

Reduplicative Morphemes and Their Non-reduplicative Allomorphs in Stratal OT: Stem-Level and Word-Level Reduplication in Hul'q'umi'num'

Gloria Mellesmoen

1. Introduction

Non-concatenative morphology poses challenges for L2 learners in language revitalization, as well as for linguists working toward cross-linguistically robust theory. However, linguists can use theory-informed predictions to contribute to a richer understanding of understudied languages, which then, in turn, can inform language revitalization strategies. Understanding how non-concatenative allomorphs are stored, selected, and realized through the lexicon and phonological grammar is an important step to inform the creation of pedagogical materials.

In the present paper, I explore (1) whether Stratal Phonology (e.g., Bermúdez-Otero 2018) is an appropriate framework for the analysis of verbal reduplication in Hul'q'umi'num', (2) whether Hul'q'umi'num' verbal reduplication supports predictions informed by Stratal Phonology, and (3) implications Stratal Phonology has for language revitalization.

The predictions that Stratal Phonology makes for allomorphy at a stem-level and a word-level are given in Section 2, and the Hul'q'umi'num' imperfective and plural non-concatenative morphemes are described in Section 3. Section 4 summarizes the differences between stem-level and word-level allomorphy, and the implications of distinguishing stem-level and word-level morphemes in Stratal Phonology are discussed in Section 5, which also raises questions about how the grammar is learned and the role of input in acquiring non-concatenative morphology.

Overall, the Stratal Phonology framework allows for good analytical coverage of non-concatenative morphological processes in Hul'q'umi'num'. In turn, the Hul'q'umi'num' data not only supports a distinction between stem-level and word-level processes, but also provides examples of the ways non-concatenative morphology may be realized at different strata in the same language, which can inform future research in theoretical and applied linguistics.

2. Stratal OT: Stem-Level and Word-Level Allomorphy

Stratal Phonology has been used to account for complex multiple reduplication patterns in several languages, including Nuuchahnulth (Stonham 2007) and Hul'q'umi'num' (Mellesmoen & Urbanczyk 2020a). Strata-based approaches to phonology are particularly apt for explaining the apparent ordering of morphological processes (relative to each other) in word derivation (see Kiparsky 2015). However, Stratal Phonology makes further predictions about the strata themselves and how allomorphy might be realized at different points in the derivation.

Stratal OT diverges from other serial approaches, such as Harmonic Serialism (e.g., McCarthy 2000), because it allows constraint rankings to differ throughout the derivation (at each strata). However, the predictions of Stratal Phonology go beyond a difference in constraint rankings. The nature of the strata is inherently different. Bermúdez-Otero (2012) proposes that the stem-level involves nonanalytical stored stems and that the word-level is fully analytical with respect to word formation. Though the stem-

* Gloria Mellesmoen, University of British Columbia, gloria.mellesmoen@ubc.ca. Thank you to the audience at WCCFL for insightful questions and suggestions regarding this project. Thank you to the Salish Working Group, ʔayʔajuθəm Lab, Henry Davis, and Suzanne Urbanczyk for their feedback and support.

level is largely nonanalytical, speakers also have a grammar of generalizations that holds over the lexicon. Characterising stem-level processes as nonanalytical is also ideal for handling irregular morphology. This approach has the additional benefit of still allowing the flexibility for productivity, as speakers still have a grammar of generalizations in addition to their stored forms and therefore can generate novel forms when needed.

Setting aside the advantages of adopting a framework that allows for serial derivation that are not specific to any one approach, such as how opacity and apparent ordering are handled, the prediction that Stratal Phonology makes, and what sets it apart, is that it predicts that different kinds of allomorphy will be possible at each stratum. A few more specific assumptions can be drawn about reduplication and non-concatenative morphology at a stem-level and at a word-level. First, reduplication may be realized differently at the stem-level and the word-level, and this is not necessarily a result of their relative order. In other words, the differences that arise between stem-level and word-level morphology may involve differences beyond what arises because the stem-level derivation occurs sequentially before the word-level derivation. Second, the differences between stem-level and word-level morphology may reflect differences beyond constraint order. While Stratal OT allows for constraints to be ranked differently at a stem-level and a word-level, the (synchronic) constraint rankings will have less of an impact on stem-level derivation and the inherent differences between the stem-level and word-level grammar may motivate divergent patterns.

