All the small things: Diminutive reduplication as infixation in ʔayʔaǰuθəm*

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Abstract: There are three reduplicative processes in ʔayʔaǰuθəm previously categorized as C_1V- prefixation (Davis, 1971; Blake, 2000; Watanabe, 2003). The treatment of the root vowel and the position of glottalization vary between them, despite the claim that their reduplicants are all C_1V- prefixes. Plural and diminutive reduplication pattern together, with the deletion of a root vowel and rightward glottalization, while the root vowel is retained in imperfective reduplication and glottalization is assigned leftward. The deletion of a root vowel in C_1V- reduplication is highly unusual in ʔayʔaǰuθəm and is problematic for Base-Reduplicant Correspondence Theory (McCarthy and Prince, 1995). This paper revisits diminutive reduplication in ʔayʔaǰuθəm and reanalyzes it as -C_1-infixation. I follow Riggle (2006) and adopt a gradient alignment constraint that motivates the infixation of a single consonant. This analysis is more compatible with the overall grammar of the language and accounts for the differences between diminutive and imperfective reduplication.

Keywords: diminutive, reduplication, Comox, infix, alignment constraints, imperfective

1 Introduction

Reduplication is a common morphological process in the Salish language family. ʔayʔaǰuθəm is no exception, having nine different reduplicative processes (Watanabe, 2003). Three of these have previously been analyzed as C_1V- prefixing reduplication. This type of reduplication can denote imperfective aspect, plurality with stative predicates, or the diminutive. Despite the argument that these reduplicative processes result from the same prefixed position and a C_1V shape, the surface forms differ, suggesting that they are subject to different phonological processes.

Table 1 summarizes surface forms described for roots under each type of C_1V- reduplication. The three reduplicative processes can be divided into two categories, based on the treatment of the root vowel in strong roots[1] and the position of glottalization. The stative plural and diminutive C_1V- pattern together, deleting the root vowel in most strong roots and displacing, or assigning, glottalization to the right-edge of the word or on the rightmost

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[1] Strong roots are roots with a full, moraic, vowel in the underlying form.

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resonant. An example of this is found in forming the diminutive for dog, *č̓an̓o*[2], where deletion of the root vowel and rightward displacement of glottalization result in *č̓ač̓noʔ* for ‘puppy’. However, in imperfective C_1V- reduplication, the root vowel is categorically retained in strong roots and glottalization is assigned toward the left edge of the word, on the stem-initial consonant, or to a resonant. For example, *gayətan* means ‘I asked him’, while the imperfective form *gag̓ayətas* means ‘she is asking him’. In the imperfective example, the first resonant in the stem receives glottalization and the stem vowel in *gay-*, ‘to ask’, is retained. The treatment of root vowels and placement of glottalization associated with imperfective reduplication is different from the plural stative and diminutive reduplicative processes, despite the fact that they are all traditionally analyzed as instances of C_1V- prefixing reduplication.

Table 1: Summary of C_1V- reduplication in Watanabe (2003)

	Diminutive	**Stative Plural**	**Imperfective**
Shape of Reduplicant	C_1V- for most strong roots, C_1i- for CVC roots and stems with schwa as the first vowel	C_1V- for strong roots, C_1a- or C_1i- for weak roots	C_1V-
Root Vowel Deletion	Yes, excluding in strong mono-syllabic roots or if deletion creates a CCC cluster	Yes	Only for weak roots
Glottalization Direction	Rightward	Rightward	Leftward (or on one of the resonants)

Though the assignment and displacement of glottalization is an intriguing dissimilarity between the reduplication patterns characterized as C_1V- prefixing, it appears to have some lexically specified properties (Watanabe, 2003: 389, 394). It deserves a more careful analysis than can be levelled in the present paper. The present analysis focuses exclusively on the treatment of the root and reduplicant segments, leaving the glottalization for future research. In the present paper, I focus specifically on the shape and position of diminutive reduplicants in ʔayʔaǰuθəm, challenging their previous characterization as C_1V-prefixes. In Section 2, I provide an analysis of diminutive reduplication as

[2] Examples in-text are transcribed in APA. I mark glottalization in this paragraph following the literature. However, my consultant does not produce glottalized resonants as frequently as might be expected, given previous descriptions of the language. Therefore, I have not marked glottalization elsewhere in this paper.

infixation. In Section 3, I outline language-internal and theory-based motivation for reanalysis. Following this, in Section 4, I consider a possible alternate, contrast-motivated, source of variation between C_1V- reduplicants, proposed in Urbanczyk (2005). As a whole, this paper argues that the diminutive reduplicant in ʔayʔaǰuθəm is best characterized as a -C_1- infix.

2 Diminutive Reduplication as Infixation in ʔayʔaǰuθəm

The data in (1) represent the majority of reduplicated diminutive forms in ʔayʔaǰuθəm. All of the non-reduplicated words in (1) begin with a CVCV-pattern. In some cases, the CVCV shape is the entire word, such as (1b) *niǰɛ* 'far', and in others the CVCV shape is the beginning of a longer word, such as (1h) *qʷoɬayšɪn* 'shoe'. Out of a total of 72 diminutive forms elicited, 48 were formed on bases starting with CVCV. The corresponding diminutive forms begin with the shape CVCC, where the first two consonants are identical and match the first consonant in the base form. The vowel in the first syllable of a diminutive form matches the first vowel in its non-reduplicated equivalent. For example, the diminutive form *tatmɛqʷɛtən* 'small scarf' in (1a) comes from *tamɛqʷɛtən* 'scarf'. The first two consonants in the diminutive form are *t* and the first vowel is *a*, while the first consonant and vowel of the base are *ta*.

