Why Constraint Conflict can Disappear in Reduplication[1]

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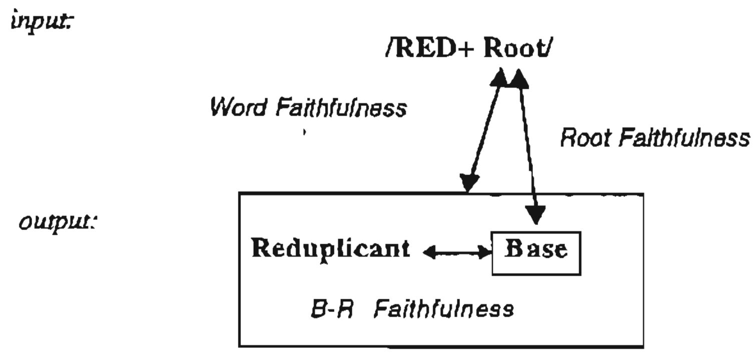
This paper introduces 'Word Faithfulness'. This is essentially a broad interpretation of Input-Output Correspondence, because it relates inputs to entire output words, including both the base and reduplicant in reduplicated words, rather than the base alone, or the base and reduplicant separately (as in McCarthy and Prince 1995; see also Raimy and Idsardi 1997; Spaelti 1997; Struijke 1997, 1998; Yip 1998).

I depict the Word Faithfulness relation below, set in the reduplicative model of correspondence I will be assuming. Apart from Word Faithfulness, the correspondence relations relevant for reduplication are Root Faithfulness and Base-Reduplicant Faithfulness.

(1) *Model of Correspondence with Word Faithfulness*



In unreduplicated words, input elements are normally in correspondence with one output element, while in reduplicated words they are potentially in correspondence with

[1] Thanks go to Laura Benua, Luigi Burzio, Paul Hagstrom, Paul de Lacy, Ania Łubowicz, John McCarthy and Paul Smolensky for comments and suggestions. Remaining errors are my own.

two output elements. Thus, in reduplicated words multiple correspondence is usually established, as depicted in (2).

(2) *Word Faithfulness in*[2]*:*

unreduplicated word *reduplicated word (red. underlined)*

Word Faithfulness constraints are satisfied if an input element is recoverable from the output. If there is one identical output correspondent, faithfulness is achieved. If there are two identical output correspondents, however, faithfulness to the input is not improved, and faithfulness constraints are not better satisfied. Hence, in the multiple correspondence established in reduplicated words, only one output correspondent needs to be identical to an input element to achieve faithfulness. I illustrate this here with the constraints playing the lead role in this paper:

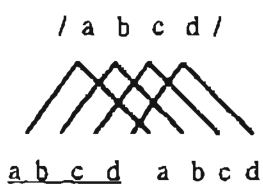
(3) $\textsc{Max}_{WD}$: Every segment in the input has some correspondent in the output word

(4) $\textsc{ID-Feature}_{WD}$: If segment S is $\propto$ F in the input, then some correspondent of S is $\propto$ F in the output

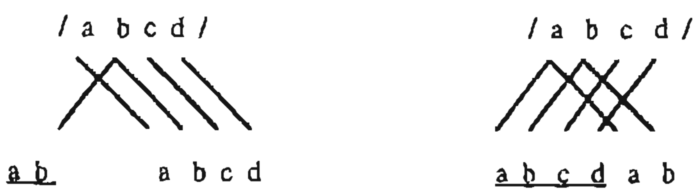
Naturally, $\textsc{Max}_{WD}$ is satisfied in reduplicated words if all input segments are parsed in both members of the base-reduplicant pair (5 *i*). In addition, faithfulness is achieved if only one member parses an input segment (5 *ii*). No violation is incurred, simply because the segment deleted in one member is present in the other. $\textsc{Max}_{WD}$ is also satisfied when the base and reduplicant both delete segments, as long as they are not the same segments (5 *iii*). Thus, faithfulness constraints are indifferent to the number of output correspondents and they do not demonstrate a preference for faithful parsing in one of the output strings over the other.

