Tone in Arapaho

Eva Zimmermann  
(University of Leipzig)

mfm 19  
May 19-21th, 2011

Introduction

Arapaho

- a Plains Algonquian language spoken almost entirely by elders in Wyoming, and to a much lesser extent in Oklahoma  
  (Salzmann 1963, Cowell & Moss 2008)
- remarkable inside the Algonquian family for being a tone language  
  (Mithun 1999, Yip 2002)
- its tone ‘has resisted attempts at explanation up to the present’  
  (Cowell & Moss 2008)

Contrastive tone

técénoo ‘door’ vs. técenoo ‘roll it out’

- high or normal tone  
- long vowels and diphtongs: only a high-low sequence is possible

(1) The µ as TBU in Arapaho

<table>
<thead>
<tr>
<th>σ_µ</th>
<th>σ_µ</th>
<th>σ_µ</th>
<th>σ_µ</th>
<th>σ_µ</th>
<th>σ_µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>‘Falling’</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
<td></td>
</tr>
<tr>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

My Aim

I. Tone in Arapaho: Analysis in a nutshell

- floating tones  
- the OCP

II. Xenophobia vs. xenophilia

In some contexts, association of a tone with a TBU belonging to the same morpheme is impossible – in other contexts, this is preferred.

- a generalized version of van Oostendorp’s ALTERNATION  
- the constraint MONO-T
Xenophobia vs. xenophilia: A paradox?

- tones that mark their underlying association as invisible can only associate to a new TBU that is affiliated with the same morpheme
  \[
  \begin{array}{c}
  \text{H} \\
  \text{µ} \quad \text{µ} \\
  \end{array}
  \]

- a floating tone can only associate to a TBU affiliated with another morpheme
  \[
  \begin{array}{c}
  \text{H} \\
  \text{µ} \quad \text{µ} \\
  \end{array}
  \]

In containment, \text{T}MONO\text{T} and \text{ALT}^c easily predict such a state of affairs

Morphemes demanding tone on the preceding syllable
(Cowell & Moss 2008)

- floating tones in the representation of a morpheme
- this floating tone is forced to associate to another morpheme
- it cannot be realized ‘too far away’ from its segmental content but it always associates with an adjacent TBU
  \[\approx \text{bounded shifting, e.g. in Bantu languages (Yip 2002, Myers 1997, Kisseberth 1998)}\]
- (the direction of association follows since no situation ever arise where a tone-demanding morpheme is followed by a potential TBU)

Tone-demanding morphemes: constraints

(3) \[
\begin{array}{c}
\text{H} \\
\text{µ}
\end{array}
\]
Assign a violation mark for every H that is not phonetically associated to a TBU.

(4) \[
\begin{array}{c}
\text{T} \\
\text{µ}
\end{array}
\]
Assign a violation mark for every element not associated a tone T of colour \(\alpha\) between elements associated with a tone T of colour \(\alpha\) and elements of colour \(\alpha\) on the same tier.

(5) \[
\begin{array}{c}
\text{ALT}^c
\end{array}
\]
Assign a violation mark for every morpheme of colour \(\alpha\) where at least one element of colour \(\alpha\) is linked with an element of colour \(\alpha\).
### Tone-demanding morphemes: analysis

(6) e.g. biiʔin-owu-H no? → beniiʔinowúno?

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>AltG</td>
<td>H</td>
<td>DepL</td>
</tr>
<tr>
<td>µ</td>
<td>µ</td>
<td></td>
<td>µ</td>
<td></td>
</tr>
</tbody>
</table>

a. H | µ | µ | µ | µ | **

### Tone-demanding morphemes: long syllables

(7) *RISE-σ

Assign a violation mark for every syllable where the first TBU is not phonetically associated with an H but the second TBU is.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>AltG</td>
<td>H</td>
<td>DepL</td>
</tr>
<tr>
<td>µ</td>
<td>µ</td>
<td></td>
<td>µ</td>
<td></td>
</tr>
</tbody>
</table>

b. H | µ | µ | µ | µ | *

c. H | µ | µ | µ | µ | *

d. H | µ | µ | µ | µ | *

### Floating tone and the OCP

(8) e.g. nóóhob-ee-H t → nonóóhobéét

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>AltG</td>
<td>H</td>
<td>DepL</td>
</tr>
<tr>
<td>µ</td>
<td>µ</td>
<td></td>
<td>µ</td>
<td></td>
</tr>
</tbody>
</table>

a. H | µ | µ | µ | µ | **

### Tone-demanding morphemes: long syllables

(9) béeé-H e no?   beenéno?

téiʔéihi-H nee  téiʔeihinee

You (pl) are strong

niíhiʔkóóku H t  niíhiʔkóókuút

‘act of running’
betéeé-H e t  betéeééiʔ?

‘They are dancing’
nóóhow -ée-H e t  nonóóhobéénee

‘I see you (pl)’

The floating tone is realized and the underlying tone remains unrealized to avoid an OCP violation.
**OCP-effects: constraints**

(10) **OCP** (Odden 1986) Assign a violation mark to every distinct pair of adjacent TBUs which are associated to different Hs.

(11) \[ H \]

Assign a violation mark for every H that is not phonetically associated to a TBU.

(12) \[ H \]

Assign a violation mark for every H that is not (phonetically or morphologically) associated to a TBU.

**Xenophobia vs. Xenophilia**

**And the phonetically invisible tone...?**

(14) ... is realized on a TBU further left.