(1) Diminutive reduplication with CVCV- bases

a.	tamɛqʷɛtən	'scarf'	tatmɛqʷɛtən	'small scarf'
b.	niǰɛ	'far'	ninǰɛ	'a little far'
c.	tala	'money'	tatla	'a little bit of money'
d.	tuɬəɬ	'bed'	tutɬəɬ	'small bed'
e.	sopayɛ	'axe'	sospayɛ	'small axe'
f.	kɪpəm	'button'	kɪkpəm	'small button'
g.	memo	'cat'	memmoʔ	'kitten'
h.	qʷoɬayšɪn	'shoe'	qʷoqʷɬayšɪn	'small shoe'
i.	ʔayaʔ	'house'	ʔaʔyaʔ	'small house'
j.	qʷasəm	'flower'	qʷaqʷsəm	'small flower'
k.	kʷoθayɪs	'island'	kʷokʷθayɪs	'small island'
l.	ǰɛnɪs	'tooth'	ǰɛǰnɪs	'small tooth'
m.	nikʷayɛ	'lamp'	ninkʷayɛ	'small lamp'
n.	šukʷa	'sugar'	šuškʷa	'little bit of sugar'
o.	talaʔostən	'eyeglasses'	tatlaʔostən	'small eyeglasses'
p.	pata	'butter'	papta	'little bit of butter'
q.	kɛpu	'coat'	kɛkpu	'small coat'
r.	talahayɛ	'purse'	tatlahayɛ	'small purse'
s.	č̓ɛɬokʷt	'raincoat'	č̓ɛč̓ɬokʷt	'small raincoat'
t.	qegaθ	'deer'	qeqgaθ	'small deer'
u.	qaya	'water'	qaqya	'a little bit of water'
v.	maqɪn	'hair'	mamqɪn	'a little bit of hair'
w.	pipa	'paper'	pippa	'a small piece of paper'

x.	ɬəkamın	‘spear’	ɬəɬkamın	‘small spear’
y.	kʷaxʷa	‘box’	kʷakʷxʷa	‘small box’
z.	ʔɛt̓ᶿəm	‘blanket’	ʔɛʔt̓ᶿəm	‘small blanket’

Under the traditional prefixing analysis, the forms in (1) represent the basic C_1V- reduplication pattern where the root vowel deletes. This means that the initial CV sequence in a diminutive form is treated as the reduplicant, such that *šu*- is analyzed as a prefixed reduplicant in (1n) *šuškʷa* ‘little bit of sugar’. This analysis requires stipulating that the vowel in the root deletes to account for why the diminutive form of *šukʷa* ‘sugar’ is *šuškʷa* and not **šušukʷa*, where the vowel would be retained in both the base and the reduplicant. Though it is a necessary claim in the prefixing analysis, it is unclear what would motivate the deletion of a root vowel.

The data can be accounted for in much simpler manner by redefining the proposed identity of the diminutive reduplicant and its position relative to the base. Instead of treating diminutive reduplication as prefixing reduplication, I analyze it as -C_1- infixation into the root. Assuming an infixation analysis, the reduplicants in (1) can be analyzed as aligning with the right edge of the root vowel. In (1n) *šuškʷa* ‘little bit of sugar’, the initial C_1V sequence *šu* is part of the base and is followed by the -C_1- diminutive infix, the word-medial -*š*-. The reduplicant consists of a single segment that becomes the coda of the first syllable. This results in a perfect root input-output correspondence, because no root segments are deleted. Therefore, unlike the prefixing analysis, the infixation account of diminutive reduplication does not require finding motivation for root vowel deletion in addition to accounting for the reduplicative process itself. Treating diminutive reduplication as infixation allows for an analysis that is much tidier, given the data in (1). Further, the infixation analysis has the additional advantage of providing a concrete reason for why root vowel retention and glottalization would apply differently in imperfective reduplication as, unlike the literature, this analysis suggests that diminutive reduplication is not C_1V- prefixing.[3] Therefore, the reduplicative processes are distinct and it is unsurprising that they might result in different surface forms.

Diminutive infixation can be accounted for in Parallel OT with the combination of alignment, general faithfulness, and markedness constraints (McCarthy & Prince, 1993), as shown in (2). I follow Riggle (2006) and adopt a gradient alignment constraint that penalizes segments between the reduplicant and the left edge of the word. However, the ALIGN-L_{red} constraint used in the present analysis penalizes segments between the right edge of the reduplicant and the left edge of the word. Though it belongs to the class of alignment constraints, ALIGN-L_{red} has the desired effect of restricting the size of the reduplicant, which results in single consonant reduplicants, as proposed for the

[3] The stative plural reduplication behaves like the diminutive. I believe, by extension, that my infixation argument would apply to the stative plural as well, though I have not elicited enough data to confirm that at this time.

data in (1). However, this effect is limited by higher-ranked alignment, faithfulness, and markedness constraints. MAX-M ensures that every morpheme in the input has a correspondent in the output (Yu, 2016). This protects against EVAL selecting candidates where the reduplicant is not expressed in the output, though they vacuously satisfy ALIGN-L$_{red}$. The position of the infix depends on higher-ranked constraints, such *COMPLEXONSET and ALIGN-L$_{root,}$[4] the former ruling out infixation on the left edge of root vowel, which would create a complex onset, and the latter motivating infixed reduplicants rather than prefixes. Finally, MAX protects segments in the input against deletion and DEP penalizes segments in the output that are not in the input (McCarthy & Prince, 1995). Neither constraint applies to the reduplicant, as it has no concrete phonological shape in the input and is comprised of segments copied from the base in the output, such that the reduplicant C_1 and base C_1 both correspond to the same input C_1.

