Lexical Derivation and Stress in Cree

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1. The Problem

The data analyzed in this paper are provided by two middle-aged speakers of Plains Cree from northern Alberta. I use a digraph (ts) for the affricate which is normally represented by c, and double vowels for long vowels, as they better show certain morphophonemic alternations related to stress. While I use the term “stress” in the title of my paper, it will become clearer in the course of discussion that “accent” might be a better alternative. In the data presented in this paper, I recognize and mark only the strongest stress of a word in citation, and I am not concerned about variable manifestations of stress in discourse or its relationship with intonation and other suprasegmental phenomena in the phonological hierarchy.

Stress has never been considered phonemic in Cree, but it is not so transparent as to be fully predictable at the phonetic surface. According to H.C. Wolfart (personal communication), the general assumption of antepenultimate stress, as exemplified by the noun and verb paradigms given in (1) and (2), is unable to account for all stress patterns in Cree. Much more knowledge on this phenomenon may have been gained by Cree linguists, but I have not been able to find an explicit account of Cree stress (or accent) in the existing literature with the exception of a brief statement in Ellis which I will comment on shortly.

(1) Noun

| a. ásikan  | ‘sock’  | b. asíkanak  | ‘socks’  |
| nitásikan | ‘my sock’ | nitásíkanak | ‘my socks’ |
| nitásíkanim2 | ‘my sock’ | nitásikánimak | ‘my socks’ |

1 I am grateful to Floyd Dion and Audrey Thomas for their kind assistance in recording the Cree material presented in this analysis.

2 The forms with the -im possessive suffix are rare and do not occur in most Cree dialects.
Ellis, describing the dialect of Cree spoken on the west coast of James Bay, says:

In Cree, stress is non-distinctive: i.e., it never keeps two otherwise identical words apart as in the case of English, permit—noun, versus permit—verb. There are, however, clearly marked degrees of stress; and for the first unit in particular, and for longer utterances, these have been marked as an aid to memory:

(') is used to show the strongest stress on a word or phrase.

(') is used to mark the next to strongest. (Ellis 1983:36)

From the stress marked by Ellis in the text on page 71, stress is indeed unpredictable, although the strongest stress is quite frequently on the antepenultimate syllable. However, one has to remember that what Ellis deals with is textual material, not individual lexical items. The problem here is that although stress is considered nondistinctive, it is unpredictable and has to be marked as an aid to memory. My claim in this paper is that stress or accent (see below) in Cree is rule-governed in a way that is yet to be characterized. The purpose of this paper is therefore to demonstrate how a stress rule works in at least most, if not all, polysyllabic forms in verb and noun paradigms.

2. Antepenultimate Stress

Let us now consider the noun forms in (1). Stress falls regularly on the antepenultimate syllable regardless of whether the word is uninflected or inflected with a prefix and/or suffix(es). Even the optional possessive suffix -tm is included in the regularity of antepenultimate stress. The forms given in (2) are paradigmatic forms of the verb -nipaa- ‘to sleep’ in which I follow Wolfart (1973) for marking person categories (i.e., 1 = lsg., 2 = 2sg., 3 = 3sg., 1p = 1pl. exclusive, 21 = 1pl. inclusive, 2p = 2pl, 3p = 3pl). In (2a) I give a paradigm for this particular verb form, inflected for person, and in

<table>
<thead>
<tr>
<th></th>
<th>1 ninipaان</th>
<th>2 ninipaان</th>
<th>21 ninipaان</th>
<th>1p ninipaaان</th>
<th>2p ninipaaان</th>
<th>3 nipaa</th>
<th>3p nipaaان</th>
<th>3 nipaa와</th>
<th>nipaa와이와</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>kinipaan</td>
<td>ni-ka-nipaan</td>
<td>ni-ka-wíi-nipaan</td>
<td>'I sleep'</td>
<td>'I'm sleeping'</td>
<td>'I slept'</td>
<td>'I will sleep'</td>
<td>'I must sleep'</td>
<td>'I was sleeping'</td>
</tr>
<tr>
<td>21</td>
<td>kinipaانaw</td>
<td>ni-wíi-nipaan</td>
<td>ni-ka-wíi-nipaan</td>
<td>'I must have slept'</td>
<td>'I'll have to sleep'</td>
<td>'I'll have to be sleeping'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>nipaa</td>
<td>ni-ka-kii-nipaan</td>
<td>ni-ka-wíi-nipaan</td>
<td>'I will have slept'</td>
<td>'I must have slept'</td>
<td>'I'll have to be sleeping'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3p</td>
<td>nipaa와</td>
<td>ni-ka-wíi-nípaan</td>
<td>ni-ka-wíi-nípaan</td>
<td>'I must have slept'</td>
<td>'I'll have to be sleeping'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) Verb -nipaa- ‘to sleep’

a. ‘to sleep’

b. ‘to sleep’ + tense/mode/aspect
(2b) I cite the same verb in the 1sg. with one or more tense/aspect/mode affixes, separated from the personal prefix and the next stem by hyphens. Again, there is no exception to the antepenultimate stress.

