Morphological rules:
Inadequacy of morphemes

LING 481
Winter 2011
Organization

• Nonconcatenative morphological patterns
• Word vs. morpheme-based models
• Exercises
Inadequacy of morphemes

• “Non-concatenative” morphology exists
  – base modifications
    • “morphological patterns in which the shape of the base is changed without adding segmentable material”
    • formatives that are simultaneous with base, rather than sequenced to base
    • base: “the element to which a morphological operation applies” (including affixation)
  – “It is often easiest to describe non-concatenative patterns as results of processes or operations that apply to a base form.” (p. 35)
Vowel change

- German

<table>
<thead>
<tr>
<th>(3.1)</th>
<th>singular</th>
<th>plural</th>
<th>‘mother(s)’</th>
<th>‘father(s)’</th>
<th>‘daughter(s)’</th>
<th>‘garden(s)’</th>
<th>‘nail(s)’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutter</td>
<td>Mütter</td>
<td>‘mother(s)’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vater</td>
<td>Väter</td>
<td>‘father(s)’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tochter</td>
<td>Töchter</td>
<td>‘daughter(s)’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garten</td>
<td>Gärten</td>
<td>‘garden(s)’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nagel</td>
<td>Nägel</td>
<td>‘nail(s)’</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Tsek’ene

- **Momentaneous imperfective and optative verb stems**

<table>
<thead>
<tr>
<th>verb</th>
<th>impf</th>
<th>pf</th>
<th>fut</th>
<th>opt</th>
</tr>
</thead>
<tbody>
<tr>
<td>d-lut</td>
<td>liit</td>
<td>lut</td>
<td>lulh</td>
<td>liit</td>
</tr>
<tr>
<td>P-e#d-h-tsut</td>
<td>tsiiit</td>
<td>tsut</td>
<td>tsulh</td>
<td>tsiit</td>
</tr>
<tr>
<td>l-ts’ut</td>
<td>ts’iit</td>
<td>ts’ut</td>
<td>ts’ulh</td>
<td>ts’iit</td>
</tr>
<tr>
<td>-dzùt</td>
<td>dzììt</td>
<td>dzùt</td>
<td>dzùlh</td>
<td>dzììt</td>
</tr>
<tr>
<td>na#n-tsus</td>
<td>tsiis</td>
<td>tsus</td>
<td>tsus</td>
<td>tsiis</td>
</tr>
</tbody>
</table>

Note use of “stem” here: root-like shape but not monomorphemic
Consonant change

• Albanian plurals

\[
\begin{array}{ccc}
\text{SINGULAR} & \text{PLURAL} & \text{meaning} \\
\text{armik} [...k] & \text{armiq} [...c] & \text{‘enemy/enemies’} \\
\text{fik} [...k] & \text{fiq} [...c] & \text{‘fig(s)’} \\
\text{frëng} [...g] & \text{frëngj} [...j] & \text{‘Frenchman/-men’} \\
\text{murg} [...g] & \text{murgj} [...j] & \text{‘monk(s)’} \\
\text{papagall} [...l] & \text{papagaj} [...j] & \text{‘parrot(s)’} \\
\text{portokall} [...l] & \text{portokaj} [...j] & \text{‘orange(s)’} \\
\end{array}
\]

(Buchholz and Fiedler 1987: 264–5)

• When C change is at morpheme edge, must be sure this is not a case of affixation (-j?) + deletion
C change

• Scottish Gaelic indefinite nouns

(3.5) NOM SG INDF | GEN PL INDF
---|---
[b...] bard | [v...] bhàrd ‘bard’
[ki...] ceann | [ç...] cheann ‘head’
[g...] guth | [γ...] ghuth ‘voice’
[tʰ...] tuagh | [h...] thuagh ‘axe’
[b...] balach | [v...] bhalaich ‘boy’

(Calder 1923: 81–93)

• Historically, triggered by preceding /ə/ (intervocalic lenition)
  – Is a synchronic phonological account still possible?
    • If so, where is [ə]?
    • [tʰ] ~ [h] seems non-phonological
English noun-verb pairs

