Preliminary Remarks on Lushootseed Syncope[1]

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Salish languages can have pervasive unstressed vowel deletion and reduction. For example, in Spokane (Interior Salish) all unstressed root vowels delete unless they are protected by a pharyngeal or laryngeal segment (Carlson 1972). This paper examines unstressed vowel deletion in Lushootseed (Central Coast Salish), focusing on diminutive stems.[2]

(1) Lushootseed Syncope

a	kupi	coffee	kú-kpi	a little coffee
	pišpiš	cat	pi-pšpiš	kitten
	caq'	spear (verb)	cá-cq'	act of spearing big game on the water
b	láq	last, behind	lá-ʔlq-il	a little late
	walis	small green frog	wá-w'lis	Little Frog

Previous works have observed that the post-tonic vowel often syncopates in diminutive stems (Hess 1966 1967; Broselow 1983; Bates 1986; Kirkham 1992), noting that the environment is frequently between voiceless obstruents (1a). However, as the preceding data show, syncope occurs in a voiced environment as well (1b). The goal of this paper is to present evidence that syncope is best explained by having a prohibition on unstressed *a*. Deletion is just one way to avoid an unstressed vowel. This explanation of syncope leaves some unexplained cases, and so a discussion of the exceptional nature of syncope will also be presented.

The paper is organized as follows. Section 1 presents several arguments in favour of analyzing syncope as a prohibition against unstressed *a*. A theme of these arguments is that this prohibition also accounts for other patterns, including vowel reduction and a preference for *a* to be stressed. Section 2 addresses the question of why only *a* is marked when unstressed, proposing that, because it is the most sonorous vowel, it cannot be in a metrically weak position. Because *a* is inherently prominent, it must be a peak, i.e, stressed. Deletion is a way to avoid an unstressed *a*. A discussion of how the irregular stems (those with unstressed /a/ and syncopated /i,u/) may be analyzed is presented in section 3.

§ 1 *unstressed-a

The pattern of syncope in Lushootseed is not entirely regular. Previous work has focused on the segmental environment, observing that it occurs most frequently between voiceless obstruents (Hess 1966; Broselow 1983; Bates 1986). This study focuses on the role that stress plays, claiming that syncope results because unstressed vowels are marked, unstressed *a* in particular. A central finding is that this approach can also account for reduction, as well as a preference for *a* to be stressed.

[1] This paper is an expansion on the analysis of Lushootseed syncope in Urbanczyk (1996a). My thinking on the topic has benefitted by discussions with -- Laura Benua, Susan Blake, Henry Davis, Hamida Demirdache, M. Dale Kinkade, John McCarthy, Lisa Selkirk, Pat Shaw, and Rex Wallace -- who are hereby thanked. This work was supported by a SSHRCC post-doctoral fellowship.

[2] Unless noted otherwise, all data are taken from Bates, Hess & Hilbert's (1994) *Lushootseed Dictionary*. Lushootseed has 37 consonants -- *p p' t t' c c' λ' č č' k k' q q' kʷ kʷ' qʷ qʷ' s šɬ xʷ χ χʷ h ʔ b d dˁ g gʷ l y w* -- schwa, and phonemic length contrast in the vowels -- *i ii a aa u uu*.

1.1 Metrically Weak Position

A central piece of evidence that lack of stress is the necessary environment for syncope is that it occurs with voiceless and voiced segments.

(2) Post-stressed Postion

a	caq'(a)	spear (verb), jab	cácq'	act of spearing big game on salt water
	saXʷ-il	grass, hay	sáʔsXʷ-il	(short) grass, lawn
	pišpiš	cat	pípšpiš	kitten
	kupi	coffee	kúkpi	a little coffee
b	dúkʷibəɬ	Transformer	dúdkʷibəɬ	strange
	wális	type of frog	wáw'lis	Little Frog (wife of *p'ic'ikʷ*)
	laq-il	late	láʔlq-il	be a little late

Because vowels can delete in a voiced environment, the syncope rule must be general enough to include voiceless and voiced environments. The position adopted here is that vowels in metrically weak positions are deleted.

