Stress in Northern Lushootseed — A Preliminary Analysis

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1. INTRODUCTION

With the exception of Demers and Horn's (1978), and Davis's (1984) work on Squamish, the systems of stress assignment in Coast Salish languages have not been studied extensively. In contrast, Interior Salish languages have been the subjects of a number of comprehensive analyses by researchers such as Bates and Carlson (1989) and Czaykowska-Higgins (1993). In this paper I will present a preliminary analysis of stress in Lushootseed, which is the name of both the language and of the people of the Coast Salish group who speak it. Today the language is in a moribund state, with fewer than ten reasonably fluent speakers. Once the primary language of the indigenous people centred around the Seattle area of Washington state, Lushootseed can be divided into at least two dialectal areas, Northern and Southern. According to Hess (1977), it is primarily the phonological differences of stress placement and dissimilation which distinguish the two branches. Hess (1994) has been studying the language for some thirty years and all of my data is drawn from Bates, Hess, and Hilbert's 1994 Lushootseed Dictionary.

This study focusses on the stress system of the Northern dialect. Hess (1977:404) writes that the major stress in Northern Lushootseed words occurs on the first non-schwa of a stem, or, if all the vowels are schwas, on the first schwa. Hess also mentions that there seems to be a "sub-classs of lexical suffixes which receive primary stress regardless of preceding vowels." Yet, as we see in (1), there is significant variation in the placement of stress in Lushootseed and it can occur in every available (stressable) position. The indication is that while Lushootseed's stress placement may represent a simpler process than occurs in the Interior branch, it is also considerably more complex than previous assumptions made about Coast Salish languages. From my data it appears that stress assignment in Lushootseed is not predictable in about ten to fifteen percent of cases.

Like other Salish languages, Lushootseed can be characterized as polysynthetic, with the root (which I signal with ✓) being the only obligatory element in a word. Roots may be affixed to indicate a variety of grammatical and semantic properties. In this paper I use = to differentiate the category of lexical suffixes from other suffixes and prefixes.[1]

(1) a. CəCV́CCC
gʷədíltxʷ
✓gʷəd -íl -txʷ
✓down -reach a state of being -caus.
marry (literally, cause to sit down)

[1]The following abbreviations are used in this paper: caus=causative, lx lnk=lexical linking element, nom=nominative, ord=derivational ordinal suffix, perf=perfect, pref=prefix, trans=transitive marker.

b. CV́CVCVCVC
x̌'álalic'a?
✓x̌'al =al =ic'a?
✓put on clothing =lx lnk =clothe, wear
clothes

c. CVCCVCV́C
q'iq'x̣ʷu?áp
✓q'iq'x̣ʷu? =ap
✓short person =bottom, base, buttocks
short-bottomed person

d. CCV́CəCVCV
stáləhali
s ✓talə =(h)ali
nom. ✓money =place where something is kept
purse

e. CəCV́CVC
x̣ələ́bac
✓x̣ələbac
hollow cedar tree

f. Cə́CəC
x̣ə́kʷəd
✓x̣əkʷəd
roasting stick (for salmon)

In (1a) and (1c) stress falls on the rightmost (final) stressable element. In (1a) this syllable is a suffix following a CəC root. In (1c) the stressed segment is a lexical suffix following a CVCCVC root. In constrast, stress in (1b), (1d), and (1f) is placed on the leftmost (initial) stressable element. (1b) consists of a CVC root plus two lexical suffixes, while (1d) is a CVCə root with a single lexical suffix, and (1f) is an independent root with the shape CəCəC. A third pattern is displayed in (1e), an unaffixed root which has the shape CəCVCVC. In this example stress appears in the medial position of three possible sites.

To account for the variety of stress assignment in (1) it will be necessary to examine both roots and their affixes in order to isolate and classify their stress properties. Following Halle and Vergnaud (1987a,b), I will provide evidence which demonstrates the existence of at least two classes of roots and two categories of suffixal morphemes. These will be shown to be characterized by the morphological attributes of stress erasure, extrametricality, and possibly, inherent lexical accent. Although I employ Halle and Vergnaud's (1987a,b) metrical theory for descriptive purposes, the basic stress patterns hold regardless of which theory one uses.

Specifically, the resultant analysis will first recognize that a classification of strong versus weak roots is justified by the inability of weak roots to carry stress. Then I will show how suffixes can be distinguished as recessive or dominant according to the ability of the dominant suffixes to trigger stress erasure. As a result, cyclic reapplication of rules governing stress assignment is possible. The concept of extrametricality is employed to explain another property of dominant suffixes, which permits them to attract stress away from a predicted site onto themselves. Finally, I will provide evidence that there may exist a small group of lexically accented words which bear idiosyncratic stress, impervious to the rules.

Like Czaykowska-Higgins'(1993) important analysis of the stress system of Moses-Columbian, an

Interior Salish language, I will postulate two rules of stress assignment in this investigation. One will be shown to govern foot construction and the location of the heads of these constituent structures, and the other, word stress. My analysis of the placement of stress in Lushootseed will be a demonstration of the interaction of its morphological features with these two rules.