In this paper I test two specific predictions that arise under Stratal Phonology about allomorphy at a stem-level and at a word-level. First, I predict that there will be more apparent “exceptions” (or exceptional allomorphy) at a stem-level than a word-level, consistent with a number of stored non-analytical forms. Given that the stem-level involved stores forms, the stem-level may host a greater amount of lexical residue from older phonological processes and this will give rise to a number of more idiosyncratic forms than those at the word-level. If morphemes at the word-level are treated in an analytical manner (as Bermúdez-Otero 2012 suggests), word-level morphemes should show greater phonological regularity and permit fewer exceptions. The second prediction is that there will be more distinct (phonologically unrelated) allomorphs at a word level, but these will be more phonologically regular in implementation, reflecting the insertion of different allomorphs at word-level with fully analytical derivation.

The two predictions are borne out in Hul’q’umi’num’; the inclusion of stored nonanalytical stems in a system with analytical word-formation processes allows for good coverage of the data. Further, the Hul’q’umi’num’ data shows clear differences between stem-level and word-level reduplication, and Stratal Phonology is a practical framework for analysing non-concatenative morphology.

3. Hul’q’umi’num’ Reduplication Patterns

Hul’q’umi’num’ (Island Halkomelem, Salish) is a critically endangered language spoken by Indigenous peoples in British Columbia, Canada. There are an estimated 93 L1 speakers across the three dialects of Halkomelem as of 2018, and approximately 1238 active learners (FPCC 2018). Language teaching and learning, as well as documentation and description, is a priority for Hul’q’umi’num’.

The two non-concatenative patterns considered in this paper are the plural and the imperfective, which each have reduplicative and non-reduplicative allomorphs. While plural reduplication can also apply in the nominal domain, the focus of this paper is on verbs. Assumptions about underlying forms come from Mellesmoen and Urbanczyk (2020a), who use Stratal OT and highlight that serial derivation is required to predict the correct output. Imperfective reduplication is considered to be a stem-level process and plural reduplication is a word-level process.

3.1. Imperfective Reduplication (Stem-Level)

The imperfective aspect in Hul’q’umi’num’ is marked by reduplication (1a-b), ablaut (1c), metathesis (1d), infixation (1e), aspiration of a sonorant (1f), or schwa insertion/deletion (1g). Previous analyses highlight that this wide range of allomorphs is hard to reconcile under a unified phonological analysis, which motivates selecting only a subset to analyse (Zimmermann 2013), or adopting a

relational approach based on analogy between words (Urbanczyk 2011). However, Mellesmoen and Urbanczyk (2020b) observe that all of the allomorphs involve the addition of a mora, and therefore the imperfective morpheme can be analysed as the affixation of a mora and different strategies may be used to fill the mora. Allomorph choice is determined by phonological, morphological, and lexical factors.

(1) Imperfective Allomorphy (Mellesmoen & Urbanczyk 2020b, from Hukari and Peter 1995)*

	Perfective		Imperfective		Allomorph
a.	líçət	‘cut it’	líłçət	‘cutting it’	C ₁ V- reduplication
b.	té:m̄	‘call, holler’	təté:m̄	‘calling, hollering’	C ₁ ə- reduplication
c.	lǝpʰt	‘slurp it’	lǝpʰt	‘slurping it’	ablaut
d.	pqʷát	‘break it’	páqʷt	‘breaking it’	metathesis
e.	hésəm	‘sneeze’	héʔsəm	‘sneezing’	glottal stop infix
f.	lǝçət	‘fill it’	hǝlçət	‘filling it’	sonorant aspiration
g.	látǝqʷəm	‘snore’	látqʷəm	‘snoring’	schwa deletion

All the imperfective forms in (1) involve the affixation of a mora, even where a /ə/ is omitted in the surface form (1g). Coda consonants are assumed to be moraic and /ə/ is not, following other analyses of Salish languages (e.g., Blake 2000), which means that the perfective in (1g) has two moras (lá_μ.tǝ.qʷəm_μ) and the imperfective has three (lá_μl_μ.qʷəm_μ). Thus, while the surface forms of the imperfective morpheme may look unrelated on first examination, they can be traced back to a single underlying affixed mora in the input. The phonological connection (shared input) suggests that the allomorphy may have arisen from a diachronic source: the ideal way to fill a mora has changed over time. This explains why some forms are morphologically or lexically conditioned, while those that are predictable reflect a phonologically regular grammar of generalizations (and what would be applied to loanwords). The phonologically regular patterns (including reduplication and ablaut) include a bulk of imperfective forms, which is consistent with what is predicted at the stem-level as it reflects a distributional frequency across lexical items and learners can form a constraint ranking based on those generalizations.