• Haspelmath and Sims exx. (p. 37)
  – a house, to house
  – a wreath, to wreathe(?)
  – a thief, *to thieve (thieving)
  – a half, to halve
  – a sheath, to sheathe

• Vowel change as well as final C change
  – a bath, to bathe
  – a breath, to breathe

• “a few cases”: is this a “pattern” then?
  – where is the line between rule/pattern and lexicon?
Tone change

• Tsek’ene
  – nayghdììchòòt ‘(3s) picked it up’
  – nayghdììchoot lò ‘(3s) had picked it up’
  – ’ide ghudà’ ‘(3s) sat there’
  – ’ide ghuda’ lò ‘(3s) had sat there’
Subtraction

- Murle (HS p. 37)

<table>
<thead>
<tr>
<th>SINGULAR</th>
<th>PLURAL</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nyoon</td>
<td>nyoo</td>
<td>‘lamb(s)’</td>
</tr>
<tr>
<td>wawoc</td>
<td>wawo</td>
<td>‘white heron(s)’</td>
</tr>
<tr>
<td>onyiit</td>
<td>onyii</td>
<td>‘rib(s)’</td>
</tr>
<tr>
<td>rottin</td>
<td>rotti</td>
<td>‘warrior(s)’</td>
</tr>
</tbody>
</table>

(Arensen 1982: 40–1)
## Subtraction

- Lardil: delete stem-final vowel in nominative

<table>
<thead>
<tr>
<th></th>
<th>nominative</th>
<th>non.fut. acc.</th>
<th>fut. acc.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C-</strong>*</td>
<td>-in</td>
<td>-urX</td>
<td></td>
</tr>
<tr>
<td><strong>V-</strong>*</td>
<td>delete stem-final vowel</td>
<td>-n</td>
<td>-rX “(irregularly -CurX in 'oyster sp.', ‘queen-fish’ and no doubt other forms)’</td>
</tr>
</tbody>
</table>

Lardil [rX] “apico-domal”
Some Lardil forms

<table>
<thead>
<tr>
<th>UR</th>
<th>nom.</th>
<th>nonfut. acc.</th>
<th>fut. acc.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>pirŋen</td>
<td>pirŋen</td>
<td>pirŋen-in</td>
<td>pirŋen-urX</td>
<td>‘woman’</td>
</tr>
</tbody>
</table>

Interacts with a phonological constraint: non-coronal consonants are not allowed in word-final position

<table>
<thead>
<tr>
<th>ηaluk</th>
<th>ηalu</th>
<th>ηaluk-in</th>
<th>ηaluk-urX</th>
<th>‘story’</th>
</tr>
</thead>
<tbody>
<tr>
<td>waŋalk</td>
<td>waŋal</td>
<td>waŋalk-in</td>
<td>waŋalk-urX</td>
<td>‘boomerang’</td>
</tr>
<tr>
<td>wuŋkunuŋ</td>
<td>wuŋkunu</td>
<td>wuŋkunuŋ-in</td>
<td>wuŋkunuŋ-kurX</td>
<td>‘queen-fish’</td>
</tr>
<tr>
<td>/yiliyili/</td>
<td>yiliyil</td>
<td>yiliyili-n</td>
<td>yiliyili-wurX</td>
<td>‘oyster sp.’</td>
</tr>
<tr>
<td>ηawuŋawu</td>
<td>ηawuŋa</td>
<td>ηawuŋawu-n</td>
<td>ηawuŋawu-rX</td>
<td>‘termite’</td>
</tr>
<tr>
<td>muŋkumunŋku</td>
<td>muŋkumu</td>
<td>muŋkumunŋku-n</td>
<td>muŋkumunŋku-rX</td>
<td>‘wooden axe’</td>
</tr>
</tbody>
</table>
6. For French adjectives, linguists have often advocated an analysis in terms of subtraction: the masculine form is formed from the feminine form by subtracting the final consonant (Bloomfield 1933: 217):

- *plat/platte*  
  - 'flat'  
  - [pla/plat]
- *laid/laide*  
  - 'ugly'  
  - [lɛ/lɛd]
- *long/longue*  
  - 'long'  
  - [lɔ/lɔg]
- *soul/soule*  
  - 'drunk'  
  - [su/sul]
- *gris/grise*  
  - 'grey'  
  - [gi/griz]

