Lexical Suffixes, Roots and Stress in SENĆOŦEN[1]

Janet Leonard
University of Victoria

It has been observed in the previous literature on Salish languages that roots and lexical suffixes are in a hierarchical relationship in terms of their ability to attract stress. Using an OT analysis modeled after Tamburri-Watt (1999) the unpredictable stress assignment for roots and lexical suffixes is accounted for in the SENĆOŦEN data presented in this paper.

1 Introduction

The goal of this paper is to provide an Optimality Theory analysis of how verb root plus lexical suffix combinations interact with the stress system of SENĆOŦEN. Lexical suffixes are derivational morphemes that have substantive root-like meaning (Montler, 1986:64). There are also full nouns in the language that share meaning with these suffixes however they do not share the same phonological form. For example: -iq^w is the lexical suffix meaning *head* and sq̓^{w}aŋiʔ is the full noun with the same meaning.

When a word is formed from a root plus lexical suffix the assignment of stress is no longer predictable. It will be shown in this paper that some lexical suffixes as well as some roots must be lexically specified for their stress properties.

The shape of the paper is as follows: in Section 1, data that illustrates the stress assignment for root and lexical suffix combinations is presented. Section 2 provides background information about similar studies in other Salish languages, this section discusses various theories of lexical stress and presents previous research that combines these ideas with OT. A description of the basic

[1]I wish to thank ŦKOȽEĆTEN alias Ivan Morris for sharing his language with me and the Saanich Native Heritage Society for providing us the space for those meetings. I would also like to thank Su Urbanczyk for organizing the fieldwork and for helpful discussion. Thanks also go to the members of her SSHRCC grant meetings of 2004/2005, Tom Hukari, Dave McKercher, Marianne Nicolson, Nick Claxton and Claire Turner for listening to presentations of this work in progress and for their useful input. I wish to thank Ruth Dyck for making her research available to me. Last but not least I would like to thank Sonya Bird for her helpful and encouraging feedback on earlier drafts. Fieldwork for this research was funded by SSHRCC grant #410-2003-1523 awarded to Su Urbanczyk. All mistakes are the author's responsibility.

stress assignment properties of SENĆOŦEN is given in Section 3. Lastly, in Section 4 an OT analysis is provided to account for the basic stress assignment of the language, and also to account for the root plus lexical suffix combinations that do not follow this basic stress pattern.

The account of stress assignment given here applies only to a limited set of data. Further fieldwork and study is needed if the findings of this paper are to be applied to the understanding of the language as a whole.

2 SENĆOŦEN[2]

2.1 The language

SENĆOŦEN is the Saanich dialect of North Straits Salish. SENĆOŦEN, also called Saanich, is spoken on the Saanich Peninsula north of Victoria and the neighbouring islands (Montler, 1986:1). At the time of Montler's writing there were around twenty speakers of the language. On May 16/05 Ivan Morris said, that he thinks he is most likely the only fluent speaker of SENĆOŦEN left at the W̱JOȽEȽP reserve.

2.2 Data

In this section, verb roots and lexical suffixes are described in terms of their stress assignment. The data was collected from Ivan Morris in the fall of 2004 and the spring of 2005 at the Saanich Native Heritage Society[3]. From this data, combinations formed from three verb roots and three lexical suffixes are described in terms of their stress assignment. In examples (1) - (3) the stress always falls on the lexical suffix. Example (1) shows that this lexical suffix will bear stress when combined with a root that has a full vowel underlyingly.

ȽX̱IK[4]
(1) ɬt̓ᶿ=íqʷ[5] /ɬit̓ᶿ =iqʷ/
cut=head
'cut on the head

We know that the root in example (1) has an underlying full vowel because of

[2]The orthography used here was developed by Dave Elliott Sr. For more information refer to Saltwater People as told by Dave Elliott Sr (1983)

[3] All the forms in this paper were re-checked with Ivan in May 2005.

[4]Due to font difficulties the last segment of this word is incorrectly reproduced. The K should have an accent mark above it but the author does not have the technical capabilities to produce this mark. In this paper qʷ = K which should be interpreted as K with an accent mark above it.

[5]The orthography used for the examples is the Americanist phonetic alphabet.

the form ⱢI𝒵ET ɬít̓ᶿət *to cut it.* This form has the transitive suffix –t marker and it is the full vowel of the root that is stressed rather than the inserted schwa between the root and the transitive marker.

Example (2) illustrates that the lexical suffix *head* will bear stress when combined with a vowelless root that ends in a sonorant.

DEM,IK
(2) t̓əm̓=íqʷ /t̓m̓=iqʷ/[6]
hit=head
'He got hit on the head'

Example (3) shows that the lexical suffix *head* is stressed when combined with a vowelless root. The evidence for this root being vowelless, is that when it is combined with the transitive marker it is the epenthetic schwa between the root and the transitive that takes the stress. This is shown in the word TȻET tkʷə́t *to break it.*

TȻIK
(3) tkʷ=íqʷ /tkʷ =iqʷ/
break=head
'the top broke off'

Examples (4)-(6) show that the stress assignment for combinations of roots plus the lexical suffix *foot* is not always consistent. In examples (4) and (5) the stress falls on the verb root and in example (6) the stress falls on the lexical suffix.

ⱢI𝒵SEN
(4) ɬít̓ᶿ=sən /ɬit̓ᶿ =sən/
cut=foot
'He got cut on the foot.'

Example (5) shows that the stress falls on the root. This example also

[6]Montler (1986:23) states that this vowelless root always has a schwa inserted before stress assignment. In this respect it differs from example (3). The evidence that the schwa is inserted before stress assignment is the form t̓ə́m̓ət *to hit it.* This contrasts with the vowelless root tkʷə́t where stress falls on the inserted schwa before the transitive marker. It is assumed in this paper that SENĆOŦEN avoids complex onsets that involve an obstruent followed by a sonorant. There may be more to this story , not only is there a sonorant present in this example but it is also glottalized leaving us with three segments. It could be that this is another restriction on the number of consonants in the onset. This type of restriction will not be pursued in this paper and is left for further research.

illustrates that the language inserts a schwa between an obstruent and a sonorant to avoid complex clusters. Montler (1986:23) says that there is always a schwa inserted between an obstruent and a sonorant before stress assignment.