Lushootseed's phonology and morphology are recognizably Salish and I provide a summary of their characteristics in Section 2. In Section 3 I will present the main body of this work, including the data and its analysis; and in Section 4, a brief conclusion.

2. PHONOLOGY and MORPHOLOGY

Lushootseed is like other Salish languages in that it has a large and complex consonantal phonemic inventory, while the vowel inventory is simple.

(2) a. **Vowels**

i		u
	ə	
	a	

b. **Consonants**

	labial	coronal	velar	uvular	glottal
stops &	p	t c č	k kʼ kʷ kʼʷ	q qʼ qʷ qʼʷ	ʔ
	pʼ	tʼ cʼ čʼ			
	b	d dʲ	g gʷ		
affricates		čʼ λʼ ǰ λʼ			
fricative		s š ł	x xʷ χ χʷ		h
resonant	m	n	l		
		y	w		

In Lushootseed words are characteristically built upon a (potentially) free-standing root in combination with one or more of a variety of affixes, both grammatical and lexical. As well as inflectional and derivational affixes, the language also possesses lexical suffixes common to Salish. All these forms concatenate in complex strings.

Lushootseed makes extensive use of reduplication but for the purposes of this paper I do not examine that data. Nor do I consider secondary stress at this time. Prefixes do not receive primary stress but I will later cite examples which provide evidence that they can affect its placement. Insertion of epenthetic schwas is the only other phonological process relevant to this discussion.

3. DATA and DISCUSSION

Halle and Vergnaud's (1987a,b) metrical framework assumes that a morphological hierarchy of stress prominence can be represented on a grid. The bottom line (0) of the grid is marked with an asterisk for each stressable element in the word, and constituent structures (bracketed) are erected upon them. Above, on line 1 (also called the foot level), the head of a constituent is selected according to a foot rule. A third (word) level, line 2, can be employed to situate the head of a constituent formed from the feet on

line 1. A further assumption of this theory is that prominence and metrical structure are not entirely co-dependent. Thus, additional specifications are allowed to precede regular stress assignment rules. The three parameters that govern constituent structures refer to whether heads are terminal [HT], binary or ternary [BND], and (R)ight or (L)eft.

3.1 Leftward Stress Placement

There is one primary stress per word in Lushootseed and, as Hess (1977) reports, it is assigned to the majority of the words in the Lushootseed lexicon in a regular and obvious pattern. The examples in (3) and (4) demonstrate typical leftward stress placement for monomorphemic words which have the shape CVCVC or CəCəC.

(3) CáCəC

a. χágʷəd
s ✓χəgʷəd
nom. ✓blackberry

b. ✓xʷáltəb
whiteman

c. ✓pʼáčəb
bobcat

d. ✓čábəqəb
Chemakum (place name)

e. ✓báləwəb
boiling, bubbling up

(4) CV́CVC

a. ✓ʔítut
sleep

b. ✓qʷíʔad
yell

c. ✓dádatut
morning

d. ✓kʼádayuʔ
rat

e. ✓sáʔagiχ
cat bird

In the examples of roots in (3) and (4), stress always falls on the first syllable, indicating the existence of a rule that creates left-headed unbounded feet, resulting in assignment of stress to the leftmost syllable.

(5) *Lushootseed Foot Rule* (LFR)

a. line 0 parameter settings are [+HT, -BND, L]
b. construct line 0 constituents
c. locate heads of line 0 constituents on line 1

The rule, as applied to (4d) is represented in (6).

(6) LFR

```
line 1        *.
line 0        (* * *)
              k'ádayu?
              rat
```

The proposed foot rule accounts for the placement of stress only in the examples in (4) which contain full vowels. The facts in the examples containing schwas (3) are later seen to be the result of a word-stress rule (9) which also selects heads in a leftmost position. The application of the word-stress rule is vacuous in the instance of the monomorphemic forms in (4).

3.2 Strong versus Weak Roots

In this section we will examine two sets of polymorphemic forms, one of which does not bear leftmost sress. The data in (7) and (8) illustrates the two stress patterns which occur when different types of roots are concatenated with the same suffixes. Additionally, the roots in (7a) and (7d) are repeated with a different suffix in (8a) and (8d).

(7)	a.	✓ʔáb *✓reach* reach with hands	=ači? *=hand*	(8)	a.	✓ʔáb *✓reach* go back and forth	=g^{w}as *=pair*
	b.	✓lúp ? glove, mitten	=ači? *=hand*		b.	✓húy *✓make* be married	=g^{w}as *=pair*
	c.	✓sáli? *✓two* twenty	=ači? *=hand*		c.	✓díɬ *✓the one who* ?	=g^{w}as *=pair*
	d.	✓yəl *✓both* both hands	=áči? *=hand*		d.	✓yəl *✓both* both sides	=g^{w}ás *=pair*
	e.	✓d^{z}əh *✓right* right hand	=áči? *=hand*		e.	✓t'əq^{w} *✓snaps in two* it came apart	=g^{w}ás *=pair*
	f.	✓q^{w}əbx^{w} knuckle (?)	=áči? *=hand*		f.	✓x̣əx̣' *✓bite something* come together	=g^{w}ás *=pair*

In the a, b, and c sets of (7) and (8) stress is assigned as far to the left as possible, as we would expect. These examples contrast with the d, e, and f sets which are not stressed on the root, but rather, to right, on the suffix. This apparent contradiction can be explained simply if we distinguish two classes of roots which affect the application of the LFR differently. The difference between the two types of roots is clearly reflected in their phonetic shapes: both a, b, and c sets contain full, non-reduced vowels and the d, e, and f sets, only schwas. We can define strong roots as those with the shape CVCX, which attract stress to the expected leftmost position of a word. Those roots of the shape CəCX are the weak roots and do not appear to bear stress when combined with a suffix.

