1 Introduction

Nez Perce is a Sahaptian language spoken in parts of Idaho, Washington, and Oregon.

This talk is about the interaction between word-level stress and morphological constituency in Nez Perce, based on the description in Crook (1999), with additional data drawn from a collection of Nez Perce oral narratives (Aoki and Walker, 1989) and the Nez Perce dictionary (Aoki, 1994).

(1) Nez Perce segmental inventory (Aoki, 1970, p. 10):

Consonants:
- p, p’
- t, t’
- k, k’
- q, q’
- c, c’
- s
- x
- χ
- h
- m, m’
- n, n’
- w
- y

Vowels: (an underlying contrast in length is preserved only under stress)
- i
- u
- e
- o
- a

(2) Nez Perce vowel harmony (Aoki, 1966, et seq.)

All vowels in a word come from one of the following two sets:

Dominant | Recessive
---|---
- i | - u
- o | - e
- a

Stress in Nez Perce depends on the interaction of default preferences with the location of underlying accents (syllables lexically specified to bear stress).

- Stress in Nez Perce is usually rightmost in some domain. . .

(3) Primary stress is on the penultimate (rightmost non-final) syllable in words with no accents:¹

- a. pískis  pískîs-ne  b. hànûi-sa  hànî-sáaq
  pískîs   pískîs-ne   hànîi-see  hànîi-seeqa
  ‘door’  ‘door-OBJ’  ‘I am making’  ‘I was making’

(Crook, 1999, pp. 294, 300)

¹Abbreviation key: 3=3rd person (subject or object), -NOM=nominative, -OBJ=objective, -ERG=ergative, -INC=incompletive aspect, -INST=instrumental, -IRR=irrealis -LOC=locative, -PFTV=perfective aspect, PL=plural agreement, -PLOB=plural object, -REC=recent past tense, -SF=stem formative
Primary stress is on the rightmost (non-final) accented syllable in words with lexical accents:

a. sèpínewiy-ù'  
   meaure-IRR  
   'I will measure'

b. páy-nóó-saqa  
   arrive-toward-REC  
   'I recently arrived towards'

c. k'ómay-náapii-k-sa  
   sick-away-SF-INC  
   'I being sick am kept away'

(Iron, 1999, pp. 352, 456, 458)

A puzzling exception: accented prefixes causes stress to becomes leftmost in verbs (in the absence of non-final accented suffixes):

Stress surfaces on a leftmost accented prefix:

a. cúukwe-ce  
   know-INC  
   "I know."

b. siléew-cúukwe-ce  
   by.seeing-know-INC  
   "I know by seeing."

c. sepée-siléew-cúukwe-ce  
   CAUS-by.seeing-know-INC  
   "I make you (sg.) know by seeing."

d. née-sepée-siléew-cúukwe-ce  
   PLOB-CAUS-by.seeing-know-INC  
   "I make you (pl.) know by seeing."

(Crook, 1999, p. 462)

This alignment reversal is sensitive to both morphological constituency and to abstract morphological prominence (accent), rather than to a surface phonological property such as weight.

Preview of the Analysis:

The leftmost pattern observed with prefixes will be analyzed as the result of a conflict between a constraint aligning primary stress with the right edge of a word, and a higher-ranked constraint preferring that accentual stresses be preserved on morphological constituents on the outer edges of a word (PRESERVE-EDGEMOST).

In most cases these constraints can both be satisfied, but when their demands diverge, it is PRESERVE-EDGEMOST that is satisfied.

2 Background: Stress in Nez Perce

2.1 Default stress

In the absence of accent, primary stress is penultimate and shifts rightwards under suffixation:

Secondary stresses occur on initial syllables that does not bear primary stress. 2

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2Crook (1999) reports that this stress is sometimes optional, particularly when it results in stress clash. Rhythmic secondary stresses also occur to prevent two-syllable lapses, and there is interaction between underlying vowel length and secondary stress assignment.
In this paper I adopt a grid-based representation for stress (Prince, 1983; Selkirk, 1984; Walker, 1996; Gordon, 2002): primary stress corresponds to a level 2 grid mark (x₂), while secondary stress corresponds to a level 1 grid mark (x₁). All syllables are associated with a level 0 grid mark (x₀).

