# The Major Processes Affecting Klallam Vowels

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Thompson and Thompson (1971) present a broad introduction to the Klallam vowel system. This paper modifies their treatment and provides a more detailed description of the major processes affecting the Klallam vowels. Klallam[1] has on the surface four contrasting vowels:

(1) i u

ə

a

Each of the vowels in (1) occurs phonetically with some variation both stressed and unstressed. Length and pitch are not generally distinctive.

This paper describes the phonetic variation and phonological processes applying to these basic vowels. Since the variation in vowels depends somewhat on neighboring consonants it will be useful to chart the consonant inventory of Klallam:

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (2) | p | t | c | č | (k)[2] | $k^w$ | q | $q^w$ | ʔ | |
| | pʼ | tʼ | cʼ | čʼ | kʼ | $k^w$ʼ | qʼ | $q^w$ʼ | | |
| | | | s | š | ɬ | $x^w$ | χ | $χ^w$ | h | |
| | m | n | | y | (l) | w | ŋ | | | |
| | mʼ | nʼ | | yʼ | | wʼ | ŋʼ | | | |

The first problem one encounters in investigating the Klallam vowel system is the distinction between /a/ and /ə/. Phonetically the high vowels /i/ and /u/ are unproblematic. /ə/ and /a/, on the other hand, are difficult. When I first began work on Klallam in 1978 the Thompsons gave me an annotated copy of their 1971 article, 'Clallam, a Preview'. Among other changes and additions throughout they had changed here and there /ə/ to /a/ and /a/ to /ə/. They warned me that those two vowels can be hard to distinguish. Harrington's notes (which are generally careful and narrowly transcribed) show that he also had a tough time with these two, sometimes spending several pages on one word with various transcriptions.

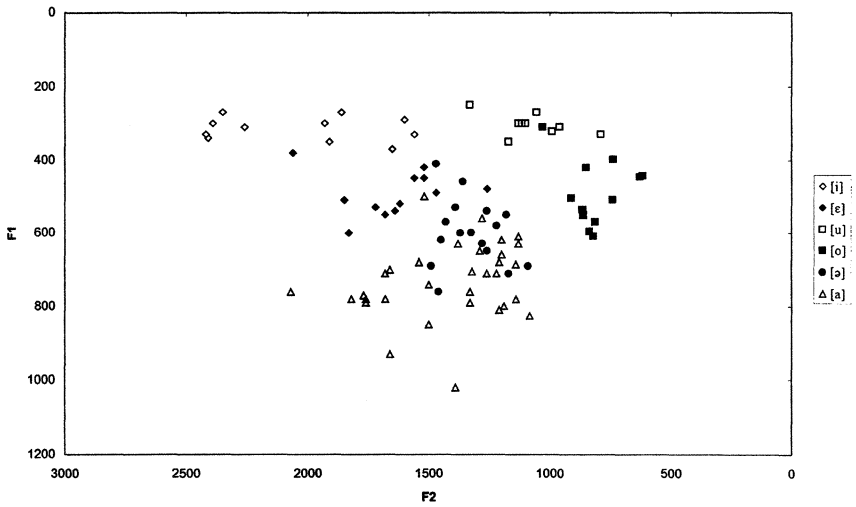
The graphs in figures (3), (4), and (5) help show the problems associated with /ə/ and /a/.

[1] Klallam is a Central Salishan language still spoken by a few people in western Washington and on the southern tip of Vancouver Island. It is very closely related to the Northern Straits language. This paper makes occasional reference to the Saanich dialect of Northern Straits.

[2] /k/ and /l/ occur only in a few loan words.



