

A note on how weaving and knitting can enhance learning Salish reduplication patterns

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There is a dearth of research on how learners acquire reduplication patterns in the Indigenous languages of North America. Additionally, most approaches to teaching reduplication (a process in which meaning is expressed by copying part of the word) utilize abstract concepts from linguistics to explain how to derive a reduplicated word from a base word. This paper outlines some strategies for incorporating key concepts from weaving and knitting into developing pedagogical materials for learning Salish reduplication patterns.

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1 Introduction¹

There is very little research on how reduplication is acquired or taught, especially in the context of Indigenous language revitalization. Reduplication patterns form a central part of any Salish language, encoding meanings, such as imperfectivity and plurality, with subtle differences in meaning associated with differences in form (see for example Mellesmoen & Huijsmans, 2019). Furthermore, many of those patterns are not transparent to learners and can be described in various different ways. For example, the following patterns from the Central Salish languages Hul'q'umi'num' (1) and ʔayʔajuθəm (2) illustrate just two ways that the patterns are describable in different ways.² Approaches to teaching these patterns are usually based on abstract linguistic analyses, and thus are subject to being formulated in several different and often equally abstract ways. Descriptions often assume that one form is the base, and a series of operations apply to it, to transform it to the reduplicated word. To derive the Hul'q'umi'num' imperfective forms in (1), statements like 'copy the first consonant and vowel, assign stress to the first syllable and reduce the unstressed vowel to schwa', could also be described as 'copy the first consonant after the first vowel and add schwa'. Data are from Hukari and Peter (1995) and are represented in the Americanist Phonetic Alphabet.

¹ Much gratitude to Leslie Saxon – who has been a wonderful friend, inspiring colleague and fantastic knitting buddy – and the many people who I have had the fortune to learn and share the words in the paper with.

² The Central Salish languages referred to here are spoken along the east coast of Vancouver Island and the adjacent mainland of British Columbia.

(1)	<i>Perfective</i>	<i>Translation</i>	<i>Imperfective</i>	<i>Translation</i>
a.	hícət	‘cut it’	híləcət	‘cutting it’
b.	hímət	‘lick it’	híləmət	‘licking it’
c.	ííləm	‘sing’	íítələm	‘singing’
d.	lémət	‘look at’	léləmət	‘looking at’
e.	k ^w íntəl	‘fight’	k ^w ík ^w əntəl	‘fighting’
f.	yeq̓	‘topple down’	ye’yəq̓	‘toppling down’

For the ʔayʔajuθəm ‘diminutive’ words in (2), the patterns have been described and analyzed differently as well (words are represented in the ʔayʔajuθəm orthography and are from Mellesmoen (2017)). Most commonly, ‘diminutive reduplication has been described as prefixing a copy of the first consonant and vowel, followed by deletion of the root vowel (Watanabe, 2003). Recently, it has been described as infixing the first consonant after the first vowel (Mellesmoen, 2017).

(2)	<i>Base</i>	<i>Translation</i>	<i>Diminutive</i>	<i>Translation</i>
a.	q ^w asəm	‘flower’	q ^w aq ^w səm	‘small flower’
b.	tala	‘money’	tatla	‘a little bit of money’
c.	sopayε	‘axe’	sospayε	‘small axe’
d.	šuk ^w a	‘sugar’	šušk ^w a	‘a little bit of sugar’
e.	ʔayaʔ	‘house’	ʔaʔyaʔ	‘small house’
f.	qegaθ	‘deer’	qeqgaθ	‘small deer’

Each of these descriptions of how reduplicated words are formed are based on the linguistic analysis of the words and involve some complex set of steps to follow. Learners sometimes express frustration at having to keep track of all the steps in doing these abstract analyses, when they are simply interested in knowing how to say the word, and would like a simple schema to learn the word patterns.