Why is this an attractive analysis?
Reduplication

“Linguists often treat reduplication as affixation of a template and copying of the root as needed to fill out the segments of that template...The prefixation of the template itself is easily understood as concatenation...However, it is less clear that the copying process is concatenative; it seems to have more in common with gemination or vowel lengthening.”
An affixation + copying approach to reduplication

• Marantz 1982
  – Affixation of a reduplicative "template" to base, a morphological unit or prosodic elements (e.g. skeletal slot, syllable, foot)
  – Copying of base melody to template:
    • entire base “melody” is copied
    • melody is associated to reduplicative template in accord with universal association principles (one-to-one, left-right, unless otherwise specified)
    • stray (unassociated) melodic elements are erased
<table>
<thead>
<tr>
<th>base</th>
<th>reduplicated</th>
<th>meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>bari</td>
<td>'body'</td>
<td>bar-bari</td>
</tr>
<tr>
<td>mag-saddu</td>
<td>'leak'</td>
<td>mag-sad-saddu</td>
</tr>
<tr>
<td>uffu</td>
<td>'thigh'</td>
<td>uf-uffu</td>
</tr>
<tr>
<td>ulu</td>
<td>'head'</td>
<td>ul-ulu</td>
</tr>
</tbody>
</table>
Agta reduplication as affixation + copying

Base: /bari/

affixation: CVC-C V C V

  |   |
  b a r i

copying:   CVC-C V C V

  |   |
  b a r i b a r i

association (1-1, L-R): C V C – C V C V

  |   |   |
  b a r i b a r i

stray erasure: C V C -CVCV

  |   |   |
  b a r b a r i
• “The element that is attached to the base often consists of both copied segments and fixed segments...Such elements may be called **duplifixes**.” HS:39 (More often called cases of “fixed segmentism”)

• Somali plurals

(3.13) Plurals in Somali: duplifix -aC

<table>
<thead>
<tr>
<th>buug</th>
<th>‘book’</th>
<th>buug-ag</th>
<th>‘books’</th>
</tr>
</thead>
<tbody>
<tr>
<td>fool</td>
<td>‘face’</td>
<td>fool-al</td>
<td>‘faces’</td>
</tr>
<tr>
<td>koob</td>
<td>‘cup’</td>
<td>koob-ab</td>
<td>‘cups’</td>
</tr>
<tr>
<td>jid</td>
<td>‘street’</td>
<td>jid-ad</td>
<td>‘streets’</td>
</tr>
</tbody>
</table>

(Berchem 1991: 102)
Two approaches to word formation

- The morpheme based model
- The word based model
Morpheme-based model

• Analogous to phrase-structure rules in syntax (decompositional/additive)
• A concrete example of how this would work
• Concatenative morphology

(3.18) Word-structure rules
a. word-form  = stem (+ inflectional suffix)
b. stem       = (i)  [(deriv. prefix +) root (+ deriv. suffix)]
               (ii) [stem+stem]
c. inflectional suffix = -s, -er, ...
d. derivational prefix  = un-, ...
e. root             = bag, event, cheese, board, happy, ...
f. derivational suffix = -ful, -ness, ...

or “→”
Lexical entries in morpheme-based model

(3.22) proposed lexical entries for some morphemes:

a. \[\text{bag} \quad \text{[} /\text{bæg}/ \text{]} \quad \text{N} \quad \text{‘bag’}\]

b. \[-s \quad \text{[} /\text{z}/ \text{]} \quad \text{N—} \quad \text{‘plural’}\]

c. \[\text{happy} \quad \text{[} /\text{hæpi}/ \text{]} \quad \text{A} \quad \text{‘happy’}\]

d. \[\text{un-} \quad \text{[} /\text{ʌn}/ \text{]} \quad \text{—A} \quad \text{‘not’}\]

subcategorization frame
Morpheme-based model and non-concatenative morphology

- **e.g. Albanian plural formation**
  
  \[
  (3.23) \begin{align*}
  \text{a. } & \textit{armik} & \text{b. } & \textit{‘plural’} \\
  & \left[ \text{/armik/} \right] & & \left[ \text{/Ø/} \right] \\
  & \text{N} & & \text{N—} \\
  & \text{‘enemy’} & & \text{‘plural’}
  \end{align*}
  \]

