Morphological Templates in Reduplication

Morphological Templates in Reduplication[1]

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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 refering 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

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show that first, both the shape and segmental content are related to morphological category.[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)

a Root	ʔíbəš	'walk, travel or journey over land by any means'
b Diminutive	ʔíʔibəš-tx^{w}	'walk a bit'
c Out-of-Control	ʔíbibəš	'pace back and forth, walk without ... a destination'
d Distributive	ʔíbʔibəš	'walk all about'

The prosodically incomplete -V_1C_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_i=Rt, RED_j=Afx, RED_k= Afx, etc. The phonological content of RED is present in the ouput, 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_1 and S_2, **correspondence** is a relation $\Re$ from the elements of S_1 to those of S_2. Segments $\alpha \epsilon S_1$ and $\beta \epsilon S_2$ are referred to as **correspondents** of one another when $\alpha \Re \beta$.

The base (S_1) is the adjacent string (the following string for prefix; preceding string for suffix) and the reduplicant (S_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)

Input: RED-stem
↓
Output: **R**eduplicant = **B**ase

IO-Correspondence relates input stem (S_1) and output base (S_2) and BR-Correspondence

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[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 (S_1) and reduplicant (S_2). 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^{z}ák^{w}-ad	shake it; rock it
cíl-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.[3] 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=Ft, 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 $-V_1C_2$ suffix followed by the DIM C_1V_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

a	ʔaɬ	fast; quickly	ʔaɬ<u>aɬ</u>	hurry up!
	dˤaq'	fall; topple	dˤaq'<u>aq'</u>	totter; stagger
	čəX	split	s-čə<u>X</u>ə<u>X</u>	cracked to pieces
b	haʔkʷ	for a long time	haʔ<u>aʔ</u>kʷ	a little while ago
	kaw'ɬ-əd	improvise	kaw'<u>aw'</u>ɬ-əd	improvise
c	yub-il	starve	yub<u>ub</u>-il	tired out; not feel well
	s-ɬadəy?	woman	s-ɬada<u>d</u>əy?	woman (living) alone

With simple CVC roots, it is a pure suffix as in (a). But with cluster-final roots (b) or polymorphemic and polysyllabic stems (c) it is a $-V_1C_2$ infix. The $-V_1C_2$ infixal 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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[3] This is more restrictive than McCarthy and Prince's instantiation of Root-Faith >> Affix-Faith. McCarthy and Prince conceived of Root >> Afx as a ranking schema, meaning that the faithfulness constraints of individual roots are ranked above those for affixes.

(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.
Domain($\mathfrak{R}$) = 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

s-čəX-OC		NoCoda	BR-MAX-Afx
a	☞ sčə.X-<u>əX</u>	*	**
b	sčəX.-<u>čəX</u>	*!*	*

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 edgemost 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
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

ha?kʷ-OC		NoCoda	Edgemost-R
a	☞ ha.?<u>a</u>?kʷ	*	*
b	ha?.kʷ<u>a?kʷ</u>	**!	
c	ha?.kʷ<u>akw</u>	**!	

By being infixal, candidate (a) incurs fewer NoCoda violations. Candidate (b), which is a strict suffix, incurs a fatal violation of 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.

(13) BR-MAX-Afx > > Edgemost-R

s-ɬadəy?-OC	BR-MAX-Afx	Edgemost-R
a ☞ s<u>ɬad</u>-<u>ad</u>-əy?	**	***
b s<u>ɬadəy</u>-<u>əy</u>-?	***!*	*

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.

(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]

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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 /*sčəXə̱/ has no coda consonants, but is not anchored at the right edge. Compare with /sčəXəX/ 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, the full range of segmental contrasts is found in lexical suffixes (grammatical suffixes do not have glottalized segments) and they have clusters, resulting in the addition of codas.