3.2. Plural Reduplication (Word-Level)

Plural allomorphy comes in two flavours: a prefixed C₁C₂ reduplicant (an affixed syllable) (2a) and an infixed *-l-* (2b). Unlike the imperfective forms in Section 3.1, there is no phonological generalization or similarity that connects the two sets.

(2) Plural Allomorphy (Mellesmoen & Urbanczyk 2020a, from Hukari and Peter 1995)

	Singular		Plural	
a.	tíləm	‘to sing’	tǝl-tíləm	‘they sing’
	lémət	‘to look at s.t.’	lǝm-lémət	‘to look at them’
b.	ném	‘go’	nǝlǝm	‘they go’
	técəl	‘arrive, reach’	tǝlǝcəl	‘arrive PL’

The plural forms in (2a) and (2b) are better analysed as two separate allomorphs (an affixed syllable and a *-l-* infix). One of the allomorphs is inserted and then the word-level phonological grammar applies. While affixing a mora in the imperfective does not need to result in reduplication, inserting a syllable at the word-level always results in reduplication. This follows from the fact that word-level derivations are purely analytical, and therefore a one repair strategy is preferred to fill an affixed syllable.

4. Stem-Level and Word-Level Allomorphy

Predictions about stem-level and word-level allomorphy in Hul’q’umi’num’ are borne out. A summary is provided in the table below, which shows how a single input at the stem-level maps to multiple allomorphs on the surface in forming imperfectives, and the choice of surface form is

determined by a combination of conditioning factors, including lexical factor. At the word-level, there is a choice between two input allomorphs (a syllable or *-l-*), but the phonological grammar is applied in a systematic way to yield output forms that are phonologically predictable and regular.

		Input	Surface Allomorph
Stem-Level <i>Imperfective</i>	Phonologically, morphologically, or lexically conditioned	mora	reduplication, ablaut, metathesis, infixation, aspiration of a sonorant, or schwa insertion/deletion
Word-Level <i>Plural</i>	Phonologically regular	Syllable <i>-l-</i>	reduplication infixated <i>-l-</i> (with schwa epenthesis where motivated by the grammar)

The first prediction was that more apparent “exceptions” (or “exceptional” allomorphy) is be tolerated at a stem-level reflecting the insertion of stored nonanalytical forms. At the word-level, there should be fewer irregularities and lexicalized exceptions because it is predicted that word formation is analytical at this stage. If stems are stored nonanalytically and the Hul’q’umi’num’ imperfective applies at a stem-level, as is possible in Stratal Phonology, a greater number of allomorphs can be accounted for under a single analysis. The observed range of “exceptional” allomorphy fits with the first prediction. In comparison, the plural morpheme does not have as many idiosyncratic forms. It is a choice between two allomorphs: an affixed syllable (filled by reduplication) and the *-l-* infix and it does not show the same degree of sensitivity to the identity of the lexical item.

The second prediction was that there could be more distinct (phonologically unrelated) allomorphs at a word-level, but these would be more phonologically regular, reflecting the insertion of different allomorphs at word-level with fully analytical derivation. The choice of an affixed syllable (filled by reduplication) and the *-l-* infix to mark the plural is consistent with this prediction. After selecting an allomorph, the derivation is phonologically regular and fully analytical. This is different when contrasted with the imperfective patterns. The imperfective shows a wider range of allomorphs on the surface, but each of these can be derived from the same input (an affixed mora). In other words, despite the large number of surface forms associated with imperfectivity, they all share a common phonological trait: they involve the addition of a mora.

The stem-level consists of stored nonanalytical forms in combination with a phonological grammar (that is informed by generalizations across the nonanalytical stems), thus in the absence of a stored stem-level form, one would predict the imperfective to default to the form that best satisfies the phonological grammar. This suggests that the speaker and learner generalizations will be reflected in the treatment of unfamiliar words, such that they will extend the patterns across their lexicon to form new stems.