1.2 /a/ Reduction

A second point in favour of analyzing the pattern as a prohibition on unstressed *a* is that syncope in Lushootseed is related to *a*-reduction. Several researchers have observed that unstressed *a* reduces to schwa (Snyder 1968; Hess 1967; Hess and Hilbert 1976; Broselow 1983; Bates 1986). Deletion and reduction are two ways to avoid having an unstressed *a*.

While a detailed investigation of syncope and reduction outside of reduplication is yet to be conducted, so far, only /a/ reduces. An examination of the alternant pronunciations in the *Lushootseed Dictionary* revealed a pattern in which /a/ reduces most frequently. It can syncopate or reduce in post- and pre-stressed position.

(3) Alternant Pronunciations

a	Post-Stress			
sčúsad	sčúsəd			star (established star as in the Dipper)
híqab	híqəb			too, excessively
b	Pre-Stress			
qacágʷ=ac	qəcágʷ=ac	qcágʷ=ac		ironwood, ocean spray, spiraea
Xáλ'=al=ap	Xəλ'=ál=ap			steer a canoe with a paddle held over the stern (like a rudder)

The data in (3a) show an alternation between unstressed *a* and schwa. Those in (3b) show a three way alternation, between unstressed *a*, schwa, and aspiration. (Snyder (1968: 15) observes that in sequences of voiceless plosives, the initial one is aspirated). Reduction is a way to avoid having an unstressed *a*.[3]

1.3 Segmental Conditions for Reduction

The third point in favour of the *unstressed-a approach is that the array of phonotactic conditions on syncope and reduction can be given a uniform explanation. Both are ways to avoid an unstressed *a*. It turns out that syncope and reduction are in complementary distribution. Vowel reduction occurs when the resultant sequence of segments would rise in sonority (*sʔáɬəgʷid* 'little mat'). Syncope occurs in other contexts -- with two voiceless obstruents (*cácq'* 'act of spearing big game on salt water'), a voiced segment followed by a

[3] A further interesting feature is that the root vowel reduces in (3b), and not the affix vowel. These are all lexical suffixes used in the derivational morphology of Lushootseed. They mean *=ac* 'tree, bush [lexical suffix]'; *=al* '[lexical linking element]'; and *=ap* 'bottom, base, buttocks'. Only the last one is found with a reduced alternant.

voiceless one (*dɬidkʷibəɬ* 'strange'), or two voiced consonants (*wáw'lis* 'Little Frog'). All instances of reduction will be cases where syncope is blocked from applying by some phonotactic constraint.

Having noted that syncope and vowel reduction both satisfy a prohibition against unstressed *a*, the segmental environment is significant because one can predict whether syncope or vowel reduction occurs. Syncope occurs when it can (a), but is blocked if the resulting cluster would rise in sonority (b).

(4) Basic Pattern

a	Syncope		[25 stems]
wális	type of frog	wáw'lis	Little Frog
pišpiš	cat	pipšpiš	kitten
b	Reduction		[15 stems (13 with C_2=[+voi])]
s-ɬagʷid	mat, sleeping mat	s-ɬáɬəgʷid	little mat
tábəc	slow up, go slower	tá?təbəc	slowly, softly
sáli?	two	sá?səli?	two small items
s-túləkʷ	river	s-túɬələkʷ	creek

The following stems highlight the fact that in each case the first consonant of the root is a voiceless obstruent, and the second a voiced obstruent or sonorant. Voiced obstruents are historically derived from sonorants (Hess 1967; Thompson 1979), and pattern with /?, l, y, w/ in a number of ways, suggesting that they are more sonorous than the voiceless obstruents. The ill-formed syncopated stems show that the result would be a voiceless obstruent coda followed by a more sonorous onset.