(2) Constraints

ALIGN(RED, R, WD, L): *(ALIGN-L$_{red}$)*	The right edge of every reduplicant should align with the left edge of a word. Assign a violation mark for every segment between the right edge of a reduplicant and the left edge of the word.
ALIGN(WD, L, RT, L): *(ALIGN-L$_{root}$)*	The left edge of every word should align with the left edge of a root. Assign a violation mark for every left edge of word that is not aligned with the left edge of a root.
MAX-M(ORPHEME):	All morphemes in the input must have a correspondent in the output (Yu, 2016).
*COMPLEX(ONSET):	Onsets should be maximally one segment. Assign a violation mark for any consonant cluster in an onset position of a syllable.

[4] This could also be ALIGN-L$_{base}$, symmetrical to the ALIGN-L$_{red}$ constraint. I use ALIGN-L$_{root}$ instead because it is highly motivated by the language. There is a categorical lack of prefixes, with the exception of some reduplicants, meaning that ALIGN-L$_{root}$ > ALIGN-L$_{affix}$. The exceptional cases of reduplication, such as C_1əC_2- plural, are so few that they can be captured by some morpheme-specific constraints that force these reduplicants to the left, despite the overall dispreference for prefixation. Further, given that words can have a root and a lexical suffix (bound root), this constraint stipulates that word edges should coincide with a root edge to avoid unwanted infixation of roots into other roots. I also assess this constraint as categorical in the present analysis as it is ranked highly, such that even one violation is fatal.

MAX:	All segments in the input have a correspondent in the output. Assign a violation mark for every segment in the input that does not have a correspondent in the output.
DEP:	All segments in the output have a correspondent in the input. Assign a violation mark for every segment in the output that does not have a correspondent in the input.

In order to derive the correct surface forms, ALIGN-L_{red} must be ranked below the other constraints. This is shown in the derivation of *θoθmın* 'small eyebrow' in (3). Candidate (3a), which outright deletes the reduplicant, fatally violates MAX-M. The candidates which have the reduplicant aligned with the left edge of the word, (3c,d,g), are eliminated for violating ALIGN-L_{base}. Candidate (3f), which has the reduplicant aligned with the left edge of the root vowel, incurs a violation under *COMPLEX and Candidate (3h), which has vowel epenthesis, violates DEP. The final two candidates satisfy all of the higher-ranked constraints and are thus are ultimately discriminated by their respective violations of the reduplicant alignment constraint. Candidate (3e) incurs four violation marks, as there are four segments between the right edge of the -C_1V- reduplicant and the left edge of the word. Candidate (3b), the attested candidate with the -C_1- infix, only receives three violation marks under ALIGN-L_{red} and therefore is selected as the winner by EVAL.

(3)

	RED + θomın	ALIGN-L_{root}	MAX-M	*COMPLEX	MAX	DEP	ALIGN-L_{red}
	a. θomın		*!				
☞	b. θo**θ**mın						***
	c. **θo**θmın	*!			*!		**
	d. **θo**θomın	*!					**
	e. θo**θo**mın						****!
	f. θ**θ**omın			*!			**
	g. **θ**eθomın	*!				*!	*
	h. θe**θ**omın					*!	***

The constraints in (2) and the ranking in (3) can account for the -C_1- infixation diminutives formed on a CVCV- base, which comprise the majority of forms. However, they cannot capture all the data. As shown in (4), there are diminutives formed with CVCC- bases. In these cases, the reduplicated forms start with a CVCV- pattern where the first two consonants and first two vowels match. For example, the first two segments in the non-reduplicated form in (4c) *ʔasx^w* 'seal' appear twice in a CVCV pattern at the beginning of the reduplicated form *ʔaʔasx^w* 'small seal'.

(4) -C_1V- diminutive reduplication with CVCC- bases

a.	ʔuɬqay	'snake'	ʔuʔuɬqay	'small snake'
b.	sayǰɛ	'leaf'	sasayǰɛ	'small leaf'
c.	ʔasx^w	'seal'	ʔaʔasx^w	'small seal'
d.	hayšɪn	'ladder'	hahayšɪn	'small ladder'
e.	walθ	'frog'	wawalθ	'small frog'
f.	gaʔwut	'paddle'	gagaʔwut	'small paddle'
g.	x̣awgus	'grizzly bear'	x̣ax̣awgus	'grizzly bear'

Under a prefixing analysis, these would be described as C_1V- reduplication without root vowel deletion. The deletion of the root vowel would create a CCC cluster, which is relatively rare in a word-medial position in ʔayʔaǰuθəm. Retaining the vowel prevents CCC clusters, which is preferred by the grammar. The avoidance of tri-consonant clusters in reduplication is also relevant in the infixation analysis. Given the CVCC- base shape, the infixation of a single consonant would create a CCC cluster. Therefore, the reduplicant copies the first vowel in the base along with the initial consonant, resulting in a -C_1V- infix. This results in *x̣ax̣awgus*, instead of **x̣ax̣wgus*, as the diminutive form of *x̣awgus* 'grizzly bear' in (4g). Out of 72 elicited diminutives, there are only seven CVCC- forms that take a -C_1V- infix.

