# A preliminary description of consonant clusters in Upriver Halq'eméylem[1]

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Using only a limited corpus of data from secondary sources, this paper offers a very preliminary discussion of initial and final consonant clusters in the language of Upriver Halq'eméylem. The questions addressed are the following: what is the maximal syllable structure and are the obstruent clusters exhaustively parsed? By following methods developed by previous works on Salish syllable structure, especially Shaw (2002) for closely related hən'q'əmin'əm' and Bianco (1996) for closely related QáwɁəcem, a preliminary claim is made that onsets are simple in Halq'eméylem, but codas can be complex.

## 1 Introduction

This paper is a working paper which offers a descriptive analysis and seeks to address the issue of initial and final clusters in Upriver Halq'eméylem. The data used in this paper comes from a grammar of the language by Galloway (1993), and consists mainly of roots and various derivatives of those roots. No original fieldwork was done for this paper. For the sake of consistency I use the same orthographic system used in Galloway's grammar. For the sake of readability, however, I use much less phonetic detail than can be found in Galloway (1993).

The study of Salish languages, and in particular Salish prosody, has called many linguistic theories and assumptions into question. Thus the study of the syllable structure of any Salish language becomes an interesting challenge. Like all Salish languages, then, the syllable structure of Halq'eméylem deserves careful description.

Halkomelem is classified within the Central Salish grouping of the family. It is spoken in British Columbia, around the Fraser River and in the south-eastern end of Vancouver Island. There are three dialects of the language: Halq'eméylem, spoken by the upriver Stó:lo or Fraser people; Hun'qumi'num' dialect of the downriver Stó:lo; and the Hul'q'umín'um' dialect spoken in

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Vancouver island by the following peoples: Nanoose, Nanaimo, Chemainus, Cowichan, Lyackson, Penelakut, and Halalt. Halq'eméylem, or Upriver Halq'eméylem is spoken along the upper regions of the Fraser River, and is considered an endangered language.

The objectives of this paper are to examine the syllable structure of Upriver Halq'eméylem by determining whether or not initial and final clusters are parsed within the syllable, and to provide a descriptive background from which further research can be done. Careful descriptions and accounts of clusters have been done by Shaw (2002) on the closely related hən'q'əmin'əm' (Musqueam) Salish, and by Bianco (1996) on the closely related Hul'q'um'i'num' (Cowichan). This report follows these two works as well as that of Czaykowska-Higgins and Willett's (1997) analysis of Nxa'amxcin syllables. Like previous work such as Czaykowska-Higgins and Willett (1997), Bianco (1996) and Urbanczyk (1996), this paper suggests that the target syllable shape is ultimately very simple, avoiding complex onsets and clusters whenever possible.

The paper is organized into four parts. Section 2 provides a brief background outlining common root shapes and noting relevant observations made by Galloway (1993). Section 3 offers a discussion of initial clusters in Halq'eméylem and provides evidence based on consistency of pronunciation, the sonority sequencing principle, and markedness, which support the claim for simple onsets. Section 4 examines the difference between OO and OOO clusters in the contexts of Shaw's (2002) account of the downriver dialect hən'q'əmin'əm', and section 5 describes final clusters in the language and in the context of Bianco's (1996) account of Hul'q'um'i'num' makes the claim final RO clusters are well-formed codas in Halq'eméylem.

## 2 Background

The language of Upriver Halq'eméylem allows a great number of word shapes and root shapes. The words listed below in (1) are examples of some typical words and typical word shapes.

(1) Typical word shapes

| | | | |
|---|---|---|---|
| ɬɛqə'c'əlsxá | 'fifty' | t'ít'ólə | 'fawn' |
| lóx̣ʷəθət | 'cover oneself up' | cól̓q | 'fall' |
| məɬ mɬ́ qʷ | 'rough (of wood)' | sxʷóƛ̓qəl | 'pillow' |
| xʷlélɛ:mət | 'listen to s.o./s.th.' | θqé:t | 'tree' |

The root shapes of the language are more restricted than affixed or derived forms, like those seen in (1), however many roots are only realized as inflected or derived stems. The surface shapes in which the roots are realized depend largely on the various suffixes occurring with them.

The majority of monomorphemic free standing roots in Halq'eméylem are simple shapes: CVC and CəC are the most common, and the majority of the syllables are CV, Cə, CVC and CəC. Galloway lists the following possible root

shapes from his corpus of data, and uses an approximate percentage to indicate how common each shape is.

(2)

| Common root shapes (97.3% total) | | Rare root shapes (under .7% each) |
|---|---|---|
| CVC | 53.1% | CVCVCC |
| CVCVC | 19.9% | CCVC |
| CVCV | 8.3% | CVCCV |
| CVCC | 7% | CVCCVCC |
| CVCCVC | 2.8% | CVCVCCV |
| CVCVCV | 2.5% | CCVCVC |
| CV | 1.9% | CVCVCVCV |
| CVCVCVC | 1.8% | CCVCVCCVC |
| | | CCVCC (Galloway 1993:50) |

In this tally, Galloway does not differentiate between roots with schwa rather than full vowels, or those with long vowels. It is very notable, however, in this tally, that initial clusters are very rare in roots. Final clusters are not quite so rare.

Clusters are more common in derived and inflected forms, however, and according to Galloway, a maximal monosyllabic word in Halq'eméylem can have the shape #(s)(C)CV(:)(C)(C)(C)(s)# and a bisyllabic word could have the shape #(s)(C)CV(:)C(C)(C)(C)V(:)(C)(C)(C)(s)# (1993:49). As these shapes indicate, clusters do occur in the language. Whether these clusters are exhaustively parsed is the question the paper addresses.

Galloway's description of the mophophonemics of the language includes a description of consonant clusters. He records that clusters of two or three occur initially, medially and finally, and that clusters of four occur both medially and finally (1993:43). Interestingly, he also notes that the speech of one speaker differs from another in how many clusters they allow. Such variation suggests slightly different phototactic rules are used by each speaker in this aspect of Halq'eméylem phonology. This important observation also suggests that all members of a cluster are not necessarily parsed within the same syllable.