(5) Unattested Syncopated Stems

tá?.tə.bəc	slowly, softly	*tá?t.bəc
s-tú.tə.ləkʷ	creek	*s-tút.ləkʷ
čá.čə.ləs	small hand	*čáč.ləs
s-ɬá?.ɬə.gʷid	small mat	*s-ɬá?ɬ.gʷid

Two observations support the syllabifications above. Roots do not begin with sequences of [-v][+v] segments, and so it is supposed that there are no rising sonority onsets in Lushootseed (Urbanczyk 1996ab). These clusters must be hetero-syllabic. Further evidence for the syllable boundaries comes from an examination of medial triconsonantal clusters, in which glottal stop and /l/ are the two coda consonants that allow the most clustering.[4]

The markedness of hetero-syllabic clusters with rising sonority has been observed to have phonological effects. A number of researchers have observed that the preferred sequence of heterosyllabic consonants is one which falls in sonority (see Hooper 1976; Murray and Venneman 1983; Zec 1988; Lamontagne 1993). Cross-linguistically, codas tend to be more sonorous than onsets. The Syllable Contact Law (SCL), as it has come to be known, has effects in sound change, syllabification, and phonotactic restrictions. In Lushootseed, the SCL is active in blocking syncope from applying. In these cases vowel reduction will satisfy both *unstressed-a and the SCL.

The following forms, while being irregular from the point of view of stress, show a further condition under which syncope is blocked. Syncope does not occur if it would result in identical adjacent consonants.

[4] Evidence in favour of a preference for sonorants in the coda, is that over half the medial triconsonantal clusters began with *l* or *?*. Assuming that there are no complex onsets in Lushootseed (as in Urbanczyk 1996ab), these medial triconsonantal clusters must be syllabified as VCC.CV, with a complex coda. If *l* and glottal stop are sonorants, then the majority of complex codas will have falling sonority.

(6) Reduced Vowel in Reduplicant

gʷad	talk	gʷə-gʷád-əd	reply
kʷ'aɬ-əb	examine	kʷ'ək'ʷáɬ-əb	nearsighted
taləɬ	nephew/niece	tətáləɬ	little nephew, little niece
tadᶻ	dance	tətádᶻəd	what a mother bird does to attract attention away from her babies

Based on an examination of the corpus contained in *The Lushootseed Dictionary* (Bates, Hess & Hilbert 1994), Urbanczyk (1995) argues that Lushootseed lacks geminates. Hess (1967: 7) observes: 'Morpheme sequences which would result in clusters of identical stops show reduction to a single stop.' So the reason that the reduplicant has a reduced vowel (rather than a syncopated one) is that geminates are not allowed in Lushootseed at all. The constraint against adjacent identical elements -- Obligatory Contour Principle (OCP) -- blocks syncope from applying.[5] Reduction of the vowel to schwa serves equally well to obey the constraint against unstressed *a*.

A further interesting feature of these stems is that they all contain the low vowel *a*. None of the DIM stems with stress on the root had the vowel /i/ or /u/. The exceptionality of /a/ again is a point of interest worth further investigation. Why can stress shift to *a*? The final form, *tacF* 'var. *tac* dance' is a loan from English (Bates, Hess & Hilbert 1994: 217) and so suggests some regularity to the pattern.

A final point regarding the constraint against unstressed *a* is that there is statistical evidence showing that, amongst the diminutive stems, *a* will reduce and delete more than *i,u*. (See the Appendix for the results.) Cross-linguistic evidence shows that a language may only reduce *a*. In Cupeño only *a* reduces when unstressed (Crowhurst 1994). Therefore, a ban on unstressed *a* is attested elsewhere.

To summarize, syncope and vowel reduction are driven by a ban on unstressed *a*. While syncope seems to be sensitive to segmental considerations, these are only important in determining whether syncope or vowel reduction occurs. The environments for syncope and reduction are in complementary distribution, as the following chart indicates.

(7)	[-voice]	[+voice]
[-voice]	cácq'	s√ɬáɬəgʷid
[+voice]	lá?lq-il	wáw'lis

§ 1.4 A Preference for Stressed /a/

The constraint against unstressed *a* can also be obeyed by stressing *a*. The regular pattern of stress in Northern Lushootseed is to stress the first full vowel (a&b), else on the first schwa (Hess 1977). first full vowel (4ab), else on the first schwa (4c).