The motivation for this analysis lies in the assumption that the schwas of CəC roots are not present in their underlying representations but are the result of an epenthesis rule (VINS). Kinkade (to appear a,b) and others also assumed that schwas are not underlying in Salish languages. Czaykowska-Higgins (1993), for instance, argues for this hypothesis in Moses Columbian (Cm):

> ...The principal difference between strong and weak roots in Cm lies in their underlying representations: strong roots have [i], [u], or [a] vowels which in Cm are unpredictable and therefore underlying, while weak roots have a surface [ə], which in Cm is predictable and epenthetic. As a consequence of this underlying difference, strong roots are always stressed on the first cycle, whereas weak roots are not.

If schwa is a member of the phonemic inventory of Lushootseed, I assume that its distribution is limited to affixes and a few classes of morphemes such as the independent pronouns, čəd 'I' and čəl 'you'. Therefore, given the analyses of other Salish languages, I assume that schwas in Lushootseed are epenthetic and not underlying. At this time I propose no further generalization regarding the predictability of epenthesis sites for Lushootseed.

Since weak roots contain no underlying vowels, they have no potentially stressable elements upon which the LFR can act. The placement of stress must, therefore, be achieved via the second rule integral to this analysis, a word stress rule which is ordered "after" epenthesis. Further motivation for the existence of this rule is forthcoming (when later derivations construc two unbounded feet on line 1 as the result of two applications of the LFR). Like the foot rule, the word stress rule also assigns leftmost stress.

(9) *Lushootseed Word Rule* (LWR)

a. line 1 parameter settings are [+HT, -BND, L]
b. construct constituent boundaries on line 1
c. locate the heads of line 1 constituents on line 2

The derivation in (10) demonstrates application of the word rule to yield stress on the first schwa of monomorphemic weak roots in Lushootseed.

(10)

```
                    CáCəCəC
                    báləwəb          boiling
Cycle 1             blwb
LFR                 n/a              (no stressable elements)
noncyclic
VINS                ə ə ə
LWR
      line 2  *
      line 1  . . .          (no foot - LFR has not applied)
      line 0  (* * *)
```

The epenthesis rule VINS must be ordered after the application of the LFR and before the LWR in order to constrain the assignment of stress to a reduced segment.

Now we turn to examples of derivations of both strong and weak roots with suffixes. We can assume that the LFR applies cyclically to ensure that it does apply at least once to strong roots before applying to the suffixes, which for now I will label as R. However, in Lushootseed this assumption is not crucial since, in any case, the root would receive stress because of the leftward placement predicted by the LFR. The LWR applies only vacuously in (12).

(11)	a.			b.			
		Stŕt - R			Stŕt - R - R		
		✓qáh	=ig^{w}s		✓tág^{w}	=us	=ab
		✓much	*=possessions*		*✓hunger*	*=face*	*=method*
	Cycle 1	✓qah			✓tag^{w}		
	LFR						
	line 1	*			*		
	line 0	(*)			(*)		
	Cycle 2		=ig^{w}s			=us	
	LFR						
	line 1	*	*		*	*	
	line 0	(*)	(*)		(*)	(*)	
	Cycle 3						=ab
	LFR						
	line 1				*	*	*
	line 0				(*)	(*)	(*)
	noncyclic						
	LWR						
	line 2	*			*		
	line 1	(*	*)		(*	*	*)
	Other rules						
		[qáhig^{w}s]			[tág^{w}usəb]		
		many things			put face in water to drink		

Presumably the [ə] which surfaces from the suffix =ab in (11b) is the result of vowel reduction in an unstressed environment, a process common in Salish languages.

(12)	a.			b.			
		WkRt - Ŕ			WkRt - Ŕ - R		
		✓q̓əp	=sád		✓səl	=ús	=qid
		✓gathers	*=leg and foot*		*✓drape over*	*=upper part*	*=head*
	Cycle 1	✓q̓p			✓sl		
	LFR	n/a			n/a		
	Cycle 2		=sad			=us	
	LFR						
	line 1		*			*	
	line 0		(*)			(*)	
	Cycle 3						=qid
	LFR						
	line 1					*	*
	line 0					(*)	(*)
	noncyclic						
	VINS	ə			ə		

LWR	(vacuous)		
line 2	*		*
line 1	(*)		(* *)
	[q̓əpsád]		[səlúsqid]
	cramp on the leg		cooked fish heads

We see how the LWR applies only vacuously to (12a), a word containing a weak root and only one suffix. The root possesses no stressable element over which to construct a foot in the first cycle and so the suffix is stressed by default. The LWR is necessary however, in order to complete the derivations of the examples of strong roots (11), and weak roots which have more than one suffix (12b). In these cases more than one foot is constructed on line 1. It is also apparent from the (b) examples that the addition of more suffixes does not affect the placement of stress at all. Thus, in (11) and (12), using two simple rules to govern foot and word stress assignment, we have accounted for the distinction between CVC (strong) and CəC (weak) roots. The classification of strong and weak roots has been illustrated by the addition of suffixes belonging to the R class. Note that if VINS occurred before the LFR in any cycle, stress would incorrectly fall on the schwa since it would be the leftmost stressable element in the word.

