenthetic (Urbanczyk 1995). An epenthetic vowel is one that is not present in the base (or input) string. So Dependence is relevant here.

(33) BR-Dependence-Afx
   If β in S, and β ∈ Affix, then β ∈ Range(ᵦ).
   "No epenthesis into affix"

   One condition for emergent unmarkedness is that a phono-constraint is obeyed at the expense of identity between base and reduplicant. The epenthetic segment /i/ appeases the markedness constraints showing that *Stressed-ə compels violation of BR-Dep-Afx.

   də́čú?  one
   tə́y-fl  go upstream

---

14 The exact formulation of *Stressed-schwa will not be explored here. See Kenstowicz (1994) for a sonority-based approach, Urbanczyk (1995: 510) for discussion of how placeless schwa cannot head a stressed foot, and Shaw (1996) in which non-moraic schwa cannot head the stressed foot.

15 Briefly, the default appears because long vowels never copy, and it is marked to have a shortened version of the vowel in the reduplicant. So /*dú-duuk/ is bad because vowel length is not transferred (see Bick (1980)). If the fixed segment were in correspondence with the base vowel, then vowel length would still not be transferred. A truly epenthetic vowel does not violate transfer.
MORPHOLOGICAL TEMPLATES IN REDUPLICATION

(34) *Stressed-ə > BR-Dependence-Afx

<table>
<thead>
<tr>
<th>DIM-qəlik</th>
<th>*Stressed-ə</th>
<th>BR-Dependence-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. qəlik</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. n qəlik</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

A second condition is that the marked structure is allowed elsewhere in the language. When there are no full vowels in a word, stress can fall on an initial schwa, showing that *Stressed-schwa is violated and IO-Dep-Rt is obeyed.

(35) IO-Dependence-Rt
If β in S₁ and β ∈ Root, then β ∈ Range(侘).
"No epenthesis into root"

In the following tableau, the optimal root is one in which schwa is stressed. If schwas are present in the input, this result is explained because IO-Dep-Rt dominates *Stressed-schwa.¹⁶

(36) IO-Dep-Rt > *Stressed-ə

<table>
<thead>
<tr>
<th>DIM-jəsəd</th>
<th>IO-Dep-Rt</th>
<th>*Stressed-ə</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. jəsed</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. n jəsəd</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The default segmentism of both DIM and OC is the result of emergent unmarkedness.

(37) IO-Dep-Rt > *Stressed-ə > BR-Dep-Afx

Distributive reduplication patterns with roots in allowing schwa to be stressed. Here we have the same conditions for the default segment, stressed schwa.

(38) Schwa Vowelled Distributive Roots

jəsəd  foot  jəsəsəd  feet; legs
s-čətəkəd  bear  s-čətəkəd  bears

Because DIST is morphologically a root it permits more marked structure than the affixal reduplicants (as per Root-Faith > Affix-Faith). A number of constraints could be responsible for not allowing the default segment because DIST is CVC shaped and an epenthetic vowel would disrupt the contiguity of the root. However, in doubly reduplicated DIST-DIM forms DIST is CV.

¹⁶ The distribution of schwa in Lushootseed (like other Salish languages) is almost entirely predictable. This has led several researchers to propose that it is absent from the input (Kinkade m.s.; Czaykowska-Higgins 1993; Mathewson 1994). If schwas were absent from the input, then both /jəsəd/ and */jəsəd/ would violate IO-Dep-Rt. Selection of the optimal form would entail that /i/ is more marked than /ə/, by having *PL/[cor] dominate *Stressed-schwa. However, this ranking would incorrectly select the diminutive /qəqəlikə/ as optimal. Assuming that schwas are present in the input does not lead to a paradox.
The over-copying of the default segment in (b) results because DIST must maintain identity between base and reduplicant. The base for the DIST is the following string, including the DIM reduplicant. The following tableau verifies the ranking of BR-Dep-Root over BR-Dep-Afx. Reduplicants and bases are indicated below each candidate (DIST-DIM stems have two reduplicants/two bases).

<table>
<thead>
<tr>
<th>DIST-DIM-bəda?</th>
<th>*Stress-ə</th>
<th>BR-Dep-Rt</th>
<th>BR-Dep-Afx</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) DIST: bə</td>
<td>bə-ə-bəda?</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>DIM: bə</td>
<td>bəda?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) DIST: bɨ</td>
<td>bɨ-ə-bəda?</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>DIM: bə</td>
<td>bəda?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) DIST: bɨ</td>
<td>≠ bɨ-bɨ-bəda?</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>DIM: bɨ</td>
<td>bɨbəda?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Candidates which have schwa as the first vowel of the distributive base are suboptimal because either schwa is stressed (a) or there is a non-base segment in the reduplicant (b). The difference in allowing marked structure in the DIST but not in DIM/OC follows from morphological classification, and shows that the affixes pattern together.

4. **Summary**

DIM and OC are affixes, consistently exhibiting unmarked phonological structure, both in shape and in segmental content. They pattern together as a class, as expected if they are morphologically affixes. The differences in shape follow from whether an affix is prefixal or suffixal. Their similarities are explained by having a phono-constraint dominate BR-MAX-Afx. In a templatic theory, it is purely accidental that the OC and DIM affixes both have the default segment. In GT reduplicative morphemes are specified for different morphological categories, so similar shape and segmental properties can be linked.

**References**


Shaw, Patricia A. 1996. 'Headless and weightless syllables in Salish' talk presented at University of Victoria.


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