<table>
<thead>
<tr>
<th>surface</th>
<th>tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>biiʔin -ee -(^H)be</td>
<td>hélhowbiiʔinéébe 'you are not finding something'</td>
</tr>
<tr>
<td>isétee -(^H)?-i</td>
<td>heniisetéʔi 'they are ripe'</td>
</tr>
<tr>
<td>beʔise -(^H)?-i</td>
<td>béeʔiséʔi 'they are rusty'</td>
</tr>
<tr>
<td>ciinén -owu -(^H)?-i</td>
<td>ceníinenóúʔú 'they are putting it down'</td>
</tr>
</tbody>
</table>

**But what about...?**

(15) ... the phonetically invisible tone remains invisible.

<table>
<thead>
<tr>
<th>surface</th>
<th>tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>niiʔeneb -éʔe -(^H)nee</td>
<td>niʔiʔenebėʔe ’I like you’</td>
</tr>
</tbody>
</table>

Tones can only ‘rescue’ themselves unto a TBU that is affiliated to the same morpheme.
Xenophobia vs. Xenophilia

The ‘dissociated’ tone: constraint

(16) **MONOCHROME**

Tone (≈ MonoT) Assign a violation mark for every tone that is associated to TBUs of different morphological colour (phonetically or morphologically).

Xenophobia vs. Xenophilia: A paradox?

- tones that mark their underlying association as invisible can only associate to a new TBU that is affiliated with the same morpheme

\[
\text{H} \quad \text{H} \\
\mu \quad \mu \quad \mu \\
\mu \quad \mu
\]

- a floating tone can only associate to a TBU affiliated with another morpheme

\[
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\]

Analysis: Escape on a TBU of the same colour

(18) **henísítéé**-\text{H}^2\text{-i} \rightarrow **henísítéé\text{?-i}**

‘they are ripe’

- in Containment: if two segments of the same morphological colour are associated underlyingly, a violation of **Alt**\text{C} can never be avoided for this morpheme

\[
\begin{array}{cccc}
\text{H} & \text{H} \\
\mu & \mu & \mu \\
\mu & \mu \\
\end{array}
\]

\[
\begin{array}{c}
\text{MonoT} \\
\text{OCP} \\
\text{Alt}\text{C} \\
\text{Dep}\text{f}
\end{array}
\]

\[
\begin{array}{c}
\text{a.} \\
\text{b.}
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]

\[
\begin{array}{c}
\text{H} \\
\mu \quad \mu \\
\mu \quad \mu
\end{array}
\]
Analysis: Escape on a TBU of another colour is impossible

(19) e.g. niííeenew-êthê-neé → niííeenenebêthêneé

'I like you (pl)'

<table>
<thead>
<tr>
<th>H</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ H ]</td>
<td>[ H ]</td>
</tr>
<tr>
<td>[ µ ]</td>
<td>[ µ ]</td>
</tr>
<tr>
<td>[ µ ]</td>
<td>[ µ ]</td>
</tr>
</tbody>
</table>

MonoT OCP Alt\textsuperscript{G} Dep

Summary

■ floating tones that are part of a morphemes must associate but cannot associate with a TBU that belongs to the same morpheme

■ the OCP

■ a generalized Alt\textsuperscript{G} and MonoT solve the apparent paradox for the obligatory/impossible association of tones with TBUs of the same morphological colour

One morpheme and two surface tones?

(20)

<table>
<thead>
<tr>
<th>1pe</th>
<th>2s</th>
<th>2pl</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonóóhob-éi?-ee-n</td>
<td>nonóóhob-éi?-ee-n</td>
<td>nonóóhob-éi?-éé-nee</td>
</tr>
</tbody>
</table>

A floating tone must associate with the preceding morpheme

Summary

Tone shifting vs. Tone augmentation for different stems?

(21)

\[
\begin{array}{ccc}
1sg & 2p \\
\text{1pe} & \text{niííenéb-êthê-neé} & \text{niííenéb-êthê-neé} \\
\text{1sg} & \text{nonóóhob-êthê-neé} & \text{nonóóhob-êthê-neé} \\
\text{2s} & \text{nonóóhob-êthê-neé} & \text{nonóóhob-êthê-neé} \\
\text{2pl} & \text{niííenéb-êthê-neé} & \text{niííenéb-êthê-neé} \\
\end{array}
\]

H Augmentation

H Shifting

\[
\begin{array}{ccc}
\text{H} & \text{H} \\
\mu & \mu & \mu \\
\Downarrow & \Downarrow & \Downarrow \\
\mu & \mu & \mu |
\end{array}
\]

\[
\begin{array}{ccc}
\text{H} & \text{H} \\
\mu & \mu & \mu \\
\Downarrow & \Downarrow & \Downarrow \\
\mu & \mu & \mu |
\end{array}
\]

\[\Rightarrow\]

\[\Rightarrow\]

\[\Rightarrow\]

\[\Rightarrow\]
A tone-demanding morpheme triggers no additional tone?

(22) 

<table>
<thead>
<tr>
<th>1pe</th>
<th>2s</th>
<th>2p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2s</td>
<td>nonóohob-éíʔ-ee-n</td>
<td></td>
</tr>
<tr>
<td>2pl</td>
<td>nonóohob-éíʔ-ée-nee</td>
<td>nonóohob-éíʔ-nee</td>
</tr>
</tbody>
</table>

Tone Augmentation No Change

Verdana H H H
Verdana μ μ μ
Verdana \(\downarrow\) \(\downarrow\) \(\downarrow\)

a floating tone 'overwrites' an underlying tone: no surface effect

Selected References


Cowell, Andrew and Alonzo Moss (2008), The Arapaho language, University of Colorado Press.


Mithun, Marianne (1999), The Languages of Native North America, Cambridge: Cambridge University Press.