(5) *Satisfaction of Max_{WD} in reduplicated words (reduplicant is underlined)*

(i)

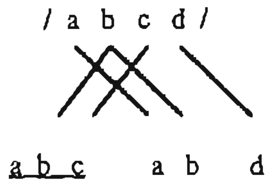


(ii)



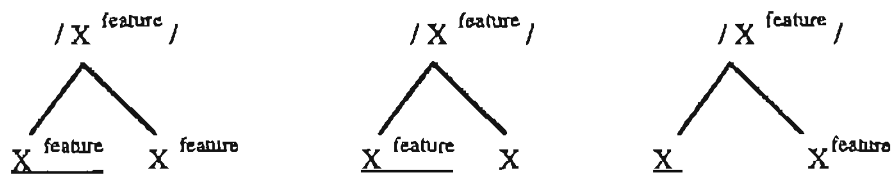
[2] Lines indicate correspondence. They should not be seen as association lines.

(iii)



Featural identity constraints are satisfied when a feature associated with an input segment is associated with some corresponding output segment. In the presence of two corresponding output segments in reduplicated words, the feature must be associated with at least one of these correspondents, but not necessarily both.

(6) *Satisfaction of ID-Feature$_{WD}$ in multiple correspondence (reduplicant is underlined)*



Thus, I argue that faithfulness constraints demand recoverability of input elements in the output, rather than identity between all input-output correspondents. Because faithfulness constraints are evaluated in this way, one member of the base-reduplicant pair can change or delete in response to a conflicting markedness constraint without incurring a Word Faithfulness violation. Of course, this will result in a breach of faithfulness along the B-R dimension, and is only allowed if B-R constraints are low-ranking.

The goal of this paper is to show that, given Word Faithfulness, a conflict between markedness and faithfulness constraints seen in unreduplicated words can disappear in reduplicated words, because both constraints can be satisfied simultaneously when multiple correspondence is established.

The Salish language Lushootseed provides empirical support for the proposal. In unreduplicated words of this language, we find free variation between forms that reduce a full unstressed vowel and forms that faithfully parse the vowel (Urbanczyk 1996; data from Bates, Hess and Hilbert 1994). In the example below vowel reduction is optionally manifested as syncope:

(7)	*input*	*faithful vowel*	*reduced vowel*	*gloss*
	/ʔidigʷàt/	ʔidigʷàt	ʔidgʷàt	'say something'

Following Reynolds (1994, et seq.) and Anttila (1997, et seq.), I assume that optionality follows from free ranking of conflicting constraints. In the Lushootseed grammar MAX$_{WORD}$ and a markedness constraint against full unstressed vowels are variably ranked with respect to each other. When the markedness constraint dominates MAX$_{WORD}$, the optimization gives an unmarked, unfaithful output. When MAX$_{WORD}$ dominates the markedness constraint, the optimization gives a marked, faithful output. In either optimization, one of the constraints must be violated in order to satisfy the other.

Assuming that reduplicated and unreduplicated words are generated by the same grammar, one might expect parallel behavior in both word types. However, free variation is not attested in reduplicated words: unstressed vowels must reduce.

(8)	*input*	**faithful vowel*	*deleted vowel*	*gloss*
	/ RED + laq' /	*lá-laq'	lá-lq'	'fall'

Reduplicated words satisfy both MAX_{WORD} and the markedness constraint against full unstressed vowels. The markedness constraint is satisfied by deletion of the base vowel (because it is the unstressed vowel). MAX_{WORD} demands an input element be present in the output, but does not demand two output correspondents. In Lushootseed, the input vowel surfaces in the reduplicant, and MAX_{WORD} is satisfied. This explains why we do not find optionality in reduplicated words. In reduplication, markedness can be satisfied without violating faithfulness. Since both the markedness and faithfulness constraints are satisfied, their relative ranking is irrelevant. No matter how they are ordered, reduction takes place in reduplicated words.

