

Fixed segmentism and plural infixation in Nuučaan'uł

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This paper provides an argument for the superiority of prosodic approaches to morphological analysis, particularly Optimality Theory, over and against linear approaches characterized by the uninterruptibility criterion of word-hood and the Bloomfieldian conception of the morpheme as a minimal meaningful unit. Specifically, this paper examines three cases of fixed segmentism and two cases of plural infixation from the Southern Wakashan language of Nuučaan'uł that prove difficult to reconcile with the linear approach so construed. Developing two alternative OT analyses which rank constraints of syllable and foot alignment over the correspondence of input and output segments (characteristic of the uninterruptibility criterion), this paper demonstrates the comparative success of the OT approach in both predicting and explaining the patterns present in these problematic datasets in terms of the prosodic word of Nuučaan'uł.

1 Introduction

This paper examines the implications of Nuučaan'uł infixation and fixed segmentism for the concept of the morpheme, the word, and morphological analysis. Specifically, this paper demonstrates how these processes challenge two presuppositions of the linear approach to morphology – a concatenative approach broadly characterized by a Bloomfieldian conception of the morpheme as a minimal meaningful unit and an adherence to the uninterruptibility criterion of word-hood (Bloomfield, 1935). While Bloomfield classically defines the morpheme as an irreducibly meaningful segment or set of segments that feature prominently in the derivation of a word, cases of fixed segmentism in Nuučaan'uł, specifically in repetitive suffix-triggered reduplication (data sets (1), (2), and (3) in the second section of this paper), challenge this concept by providing instances of empty formal units that behave like morphemes in terms of derivation, yet do not contribute to the meaning of the word. The uninterruptibility criterion of word-hood holds that, in order for a group of segments to constitute a word, extraneous segments cannot be introduced that interrupt this group of segments (Bauer, 2003, p. 63–4). This criterion is too

strict, however, and it is difficult to reconcile uninterruptibility with cases of infixation in Nuučaan'uł (data sets (4) and (5)).

This paper argues that an approach to morphological analysis that operates on a prosodic model of word-hood (McCarthy, J.J. & Prince, A.S., 1986, 1993, 1995a, 1999) is preferable to the linear approach on the grounds that it can account for the patterns that emerge in the Nuučaan'uł data sets. The analysis is couched within Optimality Theory (hereafter abbreviated OT; see Prince and Smolensky, 1993). OT conceives of grammar in terms of ranked and violable constraints on well-formedness. GEN, an operation within a grammar, generates a number of candidate forms which are then evaluated by the EVAL operation and ruled out to the extent that a candidate violates a higher ranked constraint of markedness (the degree to which a structure is unacceptable) or faithfulness (the degree to which the segments of the output structure correspond to the input) (see McCarthy, J.J. (1994), McCarthy, J.J. & Prince, A.S. (1995a), McCarthy, J.J. & Prince, A.S. (1995b) for further discussion of Optimality Theory). To this end, this paper will provide two novel OT analyses of plural infixation that draw from a formal analysis of the templates for the reduplicative segment and plural infix patterns, and a proposed hierarchy of well-formedness constraints for Nuučaan'uł to argue for the superiority of a prosodic approach to morphology over the linear (Stonham, 2004, and Kim, 2003).

Before engaging in this project, it is worthwhile to lay out genetic and geographical information about Nuučaan'uł, as well as provide an overview of the morphological processes found in the language with specific focus on the processes of fixed segmentism and infixation examined in this paper.

1.1 Genetic information and morphological processes

Nuučaan'uł is a member of the Southern Wakashan branch of the Wakashan language family, related to Makah and Ditidaht (Kim, 2003, p. 1)¹. The traditional term for the language is “t'aat'aaqsapa” meaning 'speaking true or straight'; Nuučaan'uł itself means 'all along the mountains and sea' and has at least fifteen dialects spread along the Western coast of Vancouver Island, from Brooke's Peninsula to Barkley Sound (Stonham, 2004, p. 10). It is an endangered polysynthetic language spoken by 150 to 200 speakers (Kim, 2003, p. 1). It is a morphologically complex language featuring suffixation, both partial and double reduplication, infixation, clitics, and incorporation. Interestingly, Nuučaan'uł prohibits compounding (Nakayama, 2001).

¹ The political term 'Nuuchahnulth' includes the Ditidaht people, while the linguistic term excludes the Ditidaht language.