Consider the noun paradigm for 'shoe' in (3). Stress is on the antepenultimate syllable in the first three forms, but the next four forms exhibit alternate patterns, either on the penult or antepenult.³

(3) máškisín ‘shoe’

1 nimáškisín
2 kimáškisín
3 omáškisín

1p nimáškisínínnaan ~ nimáškisínnaan
2l kimáškisínínaw ~ kimáškisínínaw
2p kimáškisíníwaaw ~ kimáškisíníwaaw
3p omáškisíníwaaw (sg) ~ omáškisíníwaaw
omáškisíníwaawa (pl) ~ omáškisíníwaawa

Considering the alternate forms, it can be seen that the occurrence of penultimate stress instead of antepenultimate stress is due to the elision of a high front vowel in the 1p, 2l, 2p, and 3p forms.

Assuming that the vowel elision rule is optional, the penultimate stress can be accounted for by assuming stress assignment before the vowel is elided. Further examples are provided in (4) to illustrate this point:

(4) a. mítítsok → mítítsok 'you (pl) eat!'
b. níkidítísón → níkidítísón 'I ate.'
c. kikiiasámísón → kikiiasámísón 'have you eaten?'
d. maaýáátsów → maaýáátsów 'she is ugly.'

The penultimate stress also results from the deletion of a glide, h or y (I have no example that involves w):

(5) a. nísaakíhísón → nísaakíhísón 'I love myself.'
b. apweesíyiwa → apweesíyiwa 'he (the other) sweats.'

Notice that the vowels across a deleted glide are identical, and the long vowel derives from two identical short vowels.

A question that arises at this point is: what happens when an underlyingly stressed i is deleted in an antepenultimate syllable? Consider the following data:

³Some speakers have a stem-final m instead of n in the forms with plural possessor.
(6) a. omaskisini'waawa → omaskisínwaawa 'their shoes'
b. nimaskisina → nimáksina 'my shoes'
c. -waasi'kahaat → -wááskahaat 'he flies about.'
d. miitisoowak → mítsoowak 'they are eating.'

Since both forms, one on the left and another on the right of the arrow, have stress on the antepenult, those forms may appear to have no problem with the stress rule. The difference however is that the stress on the right is attached to a different vowel from the stem on the left, since the vowel to which stress is originally assigned is elided. In other words, the segmental material (i.e., i) deletes, but the suprasegmental is delinked from the deleted vowel and relinked to another vowel. This phenomenon has been described in terms of "stability" for the analysis of tones in autosegmental phonology (Goldsmith 1990).

There are more data to support the stability phenomenon in Cree. As shown in (7), the stress moves to the right when the leftmost vowel, which is underlingly stressed, is deleted. In other words, stress relinking is leftward if there is room; otherwise, it is rightward:

(7) a. nitapin → ntápin 'I'm sitting'
b. nítakohp → ntákp 'my blanket'
c. nípaahkan → npááhk 'sleep later!'
d. níkaawiy → nkááwi 'my mother'
e. nímaama → nmááma 'my mom'

This phenomenon raises a serious question as to the phonological identity of what has been dubbed "stress" in Cree because stressed vowels in general (i.e., universally) are not likely to be deleted. For this reason, I think "accent" is more appropriate although I continue to use the traditional term "stress" in this paper.

To sum up, the data presented so far can be accounted for by the rules listed in (8) in that order:

(8) a. Antepenultimate stress (accent)
b. i. i-deletion
   ii. Glide-deletion
c. Relinking stress (accent)

3. Stress in Lexical Derivation

If the antepenultimate stress rule interacts only with those given in (8) above, no level ordering of rules is required. But there are other rules that interact with the stress rule. First, there is a rule that deletes a stem vowel. This rule applies during the process of stem derivation. Let me first illustrate stem derivation with an example given in (9):
LEXICAL DERIVATION AND STRESS

(9) a. miyo 'good, well'
    b. ni-nipaa-n 'I sleep.'
    c. ni-miyó-nipaa-n 'I sleep well.'