DEM,SEN

(5) t̓ə́m̓=sən /t̓m̓ =sən/
hit=foot
'He got hit on the foot'

Example (6) illustrates that when *break* and *foot* are combined it is the lexical suffix that is stressed. This example also illustrates a complex onset restriction. This time it is the number of obstruents that is the problem. The combination of root and lexical suffix in this example yields a potential onset consisting of three consonants. Montler (1986:22) notes that the language allows consonant clusters of three but only when one of those consonants is part of a prefix. Prefixes are usually considered to be outside the domain for stress in Salish languages.

TEȻSEN

(6) təkʷ=sə́n /tkʷ =sən/
break=foot
'Broken foot'

Examples (7)- (9) illustrate that the stress is never on the lexical suffix *hand* when it is combined with a verb root.

ȽIȾSES

(7) ɬ́it̓ᶿ=səs /ɬit̓ᶿ=səs/
cut=hand
'cut on the hand'

DEM,SES

(8) t̓ə́m̓=səs[7] /t̓m̓=səs/
hit=hand
'to get hit on the hand'

In example (9) there is some allomorphic variation with the lexical

[7] Ivan said that there are two ways to say this word. The second involves the addition of / e/. If the word is said with this vowel then the word is very close to swearing. This seems to be common with the lexical suffix for hand. To avoid saying something that could be construed as inappropriate Ivan's strategy seems to be to remove the connector vowel /e/ and shift the stress to the root rather than the suffix.

suffix *hand.* When combined with the root *break* a connector is present. Montler (1986:23) says that these connectors may have a prosodic function but for the purposes of this paper the connector is considered to be part of the underlying structure of the word and discussions of the prosodic role of connectors are left for further study.

TȻÁSES

(9) tkʷ-é=səs /tkʷ-e=səs/
break-conn-hand
'to break your hand

2.3 Generalizations

In this section nine examples of root plus lexical suffix combinationshave been presented. These combinations were formed from three roots and three lexical suffixes. It was observed that stress did not fall consistently on either roots or lexical suffixes. Examples (1)-(3) show that the lexical suffix for *head* bears stress no matter what root it is attached to. Examples (4)-(6) show that the lexical suffix for *foot* will bear stress only when attached to the verb *break.* Examples (7)-(9) show that the lexical suffix for *hand* never bears stress no matter what verb it is attached to. A way to formalize these observations is to say that the suffixes and roots differ in their ability to attract stress. The lexical suffix *head* is strong and is able to attract stress from any root. The lexical suffix *foot* is variable and can only attract stress from certain roots. The lexical suffix *hand* is weak and can never attract stress from a root. The verbs *cut* and *hit* both lose stress to the lexical suffixes *head* and *foot.* The only difference between these two roots is that one has a full vowel the that the other is vowelless underlyingly. Because of this the root *cut* is considered to be a strong root and *hit* is considered to be a variable root. This works if we say that strong suffixes both outrank strong roots and variable roots in their ability to attract stress. The root *break* never attracts stress and for this reason is considered to be weak. These observations yield the following hierarchy for morphological stress in SENĆOŦEN.

(10) Strong suffix >> Strong Root >> Variable Root >> Variable Suffix >> Weak Root, Weak Suffix

Example (10) reads as follows: a strong suffix outranks all types of roots. A strong root outranks a variable suffix and a weak suffix. A variable root also outranks both a variable suffix and a weak suffix. A variable suffix outranks a weak root which in turn outranks a weak suffix. The weak roots and suffixes are not ranked with respect to each other, as neither has the ability to attract stress. This hierarchy is similar to others that have been proposed for other Salish languages. These proposals will be discussed in the following section.

3 Background literature

In section 3.1 stress hierarchies proposed for other Salish languages including SENĆOŦEN will be discussed. Section 3.2 introduces background research concerning the morphological stress of roots and lexical suffixes and section 3.3 talks about two OT analyses that account for lexical stress in Squamish, another Central Salish language.

3.1 General Salish literature

3.1.1 Salish morphological stress hierarchy

Many scholars have discussed the status of roots and lexical suffixes in terms of their ability to attract stress; these researchers include van Eijk (1981a, 1985), Roberts (1993), Roberts and Shaw (1994), and Davis (In Prep) on Lillooet:Kinkade (1973) and Czaykowska-Higgins (1993a) on Moses – Columbian; Isardi (1991b) and Kuipers (1993) on Shuswap; Carlson (1989) and Black (1996) on Spokane; Thompson and Thompson (1992) on Thompson; and Isdardi (1991a) on stress in Interior Salishan languages; Revithiadou (1999) includes in her thesis Thompson, Lillooet, Moses-Columbian and Spokane; Bianco (1995) on Lushootseed; Montler (1986) on Saanich; Tamburri-Watts; and Dyck, (2004) on Squamish. The general consensus is that roots and suffixes are in a hierarchical relationship in terms of their ability to attract stress (Czaykowska-Higgins, 1998:16). This hierarchy consists of at least three types of roots and three types of suffixes; the stress of a word depends on the combination of a root plus a suffix. The three types of roots that have been attested are strong, variable and weak. The three types of suffixes are also strong, variable and weak.

(11) Morphological stress hierarchy in Salish Languages

Strong suffix >> Strong Root >> Variable Root >> Variable Suffix >> Weak Root >> Weak Suffix

This section illustrates how the hierarchy compares to the data presented in Section 1. First the hierarchy is headed by the strong suffixes; these outrank all the roots in terms of their ability to attract stress. This is true in SENĆOŦEN, where an example of a strong suffix is the lexical suffix *head.* When this suffix is combined with a strong root it is the lexical suffix that bears the stress as in example (1).

Next on the hierarchy is the strong root. As we see in example (1) this type of root is only outranked by a strong suffix. Strong roots outrank variable and weak suffixes and is attested in SENĆOŦEN as shown in examples (4) and (7).

In this hierarchy variable roots outrank variable and weak suffixes. This is illustrated in example (5)where the variable root *hit* outranks the variable suffix *foot.*

The general Salish morphological stress hierarchy states that variable suffixes outrank weak roots. This is attested in the SENĆOŦEN data and example (6) illustrates that the lexical suffix *foot* outranks the root *break.*

In this hierarchy all roots outrank the weak suffixes, however this is not the case for SENĆOŦEN. Although the strong roots do outrank the weak suffixes in this hierarchy, example (7) shows that this is not atteseted in the SENĆOŦEN data. Weak roots and weak suffixes do not outrank each other with respect to their ability to attract stress, this is shown in example (9).