In Section 3.4 below I introduce a second class of Lushootseed suffixes, and we will observe how the rules apply to them as they interact with each of the two root types. Czaykowska-Higgins (1993) cites the presence of recessive and dominant morphemes in Cm and notes that the stress system of this language is typologically very similar to Indo-European morphological stress systems. It will become clear that the suffixes of Lushootseed can also be so categorized.

3.3 Cyclicity and Stress Erasure

As we saw in derivations above, the notion of the cycle is necessary to ensure stress on the strong roots. Within Halle and Vergnaud's (1987a,b) metrical framework, the essential distinction between recessive (R) and dominant (D) morphemes is the ability of the (D) suffixes to trigger cyclic application of particular stress rules. By their account non-cyclic (recessive) items cannot affect previous stress assignment by attracting it to themselves. The addition of a dominant suffix, however creates a domain for cyclic stress rules to reapply. Included in this theory is the assumption that a convention exists which first erases previously assigned stress so that new feet are constructed over the entire word. By this Stress Erasure Convention (SEC), stress deletion (STRDEL) occurs only upon affixation of a dominant morpheme and precedes all other rule applications.

Clearly, the derivations in Section 3.2 depart from Halle and Vergnaud (1987a,b) to the extent that, in Lushootseed, both recessive and dominant suffixes are assumed to trigger cyclicity. The reason for this assumption is that my data does not show that R suffixes must be noncyclic, only that they can be. For example, if we reanalyze the R suffixes of (11b) and (12b) as noncyclic, we achieve the same stress results as demonstrated in (13).

(13)	a.				b.		
		Stŕt - R - R			WkRt - Ŕ - R		
		✓tág^{w}	=us	=ab	✓səl	=ús	=qid
		✓hunger	*=face*	*=method*	*✓drape over*	*=upper part*	*=head*
	Cycle 1	✓tag^{w}			✓sl		
	LFR				n/a		
	line 1	*					
	line 0	(*)					
	noncyclic		=us	=ab		=us	=qid

LFR						
line 1	*	*			*	
line 0	(*)	(*	*)		(*	*)
VINS				ə		
LWR						(vacuous)
line 2		*				
line 1		(*	*)			
Other rules						
	[tág^{w}usəb]			[səlúsqid]		
	put face in water to drink			cooked fish heads		

Other researchers, such as Melvold (1987) have also argued that although the SEC predicts that R suffixes must be noncyclic, in fact, cyclicity and stress erasure may be independent. I will demonstrate that the differences between D and R suffixes do not need to involve differences in cyclicity but instead are strictly those of stress erasure and extrametricality.

Note that in (13b) the vacuous application of the LWR is identical to that of (12a) because when the R suffixes are treated as noncyclic they act as a single unit.

*

3.4 Recessive versus Dominant Suffixes

To demonstrate the distinctive properties of the two classes of suffixes it is necessary to look at examples of each with the same strong root. The data shows that D or R suffixes will (almost) always be assigned stress when affixed to weak roots. In the weak root cases the roots, having no full vowels, are skipped over and stress falls predictably on the first suffix to the right. Stress assignment to first (leftmost) available position is illustrated in (14).

(14)

	WkRt - Ŕ - (-R)		
a.	✓bək^{w} -íl		
	✓all -achieve		
	all finished		
b.	✓dəx̣	=ál	=ačiʔ
	✓place where	*=lex lnk*	*=hand*
	space between fingers		

However, when we look at data involving strong roots, we see a departure in some cases from the usual leftward placement. When we compare the stress assignment in (15) and (16), which both contain CVC roots, another pattern emerges. It appears that the D suffixes possess properties not characteristic of the R class: D suffixes are stressed even when affixed to strong roots.

(15)

	StŔt - R		
a.	✓ləlíʔ	=ucid	
	✓different	*=language*	
	foreign language		
b.	✓pix^{w}(i)	=alik	
	✓shakedown	*=creative activity*	
	fell by knocking down		

(16)

	StRt - D́ (-R)		
a.	✓ləliʔ	=ák^{w}	=bix^{w}
	✓different	*=group*	*=cluster*
	foreigners		
b.	✓pix^{w}	=áp	
	✓brush off	*=bottom*	
	brush off bottom		

c.	✓líl	=axad		c.	✓lil	=áy	=ucid
	✓far	*=edge*			*✓far*	*=lex lnk*	*=mouth*
	far off				disagree		
d.	✓q^{w}ú?	=šəd		d.	✓q^{w}u?	=údaq	
	✓unite	*=leg and foot*			*✓unite*	*=friend*	
	close relatives				close friend		
e.	✓č́it	=abac		e.	✓č́it	=áləp	
	✓near	=enclosed area			✓near	=leg	
	near side				at the foot of		

I suggest that the different patterns seen in the data above can be attibuted to the fact that the stressed suffixes in (16) are dominant, and that this class is, in some way, able to attract stress away from the predicted leftmost full vowel in the root.