Following Gordon (2002), I assume a family of ALIGN constraints that align grid marks of some level \( n \) with respect to the grid marks of some other level, by default level \( n - 1 \).

The relevant constraints for Nez Perce:

(8) **Non-Finality**
Assign one violation mark for every grid mark above level 0 assigned to the last syllable of a word.

(9) **ALIGN\( (x_1, \text{Edges}) \)**
“The edges of level 0 of grid marks in a prosodic word are aligned with level 1 grid marks.” (Gordon, 2002, p.8)

(10) **ALIGN\( (x_2, \text{R}) \)**
Align all level 2 grid marks to the right edge of the level 1 grid. (one violation is assigned for each secondary stress between the primary stress and the right edge of word.)

Constraint rankings:
- **Non-Finality** \( \gg \) **ALIGN-Edges** \( \gg \) **Dep** \( (x_1) \) (Initial and penultimate stresses)
- **Non-Finality** \( \gg \) **ALIGN\( (x_2, \text{R}) \) \( \gg \) **ALIGN\( (x_2, \text{L}) \)** (Primary stress rightmost but non-final)

(11) **Non-Finality** \( \gg \) **ALIGN-Edges**, **ALIGN\( (x_2, \text{R}) \)** \( \gg \) **ALIGN\( (x_2, \text{L}) \)**, **Dep** \( (x_1) \)

2.2 Accent-determined stress

- Words with underlying morphological accents do not show the shifting stress seen in (6).
- If a word has only one accent, the accented syllable always receives main stress:

(12) a. hūiṣèmtụks b. ‘iṇìit c. hipú’ d. láwyàlac̣àqa
    hūiṣemtuks ‘sun (nom)’ ‘house (nom)’ ‘I will eat’ ‘I fished with a gaff hook recently.’
    (Crook, 1999, pp. 319, 321, 377)
If we represent stress in inputs exactly as we do stress in outputs, accent can correspond to a level 2 grid mark in the input: the attraction of primary stress to accented syllables then results from a Max $(x_2)$ violation.

(13) Max $(x_2)$ must outrank Non-Finality, in order to allow primary stress on final accents:

<table>
<thead>
<tr>
<th>iniiit</th>
<th>Max$_{IO}(x_2)$</th>
<th>Non-Finality</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. iniiit</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. iniiit</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

In cases of accent clash, primary stress surfaces on the rightmost non-final accented syllable: (Non-Finality $\gg$ Align$(x_2, R)$)

(14) a. sèpiînewi'yù'  
    b. pàynóosàqa  
    c. k'òmaynáapii̱ksa

sèpiînewi'-ù'  
measuring-IRR  
'I will measure'

pàay-nú-saaqa  
arrive-toward-REC  
'I recently arrived towards'

k'òomaynáapii̱ksa

sick-away-SF-INC  
'I being sick am kept away'

(Crook, 1999, pp. 352, 456, 458)

All accented syllables surface with at least secondary stress, even when they are final (Max $(x_1)$ $\gg$ Non-Finality)

(15) Max $(x_1)$ $\gg$ Non-Finality, Align$(x_2, R)$

<table>
<thead>
<tr>
<th>sèpiînewi'-ù'</th>
<th>Max $(x_1)$</th>
<th>Non-Finality</th>
<th>Align$(x_2, R)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. sèpiînewi'-ù'</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. sèpiînewi'-ù'</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. sèpiînewi'-ù'</td>
<td>**!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To illustrate the complete ranking of the relevant constraints, below are two illustrative tableaus:

- Max $(x_2)$ is relevantly dominated only by Culminativity, the constraint requiring outputs to have one and only one primary stress; Culminativity does not outrank Max $(x_1)$, and so all accents result in secondary stresses:

(16) Max $(x_1)$, Culminativity $\gg$ Max $(x_2)$ $\gg$ Non-Finality $\gg$ Align$(x_2, R)$ $\gg$ Align$(x_2, L)$

<table>
<thead>
<tr>
<th>hip-ù'</th>
<th>Max $(x_1)$</th>
<th>Culmin.</th>
<th>Max $(x_2)$</th>
<th>Non-Finality</th>
<th>Align$(x_2, R)$</th>
<th>Align$(x_2, L)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hìpu'</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. hìpu'</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. hìpu'</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• When there are multiple accents in a word, **non-finality** requires that primary stress be assigned to a non-final accent; primary stress still must surface on some accent, however, and the final accent receives secondary stress:

\[(17) \text{MAX} (x_1), \text{Culminativity} \gg \text{MAX} (x_2) \gg \text{non-finality} \gg \text{ALIGN}(x_2, R) \gg \text{ALIGN}(x_2, L)\]