The paper is organized as follows. In section 1 I will account for the optionality of vowel reduction in unreduplicated words via free ranking of constraints and I provide an explanation of the fact that unstressed vowels sometimes undergo partial reduction (vowel centralization) and at other times reduce totally (syncope). In section 2 I will show why unstressed vowels must reduce in reduplicated words.

1 Unreduplicated words and optional reduction of unstressed vowels

The Lushootseed vowel inventory is given below. It contains schwa and three corner vowels. The latter are distinctively long or short.

(9) *Lushootseed vowel inventory*

i / i: u / u:

ə

a / a:

For reasons of space I will not give an analysis of Lushootseed stress assignment, nor will I explain the driving force behind vowel reduction (but see Struijke, to appear). For our present purposes it suffices to say that corner vowels are prominent because they are more sonorous than schwa. Therefore they prefer to be stressed and sometimes reduce in unstressed syllables (Urbanczyk 1996, following Kenstowicz 1994). Vowel reduction is forced by a constraint that I will descriptively refer to as *UNSTRESSEDCORNERV.

(10) *UNSTRESSEDCORNERV: corner vowels are not allowed in unstressed syllables

Vowel reduction is optional in unreduplicated words[3]. At some times a speaker produces a given word with full unstressed vowels, while at other times s/he produces the same word with reduced unstressed vowels (Urbanczyk 1996). In the examples below reduction is manifested as syncope or 'total reduction'.

[3] In fact, this is only true for one class of words. Words not belonging to this class do not undergo reduction when unreduplicated. In Struijke (to appear) this is straightforwardly accounted for by high-ranking class-specific faithfulness constraints (Urbanczyk 1996; Benua 1997; Fukazawa 1999; Itô and Mester to appear). In reduplication these faithfulness constraints can be satisfied even when reduction takes place. Reduction is therefore obligatory in reduplicated words belonging to this class (see also section 2 below).

(11) *optional reduction of unstressed vowels: total reduction (syncope)*[4]

unreduced	*reduced*	*gloss*	*page*
(ʔídi)(gʷàt)	(ʔíd)(gʷàt)	'say something'	15
(ɬál-a)t-əb	(ɬál-t-əb)	'taken out of the fire'	141
bə(dáʔ-aɬ)	bə(dáʔ-ɬ)	'one's beloved child'	35
(t'úgʷu)	(t'úkʷ)	'measure; figure out, think'	242

To account for the two variant forms, opposing rankings of the markedness constraint and its conflicting faithfulness constraint are clearly needed. Faithfulness constraints need to dominate the markedness constraint for full vowel retention, but the reverse ranking is needed for vowel reduction.

Anttila (1997, et seq.) and Reynolds (1994, et seq.) resolve ranking paradoxes seen in optionality by assuming that relevant conflicting constraints are crucially unranked with respect to each other in the constraint hierarchy (see also Itô & Mester 1997 and references quoted therein, and Ringen & Heinämäki 1999). This assumption allows us to posit a single underlying form or input that can be mapped onto multiple optimal outputs by a single grammar consisting of a single, albeit partial, constraint ranking.

Even though constraints can be unranked in the grammar, they must be totally ordered in actual optimizations,[5] so that a single output form is generated at a given time. A grammar containing two unranked constraints permits two totally ordered constraint rankings, which differ only in the ranking of these two constraints. Each ranking generates a unique output.

In Lushootseed, the markedness constraint against unstressed corner vowels is unranked with respect to the conflicting faithfulness constraint MAX-VOWEL, resulting in optional vowel reduction. The tableaux in (13) show the two possible optimizations given the unranked constraints.

(12) MAX-VOWEL$_{WORD}$: A vowel in the input must have some correspondent in the output word

(13) *optional deletion*

/ ʔidigʷat /	*UNSTR CORNERV	MAXV$_{WD}$
1 (ʔídi)(gʷàt)	* !	
2☞ (ʔíd)(gʷàt)		*

/ ʔidigʷat /	MAXV$_{WD}$	*UNSTR CORNERV
1☞ (ʔídi)(gʷàt)		*
2 (ʔíd)(gʷàt)	* !	