The goal of this paper is to outline a pedagogical approach to teaching and learning reduplication patterns in Salish that is grounded in mathematical knowledge already part of the culture: weaving and knitting. I want to make the case that reduplicative patterns can be taught without technical linguistic details. This paper next discusses what is known about how reduplication is taught and learned, based on published research and personal experience (§2). The paper then discusses how to incorporate concepts from weaving and knitting into the development of pedagogical materials related to the L2 acquisition of reduplication patterns (§3). A final section of the paper provides some thoughts on how to weave culture and language learning together.

2 Context and background on teaching reduplication

The two key aspects of reduplicative patterns that need to be acquired are the meaning and the form. There is a growing body of research that aims to document the meaning and form of reduplication in Salish languages. The work on the

semantics of reduplication will surely be a great guide to learning the meanings associated with various patterns. Alongside this semantic research is theoretical research that aims to derive the correct form of reduplication. Currently, these approaches are quite technical and couched within quite abstract formal models of event semantics and constraint-based models, like Optimality Theory. While it is important that these patterns be documented accurately and models be able to correctly derive the correct forms, there is a dearth of good pedagogical materials on how to teach reduplication of Salish languages. Learners want to know the word patterns in order to gain fluency and to be able to think and express themselves in their language; not all learners are interested in also learning linguistic theories. It is, however, very challenging to explain the patterns in a way that doesn't also delve into linguistic terminology. While it is possible to just list the words to memorize, it would be helpful to have a system to point out the patterns, which is grounded in cultural concepts. I review the only published document I have been able to locate that is pedagogically oriented towards teaching complex reduplication patterns in a North American Indigenous language.

Beers, Cruz, Hirrel, and Kerfoot (2014) describe a relatively complex pattern of reduplication in Tohono O'odham (Uto-Aztecan), which is used to express plurality on nouns and verbs. Focusing on nouns, they present a pattern in which the form of the reduplicant is, for the most part, dependent on the form of the base, using McCarthy & Prince's (1986) term "quantitative complementarity". If the base has a heavy syllable (polymoraic), the reduplicant is light (monomoraic); if the base is light, the reduplicant is heavy. After describing the pattern in detail, Beers et al. present a section "Applications in the L2 classroom", where they discuss how one might approach teaching the patterns. This section first outlines the fundamental concepts learners need to know first, repeated below from Beers et al. (2018, p. 50).

- (3) *Tohono O'odham plural reduplication fundamental concepts learners should know*
- a. The difference between consonants and vowel sounds
 - b. Light versus heavy syllables
 - c. Light versus heavy reduplicants
 - d. Long versus short vowels

The authors then provide a sample worksheet to assist the learners in internalizing the pattern. This worksheet includes four questions, and are quite similar to those found in introductory linguistics problem sets. The first three questions include data sets of three words where the singular and plural are provided. A fourth singular form is listed, and the learner is asked to fill in the blank. These types of exercises involve discovering the pattern and applying it to a new form. There are no guidelines for the learner regarding how to find the patterns, as the directions include phrases such as "Compare the singular and plural forms for group (A). How is the plural formed? Can you fill in what you think the plural form would be for...?" (p. 51). The three data sets correspond with the three patterns of plural

allomorphy, and the fourth question asks for learners to “come up with possible explanations for the different patterns” (Beers et al., 2018, p. 51).

This type of fill-in-the-blank worksheet would be very helpful for those learners who are able to find patterns and think linguistically. However, not all L2 learners have these skills. I have had the experience of teaching some of the patterns presented above to different groups and learners have expressed that they want to only learn the language, and can at times find it challenging to identify all the steps needed to create new words. In one class, we developed a matching game where cards indicate the forms and learners need to identify the meanings with the forms (Claxton et al., 2019). While some learners have natural metalinguistic skills, this is not true for all learners. It therefore behooves us all to identify more culturally appropriate ways to guide learners in finding language patterns. Particularly with reduplication, when there are no comparable patterns in the learners’ L1, providing the learner with hands-on, fun activities to find patterns could be helpful in many ways.