The hierarchy proposed for Salish languages closely resembles the hierarchy proposed for SENĆOŦEN in Section 1. The only difference is the ranking of the weak roots and suffixes. In the general Salish literature weak roots outrank weak suffixes but in the hierarchy proposed in Section 1 weak roots and suffixes are not ranked with respect to each other as neither has the ability to attract stress.

3.1.2 Montler's Saanich stress hierarchy

Montler (1986:23), proposes a slightly different hierarchy for the language. He divides the roots into three classes and calls them strong, weak and vowelless. The suffixes he divides into four classes, strong, ambivalent, weak and unstressed. They are ranked as follows:

(12) Morphological stress hierarchy for Saanich (based on Montler, 1986:23)
Strong Sfx >> Strong Rt >> Ambivalent Sfx >> Weak Rt >> Weak Sfx >> Vowelless Rt >>Unstressed Sfx.

In this subsection Montler's hierarchy is compared with the data from Section 1. First the strong suffixes outrank all the roots in the hierarchy. This ranking is attested in examples (1)-(3). Strong roots out rank all the suffixes except the strong ones as observed in examples (4) and (7).

Next Montler says that the ambivalent suffixes outrank the vowelless roots, but there is no evidence in the data that ambivalent suffixes exist. Reading along the hierarchy we see that weak roots outrank weak suffixes and unstressed suffixes. In this paper it is assumed that Montler's hierarchy and the Salish hierarchy described in section 3.1.1 correspond in the following way. Montler's weak roots correspond to the Salish hierarchy's variable roots and his weak and unstressed suffixes correspond to the Salish hierarchy's variable and weak suffixes. Following this assumption this ranking is in fact attested in the data. *Hit* outranks both *foot* and *hand* as shown in examples (5) and (8).

The next ranking states that weak suffixes outrank vowelless roots. In this paper it is assumed that Montler's vowelless root corresponds to the Salish hierarchy's weak root. With this assumption in mind this ranking is also attested in the data. The suffix *foot* outranks the root *break* as shown in example (6).

Montler goes on to say that vowelless roots outrank unstressed suffixes. If we assume that the vowelless root and the unstressed suffix correspond to the weak roots and suffixes of the last hierarchy then we see that this ranking is not attested for in the data presented in Section 1. In fact these types of roots and lexical suffixes do not outrank each other in respect to their ability to attract stress. This is illustrated in example (9) where it is an additional segment that bears the stress.

3.1.3 Summary

In Section 3.1, three hierarchies were compared using data from Section 1. The hierarchy proposed in Section 1 will be followed in this paper. This hierarchy differs from the general Salish hierarchy in that it does not rank the weak roots and suffixes with respect to each other. It also differs from Montler's hierarchy. With a few assumptions on how the root/suffix classes correspond to the general Salish hierarchy, it has been shown that Montler's hierarchy includes the presence of an ambivalent suffix, which is not accounted for in the data in Section 1.

All of the above hierarchies are based on the assumption that unpredictable stress information is stored in the lexicon. This information is stored for both roots and suffixes. The background research relating to this assumption is presented in the following section.

3.2 Lexical Stress

One way that these hierarchies have been applied to the study of stress in Salish languages is to say that the strong suffixes and roots are lexically specified for stress and that those that are weak are lexically specified as being unstressed. The way that the SENĆOŦEN stress facts play out in this model is as follows: the suffixes that were termed variable in Section 1 are said not to have any stress specification details in the lexicon. The suffixes and roots that are termed as strong are considered to be lexically accented morphemes and the roots and suffixes that were labeled weak are considered to be lexically unaccented morphemes. Based on this assumption researchers recognize that there are inherently accented roots and suffixes, inherently unaccented roots and suffixes, and roots and suffixes that do not have any inherent specification for accent (Alderete, 2001a: 21, Czaykowska-Higgins, 1993: 199, Dyck, 2004: 208, Tamburri-Watt, 1999: 161). What this means is that inherently accented suffixes are encoded in the lexicon as having prominence, inherently unaccented suffixes are encoded in the lexicon as having no prominence, and unspecified roots and suffixes bear no prominence information in the lexicon. Below, in Table 1, the data from Section 1 is organized in terms of accent.

	Inherently accented (strong)	No inherent specification (variable)	Inherently unaccented (weak)
Root	ɬitᶿ 'cut	t̓əm̓ 'hit'	t̓kʷ 'break'
Suffix	=iqʷ 'head'	=sən 'foot'	=səs 'hand'

Table 1

The inherent specification of accent is grounded in work by Halle & Vergnaud (1987). The idea is that the inherently accented and unaccented suffixes are considered to be dominant and the unspecified suffixes are said to be recessive (Czaykowska-Higgins, 1993: 197). Dominant and recessive suffixes are assigned stress at different times from one another and thus are not subjected to the same phonological rules (Halle & Vergnaud, 1987:50). Following this assumption then, the inherently accented and unaccented roots and suffixes are assigned stress at a different stage of the derivation than the non-specified suffixes.

These two levels of stress assignment are reflected in Optimality Theory by what is specified in the input. If a suffix or root is dominant then its stress specification is marked in the input. If the root or suffix is recessive then no stress information will be in the input for that morpheme. In the next section, two analyses which adopt this idea are presented.

3.3 Two OT analyses

In this section two OT analyses of stress assignment are discussed. The first approach is to say that there is prosodic structure specified in the input for suffixes that are always stressed. In her paper *Roots, lexical suffixes and stress in Sḵwxu7mesh*, Tamburri-Watt (1999:174) proposes that the way to account for the stress assignment of root plus lexical suffix combinations is to say that there is prosodic structure in the input of the suffixes that are always stressed. This means that a suffix that always bears stress is the head of its own foot in the input and must then bear stress in the output. Her work is inspired by Alderete (1997). She states that the roots and suffixes are either inherently accented, accented or unaccented. As was mentioned inherently accented suffixes are the head of their own foot in the input thus implying that there is prosodic structure in the input for these morphemes. Accented suffixes are specified for prominence in the input but they do not imply any prosodic structure in that input. Unaccented suffixes are not specified for stress in the input instead they follow the basic stress system for the language. This account of lexical stress uses prosodic faithfulness constraints that demand that the output remain faithful to any lexically specified prosodic information in the input. There are two reasons not to use this account for SENĆOŦEN. The first is that there are unaccented suffixes in the language that never bear stress in root plus lexical suffix combinations and these cannot be accounted for using this model. Second, this model states that there is prosodic structure in the input, this is unusual as this type of structure should be predictable and therefore should be a result of the grammar. In this case it is a result of the ranking of universal constraints. Having said this, although we cannot use her full account, constraints used by Tamburri-Watt can be used to account for the basic stress system of SENĆOŦEN.