3.5 Extrametricality

Now, with some evidence to motivate a distinction between the classes of R and D suffixes, I claim that this difference lies in a property of the dominant morphemes that allows stress to skip over a strong root and be assigned on the suffix. Extrametricality is the second diacritic property necessary to this analysis, after stress erasure (dominance). Liberman and Prince (1977:293) first employ the concept of an *extrametrical* syllable: "it simply does not take part in the metrical calculation induced by the ESR." (English Stress Rule). In later literature extrametricality is cited as a feature which possesses a property characterized by a constituent's ability to render another element invisible to ordinary stress assignment rules. The concept is a powerful one and may seem arbitrary but it has been discussed and acknowledged by such researchers as Hayes (1982), Archangeli (1984) and Halle and Vergnaud (1987b). However, extrametricality is constrained in two ways: the item rendered extrametrical must be in an edgemost position in the word, and it must be adjacent to the extrametricality assigning morpheme. In Czaykowska-Higgins' (1993) analysis of Cm a subset of strong and weak roots is lexically marked to enable them to assign extrametricality to a suffix to their immediate right. In Lushootseed extrametricality assignment is a property of a classs of suffixes rather than roots, and assignment is to the left onto the word's root. Extrametricality is formalized in (17).

(17) Extrametricality Assignment

line 1 < * >

Root - Dominant Suffix →<Root> - Dominant Suffix

'< >' = extrametricality

In (18) weak roots cannot receive stress because they contain no stressable elements in the cyclic portion of the derivation. Therefore, extrametricality assignment is vacuous.

(18)

	a.	WkRt - D́		b.	WkRt - D́ - R		
		✓g^{w}əd	=áp		✓k^{w}əd	=áy	=aciʔ
		✓down	*=bottom*		*✓get hold*	*=lex lnk*	*=hand*
Cycle 1		✓g^{w}d			✓k^{w}d		
LFR		n/a			n/a		
Cycle 2			=ap			=ay	
STRDEL		n/a			n/a		

EM	n/a	n/a		
LFR				
line 1	*	*		
line 0	(*)	(*)		
Cycle 3			=aciʔ	
LFR				
line 1		*	*	
line 0		(*)	(*	*)
noncyclic				
VINS	ə	ə		
LWR	(vacuous)			
line 2		*		
line 1		(*	*)	
	[gʷədáp]	[kʷədáyaciʔ]		
	down on the bottom	give a hand, help		

The application of extrametricality with strong roots is shown in the derivation in (19).

(19)

	StRt - D́	
	✓pixʷ	=áp
	✓*brush off*	=*bottom*
Cycle 1	✓pixʷ	
LFR		
line 1	*	
line 0	(*)	
Cycle 2		=ap
STRDEL		
EM	< >	
LFR		
line 1		*
line 0	<*>	(*)
LWR	(vacuous)	
	[pixʷáp]	
	brush off bottom	

We see that according to the SEC, the addition of the dominant suffix =*ap* triggers deletion of the previous stress assigned to the root in the first cycle. The suffix also assigns extrametricality to the root so that the LFR can no longer apply to that morpheme. The affixation of subsequent R suffixes does not affect this pattern and the LWR applies as shown in (20). Since stress deletion is not triggered by R suffixes, the stress remains on the D suffix. I have suppressed the epenthesis of [ə] in (20a).

(20)

	a.	b.
	StRt - D́ - R	StRt - D́ - R - R -R
	✓ləliʔ =ákʷ =bixʷ	✓ʔay' =wáʔs=al =ic'aʔ =əb
	✓*foreign=group =cluster*	✓*change =pair=lex lnk=clothe =be involved in doing*
Cycle 1	✓ləliʔ	✓ʔay'
LFR		
line 1	*	*
line 0	(*)	(*)

Cycle 2	=akʷ			=waʔs				
STRDEL								
EM	< >			< >				
LFR								
line 1	*			*				
line 0	<*>	(*)		<*>	(*)			
Cycle 3			=bixʷ			=al		
LFR								
line 1		*	*		*	*		
line 0	<*>	(*)	(*)	<*>	(*)	(*)		
Cycle 4							=ic'aʔ	
LFR								
line 1					*	*	*	
line 0				<*>	(*)	(*)	(*)	
Cycle 5								=əb
LFR								
line 1					*	*	*	*
line 0				<*>	(*)	(*)	(*)	(*)
LWR								
line 2		*			*			
line 1		(*	*)		(*	*	*	*)
	[ləliʔákʷbixʷ]			[ʔay'wáʔsalic'aʔəb]				
	foreigners			change clothes				

The examples in (21) show patterns of a strong root with two suffixes, in which a D suffix is in the rightmost position. These patterns are hypothetical since I have found no data to illustrate them, but they do seem possible and therefore, I propose the following predicted sites for placement of stress.