In order to account for -C_1V- infixes in (4), another markedness constraint is needed to limit the number of adjacent consonants. This constraint, *CCC, is given in (5) and has motivations elsewhere in the language.[5] First, the phonological grammar of ʔayʔaǰuθəm has a strong preference for bimoraic and binary feet (Blake, 2000: 202). This results in an ideal foot having a (CəC.CəC), (CV.CV), (CəC.CV), or (Cə.CVC) structure. Therefore, the situations where CCC clusters arise are generally considered less ideal. Further, across the 72 diminutive forms in this paper, there are only three examples with tri-consonantal clusters. Of these, all have [s], which is notably one of the only segments that appears in complex onsets for a very limited set of words

[5] It is possible that syllable structure constraints, *COMPLEXONSET and *COMPLEXCODA, could derive the same effects needed to ban CCC clusters. However, a constraint against branching codas would prove problematic with any CVCC root, such as *ʔasx^w* 'seal'. Despite being less elegant, *CCC is less problematic for the language.

(Watanabe 2003:16). Therefore, assuming violable constraints, *CCC does not pose problems for the phonological grammar of ʔayʔaǰuθəm.

(5) Tri-consonant cluster constraint

*CCC: There should not be three adjacent consonants word-medially. Assign a violation mark for every three consonants in a row that are not on the word edge.

The tableau in (6) shows how the *CCC constraint allows the candidate with -C_1V- reduplication to win over the -C_1- one, which has three adjacent consonants in a word-medial position. Candidate (6c) does not have a reduplicant in the output and violates MAX-M. Candidate (6d) deletes a root segment and candidates (6e) and (6f) epenthesize a vowel, all incurring fatal violations under the faithfulness constraints. Candidate (6g) aligns the reduplicant with the left edge, rather than the base, and therefore incurs a violation under the high-ranked ALIGN-L_{root} constraint. Candidate (6a) fatally violates *CCC, which results in Candidate (6b), the attested one, winning. In this tableau, it is evident that a markedness constraint, like *CCC, is needed to predict the correct surface form. Without it, the alignment constraint would force an infixed -C_1- reduplicant.

(6)

	RED + ʔułqay	MAX-M	ALIGN-L_{root}	*CCC	*COMPLEX	MAX	DEP	ALIGN-L_{red}
	a. ʔu**ʔ**łqay			*!				***
☞	b. ʔu**ʔu**łqay							****
	c. ʔułqay	*!						
	d. ʔu**ʔ**qay					*!		***
	e. ʔu**ʔ**əłqay						*!	***
	f. ʔe**ʔ**ułqay						*!	***
	g. **ʔu**ʔułqay		*!					**

Though the analysis thus far can account for most of the data, it does not explain the diminutive reduplication of the three CVC monosyllabic roots in (7). The non-reduplicated word *toʔ* ‘ice’ in (7b) corresponds to the diminutive form *tetoʔ*, which has an epenthetic vowel /i/ in the first syllable. This differs from the first two patterns, where we might expect forms like **totʔ* or **totoʔ*, which have no epenthetic vowel. In the prefixing analysis, these reduplicants are characterized as taking a C_1i- shape and occurring with nouns that have schwa as a first vowel and strong roots of the shape CAC, where A represents a full vowel (Watanabe 2003: 386). In the present analysis, these nouns are best characterized as having -C_1- infixation, though the reduplicant is aligned with the left edge of the root vowel. /i/-epenthesis occurs between the stem C_1 and the reduplicant C_1 and the vowel surfaces as [e] in accordance with regular allophonic rules (Watanabe, 2003:11).

(7) -[i]C_1- diminutive reduplication with CVC# bases

a.	toʔ	'ice'	tetoʔ	'small amount of ice'
b.	puk	'book'	pepuk	'small book'
c.	pun	'spoon'	pepun	'small spoon'

The strong roots in (7), such as *puk* 'book', cannot be accounted for by the present analysis. The constraints presented so far and their relative ranking would predict a -C_1- infix with no epenthesis, **pupk*, such as in (8). This results from ranking DEP above ALIGN-L_{red}, such that the /i/-insertion in the attested candidate results in a fatal violation of DEP. The winning candidate, **pupk*, is further problematic because it inevitably forms a foot that is not binary on either the level of the mora or syllable. Therefore, this candidate can be ruled out with the inclusion of a FT-BIN constraint,[6] given in (9), which is highly motivated in the language (Blake, 2000) and ranked above the reduplicant alignment constraint.

(8)

	RED + puk	MAX-M	ALIGN-L_{root}	*CCC	*COMPLEX	MAX	DEP	ALIGN-L_{red}
	a. pu**pu**k							****!
☞	b. pu**p**k							***
☹	c. pe**p**uk						*!	***
	d. puk	*!						***
	e. **p**epuk		*!				*!	

[6] I assume a GRWD = PRWD constraint to necessitate building a foot.

(9) Binary feet constraint

FT-BIN: Feet should be binary at either the level of the syllable or the mora. Assign a violation mark for any foot that is not binary on some level.

Though FT-BIN can successfully eliminate the candidate with a -C_1- reduplicant and no epenthesis, the -C_1V- candidate, **pupuk*, fares better on DEP. This suggests that ALIGN-L_{red} must be ranked above DEP, as shown with the partial ranking in (10). Candidate (10c) fatally violates FT-BIN because it does not have a binary foot at the level of the syllable or the mora[7]. Candidate (10a), with the -C_1V- infix, is eliminating for violating ALIGN-L_{red} four times. The attested candidate, (10b), violates the alignment constraint three times and the lower ranked DEP constraint once. This ranking predicts the correct winner.

(10)

	RED + puk	FT-BIN	ALIGN-L_{red}	DEP
	a. (pu$_\mu$.**pu**$_\mu$k$_\mu$)		****!	
☞	b. (pe$_\mu$.**pu**$_\mu$k$_\mu$)		***	*
	c. (pu$_\mu$**p**$_\mu$k$_\mu$)	*!		