The verb stem in Cree may be represented by a nonderived root as in (9b), or it may be derived as in (9c), in which the stem is represented by miyo (9a) and nipaa (see Goddard 1990 for details of stem derivation). No phonological rule is involved in the stem derivation of (9c), and stress is assigned to the antepenultimate syllable as expected. Now consider the derivation (10c):

(10) a. miyo 'good, well'
    b. ni'-t-api-n 'I sit.' (t- is epenthetic)
    c. ni-miyo-api-n → nimiyopin 'I sit well.' (stem vowel deletion, antepenultimate stress)

Notice that the vowel a of the verb root api deletes following another vowel of the derivational element of the stem, miyo, in (10c), whereas the same vowel is protected by t-epenthesis following an inflectional prefix vowel in (10b). The important point here is that the stem vowel deletion occurs before stress is assigned. Recall that i-deletion and glide deletion apply after the stress assignment (see 8).

To return to epenthesis, t-epenthesis occurs following a prefix vowel and preceding a stem vowel (10b), but it can also occur between two prefix vowels. There is another epenthesis, y-epenthesis that protects a stem-initial vowel from being deleted after a derivational prefix that ends in a vowel, as illustrated by the derivations given in (11). The derivational prefix in question is Ca- called “light reduplication” (cf. Ahenakew and Wolfart 1983) and means ‘on-going action’. (I use C in this representation to indicate that this particular prefix triggers C-copy; see below.) The phonetic realization of C of Ca- (C-copy), y-epenthesis and t-epenthesis interact in the manner described below. The C of Ca- copies the stem-initial consonant if there is one, in which case y-epenthesis is bled. If there is no stem-initial consonant, a y is inserted between Ca- and a stem-initial vowel, while the C of Ca- is realized by t, i.e., t-epenthesis. In other words, a sequence of two identical vowels is eliminated by deleting one in the process of stem derivation, and is broken by y-epenthesis between a derivational prefix and stem or by t-epenthesis otherwise. The relationship of these three rules is illustrated by the derivations given below (inflectional affixes, ni- and -n, are actually added following derivation as shown in 12).
Notice that the prefix that I represent as Ca- is realized as na- in (11a) where the verb stem initial consonant is n, and as ta- where there is no stem initial consonant (11b). It will become clearer below why the t of ta-in (11b) is epenthetic.

In this linear representation of the word formation process, both t-epenthesis and y-epenthesis apply in a phonologically identical environment, i.e., between vowels. Therefore, different boundaries are recognized in a linear analysis in order to differentiate two otherwise identical phonological environments, so that a correct choice of the two epentheses may be made. This means, of course, that y-epenthesis and t-epenthesis occur in the same phonetic environment but in different morphological environments, i.e., different levels or strata in the level ordered lexical derivation.

One of the problems with the linear analysis is that the two epentheses rules (i.e., morphophonemic alternations) are not fully predictable phonologically, i.e., they are both phonologically and morphologically conditioned. In other words, both y-epenthesis and t-epenthesis occur between two vowels but of different morphemic classes. I shall now demonstrate how the rules are organized in different levels in lexical phonology and morphology (cf. Kiparsky 1982; Mohanan 1986), so that the two rules of epenthesis can be predicted phonologically.

Consider the lexical derivation in (12) for further discussion. The verb 'I am still sitting well' requires stem derivation by which miyo 'good (well)' and api 'to sit' form a verb stem. To this derived stem, the derivational prefix Ca- is affixed, the output of which is subject to inflection, i.e.:

\[(12) \begin{align*}
\text{[api]} & \quad \text{Nonderived stem (i.e., root 'to sit')} \\
\text{[miyo[api]]} & \quad \text{Stem derivation (morphology) 'to sit well'} \\
\text{[miyopi]} & \quad \text{Stem-vowel deletion (phonology)} \\
\text{[Ca[miyopi]]} & \quad \text{Ca-reduplication (derivational morphology)} \\
\text{[mamiyopi]} & \quad \text{C-copy (phonology)} \\
\text{[ni[mamiyopi]n]} & \quad \text{Inflection (morphology)} \\
\text{nimamiyopin} & \quad \text{Output of lexical derivation 'I'm still sitting well.'} \\
\text{nimami'yopin} & \quad \text{Stress rule 'I'm still sitting well.'}
\end{align*}\]
Three phonological rules are involved in this derivation; stem-vowel deletion, C-copy, and stress assignment. The first two require morphological bracketing, hence lexical rules, and the stress rule does not require morphological analysis, hence it is postlexical. As shown in (13) t-epenthesis is also postlexical:

(13) \[
\text{[api]} \quad \text{Nonderived stem (root 'to sit')} \\
\text{Ca[api]} \quad \text{Derivational affix (morphology)} \\
\text{Cayapi} \quad y\text{-epenthesis (phonology)} \\
\text{[ni[Cayapi]n]} \quad \text{Inflection (morphology)} \\
\text{niCayapin} \quad \text{Output of lexical derivation 'I'm still sitting.'} \\
\text{nitáyapin} \quad t\text{-epenthesis and Stress}
\]

In short, there are three rule domains (i.e., strata) in which different rules apply given the derived sequence of two vowels. First, the stem vowel deletion applies between morphemes that constitute the stem (i.e., in stem derivation). The next rule domain (i.e., strata), is Ca- plus stem, wherein y-epenthesis applies if the stem begins with a vowel instead of a consonant. If the stem begins with a consonant, on the other hand, C-copy applies where y-epenthesis is bled. Then, the t-epenthesis rule is an elsewhere rule in that it inserts a t between any sequence of two unlike vowels.

Returning now to the deletion of i and glides, they are clearly postlexical as they follow the antepenultimate stress rule. Assuming that the t-epenthesis rule is mutually exclusive with C-copy or follows it, the postlexical deletion rules are ordered to follow the stress rule. To conclude then, the antepenultimate stress rule in Cree is preceded by lexical rules and followed by postlexical rules, i.e.:

(14) Lexical Rules: 
<table>
<thead>
<tr>
<th>Level</th>
<th>Stem vowel deletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>y-epenthesis</td>
</tr>
<tr>
<td>Level 2</td>
<td>C-copy</td>
</tr>
</tbody>
</table>

Postlexical Rules: 
- Antepenultimate stress rule
- i-deletion
- Glide deletion
- Stress (accent) relinking

While I have not fully specified phonological environments in which these postlexical deletion rules apply, it is not likely that any of the above rules require extrinsic ordering, except the stress rule which must precede other postlexical rules. Hence the stress rule has a special status.
4. Conclusion

The word stress or accent in Cree is largely predicted by a postlexical ante­penultimate stress rule where rules of lexical derivation are organized in two or three strata. These strata are best illustrated by rules that apply between two vowels in the course of derivation. If the vowels in question belong to the stem, one gets deleted; if one of the two vowels belongs to a stem and the other to a derivational prefix, Ca-, then y is inserted between them; otherwise t is inserted between two unlike vowels. In other words, stem vowel deletion is a Level 1 rule, C-copy and y-epenthesis are Level 2 rules, and t-epenthesis is a Level 3 rule, or a postlexical rule. The two derivations given in (15) illustrate the level ordering of these phonological rules and their interaction with morphological rules:

(15) a. nimamîyopin ‘I’m still sitting well’

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Phonology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td>api</td>
</tr>
<tr>
<td>Stem derivation</td>
<td>[miyo[api]] → [miyopi]</td>
</tr>
<tr>
<td>Ca-reduplication</td>
<td>[Ca[miyopi]] → [mamîyopi]</td>
</tr>
<tr>
<td>Inflection</td>
<td>[ni[mamîyopi]n] → [nimamîyopin]</td>
</tr>
</tbody>
</table>

nimamîyopin Antepenultimate stress

b. nitâyapin ‘I’m still sitting’

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Phonology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td>api</td>
</tr>
<tr>
<td>Ca-reduplication</td>
<td>[Ca[api]] → [Cayapi]</td>
</tr>
<tr>
<td>Inflection</td>
<td>[ni[Cayapi]n] → [niCayapin]</td>
</tr>
</tbody>
</table>

nitâyapin t-epenthesis

nitâyapin Antepenultimate stress

Needless to say, there is a lot more to be learned of Cree stress or accent, but the analysis presented in this paper demonstrates the regularity of an antepenultimate stress where apparent counterexamples are accounted for
in level ordered lexical derivation. Another point to be emphasized here is that "stress" is clearly an inadequate term as indicated by the stability phenomenon. I suggest that "accent" is a more appropriate term to use until more is known about the rhythmic pattern of Cree.

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