(8)				
	a) čáləs	hand	di?-bid	on the other side of
	b) bədá?	offspring	s√dəxʷiɬ	hunting canoe
	c) jə́səd	foot	də́šəd	put on its side

However, closer examination of vowel quality shows a preference for *a* to be stressed. The regular leftmost stress is over-ridden if the first vowel is high /i, u/ and the second is low. In about half of these stems stress falls on /a/, even though it is non-initial. The following are examples of each vowel melody (high-high, high-low, low high, low-low) and the number of lexical entries found with each stress pattern (initial or peninitial).

[5] The robustness of the OCP as blocker has been observed by McCarthy (1986) where syncope is blocked in a number of languages.

(9) Stress and Vowel Quality:

a	Initial			
	č'ig^{w}-il	impatient - 86	s√Xi?ay	basket design - 43
	s√d'ábid	vegetables - 62	č'áč'as	child - 47
b	Peninitial			
	s√tiqíw	horse - 21	s√X^{w}i?áb	myth - 41
	šayú?	rival - 5	?álád'	babysit - 4

Examining the numerical values of each pattern reveals that only *a* has a clear preference to be stressed when non-initial. Further examination of the shapes of the different roots showed a few correlations (e.g. CVVC roots are always {i, u}-á; *biác* 'meat'). But there are equal numbers of CVCVC roots with initial or peninitial stress. This means that there are some stems for which the pattern is unpredictable.[6]

§ 2 What is *unstressed-a?

The preceding section proposed that the overall pattern in Lushootseed is to ban unstressed *a*. The question to be asked next is why unstressed *a* is marked. The answer is related to the observation that *a* is inherently more sonorous than the high vowels (Lehiste 1970; Kenstowicz 1994). I will draw on two areas of phonological theory: the importance of phonetically grounded constraints, and recent work on the relation between prominence, metrical structure, and segmental markedness. Being inherently sonorous, *a* constitutes a sonority peak, and must be in a metrically strong position. Therefore, it is marked to have the more prominent vowel in a metrically weak position.

The first point to establish is that *a* is inherently more sonorous than the high vowels. In Lehiste's (1970) discussion of the intrinsic duration of vowels, she cites acoustic evidence from English, German, Danish, Swedish, Thai, Lappish, and Spanish that, all things being equal, low vowels have greater duration than high vowels. The following quote is illustrative:

> It is quite probable that the differences in vowel length according to degree of opening are physiologically conditioned and thus constitute a phonetic universal. The greater length of low vowels is due to the greater extent of the articulatory movements involved in their production. (Lehiste 1970: 18-19)

What this means is that a property of the production of the low vowel is that it is longer than high vowels. Greater duration is an intrinsic feature of low vowels in the languages examined so far.

An acoustic study is being planned to compare the length of stressed *a* vs. stressed *i,u* in Lushootseed. Snyder (1968: 5) observes about the low vowel: 'As in the case of the high vowels, this phoneme is usually longer when stressed than when unstressed.' Both sets of vowels are longer when stressed, so it is expected that *a* will have a greater duration than the high vowels.

Having looked at the inherent prominence of *a*, we will now look at the role prominence plays in explaining syncope in Lushootseed. The central proposal is that being inherently prominent *a* must constitute a prominence peak. The preference for prominence and vowel length is well founded in examining stress systems. In order to ensure that *a* is a prominence peak, I propose the following principle.

(10) Prominence-Peak Principle (PPP)
If α is prominent, then α is a peak
prominent ∈ {[low], [son], [vocalic], ...}

This constraint ensures that a feature which is identified as prominent in a language, will be associated with a peak. The PPP is similar to proposals about the relation between prominence and peaks (Prince 1990; Hayes 1995), as well as the licensing of features in stressed syllables (Steriade 1994; Selkirk 1994).

[6] A second interesting feature of the {i, u}-a stems is that the unstressed *i,u* do not reduce.

The most similar constraint to PPP is the Weight-to-Stress Principle (Prince 1990), which states, if a syllable is heavy, then it is stressed. This means that if long vowels are prominent in a language then they will be stressed. The coincidence of long vowels and stress is found in the Upriver dialect of Halkomalem where long vowels are always stressed. Galloway (1993: 330) describes stress with diminutive reduplication as follows: 'The vowel in the reduplication gives up its stress only to a root or suffix vowel which is lengthened.' The regular initial stress is as in (a), and the stress on a long vowel is shown in (b).