<table>
<thead>
<tr>
<th>sepiñewi-ú'</th>
<th>MAX (x₁)</th>
<th>Culmin.</th>
<th>MAX (x₂)</th>
<th>non-finality</th>
<th>ALIGN(x₂ R)</th>
<th>ALIGN(x₂ L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. sepiñewiyù'</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>b. sepiñewiyú'</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>c. sepiñewiyú'</td>
<td></td>
<td></td>
<td></td>
<td>**!</td>
<td>***</td>
<td>*</td>
</tr>
<tr>
<td>d. sepiñewiyú'</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**An aside on gradient Align:**

The ALIGN constraints in these tableaux are evaluated **gradually**, contra the claims of McCarthy (2003). Alternative constraint rankings for achieving penultimate stress (i.e. absolute right alignment of a trochaic foot), will not work for Nez Perce: a penultimate stress can be immediately followed by an accent-determined final secondary stress:

\[(18)\]

<table>
<thead>
<tr>
<th>a. kíwyèksix</th>
<th>b. hítémèyèku'</th>
<th>c. hítàmèyàksix</th>
</tr>
</thead>
<tbody>
<tr>
<td>kíwyek-síx</td>
<td>hiitemyk-ú'</td>
<td>hiitemyk-síx</td>
</tr>
<tr>
<td>feed-INC.PL</td>
<td>sweat-IRR</td>
<td>sweat-INC.PL</td>
</tr>
<tr>
<td>“we are feeding”</td>
<td>“I will sweat”</td>
<td>“we are sweating”</td>
</tr>
</tbody>
</table>

(Crook, 1999, pp. 446-7)

### 2.3 Alignment reversal with accented prefixes

In verbs with accented prefixes (there are no accented nominal prefixes) stress is unexpectedly **leftmost** (19), unless there is a accented suffix (20b):

\[(19)\]

**Leftmost** stress with accented prefixes:

- a. cúukwe-ce
  
  cúukwe-cee
  know-INC
  “I know.”

- b. síléew-cúukwe-ce
  
  síléew-cúukwe-cee
  by.seeing-know-INC
  “I know by seeing.”

- c. sepée-síléew-cúukwe-ce
  
  sepée-síléew-cúukwe-cee
  CAUS-by.seeing-know-INC
  “I make you (sg.) know by seeing.”

- d. née-sepée-síléew-cúukwe-ce
  
  née-sepée-síléew-cúukwe-cee
  PLOB-CAUS-by.seeing-know-INC
  “I make you (pl.) know by seeing.”

(Crook, 1999, p. 462)

\[(20)\]

**Rightmost stress reasserted** by accented suffix:

- a. hí-néés-wèyik-se
  
  híí-néés-wéyik-see
  3-PLOB-cross-INC
  ‘He is crossing them.’

- b. hí-néés-wèyik-úu-se
  
  híí-néés-wéyik-úu-see
  3-PLOB-cross-toward-INC
  ‘He is crossing toward them.’

(Crook, 1999, pp. 463, 480)
This is not a cyclic effect:

- If it were cyclic, stress would be attracted onto an affix whenever it is structurally highest/outermost.
- (21) shows that accented prefixes attract stress leftward from the accented root páay ‘arrive’:

\[\text{(21) Stress falls on leftmost accented prefix...}\]

\[\begin{align*}
\text{a. } & \text{hi-sapá-páy-ca} & \text{b. } & \text{hi-náa-sapá-páy-ca} \\
& \text{hii-sepéé-páy-cee} & & \text{hii-nées-sepée-páy-cee} \\
& \text{3-CAUS -arrive-INC} & & \text{3-PLOB-CAUS-arrive-INC} \\
& \text{'He makes arrive (someone).'} & & \text{'He makes them arrive.'}
\end{align*}\]

- The derivational suffix núu ‘towards’ transitivizes the intransitive root páay ‘arrive’ (Crook, 1999, p. 481), adding an object argument. In (22), the plural object agreement marker nées agrees with the object introduced by núu, suggesting that the prefix is outside the root-suffix constituent (see, for example, the work of Pylkkänen 2008):
- Despite this, the accented suffix reasserts rightmost stress:

\[\text{(22) An inner accented suffix reasserts rightmost-ness:}\]

\[\begin{align*}
& \text{hi-nás-páy-nóo-ca} \\
& \text{hii-[nées-[páy-núu]-cee} \\
& \text{3-[PLOB-[arrive-toward]]-INC} \\
& \text{‘He arrives toward (someone).’}
\end{align*}\]

- If this is not a cyclic effect, what is going on?