However, this introduces a ranking paradox because the -[i]C_1- diminutives, such as *puk* in (10), require ALIGN-L_{red} to be above DEP and the -C_1V- ones, such as *ʔuɬqay* in (6), require the reverse. This is immediately apparent when considering the form in (11), which shows *nanat* as the diminutive form of *nat* 'night'. This is the one example where a -C_1V- infix is found with a CVC# root. The ranking paradox is shown in (12), where the partial ranking needed to derive *pepuk* in (10) predicts the wrong diminutive form of *nat*. Candidate (12c), which builds a mono-syllabic tri-moraic foot, fatally violates FT-BIN. The attested candidate, (12a), incurs four violation marks under ALIGN-L_{red} and subsequently loses to the -[i]C_1- diminutive candidate, (12b). In order to predict the correct winner, DEP would need to be ranked above ALIGN-L_{red}.

[7] As in Blake (2000), I assume that full vowels and coda consonants are moraic.

(11) -C_1V- diminutive reduplication with a CVC# base

a. nat	‘night’	nanat	‘a short night (like in summer)’

(12)

	RED + nat	FT-BIN	ALIGN-L_{red}	DEP
☹	a. (na$_\mu$.**na**$_\mu$t$_\mu$)		****!	
☞	b. (ne$_\mu$.**n**a$_\mu$t$_\mu$)		***	*
	c. (na$_\mu$**n**$_\mu$t$_\mu$)	*!		

There is no clear way to resolve the ranking paradox through the reranking or addition of constraints. The base forms given in (7) and (11) differ minimally because they are all of a CVC# shape. Similarly, there are nouns that start with a CVCC- pattern but do not take a -C_1V- infix as in (4). Of the 72 diminutive forms, the two in (13) are formed with an -[i]C_1- infix. As -C_1V- and -[i]C_1- infixes are found in the diminutive forms of both the CVCC- and CVC# nouns, there is no clear phonological motivation for the choice of one over the other. Therefore, I do not propose any strict ranking of the two in the present analysis though and leave this open as an avenue of future examination. Out of the 72 diminutives considered in this paper, only five unambiguously take an -[i]C_1- infix. All four of the five diminutives that take a -[i]C_1- have an underlying /u/. In contrast, seven of the eight -C_1V- nouns have an underlying /a/, with only [ʔuɬqaj], *snake*, having an underlying /u/. Given the small number of -C_1V- and -[i]C_1- diminutive forms overall and that they were only provided with CVCC- and CVC# bases, -C_1- infixation seems to be the default reduplication strategy, with the other two arising in particular phonological environments where -C_1- infixation would result in worse surface forms. Based on preliminary data, it appears that -C_1V- infixes are preferred with roots with an underlying /a/ and -[i]C_1- infixes are preferred with /u/ roots. Additionally, given the relatively small number of nouns, it is possible that the relative ranking of DEP and ALIGN-L_{red} is lexically specified in the formation of the diminutive.

(13) -[i]C_1- diminutive reduplication with CVCC- bases

a. mušmuš	‘cow’	memušmuš	‘small cow’
b. t̓aqt	‘mountain’	t̓et̓aqt	‘small mountain’

The low number of -C_1V- and -[i]C_1- diminutives may suggest a lower frequency of CVCC- or CVC# nouns in the language. However, this is not necessarily true. Out of a total of 19 nouns that my consultant could not make diminutive through reduplication,[8] 11 were CVCC or CVC#. There is also an

[8] These words were given following the word *titul* ‘small’.

additional set of CVCC- nouns given in (14) that take a -C_1- infix in diminutive reduplication. These reduplicated forms also offer evidence for the *CCC constraint as the only tri-consonant clusters include *s*, which behaves exceptionally in clusters in ʔayʔaǰuθəm (Watanabe 2003: 16). Otherwise, clusters are simplified by deletion or epenthesis. This is seen with the loss of *y* in the diminutive form of *x̣ayǰɪs* 'rock' in (14f), *x̣əx̣ǰɪs*, and the addition of a schwa in the diminutive form of *qatx^w* 'fire' in (14e), *qaqtəx^w*. Further, with the exception of (14b) *saplin* 'bread', all of the non-reduplicated nouns in (14) have an underlying schwa in the first syllable. In Watanabe (2003: 386), stems with a schwa as the first vowel are shown to take an epenthetic /i/ in diminutive reduplication. The form *k^{w}ek^{w}aʔsta* 'small cup' is reported in both Blake (2000:344) and Watanabe (2003: 390). Under the present analysis, this form has -[i]C_1- infix. However, in the present data, the same diminutive form was given as *k^{w}ok^{w}sta*, with a -C_1- infix. While this minimally suggests interspeaker differences, it also indicates that changes may have occurred in the ʔayʔaǰuθəm reduplication system that have resulted in fewer -[i]C_1- diminutives.

(14) -C_1- diminutive reduplication with CVCC- bases

a.	qəsnay	'shirt'	qəqsnay	'small shirt'
b.	saplɪn	'bread'	sasplɪn	'small bread'
c.	k^{w}asta	'cup'	k^{w}ok^{w}sta	'small cup'
d.	čɪtkamɪn	'knife'	čɪčkamɪn	'small knife'
e.	qatx^w	'fire'	qaqtəx^w	'small fire'
f.	x̣ayǰɪs	'rock'	x̣əx̣ǰɪs	'small rock'
g.	nʌpnač	'pants'	nanpɪnač	'small (child's) pants'
h.	ǰɛnx^w	'fish'	ǰɪǰnəx^w	'small fish'
i.	θʊk^{w}načten	'chair'	θɪθk^{w}ənačtən	'small chair'

