Distribution of Stressed Mid Vowels in Lushootseed

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Contents

1 Background

This paper focuses on the language Lushootseed, language code ISO 639-3 slh (Eberhard, Simons, & Fennig, 2022). This language is also known as southern Puget Sound Salish (Snyder, 1968). This language is in the Salishan family (Eberhard et al., 2022). This is the indigenous language spoken by the tribes located around the Puget Sound region of Washington State, stretching from Northern Seattle to the Southern tip of Puget Sound (Snyder, 1968). Tribes who spoke Lushootseed include the Duwamish, Snoqualmie, Muckleshoot, Puyallup, Nisqually, and Suquamish tribes (Snyder, 1968). Although there was sociolinguistic variation between the tribes, the dialects are mutually intelligible (Snyder, 1968). Unfortunately, this language is now an extinct language (Eberhard et al., 2022). Generally regarded as the last native speaker of Lushootseed, Vi Hilbert, died in 2008 at the age of 90 (Willmsen & Mapes, 2008).

Below, I present the phonetic and phonemic inventory of Lushootseed as proposed by Snyder (1968):

Lutshootseed vowel phonemic inventory (Snyder, 1968)

When vowels appear to the right of the dot they are rounded, otherwise they are unrounded.

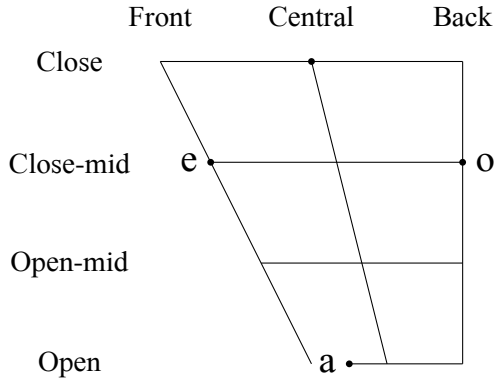

Table 1: Vowel Phonemes and their corresponding allophones according to Snyder (1968)

Phoneme	Allophones
/e/	[i], [ɪ], [e], [ɛ]
/o/	[u], [ʊ], [o], [ɔ]
/a/	[ə], [ʌ], [a]

Lutshootseed vowel phonetic inventory[1] (Snyder, 1968)

When vowels appear to the right of the dot they are rounded, otherwise they are unrounded.

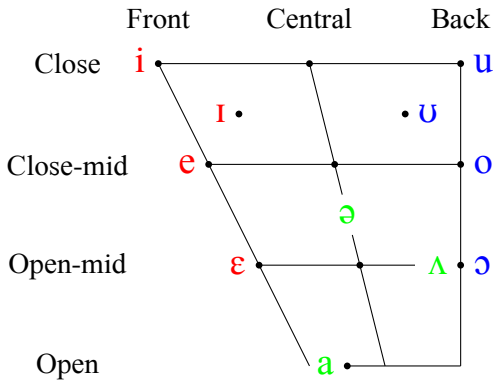

Table 2: Lushootseed consonant chart (Snyder, 1968)

Phonemes appear in voiceless-voiced order in a cell.

	Bil-abial	Alve-olar	P-alveo.	Palatal	Velar	Glot-tal
Plosive	p b	t d		c ɟ	k	ʔ
Ejective	p’	t’		c’	k’	
Labialized				c^w $ɟ^w$	k^w	
Labial Ejective				$c’^w$	$k’^w$	
Fricative		s	ʃ		x	h
Lat. Fricative		ɬ				
Labialized Fric.				$ç^w$	x^w	
Affricate		t͡s d͡z	t͡ʃ d͡ʒ			
Affricated Ejective		t͡s’	t͡ʃ’		k’	
Approx			j		w	
Lat. appr.		l				
Lat. Affric. Ejective		t͡ɬ’				

I will propose feature based rules to describe the distribution of stressed mid vowels, improving upon the work done by Snyder (1968). I specifically will focus on the phonemes /e/ and /ɔ/ and the distribution of their respective allophones. I will be analyzing data presented in Snyder (1968)[2].

[1] Red vowels correspond to allophones of /e/, green vowels to allophones of /a/, and blue to allophones of /o/.

[2] It is important to note the data was obtained by Suquamish, Duwamish, and Snoqualmie informants, and that most of the data was obtained by Suquamish informants, and cross-referenced with Duwamish and Snoqualmie informants (Snyder, 1968).

Just like English, Lushootseed has vowel shortening in unstressed syllables. These short vowels are canonically transcribed as a central mid vowel [ə], but Snyder (1968) claims that both /e/ and /o/ "[do not] fully reach the central position", and thus we obtain the [ɛ] and [ʌ] allophones of the phonemes /e/ and /o/ respectively. As I believe that this is fairly straightforward, I will instead choose to focus on the distribution of stressed mid vowels in Lushootseed.