As an agglutinative language, Nuučaan'uł has a considerable number of suffixes, which can express grammatical features or concrete lexical meanings. Nuučaan'uł has over four hundred of these lexical suffixes (Nakayama, 2001, p. 18). Prefixes are formed by reduplication, which occurs in a variety of patterns – CVV, CVc, CVt, CVł patterns. Reduplication can be of full syllables, involve vowel-shortening, or be accompanied by lengthening as well (Kim, 2003, p. 182 & p. 195). Although Nuučaan'uł does not prohibit open syllables, Kim provides evidence to suggest that there is a violable constraint against codas in reduplicants (Kim, 2003, p.202). Many cases of reduplication are triggered by somatic body part suffixes or activity suffixes. Other reduplicants can express aspect, plurality, as well as derivational meanings. Double reduplication can occur in certain contexts, namely, when both an aspectual or derivational suffix and an inflectional suffix (e.g. the plural or distributive in Nuučaan'uł) require reduplication (Kim, 2003, p. 6, 176). In all other environments, if two suffixes or inflections require reduplication, it is satisfied by a single reduplicant.

Nuučaan'uł has been characterized as a polysynthetic language that relies on lexical or syntactic incorporation rather than compounding. These lexical incorporations can have idiosyncratic meanings. There are also a number of clitics and enclitics in Nuučaan'uł that can attach to most syntactic units. In the literature, there are a number of interesting questions open for investigations, such as what criteria distinguishes lexical from syntactical incorporation, and whether or not the system of inflection as a whole is a form of clisis.

1.2 Overview of the data

The following data set presents five patterns of infixation in Nuučaan'uł. The first three sets demonstrate the concept of fixed segmentism, providing instances where some default segment always accompanies a process of reduplication in order to avoid the emergence of a marked structure, which violates the preferred syllable structure of the prosodic word (see Alderete, J., et al. (1999) for a discussion of fixed segmentism). The final two sets (4) and (5) are morphologically conditioned infixes marking plurality (see Broselow E. and McCarthy J. (1984) for a discussion of templatic infixation).

2 Data

2.1 Phonologically-conditioned fixed segmentism

The -ł- segment in (1) is the most common form of fixed segmentism in Nuučaan'uł, co-occurring with the repetitive and durative aspect triggered

reduplication of open monosyllabic bases. Note that in the data below, this prefixing reduplication also lengthens the base and copy. The *-λ-* segment seems prespecified to occupy the coda position of the reduplicant, possibly in order to satisfy phonological restrictions on the syllable structure of Nuučaan'uł. Kim suggests that this form emerges from the interaction between a faithfulness, alignment, and complex coda constraints. Later in this paper, I draw from this suggestion to provide an OT analysis of this phenomenon (Kim, 2003, p. 221).

(1) *-λ-* Fixed Segmentism²:

- | | |
|---|--|
| a. <u>tii</u> λtiiya
DUP- <i>-λ-</i> ti -(y)a·
REP- [Ø] rub -DUR
'rubbing' | b. <u>čii</u> λčiiya
DUP- <i>-λ-</i> čii -(y)a·
REP- [Ø] pull -DUR
'pulling' |
| c. <u>k^wii</u> λk ^w iiya
DUP- <i>-λ-</i> k ^w i -(y)a·
REP- [Ø] file -DUR
'filing' | d. <u>paa</u> λpaaya
DUP- <i>-λ-</i> pa -(y)a·
REP- [Ø] give potlatch gift -DUR
'potlatching' |

The *-c-* segment in (2) is a relatively rare allomorph of the *-λ-* infix noted above. Stonham suggests that the conditioning factors that license the choice between the *-λ-* and the *-c-* allomorphs are unclear, given that both occur in the environment of prefixed reduplication on open monosyllabic roots (Stonham, 2004). Examples (2a) through (c) illustrate this similarity in distribution, though (a) and (b) provide evidence to suggest that the selection of the *-c-* segment is conditioned by dissimilation on the grounds that this segment always and only precedes a lateral affricate (Kim, 2003, p. 215).

(2) *-c-* Infixation:

- | | |
|---|---|
| a. <u>λ'ii</u> cλ'iiya
DUP- <i>-c-</i> λ'i -(y)a·
REP- [Ø] shoot -DUR
'shooting' | b. <u>λaac</u> λaaya
DUP- <i>-c-</i> λa -(y)a·
REP- [Ø] drive wedge -DUR
'wedge driving' |
| c. <u>haa</u> chuula
DUP- <i>-c-</i> hawił -(y)a·
REP- [Ø] display wealth -DUR
'displaying wealth' | |

² Unless otherwise stated, all data cited from (Stonham, 2004).