Harris (1981: 4) described difficulties eliciting plural or diminutive reduplicated forms in his dissertation on the Island dialect of ʔayʔaǰuθəm. He suggests that a possible explanation for this is that the reduplicative processes fall out of use with the decline of the language. While the sparse number of -C_1V- and -[i]C_1- diminutives may suggest a similar situation for the Mainland dialect of ʔayʔaǰuθəm, the considerable number of -C_1- diminutives reflect a more positive reality. While there may be erosion in the breadth of reduplicative processes available to form diminutives, this does not necessarily reflect the vitality of diminutive reduplication or the state of the language as a whole. Sapir (1915) lists a considerable number of diminutive forms, which pattern in unique ways, further than the three types described in the present paper. Some of the listed nouns that would fall into the -[i]C_1- infix category, or a modified version of it with a different epenthetic vowel, correspond to nouns given with -C_1- diminutives in the present paper or those that could not be diminutivized in any of the three manners. While the variety of Sapir's (1915) reduplicated forms suggest lexically encoded reduplication strategies, the data in the present paper presents a phonologically regular division where -C_1V- and -[i]C_1- diminutives only occur where -C_1- creates phonologically worse candidates. Therefore, the changes in diminutive reduplication in ʔayʔaǰuθəm may be analyzed as the extension of the -C_1- infixation strategy to a broader set of words. There may be some lexical properties of diminutive formation retained in the selection of -C_1V- and -[i]C_1- diminutives, which are only separable if the root vowel is /u/ or /a/. Given the lower frequency of these forms and that the major difference is limited to the choice between candidates with /i/-epenthesis or reduplication of the root vowel, I conclude that the ranking of ALIGN-L_{red} and DEP is variable and highly lexicalized, but can account for the data presented in this paper. However, overall, -C_1- infixing diminutive reduplication appears to be a productive and largely phonologically regular process in ʔayʔaǰuθəm.

3 Motivations for Reanalysis

A straightforward analysis of diminutive reduplication in ʔayʔaǰuθəm is possible when the reduplicant is treated as an infix, rather than a prefix. However, there are further reasons to re-evaluate the traditional prefixing analysis. For example, the clearly divisible behaviour between *root vowel retaining* (imperfective) and *root vowel deleting* (diminutive and stative plural) C_1V- types of reduplication provides a straightforward argument for reanalysis. If the reduplication is C_1V- for each of these processes, than it is unclear why the vowel would delete in some circumstances and not others. These differences are not an issue under the proposed infixation analysis as imperfective C_1V- prefix is inherently different from the diminutive -C_1- infix. Therefore, the divergent behaviour is expected, rather than challenging to account for. Additionally, the diminutive infix analysis does not require stipulating that the root vowel deletes, which fits better with the language overall. Deletion of a root segment, which is purported to happen to the root vowel in prefixing C_1V- reduplication, is an extremely uncommon phonological process in ʔayʔaǰuθəm. Further, there are instances where an analysis that proposes root vowel deletion must also propose that this deletion results in surface forms that are inconsistent with sound patterns elsewhere in the language.

There is strong evidence that the phonological grammar of ʔayʔaǰuθəm protects root segments from deletion. Every syllable in ʔayʔaǰuθəm must have an onset, suggesting that there is a high-ranked ONSET constraint and there is no evidence that this constraint is ever violated (Blake, 2000: 126). Following from this, a morphological process that results in two adjacent vowels, such as affixation, will motivate the resolution of hiatus by either epenthesis or deletion to ensure that every syllable has an onset. Both strategies are found in ʔayʔaǰuθəm. Deletion is found as a way of reconciling vowel hiatus between affixes. For example, when the second person plural object suffix *-anapi* is followed by the third person ergative subject suffix *-as*, the second vowel is deleted, such as in [ʔaq̓nampɪs][9], meaning ‘he chases you all’. Thus, the deletion

[9] There seems to be something else going on in this particular example, with the loss of

of an affix vowel is permitted when two vowels are adjacent. However, deletion is not found in the resolution of vowel hiatus between a root and a lexical suffix. When a vowel-final root and a vowel-initial lexical suffix are combined, epenthesis occurs, avoiding any violation of the high-ranked ONSET constraint. This is shown in (15) with data from Blake (2000) for the lexical suffix *-aya* in (15a–b), 'container', *-aǰ̓a* in (15c), 'leaves', and *-uɬ* in (15d–f), 'young of a species'. For *-aya*, [h]-epenthesis resolves the vowel hiatus resulting from the combination of the two morphemes. A similar effect is seen with *-uɬ*, where [ʔ]-epenthesis occurs. Deletion does not appear to occur between a vowel-final root and a vowel-initial lexical suffix.

(15) Vowel-final roots and vowel-initial lexical suffixes in Blake (2000)

a.	talahayɛ tala=aya 'purse'	b.	q̓ʌnayohayɛ q'’n=ayu=aya 'sewing needle case'
c.	ʔosahaʔǰɛ ʔusa=aǰ̓a 'blueberry leaves'	d.	sɪsm̓aʔoɬ DIM+sm’a=uɬ 'small blue mussel'
e.	p̓ip̓x̣^{w}uʔuɬ DIM+p̓ux̣u=uɬ 'small raven'	f.	t̓^{θ}ot̓^{θə}maǰuʔoɬ DIM+t̓^{θ}umaǰ̓u=uɬ 'small barnacle'

Blake (2000: 127) treats lexical suffixes as bound roots, which means that they are directly evaluated under the constraints targeting roots, rather than affixes. Therefore, the resolution of vowel hiatus provides a clearer picture regarding the status of root vowels. When the combination of roots and lexical suffixes results in adjacent vowels, the grammar prefers epenthesis. This satisfies the high-ranked ONSET constraint, while simultaneously protecting vowels with root-status in the input. This same retention is not seen when the combination of two grammatical affixes yields vowel hiatus. This suggests that root faithfulness is prioritized over affix faithfulness. This is further supported in Blake's (2000) partial rankings where ROOT FAITH constraints are undominated, while AFFIX FAITH is dominated by *COMPLEX ONSET. ʔayʔaǰuθəm's strong preference for input-output root faithfulness is consistent with cross-linguistic literature, which argues that the ranking ROOT FAITH >> AFFIX FAITH is universal (McCarthy & Prince, 1995; Alderete, 2001). The deletion of a root vowel in ʔayʔaǰuθəm, as posited in the diminutive reduplication process, is extremely marked.