(21) a. StRt - D_1 -D_2
b. StRt - R - D

In (21a) I would predict that D_2 would trigger stress erasure on D_1, but that extrametricality assigned to the root by D_1 would remain intact. Therefore, stress would fall on D_1. The example in (21b) shows a R suffix adjacent to the root. Since R suffixes are unable to assign extrametricality, and the D suffix is not in position to do so, I would expect stress to remain on the root. Derivations for these patterns follow in (22).

(22)

	a.	b.
	StRt - D́$_1$ - D_2	Ś́tRt - R - D
Cycle 1	StRt	StRt
LFR		
line 1	*	*
line 0	(*)	(*)
Cycle 2	-D_1	-R
STRDEL		n/a
EM	< >	n/a
LFR		
line 1	*	* *
line 0	<*> (*)	(*) (*)
Cycle 3	-D_2	-D

STRDEL						
EM	n/a			n/a		
LFR						
line 1		*		*	*	*
line 0	<*>	(*	*)	(*)	(*)	(*)
LWR	(vacuous)					
line 2				*		
line 1				(*	*	*)

3.6 Roots with Prefixes

When we look at roots which bear prefixes as well as suffixes, we find further motivation for the feature of extrametricality in Lushootseed. It appears that although prefixes never carry stress themselves, they do play a role in stress assignment when affixed to strong roots which have a D suffix. Compare, for instance the data in (23) and (24). The D suffixes have been predictably stressed in (23) because of extrametricality. However, when roots carry prefixes, as in (24), they attract stress in the usual leftward direction.

(23)

	StRt - D́		StRt - D́		StRt - D́
a.	✓qah -áɬ	b.	✓ɬix^{w} =úlč	c.	✓pix^{w} -áp
	✓much -ord		*✓three =container*		*✓brush -bottom*
	many times		three containers		brush off bottom
	✓buus -áɬ		✓sil =úlč		
	✓four -ord		*? =container*		
	four times		side of box		
	✓d^{z}ix^{w} -áɬ		✓di? =ílc		
	✓first -ord		*✓other side =round thing*		
	first time		other side of table		

(24)

	Pref - StŔt - D		
a.	ʔu	✓líl	-aɬ
	perf.	*✓far*	*- ?*
	travelling far		
b.	s	✓ʔíl	=ilc
	nom.	*✓edge*	*=round thing*
	forehead		
c.	dx^{w}	✓p'áq^{w}	=ap
	toward	*✓bend*	*=buttocks*
	bend over at the hips		

In the following derivation (25), the D suffix is unable to assign the expected feature of extrametricality because the root is no longer in an edgemost position. The condition of *peripherality* ensures that only material at the edge of a domain may be rendered extrametrical. The presence of a prefix puts the root in a medial position and the root is unavailable to undergo the application of the LFR and to receive stress. The prefix is represented as noncyclic and does not trigger the LFR, so that it may

not be stressed itself.

(25)

	Pref - StŔt - D		
	ʔu	✓líl	=aɬ
	perf	*✓far*	*= ?*
noncyclic	ʔu		
Cycle 1		✓lil	
LFR			
line 1		*	
line 0		(*)	
Cycle 2			=aɬ
STRDEL			
EM	n/a (root not edgemost in word)		
LFR			
line 1		*	
line 0		(*	*)
LWR	(vacuous)		
	[ʔulílaɬ]		
	travelling far		

3.7 Compound Suffixes

There is one final stress pattern to examine in Lushootseed. In this pattern a strong root is affixed by two R suffixes and the leftmost suffix bears primary word stress. We would expect stress to be assigned to the root in these cases, since R suffixes cannot trigger stress deletion or assign extrametricality. Compare the following data sets (26) to (29), wherein (26) and (28) represent the usual pattern of leftmost stress; and (27) and (29), the apparent exceptions. In (26) the lexical linking element *=al* and the lexical suffix *=g^{w}iɬ* are R suffixes, as evidenced by their never being stressed when affixed to a strong root. This is true of *=al* whether it is the sole suffix or the first in a string. However, the behavior of *=al* in (27), when it is followed by the R suffix *=g^{w}iɬ*, is that of a D suffix: stress falls on the first suffix instead of the strong root. The same alternation in patterns is demonstrated in the data sets (28) with (29).

(26)

	StŔt - R - R		
a.	✓húd	=al	-əp
	✓burn	*=lx lnk*	*-bottom*
	burning on the bottom		
b.	✓ɬáq'	=al =ij̃	-əd
	✓lay	*=lx lnk =surface*	*-?*
	lay the pack down		
c.	✓q'íl	=al =ič	
	✓load	*=lx lnk =surface*	
	load of something ?		
d.	✓ʔíl	=g^{w}iɬ	
	✓lean against	*=canoe*	
	shoreline		

(27)