For reasons of space and exposition, I will conflate the tableaux for the two variants as in (14). However, the reader should keep in mind that the unranked constraints are ordered in actual optimizations.

[4] All data are from Bates, Hess and Hilbert (1994).

[5] As Anttila (1997) and Itô & Mester (1997) point out, this makes free ranking different from 'tied ranking'. In tied ranking, constraints are truly unranked. That is, they are unranked in optimizations, and violations on different tied constraints are considered equal. Thus, no decision can be made between competing candidates when the individual tied constraints generate an equal number of violations. The competition does not end, but is passed on to lower ranked constraints.

(14) *optional deletion*

/ʔidigʷat/	MAX-V_{WD}	*UNSTR CORNERV
1 ☞ ʔidigʷat		*
2 ☞ ʔidgʷat	*	

Sometimes, vowel reduction is manifested as centralization of the vowel to schwa or 'partial reduction'.

(15) *optional reduction of unstressed vowels: partial reduction (centralization)*

unreduced	*reduced*	*gloss*	*page*
c-ukʷab	(c-ukʷəb)	'skin of human or fish'	56
(k'áda)(yùʔ)	(k'ádə)(yùʔ)	'rat'	120
(ʔágʷal)-əb	(ʔágʷə)l-əb	'yawn'	4
(ʔádz-a)(lùs)	(ʔádz-ə)(lùs)	'open place where one can see and be seen; beautiful	4

Since vowel centralization is optional, Identity constraints on vowel quality are unranked with respect to *UNSTRCORNERV.

(16) ID-$VQUAL_{WORD}$: A vowel quality feature associated with an input segment must be associated with a corresponding segment in the output word.

(17) *optional centralization*

/ ʔagʷal + əb /	ID-$VQUAL_{WD}$	*UNSTR CORNERV
☞ ʔágʷal - əb		*
☞ ʔágʷəl - əb	*	

Centralization, rather than syncope, takes place in some optimizations of these forms because syncope is blocked by constraints on sonority relations within and across syllables (Urbanczyk 1996). The sonority scale relevant for Lushootseed is given in (14).

(18) *Sonority scale relevant for Lushootseed*[6]
sonorants > voiced obstruents > voiceless obstruents

Deletion does not take place in the forms of (19a) because it would create sonority reversals (i.e. codas with rising sonority[7]), which are marked cross-linguistically (Clements 1990, a.o.). In (19b) syncope is blocked because it would create marked syllable contact. That is, words would contain hetrosyllabic consonant clusters in which the coda consonant is less

[6] Possibly Lushootseed voiced obstruents are considered more sonorous than voiceless obstruents because they are historically derived from sonorants. The labial and alveolar stops /b/ and /d/ derived from /m/ and /n/ respectively; the affricates /dz/ and /dʒ/ from /y/; and the velar stops /g/ and /gʷ/ from /w/ (Hess 1995). Even though voiced obstruents derived from sonorants, in the synchronic grammar they are considered less sonorous than sonorants in the Lushootseed grammar. This is evidenced by /ʔádzalus/ - [ʔá.dzə.lus] *[ʔádz.lus]. Syncope is blocked here because it would violate syllable contact (see below).

[7] Urbanczyk claims that onsets cannot be complex. Apparent onset obstruent clusters are broken up by a voiceless vowel.

sonorous than the following onset consonant (Hooper 1976; Murray and Venneman 1983; Zec 1988; Lamontagne 1993; Davis & Shin 1997).

(19) *blocked syncope*

a.	*sonority reversals*				
	/s-tʃusad/	*(s-tʃúsd)	(s-tʃúsəd)	'star'	67
	/c-ukʷab/	*(c-ukʷb)	(c-ukʷəb)	'skin of human or fish'	56
	/RED+k'ʷid/	*(k'ʷi-k'ʷd)	(k'ʷi-k'ʷəd)	'small amount'	131
b.	*syllable contact*				
	/k'adayu?/	*(k'ád)(yù?)	(k'ádə)(yù?)	'rat'	120
	/?agʷal+əb/	*(?ágʷ)ləb	(?ágʷə)ləb	'yawn'	4
	/RED+s+tulək/	*(stú-t)ləkʷ	(stú-tə)ləkʷ	'creek'	230

Because syncope takes place unless it is blocked by constraints on sonority, deletion of a vowel is in principle more harmonic than centralization, and faithfulness constraints on vowel quality features must dominate MAX-VOWEL$_{WORD}$ in the Lushootseed grammar (Urbanczyk 1996).