(15)	-aɬ	'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

s-ɬadəy?-OC	Afx≤σ	Edgemost-R
a ☞ sɬad-ad-əy?		***
b sɬadəy-adəy-?	*!	*

Both candidates fare equally well on NoCoda and BR-MAX-Afx violations, but candidate (a) is optimal because it is monosyllabic.[6]

Maximal migration, as in **?i-?i-bəš*, 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: $[?ibəš]_{root}$-$[OC]_{affix}$
OUTPUTS:

a)	Rt	Afx	Rt	b)	Rt	Afx	Rt
	|||	||	||		||	||	|||
	?ib	ib	əš	*	?i	?i	bəš

Infixes 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	š-nihih-et	'in a crouched position'
	peč	š-pečeč- t	'sailing through the air'
b	Agta Diminutive Reduplication (Healey 1960: 10; Davis 1988)		
	hutug	hutotug	'bow'
	gilat	gilelat	'barbed steel arrowhead'

The Agta example is particularly revealing b cause it closely resembles the Lushootseed

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6 Afx≤σ should be formulated so that it is obeyed in cases which span two syllables like the VC reduplicative infix. One suggestions is that Afx≤σ is a type of headedness requirement on segment-prosody interface: There is at most one syllable per affix, such that there is some safe path from syllable to segment, where safe path includes a mora. This will rule in C, CV, CVV, CVC, VC, but will rule out VCV and others.

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 S_2)

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-Root 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

s-ɬadəy?-OC	C-Final-Rt	BR-MAX-Afx
a ☞ s{ɬad}ad{əy?}		**
b s{ɬa}ɬa{dəy?}	*!	
c s{ɬadəy}əy{?}		***!*

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 *[?ibəš]*$_{root}$ can correspond to two root

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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)	bakʷ'(a)	'move rapidly'
	bákʷ'ad	'make s.t. run all about'
	bákʷ'-txʷ	'get a glimpse of s.t.'
b)	c'ib(i)	'lick, dip into'
	c'ɪbi-d	'lick it'
	dxʷ-c'ib=wɪl	'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.

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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 affixation site. However, C-Final-Root must still be active because CVCV is also a trochaic foot.

constituents in the output.[9]

(21) Correspondence and Morphological Structure

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input:     [ʔibəš]Root - [OC]Afx
           / / /  \ \
output:    ʔib ib əš
           \|/ || ||
           Rt  Af Rt
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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.[10] 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)