## 3 Onsets

This section offers support for the claim that neither initial OO cluster or initial OOO clusters in Halq'eméylem are tautosyllabic. Although onsets are required in a Halq'eméylem syllable, the target onset seems to be a simple one. This assumption can be made based on the infrequency of initial clusters seen in the root shapes in (2) and on the relative infrequency of initial clusters within the corpus of data examined for this paper.

The number of roots that surface without initial clusters far out number those that do, and the vast majority of clusters that do occur involve the

ubiquitous nominalizing prefix /s-/, which will be discussed again later. Only a limited number of words seem to surface with initial consonant clusters other than those involving the nominalizer, such as those in (3). For example:

(3) Initial clusters

| | | | | | |
|---|---|---|---|---|---|
| a. | ƛ̓cé:s | 'island' | i. | θqé:t | 'tree' |
| b. | qʷɬé:y | 'driftwood' | j. | sθ'qʷé:y[2] | 'trout' |
| c. | txʷə́m | 'be early' | k. | ɬc'é:ls | 'cut, slice' |
| d. | θq'é:ls | 'to spear' | l. | θqə́t | 'spear s.th.' |
| e. | q'θɛ:m | 'short memory' | m. | xʷlém | 'through' |
| f. | c'ƛ́ém | 'jump' | n. | kʷtéxʷt | 'let s.o. in' |
| g. | k'ʷxʸé:t | 'counting s.th.' | o. | tqét | 'close s.th.' |
| h. | pk'ʷə́m | 'fly or burst (dusty)' | | | |

Most of these forms are not roots. They are either nouns, or verb stems that have been affected by the transitive or intransitive endings which indicate how much control is exerted over the action of the verb. Galloway defines the relevant transitive markers as follows:

(4) Transitive markers

| | |
|---|---|
| -(ə)t ~ -ə́t ~ -á(:)t ~ -é(:)t | 'do purposely to s.th.' |
| -l | 'do accidentally, happen to/manage to do s.th.' |
| -(ə)xʷ | 'do purposely to s.th. or s.o.' |

(Galloway 1993:244)

Examples are given in (5) of how the addition of a transitive marker on a root results in an initial cluster in certain words.

(5) Effects of transitive markers

| | | | | | |
|---|---|---|---|---|---|
| a. | θə́q' | 'spear' | --> | θq'ə́t | 'spear it' |
| b. | x̣ʷə́t | 'tear' | --> | x̣ʷtét | 'tear s.th' |
| c. | **tq**ét | 'close s.th', | | | |
| d. | **q'x̣**átəl | 'to argue, harrangument' | | | |

In some words, like those in (5c-d), the roots do not occur at all without such a marker attached.

The possible free *roots* with onset clusters number only four from my corpus, since many of the stems in (3) are derived from verbs that would have been affected by transitive/intransitive markers. Those four roots with initial clusters are given in (6).

[2] Galloway writes the dental affricate as [θ'] in the inventory of Halq'eméylem.

(6) Roots with initial clusters

| | | | |
|---|---|---|---|
| ƛ̓cé:s | 'island' | θqé:t | 'tree' |
| qʷɬé:y | 'driftwood' | s-θ'qʷé:y | 'trout' |

This small number in itself suggests the language tends to avoid such constructions, and that they only occur in the language systematically as a result of vowel reduction. It is also possible that these roots are derived forms.

Even if it is the case that CC initial clusters are the result of vowel reduction due to inflection or derivation, the fact remains that a number of words do surface with two adjacent consonants word initially. Further more, the initial clustering as a result of the transitive suffixes is a common phenomenon in the language. Why would this process be so active if there were highly ranked constraints against initial clusters in the morphological word? However, even if the rest of the words which surface with initial stem clusters act as stems since the transitive markers may be considered part of the phonological base, these clusters are not necessarily complex onsets. The data examined here offers evidence that complex onsets are avoided in the language. Arguments based on the Sonority Sequencing Principle, reduplication patterns, forms which demonstrate alterations between a full vowel and a schwa, and markedness constraints are used in the section below as support to the claim that the language does not allow complex onsets in either roots or stems[3].

### 3.1 Obstruent-resonant initial clusters

If complex onsets were licit in the language we would expect that they would not violate the Sonority Sequencing Principle which only allows segments to rise in sonority in an onset, and fall in a rhyme. It looks, from the available data, that obstruent-resonant clusters are avoided in the language. Out of all the forms listed with initial clusters from within the corpus, only the following contain resonants in initial clusters.

(7) OR initial clusters

| | | |
|---|---|---|
| a. | xʷlém | 'through' |
| b. | xʷlélé:m (xʷ-lélé:-m) | 'listen'[4] |
| c. | ƛ̓lxʸélówɬ | 'jack spring salmon w/ black nose' |
| d. | sxʷlémélɛ | 'bottle' |
| e. | sxʷmélɛhé:lɛ | 'fishing basket, bait basket' |
| f, | swəlméyɬ (s-wəlm-éyɬ) | 'child of a dead sibling' |

[3] The s- prefix is attested before all consonants word initially, and so fits the profile of an appendix. This will be discussed further later on.

[4] The initial [xʷ] of the two forms in (6) could be attributed to the lexical prefix referring to the head. Prefixes are not considered part of the phonological stem, according to Czaykowska-Higgins (1996) and therefore it may not contribute to a complex onset. This explanation might apply to the word *xʷlélé:m* 'listen' but does not explain *xʷlém* 'through' in (7a) since there is no reference to the location the head.

| | | |
|---|---|---|
| g. | sxʷyə́mtəl | 'belt, sling, strap' |
| h. | swə́ltəl | 'net' |
| i. | swi(yə)qɛʔá:ɬ | 'boy (three or four years)' |

OR clusters occur in personal pronouns as well:

| | | | |
|---|---|---|---|
| j. | ɬ̓ləwə ~ | ɬ̓ələ́wə | 2 object of prepositional verb |
| k. | ɬ límət | ɬ-l-ímət | independent 1 pl |
| l. | ɬ wə́ləp | ɬ-w-ə́l-əp | independent 2 pl |

None of the forms in (7) are roots. In the data I have examined, there are no examples of OR clusters occurring in roots.