2.2 Derivation-triggered fixed segmentism

Certain derivational suffixes trigger reduplication in a manner very similar to the cases examined in (2), and likewise require the pre-specified of a *-c-* segment. Three examples are given below, two of which ((b) and (c)) also involve a separate process of lengthening.

(3) *-c-* infix triggered by derivational suffixes:

- a. ʔicʔinksawiʔak maamaati
 DUP- *-c-* ʔink^w -sawiʔ -'aʔ maamaati
 SUF- [Ø] fire -in eye -TEMP bird
 'the birds were blinded by the fires'
- b. ʔuucʔuksuptaakʔaʔ
 DUP- *-c-* ʔu -suptaak -'aʔ
 SUF- [Ø] REF -compete (in) -TEMP
 'each tries to be the first to'
- c. ʔuucʔuumahsaqʔi
 DUP- *-c-* ʔu -ma· -hsa -(q)h =ʔi·
 SUF- [Ø] REF -as far -at the brink -MW =DEF
 'sit at the very edge of the bluff'

2.3 Consequences of fixed segmentism

Bloomfield (1935) defines a morpheme as a “minimal meaningful unit.” The above examples (1-3) feature segments, either *-c-* or *-ʔ-*, which behave like morphemes yet do not contribute to the meaning of the word. How can concatenative approaches to morphology account for these seemingly empty morphemes? In order to account for the behaviour of segments that feature in the derivation of a word yet do not contribute to the words meaning, theorists have proposed both the concept of the morphome and the concept of the formative. The term morphome is meant to stand for a family of morphemes sharing either meaning or the same formal segments (Bauer, 2003, p. 335). Formatives, on the other hand, are solely formal units featuring in derivation that nevertheless do not correspond to a morph (Bauer, 2003 p. 330). Supposing that we grant the validity of these concepts, they do not, in themselves, provide an explanation for why these formatives or morphomes are distributed in the manner they are in the data cited above. Before contrasting the merits of these concepts against OT, it will be worthwhile to broaden the data set to include cases of morphologically-

conditioned infixation that challenge the uninterruptibility criterion of wordhood.

2.4 Morphologically-conditioned infixation

The *-t-* infix in (4) marks the plural, and attaches to the coda of the first syllable of a stem of at least two syllables. The first syllable must contain a long vowel, or else it is lengthened (a-d are cases of lengthening). Further, the *-t-* plural only occurs when the first syllable is open, and the second syllable has a sonorant for an onset (in (4)-(a) this sonorant is /w/, in (b) /w/, in (c) /n/ and in (d) /ʔ/).

(4) *-t-* plural infixation:

- a. *naatwaayasʔi*
naw'as -t- -'as =ʔi
 sit idly chatting -PL- -outside =DEF
 'those who were sitting outside watching'
- b. *haatwiiqʌhqa*
hawiiqʌ -t- -(q)h -qa
 hungry -PL- -MW -3.SUB
 'they are eating hungrily'
- c. *t'aatneʔis*
t'aña -t- -ʔis
 child -PL- -DIM
 'several children'
- d. *haatʔum*
haʔum -t-
 food -PL-
 '(every kind of) fish'

The *-ỵ-* infix in (5) is in complementary distribution with the *-t-* infix in (4). The *-ỵ-* infix occurs as the onset of the second syllable of a stem composed of at least two syllables. It often occurs between two vowels, and is selected for when the consonant following the first syllable's nucleus is an obstruent. (In 5(a) this obstruent is /p/, in (b) /x/, in (c) /s/ and in (d) /ʌ/).

(5) -ỵ- plural infixation:

- | | | | |
|----|---------------|----|--------------------------------|
| a. | čaỵaapac | b. | caŷaaxuk čapac |
| | čapac -ỵ- | | caaxuk -ỵ- čapac |
| | canoe -PL- | | swift -PL- canoe |
| | ‘canoes’ | | ‘swift canoes’ |
| c. | maŷaasčim | d. | šiỵaaλ'aqa |
| | masčim -ỵ- | | šiiλ -ỵ- -'aqa |
| | commoner -PL- | | move house -PL- -several doing |
| | ‘commoners’ | | ‘you're all moving’ |

2.5 Consequences of the plural infix

The plural infix in these cases presents an instance of a meaningful segment that nevertheless violates the criterion of uninterruptibility for word-hood. Bauer defines uninterruptibility as the condition that “extraneous material cannot be introduced into the middle of a word-form” (Bauer, 2003, p. 63). In each of the above cases, however, the plural infix has interrupted the base form. However, in order to justify the intuition that the form the plural infix interrupts is a genuine word we must adjust our conception of word-hood. In the following discussion, I argue that the conditions for word-hood in Nuučaan'uł and the processes of infixation and fixed segmentism are better understood in prosodic terms, that is, in terms of ranked wellformedness, markedness, alignment and faithfulness constraints.