	StRt - Ŕ - R		
a.	✓hud	=ál	=g^{w}iɬ
	✓fire	*=lx lnk*	*=canoe*
	steamboat		
b.	✓ɬil	=ál	=g^{w}iɬ
	✓side	*=lx lnk*	*=canoe*
	side of canoe		
c.	✓ɬid	=ál	=g^{w}iɬ
	✓tie	*=lx lnk*	*=canoe*
	tie (their sides) together		

e. ✓ʔác =gʷiɬ
✓*centre* =*canoe*
middle of lake, river

f. ✓híqʷ =gʷiɬ
✓*move out(?)* =*canoe*
shove the canoe out

(28) StŔt -R

a. ✓xʷíʔ =alus -bid
✓*no,not* =*eyes* -*loc*
miss someone

b. ✓íkʷ =əlus -əb
✓*wipe* =*eyes* -*method*
wipe eyes

(29) StRt -Ŕ - R

a. ✓ʔil =y =álus
✓*side* =*edge*
end of table

b. ✓diʔ =y =álus
✓*other* =*edge*
the other end

c. ✓p'il =y =álus
✓*flat* =*edge*
flat ends

I propose that the explanation for the different patterns in the examples above lies in assuming that there are compound suffixes in Lushootseed. The examples in (26) and (28) show affixal strings composed of individually recessive suffixes, demonstrated by the fact that stress falls on the roots. However, in some instances, such as (27) and (29), the R suffixes combine to create compound suffixes which are single units and which behave as D suffixes in the process of stress assignment. That is, they can attract stress away from strong roots, apparently capable of erasing previous stress and assigning extrametricality to the strong root.

In Hess (1994) =*alus*, a R suffix, is glossed as 'eye, colour,' as in (28), and =*y* as a lexical linking element. When =*alus* is suffixed to a strong root it is predictably not stressed. Yet, when =*y* is combined with =*alus* as in (29), then the compound is shown to act like a D suffix. I assume that a compounding rule applies before the item is affixed to roots.

(30) - R + -R →D

The derivation in (31) demonstrates application of Lushootseed stress rules on a compound D suffix.

(31)

	StRt - R - R		
	✓ɬid	=ál	=adiʔ -d
	✓*tie*	=*lx lnk*	=*side* -*trans* →
	StRt - D́		
	✓ɬid	=áladiʔ	
	✓*tie*	=*side*	
Cycle 1	✓ɬid		
LFR			
line 1	*		
line 0	(*)		

Cycle 2		=aladiʔ
STRDEL		
EM	< >	
LFR		
line 1		*
line 0	<*>	(* * *)
LWR	(vacuous)	
	[ɬidaládiʔd]	
	tie their sides together	

Apart from the slight semantic shifts in Lushootseed, as illustrated above, there is a parallel with English, among other Indo-European languages regarding the alternation in stress patterns that arise as a result of compounding. Chomsky and Halle (1968) discuss SPE's Compound Stress Rule to explain the distribution of stress in examples like 'blúebird' and 'blue bírd.' Although the pair certainly express related concepts, the individual items do have different meanings and exactly opposite stress assignment.

To further motivate this analysis, we see that when affixed to a prefixed root, the compound suffixes behave like their monomorphemic counterparts. They do not assign extrametricality to the root because of the requirement that elements which are assigned extrametricality be edgemost in a word. Although the compound is a D suffix, the root is now in a medial position after prefixation. Therefore, the root is not available for extrametricality assignment by the suffix and stress remains on the root. The examples in (32) and (33) illustrate this alternation.

(32)

a. StRt - R - R
✓ʔil =al =gʷiɬ →
StRt - D́
✓ʔil =álgʷiɬ
✓*side* =*canoe*
side of canoe

(33)

a. Pre - StRt - R - R
s ✓ʔil =al =gʷiɬ →
Pre - StŔt - D
s ✓ʔíl =algʷiɬ
nom ✓*side* =*canoe*
side of canoe

(33) b. ✓ɬid =us =əd →
✓ɬid =úsəd
✓*tie* =*upper part*
tie (horse) with reins

b. dxʷ ✓liqʷ =us =əb →
dxʷ ✓líqʷ =usəb
permeate ✓*red* =*face*
paint one's face red

The data in the (a) examples of (32) and (33) shows two R suffixes combining to form a D suffix. The resultant compound erases the stress assigned to the strong root in Cycle 1 of the LFR. Then, the D suffix assigns extrametricality to the root so that it is no longer available to subsequent applications of the stress rule. Thus, the D compound suffix is stressed as the next leftmost syllable in the word. The following derivations of (32b, 33b) illustrate the variability of stress when a prefix such as the nominalizer, s- is added to the root morpheme. Note that in (34b) the D compound suffix, although it cannot assign extrametricality, does erase previous stress on the root, but this is not crucial to the analysis.

(34)

	a.	b.
	StRt (- R -R →) D́	Pre - StŔt (-R -R →D
	✓ʔil =álgʷiɬ	s ✓ʔíl =algʷiɬ
noncyclic		s
Cycle 1	✓ʔil	✓ʔil
LFR		

line 1	*	*
line 0	(*)	(*)
Cycle 2	=alg^{w}iɬ	=alg^{w}iɬ
STRDEL		
EM	< >	n/a
LFR		
line 1	*	*
line 0	<*> (* *)	(* * *)
	[ʔilálg^{w}iɬ]	[ʔílalg^{w}iɬ]
	side of canoe	side of canoe

3.7 Exceptional Data

Although the above discussion accounts for the vast majority of cases of stress assignment in Lushootseed, there are items that are problematic and examples exist which defy analysis within this framework. For example, *=ucid* is a R suffix and on its own does not usually bear stress when affixed to a (strong) root containing a full vowel. However, the item in (36d) contradicts this pattern.