Although Galloway makes a note that in #CC clusters $C_2$ can be a sonorant, he comments that $C_2$ of an initial CCC cluster cannot be a sonorant, labial, glottal or sibilant, but $C_3$ can be anything $C_2$ is not (1993: 44-45). These comments seem somewhat inconsistent with the form in (7c), but are important in indicating no strict sonority sequencing pattern in initial clusters, which, in itself suggests the clusters are not tautosyllablic.

According to Galloway, voiceless obstruents in the language are unaspirated prevocalically after [s] and before syllabic consonants, like [l] and [m] (1993:17). This lack of aspiration provides evidence against the idea that voiceless vowels are realized in aspiration to break up clusters. However, if a resonant is syllabified, it is acting as the rhyme of the syllable and so is not part of an onset at all. Galloway states that [m] and [l] are always syllabified following an obstruent other than the nominalizing [s-] or [c-], as well as between two consonants (1993:23). If this is the case, the [l]'s in the examples in (7) must be syllabified, and are therefore are not part of a complex onset. They themselves become the syllable peak.

Further evidence that such clusters do not belong within the same syllable comes again from Galloway who provides examples of forms with OR clusters which alternate with forms with an intervening schwa:

(8) OR clusters alternating with OəR[5]

| | | | | |
|---|---|---|---|---|
| a. | kʷlá:t | ~ kʷəlá:t | 'hold s.th.' | |
| b. | kʷ'mləxʷ | ~ kʷə́mləxʷ | 'root' | |
| c. | sɬ áqʷm | ~ sɬ áqʷəm | 'breath' (nominal) | (1993:18) |

Two further pieces of evidence that the resonants are syllabic in this context are that they are able to carry stress, as the [m] does in (8b)[6]—even in a word with a following schwa vowel. According to Galloway's grammar, there are also words in the language which do not have overt vowels and therefore syllabic [m] and [l] act as the syllable peak like those in (9).

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[5] Galloway's original transcriptions are in narrow phonetics, the forms in (8) are not.

[6] Stress is marked on resonants by a preceding ['].

(9) Resonants [m] and [l] acting as syllable peaks

| | | | |
|---|---|---|---|
| a. | s'l̓a | 'older, oldest (of children)' | |
| b. | k'ʷq'ʷ'm | 'axe, hatchet' | |
| c. | q'lql | 'thief' | (1993:24) |

In the case of the forms in (7), however, like *xʷlém 'through'* and *xʷlélé:m 'listen'*, if the resonant acts as a syllable peak, the following syllable is left onsetless. An onsetless syllable in Halq'eméylem would be very rare since the language requires an onset to every syllable. It is possible, then, that the resonant can act ambisyllabically as the peak of the first syllable as well as the onset to the next, as Dyck has suggested in Squamish (2004). The form in (7a) then, might be phonetically realized as [xʷl.lém]. Whether or not the resonant is acting ambisyllablically, however, or is simply syllabified, it is not acting as part of a complex onset.

### 3.2 Obstruent-obstruent initial clusters

If Halq'eméylem does not allow onsets with rising sonority, like the OR clusters discussed in 3.1, why would the language allow the much more marked sequence of obstruent-obstruent clusters in its syllables? Again, we would expect if the language were to permit complex onsets, they would uphold the Sonority Sequencing Principle which states sonority rises towards the peak of the syllable. Yet, OO clusters do appear, as can be seen by the sample data given in (10). Other than the data seen in (7), all the remaining examples of words containing initial consonant clusters are those which consist of obstruent-obstruent clusters.

(10) Obstruent-Obstruent initial clusters

| | | |
|---|---|---|
| a. | xt'ə́t | 'put a spell on s.o.' |
| b. | θ'q'əɬxé:m | 'kneel' |
| c. | xɬə́m | 'tired' |
| d. | c'ɬé:mət | 'hear s.th.' |
| e. | q'xátəl | 'to argue, harrangument' |
| f. | ƛ̓cé:s | 'island' |
| g. | c'q'ʷət | 'poke s.th.' |
| h. | kʷté:xʷt | 'let s.o in' |

The OO clusters such as those in (10) occur in the following combinations:

(11) OO manner sequences

| | | | | | |
|---|---|---|---|---|---|
| F= fricatives | F P' | F P | | | |
| P= stops and affricates | F F | P' F | P F | | |
| '= glottalized | P P' | P' P | P' P' | P P | |

If we assume that fricatives are more sonorant than plosives, as they are according to the sonority hierarchy, many of these combinations violate the sonority sequencing principle. However, even if fricatives and plosives share the same sonority in the hierarchy, these clusters are still marked because they exhibit sonority plateaus (Clements 1990:287-290) which are often prevented in other languages through deletion or vowel insertion (Czaykowska-Higgins, Willett 1997). Therefore, to assume that these clusters are complex onsets would lead to the further assumption that even though the language does not allow OR onsets, which are unmarked and in keeping with the sonority sequencing hierarchy, it does allow marked sequences such as FP combinations and the sonority plateau of PP. Either way, these clusters are marked as onsets.

The next piece of evidence that the clusters are not complex onsets comes from universal markedness constraints. The issue of markedness arises with a look at the laryngeal specification of the obstruents involved in the OO sequences. Cross-linguistically, most onset clusters agree in laryngeal specification i.e. both elements would be ejective or neither would be. However, if the clusters do not coordinate, the less marked combination is for the plain obstruent to precede the ejective one (Czaykowska-Higgins & Willett 1997:393). However, Halq'eméylem does not seem to follow any set precedent as far as combining ejectives with non ejectives is concerned. I have listed the combinations below in (12).