(20) *deletion is more harmonic than reduction*

input	*candidates*	*UNSTR. CORNER V	IDVQUAL$_{WD}$	MAXV$_{WD}$
/ bəda?-ał /	1 bə(da?-əł)		*!	
	2 ☞ bə(da?-ł)			*
/ ?idigʷat /	1 (?idə)(gʷat)		*!	
	2 ☞ (?id)(gʷat)			*

The fact that syncope is blocked and vowels centralize in order to avoid marked sonority structures indicates that ID-VQUAL$_{WORD}$ is dominated by the following constraints governing sonority profiles within words.

(21) SYLLCON: $C_1]_\sigma[C_2$, $|C_1| \geq |C_2|$ (Urbanczyk, 1996; after Lamontagne 1993)
Consonants in a hetrosyllabic cluster must be of equal or falling sonority.

(22) SONORITYSEQUENCINGPRINCIPLE (SSP): The sonority profile of the syllable must slope outwards from the peak.

Tableau (23) summarizes the ranking arguments[8].

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[8]Even though syllable contact can block vowel deletion, underlying clusters that result in syllable contact on the surface are not repaired: vowels are not epenthesized, nor are consonants deleted: dzətgʷád 'salmonberry' (p. 90); ?əkʷyiqʷ 'great-great-grandparent/child' (p. 11). Thus, DEP-VOWEL and MAX-CONS dominate SYLLCON.

(23) *vowel deletion vs. vowel centralization*

	input	candidates	SYLLCON	SSP	IDVQUAL$_{WD}$	MAXV$_{WD}$
a.	/ɬukʷaɬ/	1 ☞ (ɬúkʷəɬ)			*	
		2 (ɬúkʷɬ)		*!		*
b.	/ʔagʷal+əb/	1☞ (ʔágʷə)ləb			*	
		2 (ʔágʷ)ləb	*!			*
c.	/bədaʔ-aɬ/	1 bə(daʔəɬ)			*!	
		2 ☞ bə(daʔɬ)				*
d.	/ ʔidigʷat /	1 (ʔídə)(gʷat)			*!	
		2 ☞ (ʔid)(gʷat)				*

Thus, even though *UNSTRESSEDCORNERV is unranked relative to both ID-VQUAL$_{WORD}$ and MAX-V$_{WORD}$, these two faithfulness constraints must be crucially ranked with respect to each other to account for the fact that vowel deletion is, ceteris paribus, more harmonic than vowel centralization. This means that the markedness constraint is a 'floating' constraint (Reynolds 1994). Floating constraints can be ranked anywhere amongst a certain subset of constraints in the hierarchy. The ranking of constraints within this subset remains fixed.

(24) *Floating markedness constraint*

SSP SYLLCON
\/
ID-VQUAL$_{WD}$
|
MAX-VOWEL$_{WD}$
|
constraints

] *UNSTRCORNERV

A given optimization ranks the three constraints in one of the three following orders:

(25) *possible hierarchies given the free ranking*

a. *UNSTRCORNERV >> ID-VQUAL$_{WD}$ >> MAX-V$_{WD}$

b. ID-VQUAL$_{WD}$ >> *UNSTRCORNERV >> MAX-V$_{WD}$

c. ID-VQUAL$_{WD}$ >> MAX-V$_{WD}$ >> *UNSTRCORNERV

An optimization in which the constraints are ranked as in (25a) generates both outputs with vowel deletion and outputs with vowel centralization, depending on the interaction with syllable structure constraints. When the ranking is as in (25b), an optimization can generate deletion, but does not allow vowel centralization. (25c) allows neither deletion, nor centralization.[9]

