Morphological analysis, alternations

LING 451/551
Spring 2011
Overview

- Morphological analysis: Kikuyu
- Turkish verb root alternations
Assumed model of grammar

Figure 1.1 A possible descriptive architecture for grammar
Generative view of phonology

• Different pronunciations of same morpheme can provide evidence about phonology

• Hayes 6.1.1
  – ‘The morphology of a language places morphemes in different phonological contexts…’
Morphological analysis

• Always the first step in phonology
Kikuyu verbs

- Data on handout

Kikuyu Verb Conjugation

The following forms illustrate two verb tenses in Kikuyu. Tones are indicated as follows:

á = high
a = low (unmarked)
### A. Current imperfect.

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>'we are V-ing'</td>
<td>torocraya</td>
<td>'send'</td>
</tr>
<tr>
<td>'we are V-ing him/her'</td>
<td>tomorocraya</td>
<td></td>
</tr>
<tr>
<td>'we are V-ing them'</td>
<td>tomorocraya</td>
<td></td>
</tr>
<tr>
<td>'they are V-ing'</td>
<td>márôrîra</td>
<td></td>
</tr>
<tr>
<td>'they are V-ing him/her'</td>
<td>mámorocraya</td>
<td></td>
</tr>
<tr>
<td>'they are V-ing them'</td>
<td>mámorocraya</td>
<td></td>
</tr>
</tbody>
</table>

### B. Current past.

<table>
<thead>
<tr>
<th>English</th>
<th>Spanish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>'we V-ed'</td>
<td>tororiré</td>
<td>'send'</td>
</tr>
<tr>
<td>'we V-ed him/her'</td>
<td>tomororiré</td>
<td></td>
</tr>
<tr>
<td>'we V-ed them'</td>
<td>tomaroriré</td>
<td></td>
</tr>
<tr>
<td>'they V-ed'</td>
<td>márôrîra</td>
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</tr>
<tr>
<td>'they V-ed him/her'</td>
<td>mámororiré</td>
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</tr>
<tr>
<td>'they V-ed them'</td>
<td>mámororiré</td>
<td></td>
</tr>
</tbody>
</table>
Morphological analysis = identification of morphemes (and/or morphological processes)

How?
Hayes 5.9: ‘Rapid progress can be made by isolating minimal pairs...’

1. Identify the following morphemes, ignoring the tone.

   ‘look at’
   ‘send’
   ‘1st plural subject’
   ‘3rd plural subject’
   ‘3rd singular object’
   ‘3rd plural object’
   ‘current imperfect’
   ‘current past’
Comparisons

• Some minimal pairs

• A1. torɔraγa ‘we are looking at’
• A1. totomáγa ‘we are sending’

• A1. torɔraγa ‘we are looking at’
• A2. tomorɔraγa ‘we are looking at him/her’
• Not a minimal pair

• A3. tomarɔ́raγa ‘we are looking at them’
• A4. márɔ́raγa ‘they are looking’
Kikuyu morphemes

(ignoring tone)

• Roots
  /rɔr/ 'look at'
  /tom/ 'send'

• Prefixes
  /to/- 'we'
  /ma/- 'they'
  /mo/- 'him, her'
  /ma/- 'them'

• Suffixes:
  -/aγa/ current imperfective
  -/irε/ current past
Position class analysis

• Order of morphemes in the Kikuyu verb
  – subject-object-root-tense

  to-ma-r̥r-aγa ‘we are looking at them’
  1pS-3pO-look.at-curr.impf

  má-má-tóm-ír̥ ‘they sent them’
  3pS-3pO-send-curr.past

• Cf. Swahili, Hayes 5.9: subject-tense-object-root
Alternations

- Turkish possessed noun data from handout

Turkish Possessives

In the set of data below, the vowel of the possessed form suffix assimilates to the quality of the preceding stem vowel, according to the rule of vowel harmony. (See the problem “Turkish Vowels”, above.)
Notice the alternation involving the final consonant of the noun stem in some of the forms:

<table>
<thead>
<tr>
<th>noun stem</th>
<th>possessed form</th>
<th>UR (stem)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘rope’</td>
<td>ip</td>
<td>ipi</td>
</tr>
<tr>
<td>‘louse’</td>
<td>bit</td>
<td>biti</td>
</tr>
<tr>
<td>‘reason’</td>
<td>sebelep</td>
<td>sebebi</td>
</tr>
<tr>
<td>‘wing’</td>
<td>kanat</td>
<td>kanadı</td>
</tr>
<tr>
<td>‘honor’</td>
<td>şerefef</td>
<td>şerefi</td>
</tr>
<tr>
<td>‘rump’</td>
<td>kič</td>
<td>kiči</td>
</tr>
<tr>
<td>‘pilot’</td>
<td>pilot</td>
<td>pilotu</td>
</tr>
<tr>
<td>‘bunch’</td>
<td>demet</td>
<td>demeti</td>
</tr>
<tr>
<td>‘wine’</td>
<td>şarap</td>
<td>şarabi</td>
</tr>
<tr>
<td>‘Ahmed’</td>
<td>ahmet</td>
<td>ahmedi</td>
</tr>
<tr>
<td>‘slipper’</td>
<td>pabuč</td>
<td>pabuju</td>
</tr>
<tr>
<td>‘power’</td>
<td>güç</td>
<td>güjü</td>
</tr>
<tr>
<td>‘basket’</td>
<td>sepet</td>
<td>sepeti</td>
</tr>
<tr>
<td>‘art’</td>
<td>sanat</td>
<td>sanati</td>
</tr>
<tr>
<td>‘cap’</td>
<td>kep</td>
<td>kepi</td>
</tr>
<tr>
<td>‘worm’</td>
<td>kurt</td>
<td>kurdu</td>
</tr>
<tr>
<td>‘hair’</td>
<td>sač</td>
<td>saçı</td>
</tr>
<tr>
<td>‘color’</td>
<td>renk</td>
<td>rengei</td>
</tr>
</tbody>
</table>
1. Give the underlying representation (UR) of the noun stems in the space provided.

2. Write the phonological rule that accounts for the consonant alternations.

3. Justify your rule by suggesting an alternative and showing that it is inferior to your solution.
Goals of morphophonological analysis

• Posit
  – Underlying (basic) representation of each morpheme (UR)
  – Phonological rules produce different pronunciations of morphemes in context

• Phonological analysis = URs + rule system
## Morphological analysis

<table>
<thead>
<tr>
<th>Unpossessed</th>
<th>Possessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘rope’</td>
<td>[ip]</td>
</tr>
<tr>
<td>‘reason’</td>
<td>[sebep]</td>
</tr>
<tr>
<td>‘color’</td>
<td>[renk]</td>
</tr>
<tr>
<td>‘wing’</td>
<td>[kanat]</td>
</tr>
<tr>
<td>‘slipper’</td>
<td>[pabuťʃ]</td>
</tr>
<tr>
<td>‘power’</td>
<td>[gytʃ]</td>
</tr>
</tbody>
</table>
Identify morpheme alternants

- Alternants (or allomorphs)
  - different forms of a morpheme
  - minimally phonologically different
  - predictable distribution

- Turkish possessed suffix alternants
  - -[i] ~ -[ɨ] ~ -[u] ~ -[y]
  - all high vowels, differ in backness, rounding
• Turkish roots
  – Some have two alternants
    ‘reason’ [sebep] ~ [sebeb]
  – Some have one alternant
    ‘rope’ [ip]
Identify alternating segments

• **Alternation, alternating segments**
  – parts of morpheme alternants which vary in context

• Turkish **alternating roots**: root final voicing alternation

  \[
  [p] \sim [b] \\
  [t] \sim [d] \\
  [ʦ] \sim [ʤ] \\
  [k] \sim [ɡ]
  \]

• Turkish also has **non-alternating roots** ([ip])
Distribution of alternants

• Where does each alternant occur?
  ➢ this Q about alternating morphemes only

  ____#_____ V
  – ‘reason’ [sebep] [sebeb]

• Voiced alternants before vowels (suffix); voiceless alternants word-finally
Suggest underlying representation

- **Underlying representation** (UR)
  - phonologically most **basic** form of a morpheme
- Assumption (in this class)
  - morphemes have **one** underlying or basic representation
- For alternants in complementary distribution
  - choose a UR
  - predict other alternants by phonological rule
How to select UR