The second OT analyses is by Dyck (2004). This work is inspired by Alderte (2001b). Unlike the first analysis she does not propose foot structure in the input to account for lexically accented suffixes. Instead she assumes that lexically accented and lexically unaccented suffixes have some type of diacritic in the lexicon which specifies whether or not it will be stressed in the output. The assignment of stress in words with such suffixes can be accounted for by appealing to constraints that demand faithfulness to their accent specification. She uses a constraint, developed by Alderete (2001b), Head-Max, which states that the prominence in the input should be realized in the output. Using this constraint Dyck (2004:230) is able to account for the assignment of stress with words that have lexical suffixes in Squamish.

3.4 Summary

Section 3 introduced the idea that roots and lexical suffixes in Salish languages are in a hierarchical relationship in terms of their ability to attract stress. Some scholars have interpreted this hierarchy as an indication that some suffixes are lexically encoded for stress. Halle and Vergnaud (1987), who say that dominant and recessive suffixes are assigned stress in different domains, provide the background to the ideas of researchers such as Alderete, (2001), Dyck, (2004) and Tamburri-Watt, (1999). These researchers have proposed OT accounts that make use of faithfulness constraints that ensure that the information in the input (lexicon) is realized in the output. For Tamburri-Watt, lexical stress is marked by prosodic structure in the input and for Alderete (2001) and Dyck (2004) it is a lexical stress specification associated with the morpheme that is stored in the lexicon. This paper follows Tamburri-Watt in its analysis of the basic stress assignment in SENĆOŦEN. To account for the morphological stress in the language, Dyck's (2004) analysis will be followed with a minor modification to include the stress specifications for roots.

4 **Basic stress assignment in** SENĆOŦEN

Basic primary stress for mono-morphemic words in SENĆOŦEN is predictable. Two syllable words always have stress on the first full vowel. If there is no full vowel in the word, then the first schwa is stressed. A word that has more than two syllables will have stress on the penultimate syllable (Montler, 1986:23, Kiyota, 2003:7-10). Most mono-morphemic words are no longer than two syllables.[8]

The examples in (13) illustrate that when there is a full vowel in a bisyllabic word it is the full vowel that will bear stress.

(13)	SK̲E,LEW,	sqəl̓éw̓	beaver
	SȻOTI	skʷáti	crazy
	SꝀON̲I,	sqʷáŋiʔ	head
	SEMI,	səm̓íʔ	blanket

The examples in (14) illustrate that when there are two schwas in a two syllable word the first will bear the stress.

(14)	QUYEȻ	k̓ʷə́wyəkʷ	fish hook
	LEȻEX	lə́kʷəx̌	rib
	QELEW,	k̓ʷə́ləw̓	skin

The examples in (15) show that if a word has more than two syllables the penultimate syllable will bear stress.

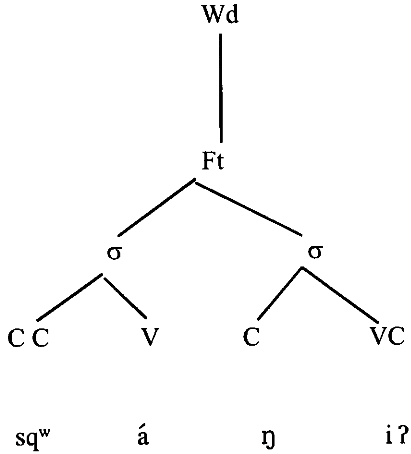
(15)	XELEJSET	x̌ələ́č'sət	turn around
	ȾEȻSENEN̲	t̓ᶿəkʷsə́nəŋ	washing your feet
	ŁEMEȾEN̲	ɬəmə́t̓ᶿəŋ	to tell s.o to pick berries
	ȾEȻiKEN̲	t̓ᶿəkʷíqʷəŋ	to wash your head

4.1 **Structural description**

There are binary feet in SENĆOŦEN. This is the case when the first syllable has a full vowel or when both syllables have a schwa. Examples (16) and (17) illustrate this.

[8] To illustrate the penultimate rule poly-morphemic words were elicited.

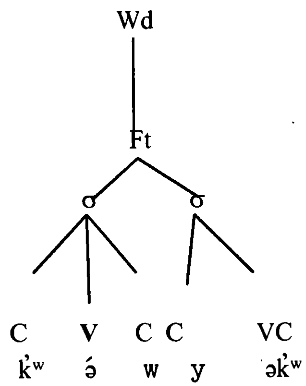
(16)



'head'

In both examples (16) and (17) the binary feet are termed trochaic because they are left headed. This is shown in the paper by bolding the syllable that is the head of the foot.

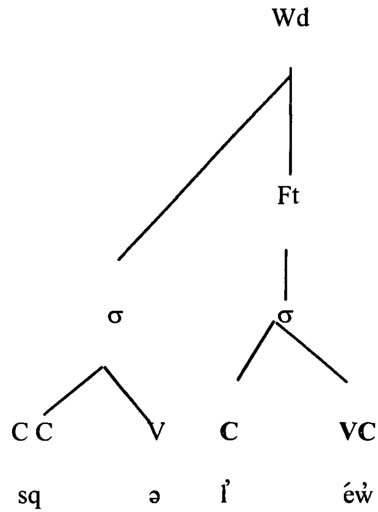
(17)



'fishhook'

Feet in SENĆOŦEN however, do not always have to be binary. This accounts for the fact that the first full vowel is stressed even if it is not in the first syllable. The example in (18) illustrates this.