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[9] Both Anttila and Reynolds account for the frequency distribution of variants by means of the grammar. A form that is optimal in a larger number of rankings should in principle be more frequently found than a form that is optimal given a smaller number of rankings. This is of course only true if one abstracts away from any extra-linguistic factors that play a role in determining which variant is pronounced in a given instance. In the case of Lushootseed, Anttila and Reynolds would predict that deletion takes place more often than centralization, because deletion is allowed by both (25 a and b), while centralization is

2 Lushootseed diminutive reduplication

Diminutive reduplication is one of several different kinds of reduplication found in Lushootseed, and was studied earlier by Browselow (1983), Bates (1986), and Urbanczyk (1996). It denotes 'smallness, diminished action [or] endearment' (Bates, Hess and Hilbert 1994; p. xvii), or indicates 'contempt or disgust' (Hess and Hilbert 1976, p. 160). The diminutive reduplicant is prefixal and is typically an open syllable. In words reduplicated for diminutive effect, vowel reduction is obligatory, as seen in the data below.

(26) *reduction in reduplicated words*

a.	*partial reduction*				
	/RED+ʔagʷal+əb/	*(ʔáʔa)(gʷàləb)	(ʔáʔə)(gʷàləb)	'yawn'	4
	/s+RED+tuləkʷ/	*(stútu)ləkʷ	(stútə)ləkʷ	'creek'	230
	/RED+sidq'/	*(sísidq')	(sísədq')	'turn it just a bit'	203
	/RED+k'ʷid/	*(k'ʷík'ʷd)	(k'ʷík'ʷəd)	'small amount'	131
b.	*total reduction*				
	/RED+pus/	*(púpus)	(pú-ps)	'toss pebbles'	164
	/RED+dukʷ+ibəɬ/	*(dúdu)(kʷìbəɬ)	(dúd)(kʷìbəɬ)	'strange'	85
	/RED+tʃ'axʷ+əd/	*(tʃ'átʃ'a)xʷəd	(tʃ'átʃ')xʷəd	'hit lightly w/ stick'	70
	/RED+kʷatatʃ/	*(s-kʷákʷa)(tàtʃ)	(skʷákʷ)(tàtʃ)	'little mountain'	123
	/RED+ʔus+il/	*(ʔúʔu)(sìl)	(ʔúʔ)(sìl)	'shallow dive'	22

Assuming that reduplicated and unreduplicated words are generated by the same grammar, one might expect parallel behavior in both word types. That is, one might expect reduction of unstressed corner vowels to be optional in reduplicated words. This section shows that the different behaviors of unreduplicated and reduplicated words follows from the assumption that Word Faithfulness relates inputs to entire output words. In particular, the fact that Word Faithfulness constraints demand recoverability of input material rather than identity of input-output correspondents causes the disappearance of constraint conflict seen in unreduplicated words: in reduplicated words *UNSTRESSEDCORNERV, MAX-V_{word} and ID-$VQUAL_{word}$ can all be satisfied simultaneously.

2.1 Vowel deletion in the base

Stress normally falls on the reduplicant because it contains the leftmost corner vowel in the word.[10] The base-initial syllable is therefore unstressed, and its vowel is subject to the constraint *UNSTRESSEDCORNERV. In the forms below, this markedness constraint is satisfied through deletion of the unstressed vowel.

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allowed only by (25 a). Since frequency data are not available for Lushootseed, this prediction cannot be tested.

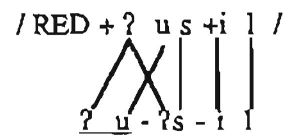
[10] When the input and base vowels are schwa, the reduplicant vowel is [i] (Bates 1986; Urbanczyk 1996; Alderete et al. 1997). Alderete et al. see this as the emergence of the unmarked vowel. In addition, this could be seen as the emergence of left stress alignment. I ignore these data, because they are irrelevant to the analysis of vowel reduction.