2 Analysis

2.1 Snyder (1968) Proposal

Snyder (1968) suggests that the stressed mid vowel phonemes /e/ and /o/ occur in the "parallel" environments, and thus these environments can be captured utilizing natural classes and feature notation. The rules that Snyder (1968) presents for the distribution of stressed mid vowels are paraphrased as follows:

Distribution of stressed mid vowels according to Snyder (1968)[a]

1. Free variation occurs between the allophones [e] and [ɪ] of the /e/ phoneme and [o] and [ʊ] of the /o/ phoneme:
   (a) Rule 1a): When the vowels are preceded by glottalized (ejectives), velar, or glottal consonants and the sonorants [w] and [j]
   (b) Rule 1b): When the vowels are followed by a velar consonant or [ɻʷ].
2. Free variation occurs between the allophones [i] and [ɪ] of the /e/ phoneme and [u] and [ʊ] of the /o/ phoneme:
   (a) Rule 2a): When the vowels are preceded by a nonglottalized bilabial, alveolar, alveopalatal, or palatal stop or fricative and the sonorant [l] except when the vowels are followed by a velar consonant or [ɻʷ].

[a]Please refer to Table 5 in the appendix for data exemplifying these rules.

2.2 Proposed Feature Notation

We can capture the rules proposed by Snyder (1968) with feature notation as follows[3]:

- For rule 1a: We see that the raising of the stressed mid vowel can be induced when the environment has a "backness" (either velar or glottal) quality of the preceding consonant[4], or the stressed mid vowel is preceded by a glide. Thus we can write rule 1a as Rule A:

[3]It should be mentioned that Snyder (1968) mentions that 'free variation' occurs between the phonemes, which would suggest that these rules can be applied optionally.

[4]In his dissertation, Sylak-Glassman (2014) argues for the inclusion of a post-velar natural class of consonants and I believe it is not a stretch to posit a natural class of 'post palatal like' consonants for Lushootseed.

Rule A: $[-\text{high}, -\text{low}, +\text{tense}, +\text{syllabic}, +\text{stress}] \rightarrow [+\text{high}, -\text{tense}] /$
$\{[+\text{consonantal}, +\text{back}^{a}], [-\text{consonantal}, +\text{approximant}]\}\_\_$

[a] I am calling the proposed 'post-palatal like' natural class as +back for simplicity.

- For rule 1b: We see that the raising of the stressed mid vowel can be induced when the environment has a velaric consonant, or the voiced labial-palatal stop [ɟʷ]. Interestingly, according to Snyder (1968), this language has a voiceless labial-velar stop, but no phonetic voiced labial-palatal stop. I find this hard to believe, and for this reason I believe that in instances where stressed mid vowels were raised because of the presence of [ɟʷ], the voiced labial-velar stop [gʷ] was actually mistranscribed as the voiced labial-palatal stop [ɟʷ][5]. Therefore, we see the raising of the stressed mid vowel can be induced when the vowel is followed by a velaric consonant and we can write rule 1b as Rule B:

Rule B: $[-\text{high}, -\text{low}, +\text{tense}, +\text{syllabic}, +\text{stress}] \rightarrow [+\text{high}, -\text{tense}] /$
$\_\_[-\text{delayed release}, +\text{dorsal}]$

- For rule 2a: We see that the raising of the stressed mid vowel to [i] or [ɪ] can be induced when the vowel is preceded by a coronal obstruent or the liquid [l], except when in the environment corresponding to rule 1b. Because of this exception, I suspect that Rule B and Rule A have some sort of rule interaction, and thus we will ignore the environment corresponding to rule 1b in the writing of this rule. We write rule 2a as Rule C:

Rule C: $[-\text{high}, -\text{low}, +\text{tense}, +\text{syllabic}, +\text{stress}] \rightarrow [+\text{high}] /$
$\{[+\text{coronal}, -\text{sonorant}], [+\text{approximant}, +\text{consonantal}]\}\_\_$

[5] It is possible that /gʷ/ is the underlying phoneme but there is some other rule which fronts /gʷ/→[ɟʷ], but this exploration is out of the scope of this paper.