Importantly, the presence of stored non-analytical forms does not preclude the ability to generate an imperfective form for a novel word. Stems are stored non-analytically, though there are active constraints in the grammar that capture the major generalizations. This allows for productivity in forming new words and accounts for the phonological cohesiveness of the allomorphs.

Word-level derivation is considered to be purely analytical, and therefore morphemes at this level show more regularity. This is because the word-level morpheme is stored in isolation and then attached to a lexical item during an analytical derivation, and then the general constraints drive the selection of the optimal candidate. Reduplication at the word-level differs from the stem-level because words will not be stored, but instead derived online, which means that lexicalized plural forms should only occur where the reduplicated form has been stored separate from, or has replaced, a simplex form.

A distinction between a stem-level and a word-level not only makes the correct predictions about allomorphy and non-concatenative morphemes in Hul’q’umi’num’, it also is better equipped to deal with the apparent “exceptions” and irregularity of the imperfective while accounting for the predictability of the plural. In sum, this preliminary exploration of stem-level and word-level morphology shows that Stratal Phonology is a practical framework for the analysis of Hul’q’umi’num’ reduplication patterns.

5. Implications for Teaching and Learning

Adopting the assumptions of Stratal OT and the classification of Hul'q'umi'num' morphemes as stem-level or word-level has broader implications than description of the language – it has relevance for language revitalization and language instruction. The differences between the imperfective and the plural forms reflect a distinction between how morphemes are stored and words are formed.

Work on heritage languages has found that interrupted acquisition results in a smaller lexicon (Polinsky 2018). Interrupted acquisition and its effects are relevant in the consideration of Salish languages due to the residential school system in Canada where children were forbidden to speak their L1 language and forced to use English (TRCC 2015). Stem-level patterns are predicted to be affected by vocabulary size, as stems are stored and the grammar is formed over generalizations based on these the stored stems. One of two things might occur when a speaker has a smaller lexicon: (1) a pattern (even one more marginal) could end up being the most dominant one if it is overrepresented in the input, or (2) the speaker might find the commonalities between the different allomorphs and end up regularizing the system toward a particular allomorph. A prediction is that the treatment of novel stems will reflect the order of constraints and the makeup of the lexicon. This means that looking at errors and loanword treatment therefore will tell us about what generalizations the learners have formed based on their knowledge.

Where forms exist at a stem level that cannot be derived by the current grammar, it follows that these forms might reflect an archaic or older configuration of the grammar. Without stored imperfective forms, the stem-level grammar produces phonologically regular forms, and therefore learning the imperfective as a stem-level process does not guarantee correct derivation if the appropriate stem has not been stored. In these cases, new (to the speaker) lexical items should be phonologically predictable and loss of less intuitive surface variants may be observed. For example, the glottal stop infix allomorph of the imperfective may be underrepresented in a learner's productions if they have not seen enough examples of it or have not been able to form a generalization about it. In contrast, if the imperfective is misclassified as a word-level morpheme and the learner has not formed the generalization that the allomorphs share a common underlying form (mora), they might retain a glottal stop infix as a second allomorph and show evidence of having two separate listed allomorphs that can be used in creating an imperfective form.

This raises questions about learnability and what should be taught explicitly. The differences between stem-level and word-level processes suggest that not all non-concatenative allomorphs are evaluated in the same way, and this raises questions about whether it is effective to teach and learn the two morphemes using the same strategy. It may be beneficial for learners of Hul'q'umi'num' to learn stem-level morphemes distinct from word-level morphemes for better mastery of the non-concatenative morphology. If speakers of Hul'q'umi'num' store imperfective stems and apply their phonological grammar more analytically to form plurals, pedagogical approaches should aim to build a similar system in L2 learners. Therefore, if we understand how speakers store and produce forms, it is possible to then assess if learners will be more successful in acquiring non-concatenative morphology if they are taught in a manner that is cohesive with how speakers produce these forms. Future work should investigate how to best incorporate non-concatenative morphology into the language revitalization context.

A distinction between stem-level and word-level suggests that it may be more economical to teach word-level processes as rules, while including some memorization practice to learn the stem-level allomorphy. The predictions of this Stratal Phonology approach can, and should, be validated experimentally as they are relevant in ongoing language revitalization across North American languages, as well as generally for ameliorating our L2 teaching and learning practices for morphologically diverse languages.