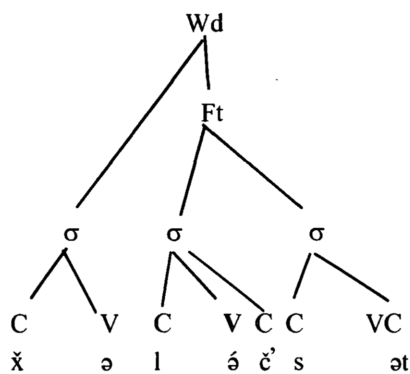
(18)



'beaver'

In words with three syllables stress has a tendency to fall on the penultimate syllable. This fact implies that the language builds trochaic feet from right to left. This is illustrated in example (19).

(19)



4.2 Summary

In this section the general stress facts for SENĆOŦEN have been presented. These observations will be formalized in the following section using an OT framework. In addition, the same framework will be used to account for the root plus lexical suffix combinations that do not follow this general stress pattern.

5 OT analysis

This section introduces an OT account of the stress system that was discussed in the previous section . Constraints taken from Alderete (2001), Dyck (2004) and Tamburri-Watt (1999) will be presented and a constraint ranking will be motivated to account for the data in the previous sections.

5.1 Explanation of basic stress placement

Constraints that are used to account for the basic stress pattern of the SENĆOŦEN data will be presented and motivated in this section. The fact that no word is found without a primary stress, motivates the use of the constraint Culminativity (Alderete, 2001:216) This is a prosodic well formedness constraint which demands that an accentual phrase must have at least one pitch accent (Alderete, 2001:216). This constraint is modified in this paper as follows:

(20) Culminativity [CULMIN] A word must have at least one primary stress.

It was shown that SENĆOŦEN constructed feet from right to left this observation is captured by the constraint Align-R (McCarthy and Prince, 1993).

(21) Align R (Ft, PrW) For every foot, align the right edge of that foot, to the right edge of the prosodic word.

The next constraint is needed to account for the fact that the first full vowel in a word is always stressed. In order to achieve this it is necessary to disallow schwas from being assigned stress.

(22) *P/ə Schwa cannot head a foot (Kentowicz, 1996)

The fact that SENĆOŦEN builds trochaic feet is captured by forcing the head of a foot to be aligned with the left edge of that foot. The constraint that achieves this is as follows:

(23) Head-L:Align L(H, Ft) For every foot, align the head that foot,to the left edge of the foot.

The next constraint ensures that all syllables are parsed into feet. The constraint that prohibits unparsed syllables is as follows:

(24) Parse-σ Parse all syllables into feet.

These constraints will be ranked below and it will be shown that they are all that is needed to account for the basic stress system of SENĆOŦEN.

Tableau 1[9] motivates the need for *P/ə, CULMIN and Head-L to be crucially ranked above Parse-σ. Candidate (a) is eliminated due to its violation of Head-L. Candidates (b), (d) and (f) lose because they all violate *P/ə. Candidate (e) is thrown out because all words should have at least one stress and thus this candidate violates CULMIN. The optimal candidate is candidate (c) as it only violates the lowest ranked constraint Parse-σ. The winning candidate is indicated with the symbol ☞.

/sqəl̓ew̓/ 'beaver'	*P/ə	CULMIN	Head-L	Parse-σ
a. (sqəl̓éw̓)			*!	
b. (sqə́l̓ew̓)	*!			
☞c.sqə(l̓éw̓)				*
d.(sqə́)l̓ew̓	*!			*
e. sqəlew̓		*!		
f.(sqə́)(l̓éw̓)	*!			

Tableau 1

The ranking of constraints to this point is as follows: *P/ə, CULMIN, Head-L >> Parse-σ

Tableau 2 motivates crucially ranking CULMIN above *P/ə. Candidate (e) is eliminated immediately by its violation of CULMIN. All of the candidates with the exception of candidate (e) violate *P/ə. However candidate (f) violates this constraint twice so is not considered any further. Candidate (b) is eliminated next as it violates Head-L and candidates (c) and (d) are thrown out as they violate Parse-σ. Candidate (a) is left as the optimal candidate.

[9]Constraints that are crucially ranked are divided with a black line. Constraints that are not crucially ranked are divided with a grey line.

/k̓ʷəwyəkʷ/ 'fishhook'	CULMIN	*P/ə	Head-L	Parse-σ
☞a.(k̓ʷə́wyəkʷ)		*		
b.(k̓ʷəwyə́kʷ)		*	*!	
c.k̓ʷəw(yə́kʷ)		*		*!
d.(k̓ʷə́w)yəkʷ		*		*!
e.k̓ʷəwyəkʷ	*!			**
f.(k̓ʷə́w)(yə́kʷ)		**!		

Tableau 2

The ranking at this stage is CULMIN >> *P/ə , Head-L >> Parse-σ

Tableau 3 motivates the inclusion of Align-R but does not predict how this constraint should be ranked. For this reason the constraint need not be crucially ranked. For now it will be placed at the end of the tableau. In this tableau candidate (d) is the first to be disqualified as it violates CULMIN, next candidate (d) is tossed out by its double violation of *P/ə. Candidate (a) loses because it violates the recently added constraint Align-R. It is Candidate (b) that wins.

/ x̌ələč̓sət/ 'turn it over'	CULMIN	*P/ə	Parse-σ	ALIGN R
a. (x̌ə́lə)č̓sət		*	*	*!
☞b.x̌ə(lə́č̓sət)		*	*	
c. (x̌ə́lə)(č̓sə́t)		**!		
d. x̌ələč̓sət	*!		**	

Tableau 3

The ranking so far is able to account for the basic stress system of SENĆOŦEN. This ranking is as follows: CULMIN >> *P/ə, Head-L >> Parse-σ, Align-R. It will be shown in the following subsection that further constraints need to be introduced and that the crucial ranking of Align-R is necessary to account for the stress assignment in words that are formed by the combination of a root and lexical suffix.

5.2 OT analysis of root plus lexical suffix combinations.

The proposed rankings are not enough to account for poly-morphemic words that are made up of a root and a lexical suffix. As was noted in Section 1 the lexical suffix for *head* is always assigned stress regardless of the quality of the root vowel. For instance, the word for *cut on the head* has a full vowel in the root underlyingly and a full vowel in the suffix. Based on these facts the prediction is that the first full vowel should bear the stress therefore it is the root that is expected to bear the stress. However this is not the form that is attested in the data. As shown in example (1) it is the lexical suffix which bears the stress.