(11) Weight-to-Stress in Upriver Halkomalem Diminutives (Galloway 1993: 331)

a	p'əq'	white	p'i-p'əq'	a little white, whitish
	qəl	be bad	qi-qəl	be naughty
	yəlɛ́w	after	yi-yəlɛw	a little later
b	t'ɛ́:yəq'	be angry	ti-t'ɛ́:yəq'	be cranky
	ɬi:m	picking (fruit, leaves)	ti-ɬi:m	picking a little bit

§ 3 Analysis of Irregular Stems

The first point to make about having irregularities to contend with is that this situation is not unusual for syncope. Syncope can be irregular because of lexical diffusion (Latin). It is also a lexical rule, because it may only co-occur with somes specified affix(es). It may also be blocked from applying. There may be a reason why some vowels retain their full vowel status. Before any of these options can be explored, the first question that must be answered is what the productive rule is. The irregularities result because some stems have been affected by a rule, and others havent. If the productive rule is to ban unstressed *a*, then we must explain why *a* can be unstressed in some stems, and why *i,u* syncopate with the diminutives examined.

There were a handful of stems which seem to have syncopated and non-syncopated forms. Comparison of the meanings of these stems shows that the words with the isolatable diminutive meaning have syncope of *a* and retention of *u*.

(12) Syncope and Non-Syncope

pastəd	white person (from *Boston*)	pápstəd	white child, white friend
		pápastəd	derogatory term for white man
s-tubš	man, male	s-tútubš	boy
		s-tú?təbš	single man (among many women)

This seems to indicate that the productive rule is for *a* to delete. (The last form may be CV- counting people reduplication.)

To account for the failure of *a* to reduce, I would like to suggest that, like Latin, syncope occurs as an instance of lexical diffusion. So, syncope began in one part of the lexicon, and is moving its way in to the rest. This lexical diffusion approach means that there is one component of the lexicon in which syncope occurs (more recently) and an older portion of the lexicon in which syncope has not occured.

A point in favour of having a distinction in the lexicon is that the same segmental environments are found when syncope occurs and when syncope fails. That is to say, unstressed *a* is found in the same environment as syncopated and reduced *a*. We find *a* between voiceless consonants as well as in the rising sonority context.

(13) a) Syncope Environment

Xaλ'-il		X<u>á</u>Xaλ-il	
λac'=ap-əb		λ'<u>á</u>λac'=ap-əd	

b) Reduction Environment

talə	dollar	<u>tá</u>ʔtalə	small amount of money[7]
č'ag^{w}-is	become irritated	<u>č'á</u>č'ag^{w}-is	become irritated

There seems to be a set that syncopates and a set that does not. This observation is interesting also because the segmental approach would have to make the same claim. The ones that fail to undergo the rules are exceptions.

In order to explain why *i,u* syncopate with some diminutive stems, I would like to suggest that a syncope rule, specific to diminutive may be developing. Syncope can be sensitive to a particular affix. For example, in the Arawakan language Piro, syncope only occurs with a certain class of suffixes (Matteson 1965; Kenstowicz and Kisseberth 1979; Lin 1987, 1992). The following loans are suggestive that a productive part of the language is to syncopate the post-tonic (root) vowel with diminutive reduplication.

(14)

pišpiš	cat	<u>pípš</u>piš	kitten
kupi	coffee	<u>kú</u>kpi	a little coffee

The interesting feature of syncope here, is that elsewhere in the language *i,u* do not reduce. Therefore, the loss of these vowels in DIM stems may be the result of associating syncope with the diminutive affix.

In support of this idea, I would like to note that syncope of the post-tonic (root) vowel accompanies diminutive reduplication in both Mainland Comox (Davis 1970; Blake 1992; Watanabe 1994) and St'at'imcets (van Eijk 1984). As far as I know, diminutive reduplication is the only productive place for syncope in Mainland Comox.