(12) OO clusters

| plain-plain | ejective-ejective | plain-ejective | ejective-plain |
|---|---|---|---|
| $q^{w}ɬ$ | $c'\overset{\shortmid}{ƛ}$ | $θk'^{w}$ | $k'^{w}q^{w}$ |
| θq | θ'q' | $\underset{\shortmid}{x}t'$ | $k'^{w}\ x^{y}$ |
| $\underset{\shortmid}{x}ɬ$ | c'q' | θq' | $\overset{\shortmid}{ƛ}p$ |
| $tx^{w}$ | $θ'q'^{w}$ | $pk'^{w}$ | $\overset{\shortmid}{ƛ}\underset{\shortmid}{x}^{w}$ |
| $\underset{\shortmid}{x}^{w}t$ | $θ'k'^{w}$ | ɬc' | q'p |
| $q^{w}s$ | | | $q'\underset{\shortmid}{x}$ |
| $ɬ\underset{\shortmid}{x}^{w}$ | | | $\overset{\shortmid}{ƛ}c$ |
| $k^{w}t$ | | | c'ɬ |
| $pq^{w}$ | | | q'θ |
| tq | | | |
| $x^{w}p$ | | | |

Not only does the highly marked sequence of ejective-plain occur, these clusters seem to occur more frequently than the less marked combinations of ejective-ejective and plain- ejective. Why then, are these marked combinations allowed to occur in onset position again when unmarked sequences such as OR are not? According to the proposed analysis, this can be explained by assuming these clusters are not tautosyllabic.

The last piece of evidence that argues against the existence of complex onsets in Halq'eméylem is the strongest. Many of the stems or roots that occur with initial consonant clusters are documented by Galloway to alternate with

forms where a voiced schwa, or even a full vowel occurs between the two consonants of the cluster. Examples of alternations like these are given in (13).

(13) OO clusters alternate with OəO or OVO

| | | | | |
|---|---|---|---|---|
| a. | c'ƛ̓ém | ~ | c'ɬ̓əm | 'jump' |
| b. | θqé:t | ~ | θəqé:t | 'tree' |
| c. | k'ʷxʸé:t | ~ | k'ʷəxʸé:t | 'counting s.th.' |
| d. | tqét | ~ | təqét | 'close s.th.' |
| e. | pk'ʷə́m | ~ | pək'ʷə́m | 'fly or burst (dusty)' |

Coupled with the low number of stems with initial clusters, these alterations show how the language actually tends to avoid syllable initial clusters. If these clusters were strict complex onsets, they would not allow a schwa to be inserted between the two consonants forming them.

The discussion in this section so far has lead to the conclusion that the initial clusters which occur in Halq'eméylem are not complex onsets. The questions remain though: if all above arguments are correct, and the initial OO sequences are not parsed into the same syllables why is the process seen in transitive verbs so common? It is marked cross-linguistically for segments not to be parsed into syllables so why would a language create clusters which are not parsed into syllables? The answer may be that the traditional concept of a well formed syllable is not as important in this and possibly other Salish languages. Or it may be that our traditional idea of what a syllable is must also be re-examined. The initial member of an OO cluster is likely to be its own, simple syllable.

The following section discusses the relevance of morphological domain in allowable initial clusters in the context of Shaw's (2002) account of initial clusters in hən'q'əmin'əm' and the difference between OO clusters and OOO clusters.

## 4 Morphological root clusters vs morphological word clusters

The preceding section offers evidence that the initial clusters seen in Upriver Halq'eméylem are not tautosyllabic. By loosely following Shaw (2002) this section looks at the difference between initial clusters found within the morphological root domain (MRt), and those found within the morphological word domain (MWd) in Halq'eméylem. From the data examined here, it is clear there is a difference in the restrictions of OOO clusters vs OO clusters because the initial syllable in a CCC cluster must be /s/.

Shaw (2002) parses the hən'q'əmin'əm' morphological word as follows:

(14) [clitics [non-Redup prefixes [Redup, Plural [ROOT...
MWd MSt MRt

Her account of whether or not initial clusters are parsed exhaustitively suggests that [OO clusters in the MRt domain are tautosyllabic, but [OOO clusters in the MRt domain must be broken up with schwa epenthesis. Clusters outside of the MRt domain are not broken up with schwa epenthasis, and there is no evidence that they exist tautosyllabically. She suggests that obstruents in the MWd domain do not pattern as though they are parsed with the Os in the MRt domain, thus clusters outside the MRt domain are non-exhaustively parsed.

I make no such claims about Halq'eméylem at this time, but simply describe the difference between OO and OOO clusters. The data examined in this section suggests that slightly different constraints may surround clusters in Upriver Halq'eméylem than those in hən'q'əmin'əm'. The following discussion, coupled with the previous section still supports the idea of simple syllables.

## 4.1 Halq'eméylem OO and OOO cluster restrictions

The following Halq'eméylem roots are $C_1C_2$ or $C_1əC_2$ roots which are realized below with transitive suffixes. When uninflected, or at the end of a word, these roots will be realized as $C_1ə́C_2$ (Galloway 1993:246).

(15) MRt domain clusters

| | |
|---|---|
| [kʷqʷ -á:ləs | 'hit in the eye with a stick like object' |
| [ɬ xʷ -á:t | 'spit s.th' |
| [tq -ét | 'close s.th' |
| [xʷt -ét | 'tear s.th' |
| [θq' -ət | 'spear it (esp. fish)' |
| [xɬ -ət | 'beat s.o. up (hurt s.o)' |
| [ƛ̓xʷ -ət | 'cover s.th or s.o (with s.th clothlike) |
| [ƛ̓xʷ -ət | 'win it (race, game)' |
| [q'p -ət | 'gather/collect s.th, pick it up' |
| [qʷs -ət | 'launch or push s.th into water' |
| [xʷp -ət | 'pick s.th up from floor or ground' |
| [xt' -ət | 'put a spell on s.o' |
| [ƛ̓p -í:l | 'descend/go down' |

Like hən'q'əmin'əm', Halq'eméylem allows OO clusters to occur within the MRt, but I have no evidence that OOO clusters are allowed in the MRt domain.