Tableau 4 illustrates the problem of using the current constraint ranking to account for the stress assignment of *cut on the head*. Both candidates (a) and (b) are predicted to win but it is only candidate (a) that is attested in the data. All the current constraints are included to show that neither of the two forms violates any of the constraints. A candidate that is incorrectly predicted to be optimal is marked with the symbol 💣.

/ɬit$^{\grave{\theta}}$=iq^{w}/ 'cut the top off/	CULMIN	*P/ə	Head-L	Parse-σ	Align-R
☞ a.(ɬt$^{\grave{\theta}}$iq^{w})					
💣 b.(ɬít$^{\grave{\theta}}$iq^{w})					

Tableau 4

Another problematic form for the current constraint ranking is the SENĆOŦEN word for *a broken foot* shown in example (6). This form presents two problems, first this two syllable word surfaces with two schwas so the current constraint ranking predicts that this form should be stressed on the first schwa. This problem will be dealt with in tableau 7. Second, we need to formally account for the presence of the epenthetic schwa. A possible reason for the schwa epenthesis was offered in Section 1 as a strategy to deal with a prohibition against complex onsets. The following tableau examines three candidates. Candidate (a) will be eliminated by the addition of the constraint *Complex Onset[10], which states that no onset can have more than two consonants. This constraint is crucially ranked above Head-L. The other two candidates illustrate the problem with the current ranking which will be dealt with in Tableau 7. Candidate (b) loses although it is the attested form and candidate (c) is incorrectly predicted to be the winner. Only constraints that are violated will be included in the tableau. A candidate that is attested in the data

[10] This constraint is a modification of *COMPLEX that can be found in Archangeli (1997:7)

but is predicted to lose in the tableau is marked with ☹.

/tkʷ=sən/	*COMPLEX ONSET	*P/ə	Head-L
a.(tkʷsə́n)	*!	*	
☹b.(təkʷsə́n)		*	*!
💣c.(tə́kʷsən)		*	

Tableau 5

The above two tableaux illustrate that the current constraint ranking, while able to account for the basic stress assignment in SENĆOŦEN is unable to account for the stress assignment for the two words with root and lexical suffix combinations presented above. In order to account for these forms we must acknowledge that they are morphologically stressed and that this type of information is represented in OT in the input.

The important thing to observe here is that the stress of these words is unpredictable. The lexicon is the place where unpredictable information is stored. To account for the fact that the two words above have an unpredictable stress pattern we can say that some roots and suffixes are lexically specified for accent. Dyck (2004:229) provides a definition of lexical accent. She says that a lexically accented morpheme is one that is represented in the lexicon with a special marking. This special marking indicates whether a morpheme is either inherently accented or inherently unaccented. In line with Dyck (2004) roots and lexical suffixes which are always accented are considered inherently accented and roots and lexical suffixes which are never accented are considered to be unaccented. Lexical suffixes that vary in their ability to attract stress are considered to have no stress information stored with them in the lexicon.

Taking this into consideration, the data can be looked at in a new light. Based on the stress facts we can determine the stress status for each of the roots and lexical suffixes presented in this paper. The lexical suffix for *head* is stressed in all three different environments. First it is stressed when combined with a root that has a full vowel. Second, it is stressed when combined with a root that has a schwa, and, third, it is stressed when combined with a vowelless root. These facts indicate that this lexical suffix is inherently accented. The roots *cut* and *hit* both lose stress to *head* but attract it from *foot* and *hand.* As was mentioned earlier the two roots differ in the quality of there vowels. *Cut* has a full vowel and *hit* has a schwa. For this reason *cut* is considered strong and *hit* variable. More analysis of the vowel quality of roots and suffixes needs to be pursued in future research. The root *cut* is considered to be inherently accented and the root *hit* is not considered to have any lexical specification for stress. The lexical suffix *foot* is variable in its ability to take stress and thus is not considered to be coded for stress in the lexicon. The root *break* and the lexical suffix *hand* can never bear stress and thus are both classed as inherently unaccented.

A way of accounting for these facts is to use a constraint proposed by McCarthy (1995) cited in (Dyck, 2004:230). This constraint ensures that prosodic faithfulness is preserved between input to output relations.

(25) Head-Max: If $\alpha \in S_1$ is a prosodic head in a word and $\alpha \, \Re \, \beta$ then β is a prosodic head. (McCarthy 1995. cited in Dyck 2004:230)

This means that if a suffix is lexically specified for accent in the input then the output must remain faithful to that specification. This applies to roots and suffixes that are lexically inherently accented and those that are lexically inherently unaccented. In order to account for the stress properties for both roots and suffixes this constraint needs to be modified. To do this we need to separate constraints, one for roots and one for suffixes. These constraints are as follows:

(26) Sfx-Max Accent: If a suffix is specified for accent in the input it must remain faithful to that specification in the output.

(27) Rt-Max Accent : If a root is specified for accent in the input it must remain faithful to that specification in the output.

Inherent accent will be shown by the symbol (+) above the appropriate morpheme. Morphemes that are inherently unaccented in the lexicon will be marked with the symbol (-).

Now that we have these new constraints we can use them to account for our two problematic forms. Tableau 6 motivates ranking Sfx-Max Accent above Rt-Max Accent. It is candidate (a) that wins because it does not violate the highest constraint Sfx-Max Accent.

+ + /ɬít$^{\theta}$ + iq^{w}/	Sfx-Max Accent	Rt-Max Accent
☞ a. (ɬt$^{\theta}$íq^{w})		*
b. (ɬít$^{\theta}$iq^{w})	*!	

Tableau 6

The word *broken foot* was earlier described as being unusual because the root had a schwa but contra to the basic stress rules for the language the suffix bore the stress. This fact can now be accounted for if we say that the root is lexically specified as unaccented. Candidate (a) wins because it does not violate Rt-Max Accent. Tableau 7 also motivates ranking Rt-Max Accent above Head-L.