(3) Klallam Vowels

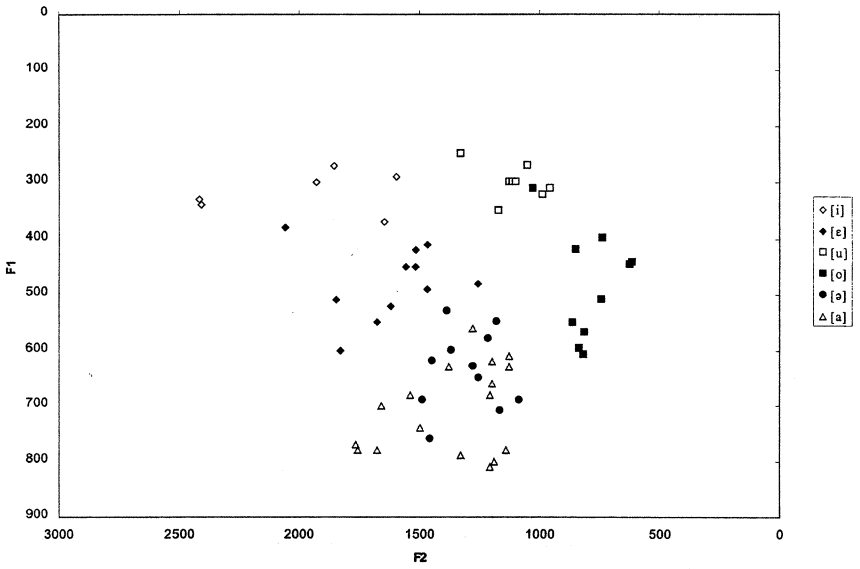



In (3) values for the first and second formants for a selection of Klallam vowels both stressed and unstressed are plotted. (4) shows the values for the first to formants of the stressed vowels only. The averages for F1 and F2 are plotted in (5). The mid vowels are conditioned variants of the high vowels, respectively, and will be discussed below. Vowels for these measurements were selected in environments that would minimize effects of following consonants. Thus these values show, with some exceptions to be discussed below, the vowels followed by anterior obstruents and mostly /p/ and /pʼ/.

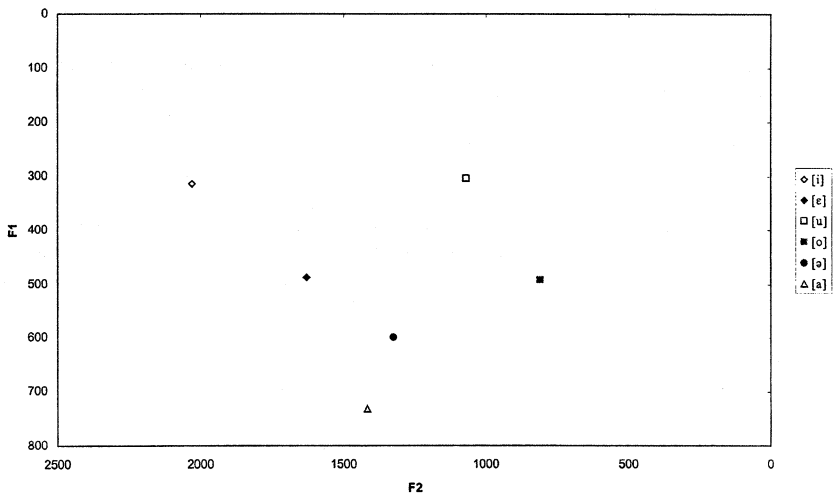
(3) and (4) show the significant overlap between /a/ and /ə/ for values of F1 and F2. There is overlap but the differences in the average F1 and F2 charted in (5) between /a/ and /ə/ are statistically significant. Aside from this quality difference between /a/ and /ə/ there is also a difference in quantity. One hundred vowels were measured and it was found that, unsurprisingly, stressed /i, u, a/ were significantly longer than unstressed vowels. This length difference between stressed and unstressed vowels is perceptible and was noted by Thompson and Thompson (1971:254). More unexpectedly it was found that, unlike the stressed /i/, /u/, /o/, and /a/, stressed /ə/ is not longer. It is in fact just as short as unstressed vowels and on average is around one half the length of other stressed vowels. There is no statistically significant difference in length among stressed /i, u, a/ and there is no statistically significant difference in length among stressed schwa and the unstressed vowels.