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C-Final-Rt   NoCoda      Afx≤σ
      \      /          /
      BR-MAX-Afx       /
            \         /
            Edgemost-R
```

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

2.2. Diminutive: Another Affixal Reduplicant

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

(23) Data: DIM = C_1V_1

ʔalʔal	house	ʔáʔalʔal	hut
ʔuqʷ'u-d	pull out	ʔúʔuqʷ'u-d	pull part way out
hiw-il	go ahead	híhiwil	go on ahead a bit
s-kʷ'uy	mother	kʷ'úkʷ'uy	poor dear mother
q'ixʷ	upstream	q'íq'ixʷ	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 Afx≤σ dominate BR-MAX-Afx.

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9 Defining the edge of the root to hold of S_2 (the output) has the formal advantage, that C-Final-Rt will evaluate all root reduplicants (also S_2). 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

DIM-hiw-il	NoCoda	BR-MAX-Afx
a ☞ hihiwil	*	***
b hiwhiwil	**!	**

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

DIM-hiw-il	Afx≤σ	BR-MAX-Afx
a ☞ hihiwil		***
b hiwihiwil	*!	*

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)

a	C_1í-		
təláw-il	run	títəlaw'-il	jog
Xəc-bid	afraid	Xí?Xəc-bid	a little afraid of it[11]
s-duukʷ	knife	s-díduukʷ	small knife
buus	four	bí?buus	four little items
č'λ'á?	rock	č'íč'λ'a?	little rock
b	C_1V_1-		
čáləs	hand	čáčələs	little hand
hiw-il	go ahead	hihiwil	go ahead a bit
s-dukʷ bad		s-dú?dukʷ	riff-raff
súqʷ'a?	younger sibling	sú?suqʷ'a?	little younger sibling

The choice between C_1V_1- and C_1í- is predictable: C_1í- when the root contains schwa, a long vowel or begins with a consonant cluster (a), and C_1V_1- 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.

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

ʔəXɬd	what happened	ʔu-ʔəXɬX-əd	What's he done?
kʷ'əq	fall backwards	s-kʷ'əqɬq	robin (tilts head back)

There 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 umarkedness.

(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

bəč	fall down	bɬbəč	drop in from time to time
gʷəd-ɬl	sit down	gʷɬgəd-il	sit down briefly
s-kʷəbšəd	animal hide	s-kʷɬkʷəbšəd	small hide
s-qəlɬkʷ	blanket	s-qɬqəlikʷ	small blanket
təd^{z}-ɬl	lie in bed	tɬtəd^{z}-il	lie down for a little while
bəlXʷ	go by, pass	bɬʔbəlXʷ	pass a little
s-dəxʷɬɬ	hunting canoe	s-dɬʔdəxʷiɬ	model canoe
s-Xʷədɬʔ	bullhead (fish)	s-XʷɬXʷədìʔ	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.[12]

(30) Diminutives with Non-Initial Stress

a	qə+qsɬʔ	favourite uncle
	t'ə+t'qʷ' =áči?	hands broken off
b	λ'ə+λ'əl=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

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

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

i)	NL	SL	
	bədɬʔ	bədəʔ	offsring

the first schwa.

(31) Northern Lushootseed Stress (Hess 1977; BHH94)

a	ʔítut	sleep
	čúqʷ-ud	to whittle s.t.
	kʷáxʷ=adad	spiritual help
	pástəd	white person [based on English *Boston*]
b	čəgʷás	wife
	təy-íl	to go upstream
	dəč'ú?	one
c	pəlxʷ-əd	to scatter s.t.
	jəsəd	foot
	XəLtəd	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 reduplicants (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'at'imcets (Interior Salish) and reflects a cross-linguistic tendency to avoid stressing schwa (Dutch, English, Indonesian, East Cheremis, French).[14]

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).[15] 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_2 and $\beta \in$ Affix, then $\beta \in$ Range($\Re$).
"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.

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dəč'ú?	dəč'u?	one
təyíl	táyil	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-duukʷ/ is bad because vowel length is not transfered (see Bates 1986). If the fixed segment were in correspondence with the base vowel, then vowel length would still not be transfered. A truly epenthetic vowel does not violate transfer.

(34) *Stressed-ə > > BR-Dependence-Afx

DIM-qəlikʷ	*Stressed-ə	BR-Dependence-Afx
a. qəqəlikʷ	*!	
b. ☞ qíqəlikʷ		*

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 S_2 and β ∈ Root, then β ∈ Range(ℜ).
"No epenthesis into root"

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

(36) IO-Dep-Rt > > *Stressed-ə

DIM-jəsəd	IO-Dep-Rt	*Stressed-ə
a. jísed	*!	
b. ☞ jəsəd		*

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	jəsjəsəd	feet; legs
s-čətkʷəd	bear	s-čətčətkʷəd	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.

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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; Matthewson 1994). If schwas were absent from the input, then both /jəsəd/ and /*jisəd/ would violate IO-Dep-Rt. Selection of the optimal form would entail that /i/ is more mar ked than /ə/, by having *PL/[cor] dominate *Stressed-schwa. However, this ranking would incorrectly select the diminutive /qəqəlikʷ/ as optimal. Assuming that schwas are present in the input does not lead to a ranking paradox.

(39) DIST-DIM stems (BHH 94)

a	yú-yu-yəbil	children are starving
b	bí-bi-bəda?	small children
	sdí-di-duuk*	small knives

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).

(40) BR-Dep-Root, *Stressed-schwa > > BR-Dep-Afx

DIST-DIM-bəda?	*Stress-ə	BR-Dep-Rt	BR-Dep-Afx
a) bə-bə-bəda? DIST: bə bəbəda? DIM: bə bəda?	*!		
b) bí-bə-bəda? DIST: bi bəbəda? DIM: bə bəda?		*!	
c) ☞ bí-bi-bəda? DIST: bi bibəda? DIM: bi bəda?			*

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.

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