- /tkʷ +sən/	Sfx-Max Accent	Rt-Max Accent	*P/ə	Head-L
☞a.(təkʷsə́n)			*	*
b.(tə́kʷsən)		*!	*	

Tableau 7

There is one more thing we need to account for concerning the assignment of stress with words that contain lexical suffixes. When roots and lexical suffixes are combined with the middle morpheme -əŋstress always falls on the lexical suffix. In example (28) the root has an underlying full vowel and therefore is considered strong . We know that the underlying vowel is /e/ because when this form is combined with the transitive marker –t the epenthetic schwa does not attract the stress instead it falls to the full vowel of the root. E.g ȾÁȻET t̓ᶿékʷət 'to wash it'. However when *wash* and *head* are combined with the middle morpheme it is *head* that bears stress.

ȾEȻIKEṈ

(28) t̓ᶿəkʷ=íqʷ-əŋ /t̓ᶿekʷ+iqʷ+əŋ/
wash=head-middle
'to wash your head' (IM May/05)

Example (28) poses no problem for the current constraint ranking as the other candidates are ruled out by their violation of Sfx-Max Accent. This is to be expected as *head* is a strong suffix and strong suffixes outrank all roots in their ability to attract stress.

+ + /t̓ᶿekʷ+ iqʷ + əŋ/	Sfx-Max Accent	Rt-Max Accent	*P/ə	Parse-σ	Align-R
☞a. t̓ᶿə(kʷíqʷəŋ)		*		*	
b. (t̓ᶿékʷi)qʷəŋ	*!			*	*
c. (t̓ᶿékʷiqʷ)(ə́ŋ)	*!		*		

Tableau 8

In example (29) the lexically unspecified suffix *foot* is stressed this poses a problem as we would expect the strong root to bear the stress. Only constraints that are violated will be included in this tableau.

ȾEȻSENEN̲
(29) t̓$^{\theta}$ək^{w}=sə́n-əŋ
wash=foot-middle
'washing your feet'

+ /t$^{\theta}$ek^{w}+ sən + əŋ/	Rt-Max Accent	*P/ə	Parse-σ	Align-R
☹ a. t̓$^{\theta}$ək^{w}(sə́nəŋ)	*!	*	*	
💣 b. (t̓$^{\theta}$ék^{w}sən)əŋ[11]			*	*
c. (t̓$^{\theta}$ék^{w}sən)(ə́ŋ)		*!		*

Tableau 9

Example (30) also poses a problem. This suffix is stressed but it is lexically specified as being unaccented.

ȾEȻSISEN̲
(30) t̓$^{\theta}$ək^{w}=sís-əŋ
wash=hand-middle
'washing your hand'

The following tableau illustrates the problem with example (30). The form that should win is tossed out straight away by the highest-ranking constraint Sfx-Max Accent. The other two candidates tie.

+ - /t$^{\theta}$ek^{w}+ səs + əŋ/	Sfx-Max Accent	Rt-Max Accent	CULMIN	*P/ə	Head-L	Parse-σ	Align-R
☹ a. t̓$^{\theta}$ək^{w}(sísəŋ)	*!					*	
💣 b (t̓$^{\theta}$ék^{w}səs)əŋ						*	*
c. (t̓$^{\theta}$ék^{w}səs)(ə́ŋ)				*!			

Tableau 10

[11] There is much debate in Salish linguistics about the issue of an open syllable containing a schwa. In the examples in Tableaux 10 and 11 the author chooses to follow her intuition that the syllable needs to be closed rather than following the sonority sequencing profile. This area needs further study.

In order to solve these problems we need to move Align-R to the head of the tableau[12]. This ensures that if there is a three-syllable word the penultimate syllable will be stressed. The following two tableaux illustrate how this works. In these two tableaux both candidate (b) and (c) are eliminated in as they both violate the highest ranking constraint.

+ /t'ᶿekʷ+ sən + əŋ/	ALIGN-R	Sfx-Max Accent	Rt-Max Accent	CULMIN	*P/ə	Head-L	Parse-σ
☞a. t'ᶿəkʷ(sə́nəŋ)			*		*		*
b. (t'ᶿékʷsən)əŋ	*!						*
c. (t'ᶿékʷsən)(ə́ŋ)	*!				*		

Tableau 11

The constraint *COMPLEX-ONSET is included here to illustrate the need for an epenthetic schwa in the root.

+ - /t'ᶿekʷ+ səs + əŋ/	ALIGN-R	Sfx-Max Accent	Rt-Max Accent	*COMP ONSET	CULMIN	*P/ə	Head-L	Parse-σ
☞ a. t'ᶿəkʷ(sísəŋ)		*	*					*
b. (t'ᶿékʷsəs)əŋ	*!							*
c. (t'ᶿékʷsəs)(ə́ŋ)	*!							

Tableau 12

5.3 Summary

In this section words with roots and lexical suffixes were analyzed. It was noted that the assignment of stress for some of these words was unpredictable. To account for this unpredictability it was posited that some roots and lexical suffixes are lexically encoded as being stressed or unstressed. This hypothesis was formalized in an OT framework. By using the following constraint ranking: Align-R >> Sfx-Max Accent >> Rt-Max Accent >> Complex

[12] This re-ranking does not affect the previous analysis. This is because the constraint was not crucially ranked before.

Onset , >> CULMIN >> *P/ə, Head-L >> Parse-σ, all the forms presented in this paper are accounted for.

6 Conclusion

This paper provided an OT analysis of how words formed from a combination of verb roots and lexical suffixes interact with the basic stress assignment rules in SENĆOŦEN. In Section 1, data that illustrate the assignment for root and lexical suffix combinations was presented. In this section it was noted that stress did not fall consistently on either root or suffix. Section 2, introduced the idea that roots and lexical suffixes in Salish languages form a hierarchy in terms of their ability to attract stress. The work of Halle & Vergnaud (1987) was briefly discussed in order to provide background to the work of more recent scholars in the area of lexical stress. Alderete (2001), Dyck (2004), and Tamburri-Watt (1999), have all proposed OT accounts of stress assignments in various languages. All of them make use of faithfulness constraints that ensure the information in the output corresponds with the information in the input. There is a difference in opinion on how that form of information is stored in the lexicon, for Tamburri-Watt, it is marked by prosodic structure and for Alderete and Dyck there is special marking in the lexicon that indicates whether or not a root or suffix will be stressed. The next section outlined the predictable stress pattern for the data. Six constraints were introduced to account for this general stress pattern and were ranked as follows: * COMPLEX ONSET >> CULMIN >> *P/ə, Head-L >> Parse-σ, Align-R.