(27) *deletion of unstressed vowel in the base*

input	**unreduced*	*reduced*	*gloss*	*page*
/RED+ʔus+il/	*(ʔúʔu)(sìl)	(ʔú̲ʔ)(sìl)	'shallow dive'	22
/RED+tʃ'axʷ+əd /	*(tʃ'átʃ'a)xʷəd	(tʃ'átʃ')xʷəd	'hit lightly w/ stick'	70
/RED+kʷatatʃ/	*(s-kʷákʷa)(tàtʃ)	(skʷákʷ)(tàtʃ)	'little mountain'	123

Under the assumption that Word Faithfulness relates the input to both the output base and reduplicant, the following correspondence relations are established for the first of these forms:

(28) *Word Faithfulness and multiple correspondence in a reduplicated word*



In a reduplicated word like this, every segment in the input has at least one correspondent in the output. That is, all input segments are recoverable from the output, and Max_{word} constraints are satisfied. These constraints are indifferent to the number of output correspondents, and are satisfied in the presence of one or more output correspondents for each input segment. In the Lushootseed examples above, *UnstrCornerV prevents parsing of the first input vowel into the base-initial syllable. Yet, Max-Vowel_{word} is satisfied, because the input vowel is recoverable from the output reduplicant. Thus, in reduplicated words, both markedness and Word Faithfulness requirements are met simultaneously.

The tableaux below show that vowel deletion must take place, regardless of the relative ranking of Max-Vowel_{WORD} and the markedness constraint *UnstrCornerV, and as long as BR-constraints are low ranking. Candidates 1 of these tableaux faithfully parse the full input vowel into both the base and the reduplicant, hence Max-Vowel_{WORD} is satisfied. However, the full vowel in the base causes a violation of *UnstrCornerV. Deleting the base vowel rids candidates 2 of this violation, without incurring a faithfulness violation. Max-Vowel_{WORD} is satisfied, because the reduplicant contains the full vowel.

(29) *vowel reduction is compulsory when Markedness >> Faithfulness*

/RED+ʔus+il/	*Unstr CornerV	Max-V_{wd}	Dep-V_{BR}
1. (ʔú-ʔu)(s-ìl)	* !		
2. ☞ (ʔú-ʔ)(s-ìl)			*

(30) *vowel reduction is compulsory when Faithfulness >> Markedness*

/RED+ʔus+il/	Max-V_{wd}	*Unstr CornerV	Dep-V_{BR}
1. (ʔú-ʔu)(s-ìl)		* !	
2. ☞ (kú̲ - k)pi			*

We are now in a position to explain why we do not find optionality of reduction in reduplicated words. In reduplication, markedness can be satisfied without violating faithfulness. Since both the markedness constraint and Max-Vowel_{WORD} are satisfied, their relative ranking makes no difference. No matter how they are ordered, deletion takes place in reduplicated words. Competing candidates which do not show deletion can never be optimal, because they incur a superset of violations on the unranked constraints compared to reduced candidates.

2.2 Vowel centralization

Vowel centralization shows the same distribution as syncope: it is optional in unreduplicated words, but obligatory in reduplicated words. The forms in (31) show vowel centralization, rather than deletion, because deletion is blocked by syllable structure requirements (see section 1 above).

(31) *reduction of unstressed vowels in the base*[11]

input	**unreduced*	*reduced*	*gloss*	*page*
/RED+ʔagʷal+əb/	*(ʔá-ʔa)(gʷàl-əb)	(ʔá-ʔə)(gʷàl-əb)	'yawn'	4
/s+RED+tuləkʷ/	*(s-tú-tu)ləkʷ	(s- tú-tə)ləkʷ	'creek'	230
/RED+sidq'/	*(sí-sidq')	(sí-sədq')	'turn it just a bit'	203

Again, the reduplicant syllable is stressed, because it contains the left-most corner vowel, and centralization of the base-initial vowel satisfies the markedness constraint *UNSTRESSEDCORNERV. ID-VQUAL$_{WORD}$ is satisfied also, because the reduplicant vowel is identical to the first input vowel, and each feature associated with an input segment is associated with some corresponding output segment. As was the case in reduplicated words undergoing syncope, both markedness and faithfulness constraints can be satisfied simultaneously, rendering their relative ranking irrelevant. Either ranking results in vowel centralization, as long as BR Identity constraints are low-ranking. This is shown in the tableau below, which summarizes the two possible optimizations.