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one of the object suffix vowels and place assimilation within the suffix. However, this fits with an assumption that deleting affix vowels is largely permissible.

Diminutive C_1V- prefixing reduplication is further problematic under Base-Reduplicant Correspondence Theory (BRCT) as described in McCarthy and Prince (1995). Some ʔayʔaǰuθəm diminutives are given in (16), with the reduplicant marked in bold following the traditional prefixing account. In (16b), the reduplicant is *tu-* from an underlying *tułəł*. However, not all of the reduplicant segments correspond to ones present in the surface form of the base. The vowel in the root *tułəł* is deleted in the surface form, meaning that the base-reduplicant relationship is inverted. This cannot be captured in the basic BRCT model, but requires appealing the full model, which includes an input-reduplicant correspondence relationship in addition to the input-base and base-reduplicant ones (McCarthy & Prince, 1995: 110). While Blake (2000: 198) does not give a formal account of reduplication in ʔayʔaǰuθəm, she reaches a similar conclusion, hypothesizing the deletion of the root vowel in diminutive reduplication requires comparing the vowel in the reduplicant to the vowel in the input, to ensure that they match. However, McCarthy and Prince's (1995) inclusion of input-reduplicant faithfulness constraints comes with the caveats that it has limited benefit and that it cannot be ranked above input-base faithfulness. This presents a significant problem in accounting for the ʔayʔaǰuθəm data in (16).

(16) ʔayʔaǰuθəm diminutive reduplicants under C_1V- prefixing analysis

a.	tala	'money'	**ta**tla	'a little bit of money'
b.	tułəł	'bed'	**tu**tłəł	'small bed'
c.	ʔayaʔ	'house'	**ʔa**ʔyaʔ	'small house'
d.	memo	'cat'	**me**mmoʔ	'kitten'

In the full model of BRCT, the inclusion of an input-reduplicant correspondence relationship is crucial for accounting for languages where other markedness constraints interfere with the base-reduplicant correspondence. This accounts for cases, such as in (3), where the reduplicant has stem material from the input that is omitted from the base in the surface form. McCarthy and Prince (1995) argue for the inclusion of this additional correspondence relationship to account for distributive reduplication in Klamath, where markedness constraints motivate syncope of a base segment, while the reduplicant retains it. However, the reduction of the base is motivated by other constraints that are active in the general phonological grammar, rather than as an effect associated with a specific reduplicative process. A similar analysis cannot be extended to ʔayʔaǰuθəm, as the deletion of root vowels is extremely marked and not generally motivated by other constraints in the language. The diminutive root vowel deletion can only be explained as a part of the specific reduplicative process, as is evident in a comparison with the imperfective C_1V- reduplication where the root vowel is retained. While input-reduplicant correspondence could potentially account for the diminutive patterns in ʔayʔaǰuθəm in concert with other markedness constraints, this would require demoting the input-base reduplicant correspondence constraints in the assessment of diminutive and plural stative reduplication, which violates universal assumption that input-base constraints dominate input-reduplicant ones.

As established above, there is little evidence for high ranked constraints that would motivate the deletion of a root vowel in the *root vowel deleting* (diminutive and stative plural) reduplicative processes but not in *root vowel retaining* (imperfective) ones. The deletion of the root vowel in diminutive reduplication does not appear to ameliorate candidate performance on any other markedness constraint, but it does result in a greater number of violations to other high-ranked constraints that would otherwise be satisfied. A substantial number of phonological processes in ʔayʔaǰuθəm apply to improve prosodic structure, with high-ranking constraints militating for binary feet at the level of the mora and, just beneath that, the level of the syllable (Blake, 2000). In (17), I show examples of C_1V- diminutive reduplicants in words with three syllables, where the retention of the root vowel would result in better forms than the attested ones. For example, retention of the root vowel in (17a) would result a form like **susupayɛ*. This unattested form perfectly meets the requirement of foot binarity at the level of the mora and the syllable. Whereas, *sospayɛ*, the actual diminutive form, does not have binary feet at the level of the syllable and thus incurs further violation marks under both foot structure and FAITH ROOT constraints. Similarly, **θɪθɪčapoq* would fare better on prosodic constraints than the form in (17d). The unattested candidate with the root vowel retained can be segmented into two bi-syllabic feet, where the last one incurs a single violation mark for being a tri-moraic foot. The actual form, *θɪθčapoq*, fares the same on the moraic foot binarity constraint and additionally violates the syllable-level binarity constraint. It is unclear what would motivate the choice of a candidate that deletes the root vowel, violating several high-ranked constraints, over other potential candidates that are better prosodically.