6. Conclusion

The formation of imperfectives and plurals in Hul'q'umi'num' demonstrates how non-concatenative morphology is realized differently at a stem-level than a word-level. Stratal OT provides good analytical coverage of the non-concatenative morphological processes in Hul'q'umi'num'.

The different nature of the stem and word levels for allomorphy make empirical predictions that can be tested in future experimental work. Though this is a critical time for language revitalization, when there are remaining L1 speakers and many dedicated L2 learners, there is still a dearth in our understanding of the acquisition of reduplicative morphemes and other non-concatenative morphemes, more generally. Understanding how speakers store and form words using morphemes with more complicated allomorphy is an important step in figuring out how to teach these patterns to future generations.

References

- Bermúdez-Otero, Ricardo. (2012). The architecture of grammar and the division of labour in exponence. *The morphology and phonology of exponence*, 41, 8–83.
- Bermúdez-Otero, Ricardo. (2018). Stratal phonology. *The Routledge handbook of phonological theory*, 100, 134.
- Blake, Susan. (2000). *On the distribution and representation of schwa in Sliammon Salish: Descriptive and theoretical perspectives*. PhD thesis, University of British Columbia, Vancouver.
- First Peoples' Cultural Council (FPCC). (2018). Report on the Status of B.C. First Nations Languages. Retrieved from <http://www.fpcc.ca/>
- Hukari, Tom, & Peter, Ruby. (1995). *Cowichan dictionary*. Duncan, BC: Cowichan Tribes.
- Kiparsky, Paul. (2015). Stratal OT: A synopsis and FAQs. *Capturing phonological shades within and across languages*, 2, 1–45.
- McCarthy, John. (2000). Harmonic serialism and parallelism. *Linguistics Department Faculty Publication series*, 40.
- Mellesmoen, Gloria, & Urbanczyk, Suzanne. (2020a). Avoiding multiple reduplication without INTEGRITY. Paper presented at WCCFL 38, Vancouver, Canada.
- Mellesmoen, Gloria, & Urbanczyk, Suzanne. (2020b). Mora affixation and Halkomelem imperfective allomorphy. *Papers for ICSNL* 55. 238–256.
- Polinsky, Maria. (2018). *Heritage languages and their speakers*. Cambridge: Cambridge University Press.
- Stonham, John. (2007). Nuuchahnulth double reduplication and stratal optimality theory. *The Canadian Journal of Linguistics*, 52(1), 105-130.
- Truth & Reconciliation Commission of Canada (TRCC). (2015). *Canada's residential schools: The final report of the Truth and Reconciliation Commission of Canada* (Vol. 1). McGill-Queen's Press-MQUP.
- Urbanczyk, Suzanne. (2011). Evidence from Halkomelem for word-based morphology. *UBCWPL* 30, 470–489.
- Zimmermann, Eva. (2013). Non-concatenative allomorphy is generalized prosodic affixation: The case of Upriver Halkomelem. *Lingua* 134, 1–26.

Proceedings of the 39th West Coast Conference on Formal Linguistics

edited by Robert Autry,
Gabriela de la Cruz Sanchez,
Luis A. Irizarry Figueroa,
Kristina Mihajlovic, Tianyi Ni,
Ryan Smith, and Heidi Harley

Cascadilla Proceedings Project Somerville, MA 2024

Copyright information

Proceedings of the 39th West Coast Conference on Formal Linguistics
© 2024 Cascadilla Proceedings Project, Somerville, MA. All rights reserved

ISBN 978-1-57473-481-2 hardback

A copyright notice for each paper is located at the bottom of the first page of the paper.
Reprints for course packs can be authorized by Cascadilla Proceedings Project.

Ordering information

Orders for the printed edition are handled by Cascadilla Press.
To place an order, go to www.lingref.com or contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA
phone: 1-617-776-2370, fax: 1-617-776-2271, sales@cascadilla.com

Web access and citation information

This entire proceedings can also be viewed on the web at www.lingref.com. Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Mellesmoen, Gloria. 2024. Reduplicative Morphemes and Their Non-reduplicative Allomorphs in Stratal OT: Stem-Level and Word-Level Reduplication in Hul'q'umi'num'. In *Proceedings of the 39th West Coast Conference on Formal Linguistics*, ed. Robert Autry et al., 346-351. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #3647.