Klamath

• Data on class web site

In his grammar, Barker makes the following assumptions:

Phonological rules are unordered. All rules apply simultaneously to underlying representations to derive surface representations.

Show how Barker’s set of rules can be simplified by abandoning these assumptions and assuming that phonological rules apply in order, each rule applying to the output of the preceding rule in the list of ordered rules. Write the rules sufficient to describe the above data, and state the order in which they apply.

• The problem in a nutshell: describe the data using 2 rules + rule ordering instead of 5 rules
# Klamath segment inventory

<table>
<thead>
<tr>
<th></th>
<th>stops</th>
<th>fricatives</th>
<th>nasals</th>
<th>laterals</th>
<th>glides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p  pʰ p’</td>
<td>t  tʰ t’</td>
<td>tʃ  tʃʰ tʃ’</td>
<td>k  kʰ k’</td>
<td>q  qʰ q’</td>
</tr>
<tr>
<td>stops</td>
<td>p  pʰ p’</td>
<td>t  tʰ t’</td>
<td>tʃ  tʃʰ tʃ’</td>
<td>k  kʰ k’</td>
<td>q  qʰ q’</td>
</tr>
<tr>
<td>fricatives</td>
<td>s</td>
<td></td>
<td></td>
<td></td>
<td>h</td>
</tr>
<tr>
<td>nasals</td>
<td>m  ᵐ m’</td>
<td>n  n̥ n’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>laterals</td>
<td></td>
<td>l  ɬ l’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>glides</td>
<td>w  w  w’</td>
<td></td>
<td>j  j  j’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Distinctive phonation features

<table>
<thead>
<tr>
<th></th>
<th>( p )</th>
<th>( p^h )</th>
<th>( p' )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( m )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( m' )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( s )</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>( m_0 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( h )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( ? )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- [spread glottis]
- [constricted glottis]
Barker’s 5 rules

A. nl $\rightarrow$ ll
B. nl̥ $\rightarrow$ lh
C. nl’ $\rightarrow$ lʔ
D. ll̥ $\rightarrow$ lh
E. ll’ $\rightarrow$ lʔ

How can this set be simplified?
Notice

• Some overlap in structural descriptions
• Some overlap in structural changes
Overlapping structural changes

• B. n'l → lh
• D. ll' → lh

• C. n'l' → lʔ
• E. ll' → lʔ
Overlapping structural descriptions

- A. $\text{nl} \rightarrow \text{ll}$
- B. $\text{n₁} \rightarrow \text{lh}$
- C. $\text{nl'} \rightarrow \text{lʔ}$

- D. $\text{l₁} \rightarrow \text{lh}$
- E. $\text{ll'} \rightarrow \text{lʔ}$
Eliminate the overlap

Basically two phonological operations:

A. nl       ll
B. n̥ → l̥ (D) → lh
C. nł’      ll’ (E)   lʔ
Lateralization

• $n \rightarrow l / \_\_\_ l \_\_ l'$

i.e.

+son
+cor $\rightarrow$ [-nasal] / ____ +cor
+cons

(nasals (lateral) (laterals) and laterals)
Debuccalization

- loss of supralaryngeal place of articulation
  (in this case, applies to sequences of laterals whose second lateral is voiceless or glottalized)

\[
\overset{\prime}{l} \rightarrow h / l \\
\overset{\prime}{l} \rightarrow ? / l \\
\]

+son \rightarrow -labial +son
+cor \rightarrow -coronal / +cor ___
+cons \rightarrow -dorsal +cons
-nasal \rightarrow -son -nasal

{+spread gl, +const gl}
Derivations


Lateralization

L [ ] L L --\(^1\) --\(^1\)

Debuccalization

\(^2\) h ? h ?

(other phonol)

i

[holli:na] [holhi] [hol?a:l’a] [pa:lha] [jaljal?i]

\(^1\) [ll] and [ll’] meet the structural description of Lateralization (as formulated in terms of features), but as they are already lateral, there is no phonetic change. (vacuous application)

\(^2\) [ll] does not meet the structural description of Debuccalization.
Not all a matter of rule order

• Barker’s 5 rules can be simplified to 3 with features

A. $\text{nl} \rightarrow \text{ll}$
B./C. $\text{nl}_\circ, \text{nl}' \rightarrow \text{lh}, \text{l}'$
D./E. $\text{l}l_\circ, \text{l}l' \rightarrow \text{lh}, \text{l}'$  (ditto)
Two possible analyses

• 3 rules and no rule order
  – nl → ll
  – nl̥, nl’ → lh, lʔ
  – ll̥, ll’ → lh, lʔ

• vs. 2 rules and rule order
  – n[+lat] → l[+lat] (where [+lat] = {l, l’, l̥}) feeds
  – ll̥, ll’ → lh, lʔ

• Analysis with rule order preferable
  – lack of redundancy (no overlapping structural changes)
  – no rule has two foci (unlike nl̥, nl’ → lh, lʔ, which performs two changes)