(15) Sliammon (Watanabe 1994: 49)

supayu	ax	<u>su</u>-spayu	small ax
t'uɬaɬ	bed	t'<u>u</u>-tɬaɬ	small bed

While van Eijk (1984) analyzes diminutive reduplication as a consonantal suffix, re-analyzing it as prefixing CV-reduplication with concomitant syncope will make it structurally more similar to diminutives in other Salish languages.

(16) St'at'imcets (van Eijk 1984: 69)

cilkst	five	<u>cə</u>-cl'əkst	five animals
sqlaw'	beaver	sq-<u>lə</u>-ləw'	little beaver
Xzum	big	X-<u>zə</u>-zəm'	a little bigger

In support of the idea that syncope is a morpho-phonological rule which accompanies reduplication, van Eijk (1984: 37) observes that (while in general unstressed vowels do not reduce or delete) some roots can drop the full vowel entirely before certain suffixes. So some affixes trigger syncope anyways in St'at'imcets.

A further point regarding cases where *a* is retained is that there may be some effects of how prosodic structure is built on morphologically complex words. The following set of stems with a shared root vowels show all three degrees of reduction.

(17) Morphological Complications

a) X^{w}aq^{w}	troubled, preoccupied, worry; bother; busy
X^{w}<u>á</u>X^{w}aq^{w}	worrying
X^{w}<u>á</u>X^{w}əq^{w}-bi-d	be worried about someone
X^{w}<u>á</u>X^{w}q^{w}-bi-t-əb	be a bother to someone
X^{w}<u>á</u>ʔX^{w}q^{w}-əd	pay attention to someone

[7] This form is also listed with an alternant pronunciation with a reduced *a*: *táʔələ*.

Closer examination of morphologically related words may shed light on the problem. The following forms may also shed light on what the productive pattern is.

(18)

λ'iq	emerge, take something out;	
	<u>λ'í</u>λ'q	surface now and again
	<u>λ'í</u>λ'iq^{w}=us	pimples (cf. *λ'iq^{w} -ns* 'stick face out (the window)')
šuk^{w}	powder	
	<u>šú</u>šk^{w}il-d	make something a little gray (cf. *šuk^{w}'il-d* 'make something gray')
	<u>šú</u>ʔšuk^{w}	unidentified blue berry

§ 4 Summary

Analyzing syncope as resulting from a constraint banning unstressed /a/ is promising because syncope and reduction are related. A wider set of data are explained than if syncope were sensitive to consonantal environment (i.e. those with voiced consonants would not be explained).

Appendix:

Statistical evidence from Urbanczyk (1996a) shows that *a* reduces or deletes more frequently than *i, u*. This is significant because it means that *a* reduces and deletes more than the high vowels. It also shows that the high vowel can remain unstressed. The following charts sort diminutive stems by vowel quality and degree of reduction (syncope-- reduced-- no reduction).

In each cell, the actual number is given first, the expected number second. The expected number for a cell in row$_i$ and column$_j$ is the product of the total number of occurrences for row$_i$ & column$_j$, divided by grand total. Expected Value: $\frac{\text{row}_i * \text{column}_j}{\text{grand total}}$

(19) Actual and Expected Numbers

	Syncope	Reduce-V	Full-V
/i/	13 / 13.3	9 / 8.5	26 / 17.7
/u/	9 / 8.9	5 / 5.7	18 / 11.7
/a/	25 / 16.4	16 / 10.5	18 / 21.6

Shading indicates that syncope and vowel reduction occur more than expected with *a* and less than expected with *i,u*.[8] A chi-squared test shows that vowel quality is statistically significant in determining vowel reduction/syncope. It was significant at $p < 0.05$ for syncope of *a* and retention of unstressed *i*. The significance for *a*-reduction and *u*- retentioan was at $p < 0.1$.

(20) Chi-Square of Unstressed Vowel following DIM

	Syncope	Reduce-V	Full-V
high: /i/	--	--	3.89
/u/	--	--	3.39
low: /a/	4.51	2.88	--

[8] One caveat is warranted here. With one exception, these figures represent the raw data. The form *ǻiǻaləs* 'small hand' is recorded as *ǻičələs* in every source except the *Lushootseed Dictionary*. I have treated it as a reduced stem.

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