The next section presents some suggestions for doing this, drawing on work in ethnomathematics, and the parallel between mathematics and linguistics. The goal is to outline a way to teach linguistic patterns by relating the patterns to culturally significant activities like weaving and knitting.

3 Some suggestions for using weaving and knitting to teach reduplication patterns

Inspired by the work of mathematicians and my colleagues, I would like to suggest some ways that weaving and knitting can be used to teach reduplication patterns. Both activities are part of Central Salish culture and involve repetition, patterns, and a one-to-two relationship of units, where the units are stitches. These are fundamental concepts that are needed to understand reduplication, and by linking these concepts to cultural practices, learners can avoid having to learn linguistic analyses along with learning their language.

Mathematician Vesselin Jungic and Tayaʔajuθəm speaker and weaver Betty Wilson have identified a number of ways that concepts from mathematics are present in weaving patterns on Tla’amin baskets. (See <https://bit.ly/3zzU2Lk> for a discussion of this project.) For example, in the image below from the article noted above, the concept of polynomials is present in the repeating motif on the basket.

Figure 1*Tla'amin Basket*

The very act of repeating a design is parallel to repeating patterns in language. As can be seen in the imbrication pattern above, not only do some parts of the pattern repeat, but there is also the situation in which there is a single item – the darkest colour – that corresponds to two elements on the next row up and the next row down. This one-to-two mapping is very similar to how reduplication is represented in some models of reduplication, in which an input segment is mapped onto two output segments.

One way that weaving patterns can be applied to teaching reduplication patterns is to indicate the pattern on a grid or graph paper, similar to basket imbrication. Different colours can be used to link segments that are repeated, as well as to indicate any sounds that are part of the pattern, but are fixed in quality. This will be illustrated with an example from *ʔayʔajuθəm* ‘plural’ reduplication. As in many languages, there are a number of plural allomorphs. One of the most common patterns involves $C_1əC_2$ -reduplication, as indicated below.

(4)	<i>Singular</i>	<i>Translation</i>	<i>Plural</i>	<i>Translation</i>
a.	tumɪʃ	‘man’	təmtumɪʃ	‘men’
b.	θoman	‘eyebrow’	θəmθoman	‘eyebrows’
c.	qəməp	‘thigh’	qəmɒqəməp	‘thighs’
d.	pun	‘spoon’	pənpun	‘spoons’

The *ʔayʔajuθəm* orthography represents vowels allophonically, in a transparent way, reflecting the pronunciation, rather than abstractly representing the phonemes. As schwa gets its quality from neighbouring consonants, there are some patterns where it is not straightforward to learners that the reduplicated portion has a schwa and copies the second consonant. The following words look like they could be exceptions to the rule, because the part that is added is simply CV-.

(5)	<i>Singular</i>	<i>Translation</i>	<i>Plural</i>	<i>Translation</i>
a.	čeyɪʃ	‘hand’	čičeyɪʃ	‘men’
b.	sayɛyəχən	‘shoulder’	sisayɛyəχən	‘shoulders’
c.	sayɛyɪqʷən	‘ankle’	sisayɛyɪqʷən	‘ankles’
d.	χʷaʷawoʃɪn	‘toe’	χʷoχʷaʷawoʃɪn	‘toes’

In the examples above, the quality of the vowel in the reduplicant is related to the glide – it vocalizes and so obscures the fact that the second consonant is copied and that there is usually a schwa in the nucleus. Having introduced the basic pattern and issue, let's look at how one could teach these patterns using concepts from weaving and knitting.

An example of the transparent case of C₁əC₂- reduplication is provided below in the form of a chart with colours. A schema for the plural word pattern is given on the top row, indicating which segments correspond to each other, as well as there being a schwa between the two consonants of the reduplicant. Below this is a row, with only colours, in which the corresponding consonants are in the same colour – red for the first consonant and blue for the second consonant. Green is used to show that the fixed vowel schwa is part of this plural pattern. The other boxes are plain, to indicate that learners do not need to pay attention them, as they are not important in understanding the pattern. Just below the schema is an example word to illustrate the pattern. It is recommended that a very common word is used as the example word, as this is something that learners would remember and wouldn't need to construct on the spot.