(32) *reduction in the base*

/RED + ʔagʷal + əb /	ID-VQUAL$_{WD}$	*UNSTR CORNERV	ID-VQUAL$_{BR}$
1. (ʔá - ʔa)(gʷàl - əb)		* !	
2. ☞ (ʔá - ʔə)(gʷàl - əb)			*

A few reduplicated words stress the first vowel in the base, rather than the reduplicant vowel.

(33) *stressed bases*

/RED+tádz+əd/	tə-tádz-əd	'little dance'	217
/s+RED+táləɬ/	s-tə-táləɬ	'little nephew/niece'	218
/RED+k'ʷáɬ+əb/	k'ʷə-k'ʷáɬ-əb	'nearsighted'	127
/RED+gʷád+əd/	gʷə-gʷád-əd	'talk'	96

I hypothesize that left-assignment of stress is forsaken in these forms because the root carries underlying stress, and Root Faithfulness on underlying accent ensures that it surfaces in the base, rather than the reduplicant (see model of correspondence in (1); Positional Faithfulness, Beckman 1997).

[11] Lexical prefixes are not reduplicated in Lushootseed (e.g. /s-/).

(34) *when a root carries underlying stress, it surfaces in the base*

/RED + tádz + əd/	Root Faith Accent	Word Faith Accent	Align-L
1. (tá - tə)dz - əd	* !		
2. ☞ tə - (tádz - əd)			*

Here the reduplicant vowel is subject to the markedness constraint against full unstressed vowels, because it is unstressed. Again, both faithfulness and markedness constraints are satisfied in these reduplicated words, and their relative ranking in an optimization makes no difference. Vowels never reduce fully in reduplicants, because syncope would create adjacent identical segments, fatally violating a constraint militating against such a constellation (such as *GEMINATE (Urbanczyk 1996) or the OCP).

(35) *reduction in the reduplicant*

/RED + tadz + əd/	ID-VQUAL$_{WO}$	*UNSTR CORNER V	ID-VQUAL$_{BR}$
1. ta - (tádz - əd)		* !	
2. ☞ tə - (tádz - əd)			*

3 Conclusion

In this paper I introduced Word Faithfulness which relates inputs to entire output words, regardless of their morphological make-up. In reduplicated words it relates the lexically specified input to both the base and the reduplicant through splitting.

I have argued that Faithfulness constraints demand recoverability of input material from the output, rather than identity between the two. Given an input element and a single identical output correspondent, both identity and recoverability are achieved. However, in multiple correspondence as established in reduplication, recoverability does not imply identity. If one output correspondent is identical to an input element but a second output correspondent is not, recoverability is served, but identity is not achieved. I argued that faithfulness constraints are satisfied in such a situation, because the input element is recoverable from the output.

Since one member of the base-reduplicant pair can ensure faithfulness, the other can change to satisfy a markedness constraint without incurring a faithfulness violation. When this markedness constraint only demands one of the output copies to change, as is the case in Lushootseed, both faithfulness and markedness requirements can be met in full and any conflict that may be found between them in unreduplicated words is lost in reduplicated words.

If a pair of conflicting markedness and faithfulness constraints are unranked with respect to each other in the grammar, the phonological alternation demanded by the markedness constraint is optional in unreduplicated words (Anttila 1997, Reynolds 1994). Given the way faithfulness constraints are evaluated in multiple correspondence, both the markedness and faithfulness constraints can be satisfied in reduplicated words. Concluding, alternations that are optional in unreduplicated words are predicted to be obligatory in reduplicated words when Base-Reduplicant Identity requirements are of low-priority, as is true for Lushootseed vowel reduction.

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