As established in the previous section, the sonority of the members of the cluster plays no role in determining allowable clusters, however, to a certain extent the constraints surrounding which consonants can cluster do follow the OCP. Each member of a cluster must be distinct from the other in either place or manner. However, in general, there are few restrictions governing theses root internal OO clusters as long as each member can easily be perceived as different from the other.

As Galloway has attested, OOO clusters occur within the MWd domain, as can be seen in the examples in (16) below. But as previously mentioned, $C_1$ of an OOO initial cluster is always /s/.

(16) OOO initial clusters

| | | |
|---|---|---|
| [s- | [ɬ q'é:cəs - s | 'five o'clock' |
| [s- xʷ- | [ʔáθəs - xʸəl | 'sole of foot' |
| [s- xʷ- | [ʔáθəs - cəs | 'palm of hand' |
| [s- | [θ'qʷé:y | 'trout' |
| [s- | [ƛ̓p'-élqəl | 'long feathers' |
| [sxʷ- [qí- | [qəx̣á - θət | 'sled, toboggan, ice skate' |
| [sxʷ- | [ʔéθ-ələc | 'bottom of anything' |
| [sxʷ- | [t'éɬ | 'bridge made of small logs' |
| [sxʷ- | [θ'émq-əls | 'scissors' |
| [sxʷ- | [ƛ̓áxʸ-ələp | 'a plow' |

Again, there are a very limited number of forms which contain OOO clusters, but those that do are strictly constrained. Even in the very rare CCC clusters which include resonants, $C_1$ is always /s/.

(17) CCC clusters

| | |
|---|---|
| sxʷ-lɛ́m-ɛ́lɛ́ | 'bottle' |
| sxʷ-mɛ́lɛ-hɛ́:lɛ́ | 'fishing basket, bait basket' |
| sxʷ-yə́m-təl | 'belt, sling, strap' |

According to data like that in (16) there are more restrictions in clusters The two nominalizing prefixes /s-/ and /sxʷ-/ are two examples of prefixes creating clusters across the MRt domain, in the MWd domain. Other consonant-only prefixes include, but probably are not limited to the following:

| | | |
|---|---|---|
| ɬ- | 'use, extract a portion of' | |
| c- ~ c'- | 'be/have colour' | |
| xʷ | 'pertaining to the head' | (Galloway 1993:198) |

These prefixes, along with the nominalizing prefixes would all occur outside the MRt domain, but none of them are attested as an allowable $C_1$ in a CCC cluster—only /s/ is attested in that position.

These circumstances, illustrated again in (18) by Galloway's formalization of possible monosyllabic or bisyllabic word shapes, suggest that /s/ is an allowable appendix consonant both word initially and word finally, in a similar way to English /s/.

(18) maximal monosyllabic word shape: #(s)(C)CV(:)(C)(C)(C)(s)#
maximal bisyllabic word shape:
#(s)(C)CV(:)C(C)(C)(C)V(:)(C)(C)(C)(s)#

Thus the segment /s/ when found on the edges of clusters is external to the parsed syllable.

## 4.2 Reduplication patterns

Another difference between clustering patterns in Halq'eméylem than those in hən'q'əmin'əm' is that of reduplication patterning. Unlike hən'q'əmin'əm', Halq'eméylem does not display a pattern where $C_1$ and $C_2$ of a cluster are both reduplicated. Halq'eméylem has a number of reduplicative patterns, but none reduplicate initial clusters. In fact, following (Czaykowska-Higgins, Willett 1997), infixing between $C_1$ and $C_2$ of an initial cluster can be used as an argument that such clusters are not tautosylalbic. The lack of such a pattern that does copy both initial consonants coupled with reduplication patterns which result in word forms where such clusters are divided can be seen as further evidence that OO initial clusters in Halq'eméylem are separate, simple syllables.

(19) Dividing clusters via reduplication

| | | |
|---|---|---|
| -$R_1$- | (-$C_1$ə- after $V_1$) | |
| | s-θ'q$^{w}$é:y ~ s-θ'əq$^{w}$é:y | 'trout' |
| | sθ'əθ'əq$^{w}$é:y | 'a lot of trout' |
| $R_3$- | ($C_1$ə$C_2$-) | |
| | c'q'$^{w}$ə́t | 'poke s.th/s.o' |
| | c'əq'$^{w}$c'əq'$^{w}$t | 'poking s.o/s.th many times' |
| | c'ƛ̓ə́m ~ c'ɬƛ̓ə́m | 'jump' |
| | ƛ̓ə́mƛ̓ə́m-x$^{y}$əl | 'grasshopper' (bk formation) |
| | c'ɬc'ə́ƛ̓ə́m | 'jumping' |
| $R_4$- | ($C_1$ɬ-) | |
| | c'ɬ é:m | 'hear' |
| | c'ic'ɬ é:m ~ c'əc'ɬ é:mət | 'hearing' |
| | q$^{w}$ɬ é:y | 'driftwood' |
| | q$^{w}$ə́q$^{w}$əɬ iy | 'lots of little driftwood' |
| | θqé:t | 'tree' |
| | θɬθqət | 'little tree' |
| | θə́θəqət | 'thicket' |
| $R_4$- | ($C_1$ l-) | |
| | θk$^{w}$'ə́t | 'pull/stretch s.th' |
| | θəθk$^{w}$'ɬtəl | 'have a tug of war' |
| | q'x̣átəl | 'argue' |
| | q'əq'x̣é̓t | 'argue with s.o' |

(Galloway 1993: 133-160)

This evidence supports the unmarked status of a simple onset, since simple onsets are the target shape of these patterns and the reduplicant shapes break up these clusters.