3 Discussion

3.1 Prosodic templates

The fixed segments in (1–3), in conjunction with the cases of plural infixation in (4) and (5), suggest that a prosodic model of word-hood is more applicable to Nuučaan'uł. That is, a model where word-forms are understood in terms of ideal syllable and foot shapes, marked structures and faithfulness constraints. A quick examination of the data suggests that both the reduplication-triggered segments and the plural infixation align to the right of the initial syllable of the iambic foot. Stonham (2004) suggests that the -t- infix must be understood templatically, given that it always co-occurs with lengthening and attaches as a coda to the initial syllable (p. 188). Nonetheless, this account does not sufficiently capture the distribution of the -ỵ- infix. For this case, Stonham (2004) proposes a template in which the -ỵ- infix inserts to the right of a monosyllabic root but

transforms this into a bi-syllabic foot (p. 193). Stonham (2004) further argues that the -y̥- infix is attached as the onset of this lengthened second syllable (p. 193–4). To demonstrate the virtues of this prosodic approach to word-hood over and above the linear approach, the next subsection of this paper generates two OT analyses that serve to explain the emergence of Stonham's templates.

3.2 Optimality Theory analyses

Drawing from Prince and Smolensky (1993), and McCarthy & Prince (1995a, b) I present two OT analyses of the plural infixes assuming the templates proposed by Stonham (2004). It is the main contention of this paper that OT can correctly predict the form of the plural infixation while the linear approach to morphology, albeit bolstered by adding the notion of formatives and morphomes to its conceptual repertoire, cannot. Insofar as prosodic approaches can better explain the phenomena in question, they are to be preferred.

In the following tableaux, $V_1 \rightarrow V$: is an abbreviation for a family of constraints that ban a short vowel in initial position of plural words, Align-Right-1stSyll is the constraint which holds that any infix must align to the right of the first syllable in the foot, Align-Left-2ndSyll is the alignment constraint which holds that the infix must align to the left of the second syllable in the foot, and IO-DEP (input-output dependence) is a faithfulness constraint that bans insertion: every element of the output must have a correspondent in the input (See McCarthy and Prince, 1995, p. 370). For the purposes of demonstrating the superiority of the prosodic word model, I take the Alignment constraints to be exemplary of the constraints suggested by conceiving of the word in a manner informed by direct acquaintance with the preferred syllable and foot structure of the language. Furthermore, I take IO-DEP to be a constraint that expresses the uninterruptibility criterion of word-hood. As a brief summary, in OT, the GEN operation creates a host of candidate word-forms, listed below as (a) through (d). Once the constraints are ranked, the EVAL operation then evaluates candidates according to the constraint hierarchy; word forms that violate higher ranked constraints are eliminated in favour of those which violate lower ranked constraints. Although other theorists support the rankings I have proposed below, I have placed IO-DEP lower than the Alignment constraint on the hypothesis that the prosodic word model can better account for the actual patterning found in the language. This hypothesis appears confirmed in the tableau below. Should we follow the linear approach, the best candidate would be the unacceptable forms *haʔumt and *čapacy̆. Ranking prosodic concerns over interruptibility, however, yields the desired results.

Tableau 1. -t- infix

	$V_1 \rightarrow V$:	Align-Right-1 st Syll	IO-DEP
a.  haatʔum			**
b. haaʔtum		*!	**
c. hatʔum	*!		*
d. haʔumt	*!	*	

Tableau 2. -y- infix

	$V_2 \rightarrow V$:	Align-Left-2 nd Syll	IO-DEP
a.  čaŷaapac			***
b. čaaŷpac	*!	*	***
c. čaŷapac	*!	*	**
d. čapacy	*!	*	

4 Conclusion

In this paper, I have shown that the fixed segmentism and plural infixes of Nuučaan'uł provide important cases in which prosodic approaches to morphology, in this case exemplified by Optimality Theory, are met with a much greater degree of success than the traditional linear approach to the problems presented in this data set. I have presented support for the conclusion that the fixed segments (1), (2) and (3) are best accounted for as units required to complete the well-formed prosodic word structure of Nuučaan'uł, and that this template for the desired word structure can also account for the examples of the plural infix in (4) and (5).

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