(35)

StRt - R

a. ✓húy =ucid
✓*make* =*eat*
finish eating

b. ✓d^{z}íx^{w} =eat
✓*first* =*eat*
eat first

c. ✓ələ́ʔ =language
✓*foreign* =*language*
foreign language

d. ✓diʔ =úcid
✓*other side* =*mouth*
other side of river, lake

In one interesting example of these exceptional items, a Lushootseed word is glossed differently for the Northern and Southern dialects (NL, SL), sharing only a part of the semantics.

(36) diʔ =úcid
a. NL = the other side of a body of water
b. SL = other side of path or road

Given that, according to Hess (1977), the stress patterns of the two dialects are often mirror images, these homophones may indicate a borrowing of lexical items with stress intact.

According to Hess (1991:3), the roots diʔ and ʔil are similar to a small class of roots in Lushootseed which must be bound to a lexical suffix. This class of bound roots includes two other strong roots, ʔac- and ʔudəg^{w}. I do not have enough data to state anything conclusively but some examples of these roots with prefixes are not stressed as this analysis predicts. Therefore I assume that if they are exceptional in that they are bound morphemes, it is also possible that they are idiosyncratic regarding stress. I have no

explanation for these exceptions, examples of which in (37) display this irregular stress pattern.

(37) a. s ✓ʔil =ál =ig^{w}əd whole side
b. x^{w} ✓ʔil =əlúg^{w}əb buttocks

Finally, we observe that any theory of stress may inevitably have to acknowledge some stipulations or encoding based on semantic information. Within a metrical grid theory these idiosyncratic items are defined as inherently stressed or lexically-accented. In some cases in Lushootseed they are the result of a root having two subtly distinguished meanings. Combined with the same suffix these roots yield two, related, but distinct concepts. The example in (38) demonstrates this alternation of stress, one example of which must be necessarily be an exception to my hypothesis.

(38)

Wk Rt - R

a. ✓yəl =aciʔ
✓*pair* =*hand, forearm*
[yə́laciʔ]
glove, mitten

b. ✓yəl =aciʔ
✓*both* =*hand, forearm*
[yəláciʔ]
both hands

In other cases, the word with the unpredictable stress pattern has a metaphorical meaning as in the b. examples of (39) and (40).

(39)

Str Rt - R
✓huy =ucid
✓*make* =*eat, mouth*

a. [húyucid]
finish eating

b. [huycíd]
whitefish (...when he became a fish his mouth stayed small)

(40)

Str Rt - R
✓č̓it =abac
✓*near* =*enclosed area*

a. [č̓ítabac]
near side

b. [č̓itábac]
Saturday (on the near side of the Sacred Day)

4. CONCLUSION

Although stress is assignned primarily in a leftward direction in Lushootseed, this analysis has

accounted for the other varieties of other patterns found in the language. These are summarized in (41).

(41)	a.	Monomorphemic Roots		
		CV́CX	t'ílib	sing
		CəCəX	béləwəb	boiling
		CəCV́X	x̌əlábac	hollow cedar tree
	b.	Weak Roots		
		WkRt - Ŕ	q'əp-sád	cramp on the leg
		WkRt - Ŕ -R (-R)	səl-ús-qid	cooked fish heads
		WkRt - D́	dəg^{w}-áləp	pants
		WkRt - D́ -R (-R)	bəč-ál-əp	anchor with canoe pole
	c.	Strong Roots		
		StŔt - R	g^{w}ád-il	leap
		StŔt - Ŕ	č'it-ábac	Saturday
		StŔt - R - R (-R)	tág^{w}-us-ab	put face in water
		StŔt - Ŕ - R (-R)	hud-ál-g^{w}iɬ	steamboat
		StŔt - D́	p'il-álubid	broad shoulders
		StŔt - D - (-R -R)	ʔu ✓líl-aɬ	travelling far
		StŔt - D́ - R (R)	ləliʔ-ák^{w}-bix^{w}	foreigners

In Lushootseed two classes each of roots and suffixes interact in a metrical theory which constructs constituents over morphemes and erects their heads on a grid. A morphophonemic interface yields the stress patterns above through the appliction of two simple rules and recognition of the distinctive properties of the four categories of morphemes.

The rules, LFR and LWR locate the heads of constituents at the foot and word levels, respectively, to ensure leftward stress placement. This analysis recognizes the classification of strong versus weak roots which is justified by the inability of the weak roots to carry stress. The roots are distinguished by whether they contain full vowels (strong) or only schwas (weak). Suffixes are characterized by whether or not they can trigger stress erasure and extrametricality. This latter property renders an adjacent strong root invisible to the application of the LFR so that stress is placed on the suffix.

Some compounds formed from two recessive suffixes are shown to act like dominant suffixes for the purposes of stress placement, and evidence for both is provided by affixing them to roots with prefixes. Finally, some apparent exceptions to this hypothesis may be explained by lexical accent indicating semantic differences and borrowing from neighbouring languages. Perhaps an analysis of stress in SL might resolve more of these problematic items, and establish a body of work around which a general theory of stress assignment in Coast Salish languages can be built.

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