What we find instrumentally is that there is indeed a quality difference between /a/ and /ə/ despite substantial overlap. However, where the quality difference fails the opposition is carried by quantity.

**(4) Stressed Klallam Vowels**




**(5) Klallam Vowel Averages**








Although each of the vowels occurs phonetically both stressed and unstressed, only the stressed vowels are not predictable. The presence and quality of all of the unstressed vowels can be predicted through a small set of phonological processes. The following are the processes that account for the Klallam vowels. Ordering is crucial and will be discussed in section 8.

1. **Stress assignment.** The rules assigning stress to syllables are the fundamental determinants of whether the syllable will contain a vowel of predictable or unpredictable quality. As in Northern Straits and other Salishan languages stress assignment is generally morphologically conditioned--certain suffixes attract stress. In Klallam as in Saanich there is a tendency to penultimate stress other things being equal. I leave a fuller description of Klallam stress placement for a later study. It suffices here simply to say that primary stress is assigned to one of the vowels of the fully derived word.

2. **Vowel reduction.** When stress is applied to a form any unstressed /i/, /u/, or /a/ becomes [ə]. In (6), for example, the /í/ of the root reduces to [ə] when the stressed causative suffix is added.

(6) ʔíɬn 'eat' plus causative suffix is ʔəɬnístxʷ 'feed'

3. **Schwa deletion.** Unstressed schwas are deleted. For some speakers this applies generally but for the best speakers this rule is variable. In the most careful pronunciation schwas are retained while in fluent natural discourse they drop out.

It is interesting that those native speakers who are most English-oriented[3] apply this very non-English process most consistently. This process is also more often found occurring in speakers from the western end of Klallam territory[4].

(7) ʔəɬnístxʷ ~ ʔɬnístxʷ 'feed'

3 There are very few remaining native speakers of Klallam and all are English bilingual. It is useful to distinguish a range of fluency. Those that are most English-oriented rarely speak spontaneously in Klallam and never more than a sentence or two at a time. They are unable to translate freely from English to Klallam, but can do so from Klallam to English. Those that are most Klallam-oriented speak in Klallam whenever there is someone to understand them and sometimes when there isn't. They can translate more easily from English into Klallam than from Klallam to English.

4 In Montler (1996) three regional varieties of Klallam are identified. I have worked directly with speakers of western and Becher Bay Klallam in the 1970's and 1990's. My information on eastern Klallam comes from recordings made by Leon Metcalf in the 1950's and by Laurence C. Thompson in the 1960's and 1970's. Thus the data on eastern Klallam are both from a different region and a different generation. It may be that some of the differences are due to generational rather than regional dialect, but there is evidence in traditional wisdom from both eastern and western speakers that there long have been regional dialect differences.

4. **Schwa excrescence.** This process applies optionally to separate sonorants. This is a fortition that applies only in the most careful speech of the most Klallam-oriented speakers and in the speech of those from the eastern end of Klallam territory.

(8) ʔáʔiŋ ~ ʔáʔyəŋ 'house'
(9) kʷə́yŋ ~ kʷə́yəŋ 'spill'

5. **Vowel retraction:** This vowel lowering process is the most unusual phenomenon of the Klallam vowel system. It was reported by Thompson, et al. in the 1974 comparative paper but not in the 1971 Klallam sketch. In this process non-low vowels are lowered when followed by [ʔ]: i → ɛ, u → o, ə → a.