The preliminary discussion in this section is a starting point for an analysis which may either conflict or correspond with that of Shaw (2002). At this point, however, the data listed here supports the claim that neither OO clusters, OOO clusters, or clusters involving resonants are tautosyllabic. However, other than the syllable appendix /s/, it may be possible that the segments belonging to theses clusters might be exhaustively parsed. (An analysis addressing this idea will be not be developed here.) The following section looks at final clusters in Halq'eméylem and determines whether or not they can be analyzed as complex codas.

## 5 Codas

Halq'eméylem demonstrates somewhat different behaviour in its final clusters than in its stem initial consonant clusters. Galloway states three member final clusters are attested, but mostly across morpheme boundaries. He records the existence of RO and OO final clusters as well, and he states that the $C_1$ of the cluster is almost always a resonant, and if the second consonant is an ejective, the first consonant of the cluster must be a resonant. In all of these clusters there is an avoidance of glottalized consonants in either first or last position ($C_1$ or $C_3$) and sonorants are avoided in any position but $C_1$ (1993:47). The forms in (20) are examples listed by Galloway of complex final clusters.

(20) Word final clusters

| | | |
|---|---|---|
| a. | / cɛɬ təlɛ́-wtxʷ-s/ | 'his/her/their smokehouse, fish smoking building' |
| | / cɛhɛyəɬ ɛ́-wtxʷ-s/ | 'his/her/their church' |
| | *-ɛ́wtxʷ* 'building/room' | *-s* 'third person' |
| b. | /xʸə́p-qs-t/ | 'sharpen the point of s.th. (*xʸip* 'carve, trim, taper') |
| | /ʔə́x̣-qs-t/ | 'scratch on the nose' (*ʔíx̣* 'scratch, scrape') |
| | *-qs* 'on the nose or point' | *-(ə)t* purposeful control transitive mrk. (Galloway 1993: 48) |

According to this limited data set, however, final clusters are uncommon like initial clusters, consisting of just over 7% of root shapes according to Galloway's calculations. Unlike in initial clusters, however OO final sequences are not at all common. Final RR and OR sequences are not found, and OO clusters are very rare, but RO sequences are allowed. This section proposes that RO sequences are well-formed complex codas in Halq'eméylem.

My corpus of data only includes the following word final clusters—some of these words may not be roots after all.

(21) Root final clusters

| | | |
|---|---|---|
| a. | smé:lt | 'rock, mountain' |
| b. | qʷá:mθ' ~ qʷámθ' | 'lump' |
| c. | skʷɛ́:lx̣ | 'young bald eagle' |
| d. | hɛ́:wt ~ hɛ́wt | 'rat, vole' |
| e. | sqɛ́:wθ | 'potato' |
| f. | x̣ɛ́:ls | 'Transformer' |
| g. | sxə́lƛ̓ | 'feather' |
| h. | qɛ:ys | 'lately, recently' |
| i. | cə́lq | 'fall' |
| j. | ƛ̓ɛ́qt ~ ƛ̓ɛ́lqt-ələc | 'long' |
| k. | x̣ə́lc' | 'twist, turn around' |
| l. | st'ɛ́:lq | 'irregularly spotted' |
| m. | hɛ́lkʷ | 'pocket knife' |
| n. | sc'ɛ́:yxʷ | 'be dried' |

In the case of the two words in (22), the root surfaces with an apparent complex coda and an intransitive (reflexive) marker attached. The $C_1C_2$ clusters in (22) are still acting as codas since -θət acts as a syllable on its own. Therefore, I will include these forms in my discussion as well.

(22) xʸɛ́lxʷ-θət 'to cool off (person)'
q'ʷíyx̣-θət 'refl. shake, bob about'

The small number of forms suggests the language seems to avoid such clusters. Almost all of the above forms occur in resonant-obstruent sequences, OO final clusters only occur very infrequently in roots. In the data above, only (21j.), *ƛ̓ɛ́qt 'long'* contains an OO final cluster[7].

## 5.1 Comparison with Həlʔq'əmíʔnəmʔ -Qə́wʔəcem final clusters

The situation found in Upriver Halq'eméylem is very different than that found in the closely related Hul'q'um'i'num', examined by Bianco (1996). Bianco's analysis examines the sonority of Hul'q'um'i'num' syllables in her search for why VPP sequences are allowed in coda position, as are əPP and əFP, but not *VFP, *OR, *RO, or *RR. She assumes schwa is always epenthetic, as it is in most Salish languages, and that it is not as sonorant as a full vowel.[8]

[7] The word *məł mə́ł qʷ 'rough'(wood)* is also an exception, but I am hesitant to include it because it is a reduplicated form and I have not found its root occurring free standing.
[8] It has been claimed by Shaw et.al. (1999) and Shaw (2002) that schwa has no moraic weight. Though it is evident that schwa is a less sonorant syllable peak than a full vowel

Thus if a syllable has a full vowel and contains a coda consonant that also has a certain level of sonority, the language requires a schwa to be inserted to create another syllable rather than allowing that syllable too much sonority. In other words, Bianco claims syllable shape is restricted by the sonority of the components.

Unlike Bianco's account of Hul'q'um'i'num', when root shape and schwa distribution in Halq'eméylem syllables is examined, the evidence suggests that the sonority of the syllable does not affect allowable clusters the same way. Following Bianco's method of analysis, I examined the 3C roots that hold final clusters as well as those that do not in order to try to determine in which environments schwa must occur. Below in (23) I have listed what I assume to be the three C roots from the corpus that either end in clusters or a heavy schwa syllable.