Figure 2

Plural Reduplication Chart

Schema		C ₁	ə	C ₂	C ₁	V	C ₂	X		
Colours										
Example		t	ə	m	t	u	m	ɪ	ʃ	

This chart has the potential to allow learners to more easily see the pattern. One could also combine the schema and colours into one row, if that is simpler for learners.

A pattern chart like this also provides a frame to develop practice exercises. For example, the instructor could provide students with a list of singular words, and ask them to do any number of things, such as first put the singular in the right spot and then fill in the blanks with what is predicted to be the copied portion. The instructor could also pre-fill the schwas. Once one pattern is demonstrated, learners could also explore more reduplication patterns, by looking at new words and colouring in the segments that correspond with each other.

This approach could also be used to introduce plural allomorphs once the basic pattern is learned. Recall that when the second consonant is a glide, the reduplicant has the vowel alternant of the glide. There are a couple of different ways that one could present this pattern, depending on whether or not the instructor wants the students to see that the two plural allomorphs are essentially the same. The following chart combines the colours with the schema in the first row. I have made the vowel of the reduplicant blue-green in colour to indicate that the nucleus

of the reduplicant is a combination of the second consonant (blue) and schwa (green).

Figure 3

Plural Reduplication with a C₂ as a Glide

Schema & colours	C ₁	i		C ₁	V	y	X		
Example	č	i		č	e	y	ɪ	š	

For learners who are interested in knowing whether there is one general pattern for both types of words, it would also be possible to combine the two types of charts as follows. In this case, the top line is the general pattern. This allows learners to see that C₂ is the glide and that schwa and the glide combine to make the vowel [i].

Figure 4

Plural Reduplication Illustrating the General Pattern when C₂ is a Glide

General Pattern	C ₁	ə	C ₂	C ₁	V	C ₂	X		
Schema & colours	C ₁	i		C ₁	V	y	X		
Example	č	i		č	e	y	ɪ	š	

Knitting is another cultural practice that could be used in a similar way. The same type of grid patterning is found in Cowichan sweaters, where dark colours are used to indicate repeating or culturally significant patterns, as indicated below

Figure 5

Cowichan Sweater Design (<https://bit.ly/3IUj04E>)



If learners are more familiar with knitting, then the connection with knitting could be made instead of weaving.

In addition to having repeating patterns, there are also several knitting techniques to increase stitches, in which one stitch can be turned into two stitches. For example, KFB – “knit into the front and the back” is a widely used technique in knitting that has a stitch on one row and creates two stitches on the second row. Increasing stitches like this is similar to models of reduplication in which a single input segment maps to two output segments. If learners are familiar with knitting stitches, it is possible to show them a representation of a reduplicated word, like the following and relate the segments to stitches.

Figure 6

Input-Output Mapping of Reduplicated Word

tumtš	man
	men

The figure above has lines to indicate the consonants that are doubled, similar to how a single knitted stitch can be increased to two stitches on the next row.

4 Summary

So far, I have only discussed using graph paper to find repeating patterns in words, and haven't discussed how to relate language learning in general to weaving and

knitting activities. There are many ways that weaving and knitting can be used to enhance language learning, other than by the parallels of repetition in language. One clear direction would be to have weaving and knitting workshops and introduce language related to those activities. One could make a weaving or knitting game or contest, were learners use reduplication patterns to guide their creative works.

In closing, I hope that these small suggestions will be useful to language learners and teachers in developing lessons, exercises and learning activities related to learning reduplicated words. By referencing cultural concepts of pattern repetition in knitting and weaving, learners can grasp the core concepts of how reduplicated words are formed, without reference to abstract linguistic concepts.

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