(17) Diminutive reduplication applied to 3 syllable bases in ʔayʔaǰuθəm

a.	supayɛ	‘axe’	**so**spayɛ	‘small axe’
b.	x̣ax̣čmɪn	‘fork’	**x̣a**x̣čamɪn[10]	‘small fork’
c.	tihayɛ	‘tea’	**ti**thayɛ	‘a little bit of tea’
d.	θɪčapoq	‘hat’	**θɪ**θčapoq	‘small hat’

Given the language-internal and theoretical issues with treating diminutive reduplication as C_1V- prefixing, there is good reason to re-evaluate the shape and position of the reduplicant in ʔayʔaǰuθəm. The infixation analysis laid out in Section 2 does not stipulate root vowel deletion and therefore avoids the problems that arise with the deletion of the root vowel. For this reason, the infixation analysis is a better fit for the data and the language.

[10] I also have this transcribed elsewhere as *x̣əx̣čamɪn*, where vowel reduction improves foot binarity at the level of the mora because schwa is non-moraic.

4 The Cross-Salish Reduplication Contrast Enhancement Argument

The curious differences between the imperfective and diminutive "C_1V-prefixing" reduplicative processes in ʔayʔaǰuθəm have been previously highlighted in the study of contrast in reduplication. Though the present analysis shows that positing a different reduplicant shape and position can easily account for the divergent behaviour, there is an alternate explanation that merits consideration. Urbanczyk (2005) argues that the differences between diminutive and imperfective reduplication in ʔayʔaǰuθəm, with respect to root vowel deletion, arise to enhance contrast between similar surface forms. In this analysis, she retains the traditional C_1V- prefixing analysis and uses it as evidence for contrast enhancement in reduplication. She concludes the paper by noting that ʔayʔaǰuθəm might not be the best example, as diminutive reduplication occurs with nouns and the imperfective with verbs, meaning that the reduplicants may maintain contrast due the identity of the base. However, she points out the third type of C_1V- reduplication, plural C_1V-, can also occur on verbs and therefore further study may find minimal pairs with the imperfective.

While contrast enhancement is undoubtedly important in language, it is highly unlikely that this is the reason for the differences described in ʔayʔaǰuθəm. The contrast argument largely only pertains to strong roots, where root vowel deletion is apparent. Root vowel deletion is documented for weak roots in all three types of C_1V- reduplication, meaning contrast is not enhanced or only barely amplified in some forms by glottalization. Further, the diminutive and plural stative reduplication processes are almost identical, as laid out in Table 1 (in Section 1 above). Therefore, if the differences are the result of contrast enhancement, the extent of its helpfulness in acquisition and communication is questionable. It is also unclear why ʔayʔaǰuθəm would require an enhancement of contrast between these three particular types of reduplication, as they are used in considerably different contexts and constructions. Plural CV-reduplication occurs solely with stative predicates (Watanabe, 2003: 376). Therefore, this type of reduplication is accompanied by other aspectual marking that disambiguates it from the imperfective. Even more conclusively, the imperfective and the stative aspect cannot co-occur (Watanabe, 2003: 414), meaning a form marked for stative aspect which also bears CV- reduplication will necessarily denote plurality. Further, Urbanczyk's (2005: 232) observation that the diminutive does not occur with the same roots as the imperfective is largely correct. Imperfective reduplication is associated with verbs and the diminutive generally applies to nouns. The motivation for developing different surface forms in ʔayʔaǰuθəm for the same reduplicative process as a method of contrast enhancement is unclear as there are other cues to distinguish the imperfective from the stative plural and the diminutive.

The contrast enhancement analysis only solves the issue of the surface forms and does not address the deeper implications of CV- prefixing for the grammar, as laid out in Section 2. While contrast is important for communication, it is doubtful that enhancement alone is reason to force violations of or demote multiple high-ranked faithfulness and prosodic constraints. Positing that diminutive reduplication is infixation is not only cohesive with the phonological grammar, it also fits with the morphological patterns in the language and with cross-Salish patterns. ʔayʔaǰuθəm has other affixes which are infixed into a root, such as the possessive affix /-hV-/ (Blake, 2000: 269) and a stative marker /-ʔ-/ (Watanabe 2003: 328). It is also pertinent to highlight that [ʔ]-infixation, following a root vowel, has been attested marginally to mark the diminutive in previous literature, though this fourth type of diminutive was only attested in one form (Watanabe 2003: 389). Further, -C_1-reduplication is not only attested elsewhere in Salish, but also is used to mark the diminutive in Shuswap (Bell, 1983). This provides support for the validity of such an analysis in ʔayʔaǰuθəm. Further, Haynes (2007) reanalyzes a type of reduplication, associated with the suffix -mút, in Kwak'wala as prefixing or infixing reduplication of a single consonant.[11] Though it is a Wakashan language, not Salish, Kwak'wala and ʔayʔaǰuθəm are traditionally spoken in neighbouring areas (Blake, 2000: 314). Therefore, proposing infixing reduplication for the diminutive is cohesive with the structure of ʔayʔaǰuθəm while fitting with familial and areal patterns.

5 Conclusion

Diminutive reduplication in ʔayʔaǰuθəm is best characterized as -C_1- infixation. This analysis addresses and resolves several key issues with the previous C_1V-prefixing analyses. It fits with language internal and external influences, appeases threats to well-established universals in phonological grammar, provides a more descriptively intuitive account of how surface forms are derived, and tidily accounts for the differences between diminutive and imperfective reduplication. While there are still open questions regarding the state and vitality of diminutive reduplication in ʔayʔaǰuθəm and the assignment of glottalization, which are crucial to a more complete formal analysis, there is strong evidence to treat diminutive reduplication as -C_1- infixation.

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[11] Though I came across this article after my analysis was complete, it is worth noting that Haynes (2007) identifies similar issues with Kwak'wala reduplication in a BRCT approach and uses them to motivate her reanalysis.

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