(23) Roots ending in CC or CəC.

| CV:CC | CVCC | CəCC | CəCəC | CVCəC | CV:CəC |
|---|---|---|---|---|---|
| hé:wt ~ | héwt | x̣ólc' | t'ámaq'ʷ | xíməl | ʔí:məθ |
| sqé:wθ | q'ʷíyx̣-θət | cálq | ʔəmát | t'éyaq' | stá:ləs |
| qʷá:mθ' ~ | qʷámθ' | | sqámal | ʔéləxʸ | sp'é:q'əm |
| sk'ʷé:lx̣ | xʸélxʷ-θət | | θ'ápaq | lélám | stí:wəl |
| st'é:lq | ƛ̓éqt~ ƛ̓élqt-ələc | | qálám | xʸéwaq | sc'á:məqʷ |
| x̣é:ls | x̣éym-ət | | ƛ̓áləq'ʷ | míməl | yá:səqʷ |
| qé:ys | mélq-l-əxʷ | | t'ələs | sq'áxʸəl | swé:yál |
| sné:lt | x̣ɛyl-əx̣ | | sláxʷał | θámál | θá:θəl |
| | x̣éywát | | qʷáx̣əm | θ'íwál | |
| | | | láp̓əc | k'ʷét'əl | |
| | | | x̣ʷáləkʷ-t | cékʸət | |
| | | | t'ał əqʷ-t | c'éc'əs-əm | |
| | | | t'áləs-t | swéqəθ | |
| | | | θ'əx̣át | méc̓əl | |
| | | | | mát'əs | |

in Halq'eméylem and cross-linguistically, I assume schwa has weight in Halq'eméylem for the following reason: If there are moraic codas in the language and schwa did not hold a mora, but a full vowel did, we might expect that full vowels be avoided in syllables with RO final clusters in order to avoid heavy syllables. But within the data this paper examines the number of Halq'eméylem roots shaped CVRO is equal to those shaped CəRO, and it is common for a long vowel to precede a resonant coda as well.

It appears from the root shapes listed above that there is indeed an aversion to OR and RR final clusters in the language. However, these forms also suggest that long vowels are most often found preceding a resonant[9]. Abbreviations are given below to allow the root shapes in (23) to be categorized into more general shapes in order to illustrate the kinds of final clusters found in Halq'eméylem roots.

(24) Abbreviations

| | | | | |
|---|---|---|---|---|
| R = Resonants: | L = Liquid | O = Obstruents: | F = fricative | |
| | N= nasal | | P = Plosive | |
| | G = Glide | | | |

(25) Root shapes

| CV:CC | CVCC | CəCC | CəCəC | CVCəC | CV:CəC |
|---|---|---|---|---|---|
| CV:GF | CVGP | CəLP | CəNəP' | CVNəL | CV:NəF |
| CV:LF | CVGF | CəLP | CəNəP | CVGəP' | CV:LəF |
| CV:LP | CVNP' | | CəNəL | CVLəF | CV:PəN |
| CV:LF | CVLF | | CəPəP | CVLəN | CV:GəL |
| CV:GF | CVPP | | CəLəN | CVGəP | CV:NəP |
| CV:LP | CVGN | | CəLəP' | CVNəL | CV:FəP |
| | CVLP | | CəLəF | CVFəL | CV:GəL |
| | CVGN | | CəFəF | CVNəL | CV:FəL |
| | | | CəFəN | CVGəL | |
| | | | CəPəP | CVP'əL | |
| | | | CəLəP' | CVPəP | |
| | | | CəFəP' | CVP'əF | |
| | | | CəPəN | CVPəF | |
| | | | CəLəF | CVPəL | |
| | | | CəFəP | CVP'əF | |

Distribution of schwa in 3C roots:

| | | |
|---|---|---|
| CəRəO | CVRəR | CV:RəR |
| CəRəR | CVRəO | CV:RəO |
| CəOəR | CVOəR | CV:OəR |
| CəOəO | CVOəO | CV:RəO |

The categorization of root-final clusters in (25) indicates how many of each root shape appeared, and which root shapes are not found at all.

[9] It is possible that CV'R > CV:R (Urbanczyk personal communications 2004).

| | | | |
|---|---|---|---|
| **licit root shapes:** | 1 CVOO<br>4 CVRO | 6 CV:RO | 4 CəRO |
| **illicit root shapes:** | *CVRR<br>*CVRO | *CV:RR<br>*CV:OR | *CəRR<br>*CəOR |

According to the data in (23) and the patterns determined in (25), Halq'eméylem is like Hul'q'um'i'num' in that it does not allow for OR or RR final clusters. Such a combination always has a full scwha in between $C_2$ and $C_3$. However, Halq'eméylem does allow RO final clusters and seems to avoid OO clusters, whereas Hul'q'um'i'num' only seems to allow PP final clusters (with a full vowel) because plosives are the least sonorous segments.

Because $C_2$ and $C_3$ of roots ending in both CC and CəC can be a resonant and an obstruent, in that order, regardless of the quantity of the preceding vowel, it would be difficult to argue for an analysis like that of Bianco's for Hul'q'um'i'num'. In Halq'eméylem the vowels in the root, V, V: or ə, seem to act the same way in regards to syllable structure which suggests different constraints are active in Halq'eméylem syllable structure than in Hul'q'um'i'num'.[10]

The root shapes examined in this section suggest that an RO combination in final position is a perfectly legitimate coda in the language. Those clusters do not violate the sonority sequencing hierarchy, unlike their word initial counterparts. In fact, there is nothing very marked about final RO clusters at all since they do not display unusual laryngeal specification and are in keeping with Clement's claim that in many languages, syllables would prefer to be open, but if closing, prefer to do so with small drops in sonority (1990:301). The sonority of these syllables does drop gradually with RO. Therefore, it seems that Halq'eméylem allows for complex codas under the specific shape constraint of RO.

The next section brings up the issue of whether complex final clusters are parsed into syllables or not when they occur outside the root domain.