2.3 Derivations

Here we provide derivations for Rule A:

Table 3: Derivations for Rule A

/UR/	/lʌˈp’elɪbʌçʷ/	/lʌˈp’elɪbʌçʷ/	/ˈt’obcs/	/ˈt’obcs/
Rule A	lʌˈp’elɪbʌçʷ	lʌˈp’ɪlɪbʌçʷ	ˈt’obcs	ˈt’ʊbcs
[SR]	[lʌˈp’elɪbʌçʷ]	[lʌˈp’ɪlɪbʌçʷ]	[ˈt’obcs]	[ˈt’ʊbcs]

Here we provide derivations for Rule B and C, highlighting the overlapping distribution and the fact that Rule C does not apply when followed by velaric consonants:

Table 4: Derivations for Rules B and C

/UR/	/ˈʃesɪd/	/ˈʃesɪd/	/ˈgohʊb/	/ˈgohʊb/	/ˈpeɟʷɪd/	/ˈpeɟʷɪd/	/ˈpeɟʷɪd/	/ˈpeɟʷɪd/
Rule C	ˈʃɪsɪd	ˈʃisɪd	ˈguhʊb	ˈgʊhʊb	–	–	ˈpɪɟʷɪd	ˈpiɟʷɪd
Rule B	–	–	–	–	ˈpeɟʷɪd	ˈpɪɟʷɪd	–	–
[SR]	[ˈʃɪsɪd]	[ˈʃisɪd]	[ˈguhʊb]	[ˈgʊhʊb]	[ˈpeɟʷɪd	[ˈpɪɟʷɪd]	[ˈpɪɟʷɪd]	*[ˈpiɟʷɪd]

3 Discussion

We see that Rule C is not induced when the environment of the mid stressed vowel is followed by a velaric consonant, but rather that Rule B is induced. Therefore, this would suggest that Rule B takes priority over Rule A, and Rule C precedes Rule B ensuring that Rule B is applied at the surface realization. Therefore, I propose the rules must be ordered in a way such that Rule B is applied after Rule C is applied, i.e.

$$\text{Rule C} \rightarrow \text{Rule B}$$

Unfortunately, this C→B rule ordering does not quite give the correct surface realization. Invoking Rule C before Rule B would change Rule B’s input (the stressed mid vowel) to either [i] or [ɪ], and thus Rule B would therefore not be induced and our surface realization would not be grammatical as we see in the rightmost column of Table 4. This is problematic, and for this reason, I believe that Rule C and Rule B are interacting in conjunction with rules governing the distribution of consonants in Lushootseed, which is out of the scope of this paper. These rule interactions between consonants and vowels can and should be explored further.

With that being said, this analysis of the distribution of stressed mid vowels is an improvement over the analysis presented by Snyder (1968). By defining natural classes using feature notation, we were able to systematically predict the distribution of the allophones of stressed mid vowels, and explain why such a distribution occurs. Snyder (1968) does not attempt to explain the motivation behind the distribution of stressed mid vowels in Lushootseed, but merely observes the distribution of stressed mid vowels. This analysis not only attempts to do explain the motivation behind the distribution, but also lays a groundwork for further explanation.

4 Appendix

Below is data presented in Snyder (1968), transcribed using modern IPA symbols. This accounts for most of the data that I considered when revising Snyder (1968)'s rules[6]. This data is organized first by rule, and then by which alternation the data exemplifies.

Table 5: Snyder (1968) High Stressed Vowel Data:

	/UR/	[SR]	Gloss
Rule A	/e/ →[e, ɪ]		
1	/lʌˈpʼelɪbʌçʷ/	[lʌˈpʼelɪbʌçʷ], [lʌˈpʼɪlɪbʌçʷ]	The tide is coming in.
2	/ʊˈtʼe͡tsɪb/	[ʊˈtʼe͡tsɪb], [ʊˈtʼɪ͡tsɪb]	Someone is swimming
3	/tʊˈcʼetʃ/	[tʊˈcʼetʃ], [tʊˈkʼɪtʃ]	Someone hung up
4	/tʊˈkʼelʌçʷ/	[tʊˈkʼelʌçʷ], [tʊˈkʼɪlʌçʷ]	Someone came by canoe.
5	/ˈqʼʷedɪd/	[ˈqʼʷedɪd], [ˈqʼʷɪdɪd]	Count it!
6	/ʌsˈkʼʷebʌçʷ͡tsɪd/	[ʌsˈkʼʷebʌçʷ͡tsɪd], [ʌsˈkʼʷɪbʌçʷ͡tsɪd]	I'm off the canoe.
7	/ˈ͡tsʼe͡tʃʼʌb/	[ˈ͡tsʼe͡tʃʼʌb], [ˈ͡tsʼɪ͡tʃʼʌb]	blanket
8	/ˈkeboʔxʷ/	[ˈkeboʔxʷ], [ˈkɪboʔxʷ],	raft
9	/ʌsˈkʷeb/	[ʌsˈkʷeb], [ʌsˈkʷɪb]	Someone grabs it.
10	/ʊˈwelɛkʷ͡tʃɪd/	[ʊˈwelɛkʷ͡tʃɪd], [ʊˈwɪlɪkʷ͡tʃɪd]	I'm asking.
11	/ʊ͡tsʼˈjecʼʌlʊs/	[ʊ͡tsʼˈjecʼʌlʊs], [ʊ͡tsʼˈjɪcʼʌlʊs]	Someone winks.
12	/ˈheleʌçʷ/	[ˈheleʌçʷ], [ˈhɪleʌçʷ]	See now!
	/o/ →[o, ʊ]		
13	/ˈtʼobcs/	[ˈtʼobcs], [ˈtʼʊbcs]	ling cod
14	/ˈcʼoj/	[ˈcʼoj], [ˈcʼʊy]	mother
15	/ˈ͡tsocʊd/	[ˈ͡tsocʊd], [ˈ͡tsʊcʊd]	Suck it!
16	/ˈ͡tɬʼob/	[ˈ͡tɬʼob], [ˈ͡tɬʼʊb]	Alright.
17	/ˈkoʔ/	[ˈkoʔ], [ˈkʊʔ]	water
18	/ˈxodxʊd/	[ˈxodxʊd], [ˈxʊdxʊd]	to be talking
19	/ˈjokʼʷʌjʔ/	[ˈjokʼʷʌjʔ], [ˈjʊkʼʷʌjʔ]	rotten stick
20	/ˈhojtəd/	[ˈhojtəd], [ˈhʊjtəd]	material from which to make something
Rule B	/e/ →[e, ɪ]		
21	/ʊˈd͡ʒek'ɪd/	[ʊˈd͡ʒɪk'ɪd], [ʊˈd͡ʒek'ɪd]	Someone is soaking it.

[6]This is a non-exhaustive dataset. For an exhaustive data set, please see Snyder (1968) pages 2 through 4.

	/UR/	[SR]	Gloss
22	/ʊˈlekˈʼʷ/	[ʊˈlekˈʼʷ], [ʊˈlɪkˈʼʷ]	Someone slides.
23	/ˈpeɬʷɪd/	[ˈpeɬʷɪd], [ˈpɪɬʷɪd]	to sing a spirit song.
	/o/ →[ʊ]		
24	/ʌsˈɬokˈʼʷ/	[ʌsˈɬokˈʼʷ], [ʌsˈɬʊkˈʼʷ]	Someone is peeling it.
25	/ʊˈd͡ʒoxʷʌt/	[ʊˈd͡ʒoxʷʌt], [ʊˈd͡ʒʊxʷʌt]	Someone vomited.
Rule C	/e/ →[ɪ, i]		
26	/ˈbet/	[ˈbit], [ˈbɪt]	salmon soup
27	/ˈpied/	[ˈpiɪd], [ˈpɪɪd]	bed
28	/ˈdeʔɪɬ/	[ˈdiʔɪɬ], [ˈdɪʔɪɬ]	that one already mentioned
29	/ˈteʔɪɬ/	[ˈtiʔɪɬ], [ˈtɪʔɪɬ]	that one
30	/ˈcʷeʔcʷɪɪl/	[ˈcʷiʔcʷɪɪl], [ˈcʷɪʔcʷɪɪl]	skate fish
31	/ˈs͡tse͡ltsɪl/	[ˈs͡tsɪl͡tsɪl], [ˈs͡tsil͡tsɪl]	lazy one
32	/ˈʃesɪd/	[ˈʃisɪd], [ˈʃɪsɪd]	Stretch it!
33	/ˈɬet͡ʃʼɪd/	[ˈɬit͡ʃʼɪd], [ˈɬɪt͡ʃʼɪd]	Cut it!
34	/ˈlel/	[ˈlil], [ˈlɪl]	far away
	/o/ →[u, ʊ]		
35	/ˈbos/	[ˈbus], [ˈbʊs]	four
36	/ˈposʊd/	[ˈpusʊd], [ˈpʊsʊd]	Hit it!
37	/ˈdocʷɪbəɬ/	[ˈducʷɪbəɬ], [ˈdʊcʷɪbəɬ]	Transformer
38	/ˈgohʊb/	[ˈguhʊb], [ˈgʊhʊb]	to bark (dog)
39	/ʌsˈd͡ʒuɪl/	[ʌsˈd͡ʒuɪl], [ʌsˈd͡ʒʊɪl]	Someone is happy
40	/ˈɬup/	[ˈɬup], [ˈɬʊp]	morning

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