The observation: Prefixes only attract stress iteratively leftwards when the only alternative is to place primary stress on the verb root: as soon as the rightmost accent is not on the root, the default rightmost pattern reasserts itself ((22d)).

2.4 Analysis of default-to-opposite stress on prefixes

Proposal: the alignment reversal results from conflicting requirements on the alignment of stress: the pressure for rightmost alignment (from ALIGN(x_{2}, R)) competes with a constraint privileging the preservation of accent on morphological constituents further towards each edge.

\[\text{(23) PRESERVE EDGEMOST (x_{2}) [pres-edges]}\]

Assign a violation if a level-2 gridmark that is outermost from the root on one edge in the input is not present in the output.

- Differential faithfulness: necessary because all potential stress positions are indistinguishable in the output. Accents are only distinguishable in the input.
- Consider the following underlying morphological bracketing:

\[\text{[ [ } \alpha - [ [ \beta - [ [ \text{ROOT} ] - \gamma ] ] ] ]}\]

All the affixes bear accents, and \(\gamma\) is the innermost affix.

\text{PRESERVE EDGEMOST (x_{2})} would be violated by the deletion of an accent on \(\alpha\) or on \(\gamma\), because those accents are furthest from the root on the left and right edges, respectively.
• **Preserve Edgemost** \((x_2)\) must be outranked by culminativity, as *both* edgemost accents are never preserved, and it must outrank the \(\text{Align}(x_2, R)\) constraint in order to force leftward stress assignment:

\[
\begin{array}{|l|c|c|c|}
\hline
\text{preserve edgemost} & \text{max} & \text{align (x2, R)} & \text{align (x2, L)} \\
\hline
\text{née-sepè-slèw-cúkwè-ce} & \text{préedges} & \text{***} & \text{****} \\
\text{née-sepè-slèw-cúkwè-ce} & \text{***} & \text{****} & \text{****} \\
\text{née-sepè-slèw-cúkwè-ce} & \text{***} & \text{*} & \text{**} \\
\text{née-sepè-slèw-cúkwè-ce} & \text{***} & \text{**} & \text{**} \\
\hline
\end{array}
\]

• When an accented suffix is present, the same ranking predicts the reassertion of right-aligned primary stress: note that the prefix-stressing and suffix-stressing candidates incur equal violations of **Preserve Edgemost** \((x_2)\):

\[
\begin{array}{|l|c|c|c|}
\hline
\text{preserve edgemost} & \text{max} & \text{align (x2, R)} & \text{align (x2, L)} \\
\hline
\text{hi-nèè-wèyik-únu-se} & \text{préedges} & \text{***} \\
\text{hi-nèè-wèyik-únu-se} & \text{***} & \text{****} \\
\text{hi-nèè-wèyik-únu-se} & \text{**} & \text{**} \\
\hline
\end{array}
\]

**Contrast with Chamorro** (Chung, 1983)

• Chamorro default primary stress is penultimate, though a root can be lexically determined to have stress fall on any of its three final syllables.

• A subset of prefixes attract stress onto themselves as long as there is no morphologically exterior suffix:

\[
\begin{array}{|l|c|c|c|}
\hline
\text{Chamorro stress-attracting prefixes} & \text{préedges} & \text{max} & \text{align (x2, R)} \\
\hline
\text{púgas} & \text{mipugas} & \text{uncooked rice} / \text{abounding in uncooked rice} \\
\text{mantìka} & \text{mímantìka} & \text{fat} / \text{abounding in fat} \\
\text{panìti} & \text{ápanìti} & \text{to strike} / \text{to strike one another} \\
\text{agradési} & \text{sénagradesi} & \text{to give thanks} / \text{to give many thanks} \\
\hline
\end{array}
\]