The alternation can be seen especially in the 'imperfective/actual' aspect, which is usually indicated by a glottal stop infix after a stressed /i/, /u/, or /a/, and in the 'diminutive', which involves reduplication and glottal stop infixation.

| | |
|---|---|
| (10) ʔípt 'brush it' | ʔéʔpt 'brushing it' |
| (11) ʔíɬn 'eat' | ʔéʔɬn 'eating' |
| (12) pʼíχʷŋ 'overflow' | pʼéʔχʷŋ 'overflowing' |
| (13) ʔítt 'sleep' | ʔéʔtt 'sleeping' |
| (14) šúpt 'whistle' | šóʔpt 'whistling' |
| (15) ɬúpʼt 'slurp it' | ɬóʔpʼt 'slurping it' |
| (16) kʷúxʷn 'dancing pole' | kʷaʔkʷóʔxʷn 'small dancing pole' |

A root /a/ is not affected by the following glottal stop:

| | |
|---|---|
| (17) ƛ̓pátŋ 'is felt' | ƛ̓aʔpáʔtŋ 'is being felt' |
| (18) smáć'n 'skunk' | smaʔmáʔć'n 'small skunk' |

This retraction is exceptionless and applies to loans as well as to native words:

| | |
|---|---|
| (19) píšmn 'fish with rod and reel' | péʔšmn 'fishing' |
| (20) ʔípn 'apron' | ʔɛʔéʔpn 'small apron' |
| (21) číkn 'chicken' | čaʔčéʔkn 'small chicken' |
| (22) músməs 'cow' | maʔmóʔsməs 'small cow' |

The F1 and F2 values for [ɛ] and [o] plotted in (3), (4), and (5) are all cases of high vowels lowered by following glottal stop.

The Interior Salishan languages have a striking and regular lowering of vowels in the environment of and especially before uvulars and pharyngeals. This has been described for all of the Interior languages: Coeur d'Alene (Doak 1992), Colville-Okanagan (Mattina 1979), Lillooet (van Eijk 1985), Moses-Columbia (Kinkade 1967), Shuswap (Kuipers 1974), Spokane (Carlson 1972), and Thompson (Thompson and Thompson 1992).

Although the retraction effect in Klallam is similar to that found in the Interior languages, the cause appears to be quite different. Unlike the vowel retraction found in the Interior Salishan





languages, uvulars do not effect Klallam retraction. In (23) the uvular following the stressed /u/ has no effect on it, but in the 'actual' aspect the glottal stop infix causes the vowel to lower:

(23) ʔúχʷ 'go to' ʔóʔχʷ 'going to'

Furthermore, the glottal stop does not effect vowel lowering in the Interior Salishan languages. Bessell (1992) shows specifically and convincingly that glottals in the Interior Salishan languages do not have a retracting effect on vowels.

In fact, it is well known that glottals are not supposed to affect vowels in this way since laryngeal articulation is physically independent of tongue articulations. For example, in speculations on the quality of the Indo-European 'laryngeals' often $h_1$ is assumed to be *ʔ* (e.g. Beekes 1995) precisely because it is this 'laryngeal' that affects only the quantity, not the quality, of the preceding vowel. In most modern models of feature geometry (e.g. Sagey 1986) the Laryngeal node is separate from all of the other articulator nodes precisely to capture the universal generalization that oral and laryngeal articulations are independent. Yet in Klallam it is indeed laryngeal articulation that affects the quality of preceding vowels.

Interactions of tongue and laryngeal articulations are not unheard of, however. Halle (1995) has introduced a Guttural node in feature geometry covering tongue root and laryngeal articulations citing a number of studies that indicate an association of laryngeal features such as creak, breathiness, and voicing with tongue root articulation.

While viewing the spectrograms to measure the length and formant frequencies of these vowels I incidentally noticed that the glottal stop following stressed vowels is actually not a complete stop. There is no complete cessation of voicing in Klallam, so it was difficult to tell where the vowel ended and the glottal stop began. Rather than an abrupt cessation of voicing as expected of a glottal stop, the vowel undergoes a more or less gradual transition from plain to creaky voice. This is unlike cognates in Saanich where a glottal stop after a stressed vowel has a complete cessation of voicing much as a /p/ or any other voiceless stop. Example (24) is cognate with the Klallam [ʔéʔɬn] in (7).

(24) Saanich ʔíʔɬən 'eating'

The glottal stop is always voiceless in Saanich and retraction of vowels before glottal stop never occurs in Saanich. It seems likely that this vowel retraction process in Klallam is related to the distinctive phonetics of the Klallam glottal stop following stressed vowels.