Next words with roots and lexical suffixes were analyzed. Two new constraints were introduced in this section to account for the fact that some words did not follow the predictable stress pattern. Also an already established constraint was re-ranked in order to account for the stress assignment of three syllable words. The two new constraints demanded that stress in the output must remain faithful to the stress specification in the input. These constraints are Sfx-Max Accent and Rt-Max Accent. To account for the three syllable words Align-R was ranked highest. The final ranking needed to account for the data in this paper is as follows: Align-R >> Sfx-Max >> Rt-Max >> *COMPLEX ONSET , CULMIN >> *P/ə, Head-L >>
Parse-σ.

This paper is based on a limited amount of data, and does not claim to account for the stress assignment of SENĆOŦEN as a whole. Further fieldwork and study is needed in order to see if the above proposals are enough to account for the stress assignment facts of this language.

References

Alderete, John. 1997, Root-controlled accent in Cupeno. ms., University of

Massachusetts, Amherst.
Alderete, John. 2001a Morphologically governed accent in optimality theory, New York: Routledge. Revised version of Ph.D dissertation., University of Massachusetts, Amherst, 1998.
Archangeli, D and Terence, D. 1997. *Optimality theory: an overview.* ed. Blackwell
Bianco, Violet. 1995, Stress in Lushootseed -- A preliminary analysis. *WorkingPapers for the 30th International Conference on Salish and Neighboring Languages,* Victoria, B.C., pp 127-136.
Czaykowska-Higgins, Ewa. 1988. Salish Languages and Linguistics. Czaykowska-Higgins & M.D. Kinkade eds. *Salish Languages and Linguistics: Theoretical and Descriptive Perspectives.* Mouton de Gruyter.
Czaykowska-Higgins, Ewa. 1998. The Morphological and Phonological Constituent Structure of Words in Moses Columbian Salish. In Czaykowska-Higgins & M D. Kinkade (eds). *Salish Languages and Linguistics:Theoretical and Descriptive Perspectives.* Mouton de Gruyter.
Czaykowska-Higgins, Ewa. 2004. The Morphological and Phonological Status of Nxaʔamxcin Lexical Suffixes. *University of Montana: Occasional Papers in Linguistics. No 17,* Salish Linguistics in honor of M. Dale Kinkade. Ed Donna B Gerdts & Lisa Matthewson.
Davis. Henry. In Prep. PRE-FINAL DRAFT of Teaching Grammar of St'át'imcets.
Dyck, Ruth. 2004. Prosodic and morphological factors in Squamish (S<u>k</u>u<u>x</u>wú7mesh) stress assignment. Ph.D dissertation. University of Victoria.
Elliott, Dave. 1983. *Saltwater people as told by Dave Elliot Sr. A resource book for the Saanich Native studies program.*ed Janet Poth. Native Education.School district 63 (Saanich).
Halle Morris and Jean-Rodger Vergnaud (1987). Stress and the cycle. *Linguistic Inquiry 18*: 45-84.
Isardi, William J. (1991a). Stress in Interior Salish. *Papers from the 27th Regional Meeting of the Chicago Linguistic Society* 27: 246-260.
Isardi, William J. (1991b). Stress and glottalized sonorants in Shuswap. Paper presented at meeting of the Canadian Linguistics Association. [Also in Papers for the 26th International Conference on Salish and Neighboring Languages.]
Kinkade, M. Dale. 1973. A grammar of lexical suffixes in Columbian Salish Paper presented at Eighth International Conference on Salish and Neighboring Languages. Eugene Oregon.
Kiyota, Masaru. 2003. Plural Allomorphs in Saanich. *UBC Phonology Generals Paper.*

McCarthy, John and Prince Alan. 1993. Prosodic morphology 1: Constraint interaction and satisfaction. Ms., University of Massachusetts at Amherst and Rutgers University.
McCarthy John and Prince Alan. 1999. *Faithfulness and identity in prosodic morphology*. in The prosody morphology interface. Ed by René Kager, Harry Van der Hulst, and Wim Zonneveld. Cambridge: Cambridge University Press.
Montler, T. 1986. An Outline of the Morphology and Phonology of Saanich, North Straits Salish. *University of Montana Working Papers in Linguistics 4.*
Montler, T. 1991. Saanich North Straits Classified Word List. *Canadian Ethnology Service Paper No.119 Mercury Series*. Canadian Museum of Civilization.
Revithiadou, Anthi (1999). *Headmost accent wins: head dominance and ideal prosodic form in lexical accent systems.* The Hague: Holland Academic Graphics.
Roberts, Taylor (1993). Lillooet stress shift and its implications for syllable structure and prosody. *Papers for the 28th International Conference on Salish and Neighbouring Languages.* University of Washington, Seattle.
Roberts, Taylor and Patricia A. Shaw (1994). Optimality in the St'át'imcets (Lillooet Salish) stress system. Paper presented at meeting of the Canadian Linguistic Association, Calgary, Alberta.
van Eijk, Jan P. (1981a). Stress in Lillooet. Papers for the 16th International Conference on Salish and Neighboring Languages, Missoula.
van Eijk, Jan P. (1985). The Lillooet language: phonology, morphology, syntax. Ph.D. dissertation, University of Amsterdam.
Watt, Linda Tamburri. 1999. Roots, Lexical Suffixes and Stress in Skwxu7mesh. *UBCWPL Vol 1 March 161-179.*
Watt, Linda Tamburri. 2000. What's in the Input: A look at pre-specification in Optimality Theory. *Handout SCIL. University of Arizona.*

Janet Leonard
jleonard@uvic.ca

Appendix Dave Elliott's alphabet with phonetic equivalent

A	e	K	q̓	Q	k̓^{w}
Ⱥ	ey	Ꝁ	q̓^{w}	S	s
Á	e	K̲	q	Ś	š
B	p̓	K	q^{w} (note this K should have an accent mark above)	T	t
C	k	L	l	T̲	ƛ̓
Ć	č	Ł	ɬ	Ŧ	θ
Ȼ	k^{w}	M	m	Ⱦ	t̓^{θ}
D	t̓	N	n	U	u
E	ə	N̲	ŋ	W	w
H	h	O	a	W̲	x^{w}
I	i	P	p	X	x̌
Í	əy or ay			X̲	x̌^{w}
J	č̓			Y	y
				Z	z