- treats simultaneous morphology as sequence of abstract elements
  
  - “the morpheme based model must assume that the zero affix has some property that triggers palatalization on the final consonant of the root”

- **Should phonetically null morphemes ever be allowed?**
  
  - “Zero morphemes are add hoc devices that are posited for no purpose other than to save the principle of a concatenation-only model.”
Formal devices of word-based model

• Lexical entries
• Word-schemata (summary of patterns seen across lexical entries) “word-schemas...represent the features common to morphologically related words”
• Morphologically related words related by “morphological correspondence” by morphological correspondences; e.g.

\[
\begin{align*}
\begin{bmatrix}
/X/N \\
\text{‘}x\text{‘}
\end{bmatrix} & \leftrightarrow \begin{bmatrix}
/Xz/N \\
\text{‘}\text{plurality of } x\text{s}\text{‘}
\end{bmatrix}
\end{align*}
\]

— “for some word matching the schema on the left, there is a corresponding word matching the schema on the right” (and presumably vice versa--SH) (p. 47)
Descriptive advantages of word-based model

• 1. Handles non-concatenative as well as concatenative morphology
  – English sg. and plural nouns
    \[
    \begin{array}{lcl}
    \left[ /X_1 /_N \right] & \leftrightarrow & \left[ /X_2 /_N \right. \\
    \left[ 'x' \right] & \leftrightarrow & \left[ 'plurality of xs' \right] \\
    \end{array}
    \]
  – Albanian sg. and plural nouns
    \[
    /X_3 /_N \leftrightarrow /X_4 /_N \\
    +\text{dorsal} \\
    +\text{high} \\
    -\text{back} \\
    +\text{front} \\
    \]
    \[
    'x' \leftrightarrow '\text{plurality of xs}'
    \]
2. Crossformations.

0~-ion~-ive pattern

<table>
<thead>
<tr>
<th>attract</th>
<th>attraction</th>
<th>attractive</th>
</tr>
</thead>
<tbody>
<tr>
<td>suggest</td>
<td>suggestion</td>
<td>suggestive</td>
</tr>
<tr>
<td>prohibit</td>
<td>prohibition</td>
<td>prohibitive</td>
</tr>
<tr>
<td>elude</td>
<td>—</td>
<td>elusive</td>
</tr>
<tr>
<td>insert</td>
<td>insertion</td>
<td>—</td>
</tr>
<tr>
<td>discuss</td>
<td>discussion</td>
<td>—</td>
</tr>
<tr>
<td>—</td>
<td>illusion</td>
<td>illusive</td>
</tr>
<tr>
<td>—</td>
<td>aggression</td>
<td>aggressive</td>
</tr>
</tbody>
</table>

More examples of this pattern?

-ceive      -ception      -ceptive (conceive, deceive, receive, perceive)

---      inception      inceptive
---      recursion      recursive
delude      delusion      ---
Problem for morpheme-based model

• What is predictable from what?
• Morpheme-based model
  – base X, lex entry from –af predicts X-af, not: $X_{-af_z}$ predicts $X_{-af_x}$
  ➢ also “usually assumes that complex words are not stored in the lexicon” (p. 50)
  – *illude, illusion [/-ion/; N; V____], illusive [/-ive/; A; V____]
• Word-based model crossformation rules

(3.33) a. 

\[
\begin{align*}
[ /X/v] & \leftrightarrow [ /Xion/n \text{'}dox\text{' }] \\
& \quad \quad \text{'}action of doing x\text{' }
\end{align*}
\]

b. 

\[
\begin{align*}
[ /X/v] & \leftrightarrow [ /Xive/a \text{'}dox\text{' }] \\
& \quad \quad \text{'}prone to doing x\text{' }
\end{align*}
\]

c. 

\[
\begin{align*}
[ /Xion/n \text{'action of doing x'} ] & \leftrightarrow [ /Xive/a \text{'}prone to doing x\text{' }]
\end{align*}
\]

“allowing for a direction relation between illusion and illusive” (p. 51)

Question: what does the word-based model actually predict?