A complete phonetic explanation for this connection is lacking, but the situation in Klallam may be similar to that found in Jalapa Mazatec by Ladefoged, et al. (1988). They have discovered a tendency in that language for creaky or laryngealized vowels to have a slightly higher first formant. This higher F1 is caused, presumably, by the raising of the glottis during creaky articulation. A higher F1 produces the impression of a lower vowel.

In Klallam the creakiness in vowels is also often caused by a following laryngealized glide. For some speakers, especially those from the western end of Klallam territory, laryngealized /y̰/ and /w̰/ cause retraction of a preceding stressed vowel. But this does not happen as consistently as retraction before glottal stop. (25) is one example.

(25) mohóy̓ ~ muhúy̓ 'basket'

No other glottalized consonants cause retraction.

6. **Schwa assimilation.** In a variable process that occurs in both Klallam and Saanich a schwa may totally assimilate to a stressed vowel when they are separated by only a laryngeal, /ʔ/ or /h/. This gives Klallam a number of unstressed non-schwas and the only cases of unstressed mid vowels. Examples (20), (25), (26), and (27) show this.

(26) cəʔít ~ ciʔít 'true'
(27) cəʔéʔt ~ cɛʔéʔt 'true (actual)'

The glottal stop causes the retraction of the preceding stressed vowel yet is transparent to the quality of a following stressed vowel.

6. **Glottal stop deletion.** In very casual speech /ʔ/ may delete thus phonologizing the í/é and ú/ó oppositions. This may occur anywhere but especially before stops:

(28) ʔéʔtt ~ ʔétt 'sleeping'
(29) šóʔpt ~ šópt 'whistling'

Even (27) may be pronounced [cɛét].

7. **Glide vocalization:** As in many other languages glides /y/ and /w/ become [i] and [u], respectively, between nonsyllabic consonants or between a non-syllabic consonant and a word boundary.

(30) čáy 'work' čáʔi 'working' (ča<ʔ>y)
(31) ɬúyəs 'leave it' ɬiŋíŋəs 'leave me' (ɬuy+ŋíŋəs)
(32) kʷáyŋ 'spill' ʔskʷáʔiɬ 'it's spilled' (ʔəs+kʷa<ʔ>y+ɬ)
(33) ɬáwʔ 'get away' ɬuʔístxʷ 'kidnap' (ɬawʔ+ístxʷ)

These unstressed vowels from glides do not undergo retraction before glottal stop. And usually the unstressed vowels from the glides do not delete as other stressed vowels, but there is one case where this does happen:

(34) čxʷícn < čixʷícn < čáyəxʷ 'enter' + -icn 'back'

As this example illustrates the deletion of unstressed vowels creates many environments for the application of glide vocalization. In Saanich, where unstressed vowels become schwa and do not regularly delete, there are very few cases of unstressed [i] and [u] so that there is usually only one non-schwa per word and that is the stressed vowel. In Klallam there are a larger number of consonant clusters because of schwa deletion, but also because of that same process there are a larger number and variety of unstressed vowels.





8. **Summary--ordering:** These processes display patterns of interaction that can be described in terms of crucial ordering. As a conclusion I will summarize these:

Stress Assignment provides the environment for Vowel Reduction which in turn provides the schwas that undergo Schwa Deletion. Schwa Excrescence must follow Schwa Deletion in a counterfeeding relationship.

Retraction must precede and counterfeed Schwa Deletion since schwas before [ʔ] do not delete but become [a] as in (17), (21), and (22). Retraction also must precede Schwa Assimilation as in (20) and (25) since it is the lowered vowel that spreads. Retraction must also apply before Glide Vocalization since those derived vowels are not lowered.

As noted in section 7 Schwa Deletion provides environments for Glide vocalization And Schwa Excrescence and Glide Vocalization are mutually bleeding since the application of either prevents the application of the other.

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