## 5.2 Final clusters in suffixes

Since final OO clusters are so rare in roots, they could be considered just exceptions, but such clusters are not so rare in inflected, derived, and suffixed forms. Like in the discussion of initial clusters, it must be addressed that final clusters do occur more frequently in suffixes and across morpheme boundaries than they do in roots. This occurrence suggests that like CCC

[10] As previously mentioned, according to my corpus, a long vowel is even more likely to occur in a syllable with a final RO cluster than either a scwha or a full vowel. According to Bianco's account, a CV:RO syllable would hold a much higher sonority level than a CəRO. It is likely that a schwa between an R and O in $C_2$ and $C_3$ position may be a phonemic schwa in Halq'eméylem, since the environment is not necessarily predictable like it is in Hul'q'um'i'num'.

clusters in initial position, the morphological boundaries correlate with different phonological restrictions. The root may allow RO complex codas, but not OO complex codas, while general constraints on final clustering are less restrictive.

Halq'eméylem has lexical suffixes which end in consonant clusters, and often the addition of the transitive or intransitive markers create final clusters in verb stems as well. As seen in (26) and (27), both the suffixes and the verb stems occur with final RO and OO clusters.

(26) Lexical suffixes

| | | |
|---|---|---|
| -əɬ p | 'tree,/plant' (very productive) | -əOO |
| -ɬ:ws | 'on the body' | -V:RO |
| -ˊ(l)qs | 'point, nose, extended bit' | -(R)OO |
| - ɛ́:wtxʷ ~ -əwtxʷ ~ - ɛ́ltxʷ | 'house, building | -V:ROO |

(Galloway 1993:203)

(27) Verb stems with [-əls] intransitive mrk, or [-t] transitive mrk

| | | |
|---|---|---|
| t'əm-ə́ls | 'adze, chop' | CəRəRO |
| pá:y-t | 'bend s.th.' | CV:RO |
| x̣ələ́q'-t | 'open one's eyes' | CəRəOO |
| xə́ləkʷ-t | 'wrap s.th.' | CəRəOO |
| cá:l-t | 'follows.o' | CV:RO |
| yə́θ-t | 'talk about s.o' | CəOO |
| θíy-t | 'make s.th' | CVRO |
| c'í(:)yxʷ-t | 'dry s.th' | CV:ROO |
| sə́wq'-t | 'seek s.th' | CəROO |

Consonant clusters occur word medially as well, as previously mentioned, however, note that the clusters in the forms below conform to the allowable root shape of CVRO.

(28) Word internal coda clusters

| | |
|---|---|
| xʸɛ́lxʷ-θət | 'to cool off (person)' |
| q'ʷíyx̣-θət | 'refl. shake, bob about' |

Thus it has been established that although the final OO clusters are not common, they do surface both in derived forms and in roots as is indicated by the data in (26) –(28). Like intial clusters, there are certain co-occurrence restrictions found in the final OO clusters. As can be seen below, the OO clusters from the words above are constrained by perceptional difference—they always differ either in place or in manner.

(29)

| OO clusters | FP | PF | PP |
|---|---|---|---|
| | ɬ p | qs | q't |
| | xʷt | txʷ | k'ʷt |
| | θt | | qt |
| | st | | |

It is difficult to make generalizations based on such a small number of forms, but like the initial OO clusters, the sequencing is not entirely dependant on sonority, since two examples out of nine violate the Sonority Sequencing Principle by occurring with a less sonorant plosive closer to the nucleus than the more sonorant fricative. One of these cases could be accounted for by the assumption that /s/ is an appendix and therefore plays no part in the syllable structure. The other observation that should be made is that the final member of the OO final cluster is often a coronal consonant.

Forms like those seen in (20), especially */xʸə́p-qs-t/ 'sharpen the point of s.th.'*, are exceptional in that their final clusters consist of more consonants than others examined here, and also in that they do not follow the pattern of RO, or ROO that most of the other clusters follow. On one hand, due to the number of consonants involved in a cluster like those in (20), it seems unlikely that such a cluster could be an allowable coda consonant. However, on the other hand, it is also important to note that none of the final clusters are listed as alternating with forms that surface with a realized schwa between.

The clusters which alternate with schwa are the strongest piece of evidence that initial OO clusters are not complex onsets. No such strong piece of evidence argues against tautosyllabic final clusters. At this point, the lack of alternation with such forms as well as the general abidance with the sonority sequencing principle suggests that complex codas are allowed in Halq'eméylem. The restrictions on those complex codas, however, are still to be determined.

## 6 Conclusion

It is clear that more must be done in order to determine the true nature of the Halq'eméylem syllable. Brief comparisons between accounts of closely related hən'q'əmin'əm' and Hul'q'um'i'num' provide insight of how morphological boundaries and sonority may affect syllables and allowable clustering in Halq'eméylem, but at the same time show that each language is different in its prosodic constraints.

From the data examined in this word, evidence suggests initial clusters in the language are not tautosyllabic, but final clusters might be. In both initial clusters and final clusters the segment /s/, when found on the outside of a cluster, is not parsed as part of the syllable--it is an appendix consonant. The account given in this paper, is very preliminary, however, and needs further examination.

It is possible that the nature of the phonological nature of the morpheme plays a role in whether or not the cluster is parsed tautosyllabically. I project this possibility based on two more forms from Galloway's grammar, given in (30), where final clusters are formed with root consonants when prefixed.

(30) Roots as final clusters

| | | | | | | |
|---|---|---|---|---|---|---|
| lə́kʷ | 'break (of bone or stick)' | → | hɛ́lkʷ | 'pocket knife' | | |
| yə́qʷ | 'burn' | → | hɛ́yqʷ ~ | hɛ́yəqʷ | 'burning, fire' | |

This kind of data suggests that the sonority of root consonants may determine their shape in derived or inflected forms. Such a possibility also needs to be examined further.

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