- Try out possible analyses, choose between them
- Good practice to consider all logically possible analyses (usually a small set)
Turkish alternating roots

- [sebep] ~ [sebeb]
- Two possible analyses of alternating roots
  1. /sebeb/ (UR), Final Devoicing (P rule)
     \[ C \rightarrow [-\text{voiced}] / ____ \# \]
  2. /sebep/, Voicing
     \[ C \rightarrow [+\text{voiced}] / ____ + V \]

before morpheme-initial vowel; cf. [sepet] ‘basket’
Decide between analyses

- Consider predictions of each analysis
  - Analysis 2 (with Voicing) predicts all roots will have voiced root-final consonants before vocalic suffixes
    - incorrect prediction about non-alternating roots like [ip-i] (*[ibi])
  - Analysis 1 (with Final Devoicing) predicts all roots will have voiceless consonants word-finally
    - correct for all data provided
Decide between analyses

• Empirical (data-driven) considerations are primary
• But if all analyses equally valid empirically
  – compare in terms of complexity
  – all other things being equal, simplest analysis preferred
• ‘rope’ /ip/
• ‘louse’ /bit/
• ‘reason’ /sebeb/
• ‘wing’ /kanad/
• ‘honor’ /ʃereʃ/
• ‘rump’ /kiʧʃ/
• ‘pilot’ /piʃʃ/
• ‘bunch’ /deʃet/
• ‘wine’ /ʃarab/
• ‘Ahmed’ /aʃmed/
• ‘slipper’ /pabudʒ/
• ‘power’ /gyʧʒ/
• ‘basket’ /sepet/
• ‘art’ /sanat/
• ‘cap’ /keʃp/
• ‘worm’ /kurd/
• ‘hair’ /satʃʃ/
• ‘color’ /reng/
Final version of rule

• Final Devoicing
  1. C --> [-voiced] / ____ #
     \textit{Consonants are voiceless word-finally.}

     vs.

  2. C --> [-voiced] / ____ #
     [+voiced]
     \textit{Voiced consonants are voiceless word-finally.}

• Remember: ‘phonologists usually do write their rules [like 1.], if only to keep them simpler and easier to read’ (Hayes 4.9.3)
  – 1. applies \textit{vacuously} (without change) to voiceless Cs
Summary

• Goal of analysis of alternations problems
  – (1) URs of all morphemes
  – (2) Phonological rules which predict pronunciation of morphemes

• A.k.a. morphophonemics/morphophonology
General procedure for alternations problems

1. Morphological analysis: describe structure of words, identify morphemes
2. Identify morpheme alternants.
3. Determine distribution of alternants
4. Consider possible analyses of alternating morphemes
5. Choose one analysis (the best one)
6. Summarize analysis: URs of morphemes; final form of P rule(s)
7. Derivations of representative forms always a good idea
Alternations practice

- Worksheet on Russian
Neutralization of laryngeal contrasts

• Fairly common cross-linguistically. Most common contexts:
  – word-finally (Turkish, Russian)
  – syllable-finally (Korean example in Odden, p. 254)

• Usually affects obstruents only
  – sometimes applies to sonorants (Angas), vowels (Havasupai etc.)
Towards a consonant chart for Turkish

\[
\begin{align*}
\text{p} & \quad \text{b} & \quad \text{t} & \quad \text{d} & \quad \text{ʧ} & \quad \text{ʤ} & \quad \text{k} & \quad \text{g} \\
\text{f} & \quad \text{s} & \quad \text{ʃ} & \quad \text{h} \\
\text{m} & \quad \text{n} & \quad \text{l} & \quad \text{r}
\end{align*}
\]

Notice: in Turkish, /p/ and /b/ (etc.) are phonemes

[se\text{b}ep] ‘reason’
[se\text{p}et] ‘basket’

i.e. [voiced] is distinctive for stops and affricates
Neutralization

- **Allophony** (450)
  - rules that describe non-phonemic sounds in complementary distribution

- Many P rules are **neutralizing** rather than allophonic
  - neutralize or merge distinction between phonemic contrasts in certain contexts

- In Turkish, root-final C contrasts in voicing
  - e.g. /kanad/ ‘wing’ vs. /bit/ ‘louse’
  - Final Devoicing **neutralizes** root-final voicing contrast in favor of voiceless word-finally.