(Chung, 1983, p. 40)

• What distinguishes this pattern from Nez Perce is that this process is sensitive to bracketed constituency: a prefix *outside* the scope of a suffix attracts stress, while a prefix *within* the scope of a suffix does not:
(27) Bracketing-sensitive stress

a. [ā[kwentus][i]] ‘to speak to one another’
   (cf. kwéntus ‘to speak’, kwentús + i ‘to speak to’)

b. [[mi[mantiká]][ña] ‘more abounding in fat’
   (cf. mantika ‘fat’, ḿ + mantika ‘abounding in fat’)

c. [[ma[fátinás]][ña] ‘its being made’
   (cf. fátinás ‘to make’, ma + fátinás ‘being made’)

d. [man[á[[t́ugi?[i]]]] ‘to write to one another (pl.)’
   (cf. tugi ‘to write’, tugi+ i ‘to write to’, ´á + 
tugi+ i ‘to write to one another’)

(Chung, 1983, p. 41)

While Nez Perce accented prefixes lose out to any suffix, regardless of morphological scope, Chamorro accented prefixes present a real cyclic effect, where the outermost affix always regularly asserts its influence on word-level stress.

3 Alternative analysis

• Crook (1999) presents a partially cyclic analysis of prefix-attracted stress, proposing that there is constraint re-ranking triggered by the presence of an accented verbal prefix.

• Reranking promotes a *Stressed Lexical Head constraint, defined in (28):

(28) *Stressed Lexical Head
   “Main stress must not be assigned to the lexical head.” (Crook, 1999, p. 454)

• In order to get stress on a leftmost prefix (rather than on any non-root morpheme) Crook proposes a process of partial bracket erasure, also triggered by the presence of an accented prefix:

(29) Original bracketing: sepéesĺewćukẃe

   [sepé [sĺeeew [cúukwe]]] -cee
   [CAUS [by.seeing [know]]] -INC

   After bracket erasure:
   [sepé [sĺeeew cúukwe]] -cee
   [CAUS [by.seeing know]] -INC

• Applied to the structure in (29), *Stressed Lexical Head will be violated by placing primary stress on anything other than the leftmost prefix.³

• Accented suffixes present a problem for the bracket-erasure approach: in (30) if the accented prefix n´ees triggered total bracket erasure, the suffix ´uu would no longer be morphologically distinguishable from the verb root:

(30) Original bracketing with prefixes and suffixes: hinèswèyikúuse ‘he is crossing towards them.’

   [hii [nées [[wéeyik] úu]]] -see
   [3 [PLOB [[cross toward]]] -INC

   After bracket erasure:
   [hii [nées [wéeyik úu]]] -see
   [3 [PLOB [cross toward]]] -INC

³Crook does not address the point that it must be a property only of accented morphemes that they erase brackets within their constituents. Otherwise an outermost unaccented prefix would erase all brackets further in, and stress would default again to the rightmost accent.
• A solution: protect the bracketing of suffixes from the process of bracket erasure: but this loses the appeal of a cyclic account.

The same problem would apply to an analysis in terms of accent deletion / Affix Controlled Accent (Alderete, 2001).

NP prefixes aren’t dominant (in the sense of Alderete (2001)) – they don’t erase accentual contrasts in the constituent to which they

4 Conclusion: implications for default-to-opposite typology

The Nez Perce stress pattern reviewed here bears a resemblance to the classic default-to-opposite phenomenon: the analogous case is one in which stress falls on a leftmost heavy syllable, otherwise on the penult.

The analysis of Nez Perce proposed here bears a similarity to Zoll’s (2002) approach to default-to-opposite phenomena.

• Zoll: Default-to-opposite systems emerge when marked structures are limited in their distribution (i.e. can only occur initially), while unmarked structures are aligned at an opposite edge. If marked stressed syllables (e.g. stressed light syllables) can only occur initially, but a general stress alignment constraint aligns stress at the right edge, a default-to-opposite pattern will emerge if the constraint specific to light-syllable-stresses outranks the general alignment constraint.

• Nez Perce is similar but shows a different interaction between constraints enforcing the alignment of stress: instead of positional licensing, positional faithfulness.

• This is an expected elaboration of the default-to-opposite stress typology, on Zoll’s analysis.
References