Ling 403/603

Introduction to Phonology

DAY 5

CESAR KOIRALA
Types of Phonological Rules

Phonological processes can also be categorized into different types:

- Assimilation
- Dissimilation
- Insertion
- Deletion
- Metathesis
- Strengthening
- Weakening
Assimilation is when a sound becomes more like a neighboring sound with respect to some phonetic property.
<table>
<thead>
<tr>
<th>English</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can ask</td>
<td>[ai kæn ɑ esk]</td>
</tr>
<tr>
<td>I can see</td>
<td>[ai kæn si]</td>
</tr>
<tr>
<td>I can bake</td>
<td>[ai kæm beɪk]</td>
</tr>
<tr>
<td>I can play</td>
<td>[ai kæm pleɪ]</td>
</tr>
<tr>
<td>I can go</td>
<td>[ai kæŋ goʊ]</td>
</tr>
<tr>
<td>I can come</td>
<td>[ai kæŋ kʌm]</td>
</tr>
</tbody>
</table>
English Nasals

- Place assimilation in nasals

\[ I \text{ can ask} \quad [\text{i{kæn æsk}] \]
\[ I \text{ can see} \quad [\text{i{kæn si}] \]
\[ I \text{ can bake} \quad [\text{i{kæm beik}] \]
\[ I \text{ can play} \quad [\text{i{kæm plei}] \]
\[ I \text{ can go} \quad [\text{i{kæŋ gou}] \]
\[ I \text{ can come} \quad [\text{i{kæŋ kæm}] \]

- The nasal has the same place of articulation as the stop following it

\[ /n/ \rightarrow [m] / \_\_C_{[labial]} \]
\[ /n/ \rightarrow [ŋ] / \_\_C_{[velar]} \]
\[ /n/ \rightarrow [n] / \text{elsewhere} \]

- Very common process across languages
Finnish Vowel Harmony

/-ssa/ ‘in’
[-ssa] or [-ssæ]

[talo] ‘house’   [talo-ssa] ‘in the house’
[metsæ] ‘forest’ [metsæ-ssæ] ‘in the forest’
Finnish Vowel Harmony

- Vowel backness assimilation

/-ssa/ ‘in’
[-ssa] or [-ssæ]

[talo] ‘house’               [talo-ssa] ‘in the house’
[metsæ] ‘forest’            [metsæ-ssæ] ‘in the forest

/-ssa/ → [-ssæ] / preceded by a front vowel in same word
/-ssa/ → [-ssa] / elsewhere

- Vowel harmony is a subclass of assimilation
- Many languages also exhibit vowel harmony of other features such as height, tenseness, and rounding (Turkish)
**Dissimilation**

*Dissimilation* is a rule where two close or adjacent sounds become less alike with respect to some property.
Greek Stops

- Manner dissimilation in stops

/epta/       [efta] ‘seven’
/ktizma/     [xtizma] ‘building’

Note: [x] is a voiceless velar fricative

/C_[stop]/ → [C_[fricative]] / ___ C_[stop]

- A stop becomes a fricative when followed by another stop
Insertion

*Insertion* is when a sound appears in the surface phonetic form which was not in the underlying phonemic form.
English Voiceless Stops

- Insertion of voiceless stops

/dænØs/  [dænts] ‘dance’
/strɛŋØθ/  [strɛŋkə] ‘strength’
/hæmØstɛr/  [hæmpstɛr] ‘hamster’
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/Ø/ → \[C_{voiceless\ stop}\] / between a nasal and voiceless fricative

- A voiceless stop is inserted between a nasal and a voiceless fricative
- The inserted stop has the same place of articulation as the following nasal
### Hypothetical language

<table>
<thead>
<tr>
<th>UR</th>
<th>SR</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Stok</td>
<td>istok</td>
<td>Snet</td>
<td>isnet</td>
<td>slin</td>
<td>silin</td>
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<td>ismid</td>
<td>Srat</td>
<td>sərat</td>
</tr>
<tr>
<td>Spim</td>
<td>ispim</td>
<td>Smak</td>
<td>ismak</td>
<td>srak</td>
<td>sərak</td>
</tr>
<tr>
<td>Spal</td>
<td>ispal</td>
<td>Smit</td>
<td>ismit</td>
<td>srad</td>
<td>sərad</td>
</tr>
</tbody>
</table>

What is going on here?
Deletion is when a sound which is present in the underlying phonemic form is not expressed at all in the surface phonetic form.
The deletion of /h/ in unstressed syllables.

‘He handed her his hat’

/həndəd ʰər ʰɪz ʰæt/

[hi hændəd Øər Øiz hæt]
Metathesis

Metathesis occurs when there is a change in order of sounds
Leti CVs
(Austronesian Lang)

- Metathesis of a consonant and a vowel

/danat kviali/ [dantakviali] ‘millipede’
/ukar ppalu/ [ukrappalu] ‘index finger’
/ukar lavan/ [ukarlavan] ‘thumb’
Leti CVs
(Austronesian Lang)

- Metathesis of a consonant and a vowel

/\d^a^\n^a^\t^a^\k^v^i^a^l^i^/ [d^a^n^t^a^k^v^i^a^l^i^] ‘millipede’
/\u^k^\r^a^r^p^p^a^l^u^/ [u^k^r^a^p^p^a^l^u^] ‘index finger’
/\u^k^\r^a^r^l^a^v^a^n^/ [u^k^a^r^l^a^v^a^n^] ‘thumb’

/\V^C^/ \rightarrow [C^V^] / three consecutive Cs

- When there are three consecutive consonants, the first consonant switches positions with the preceding vowel
What is the environment for metathesis?
**Strengthening** (fortition) occurs when a sound becomes stronger

**English Aspiration**

\[
/C_{[\text{voiceless stops}]}/ \rightarrow [C_{[\text{aspirated}]}/ $[\text{stress}]\
\]

- Voiceless stops become aspirated at the beginning of stressed syllables
- Aspirated stops are considered stronger because the duration of voicelessness is much longer than in unaspirated stops
Weakening (lenition) is when a sound becomes weaker

English Flapping

/C[alveolar oral stop]/ → [ɾ] / V[stress] — V[unstress]

- An alveolar oral stop /t/ or /d/ becomes a flap when it occurs after a stressed V and before an unstressed V
- The flap is weaker because it is shorter and obstructs air less than the alveolar stops
Example from Mbabaram\(^1\). (Dixon 1991; language from Australia with one speaker left at the time of Dixon’s research.)

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>pir</td>
<td>‘emu’</td>
</tr>
<tr>
<td>aba</td>
<td>‘body’</td>
</tr>
<tr>
<td>alba</td>
<td>‘camp’</td>
</tr>
<tr>
<td>nap</td>
<td>‘who’</td>
</tr>
<tr>
<td>palán</td>
<td>‘moon’</td>
</tr>
<tr>
<td>púmba</td>
<td>‘ashes’</td>
</tr>
<tr>
<td>níp</td>
<td>‘what’</td>
</tr>
<tr>
<td>mbērp</td>
<td>‘wild dingo’</td>
</tr>
<tr>
<td>tulbu</td>
<td>‘matches’</td>
</tr>
<tr>
<td>tum</td>
<td>‘hard’</td>
</tr>
<tr>
<td>kúludún</td>
<td>‘dove’</td>
</tr>
<tr>
<td>adil</td>
<td>‘ring-tail possum’</td>
</tr>
<tr>
<td>arōk</td>
<td>‘magpie’</td>
</tr>
<tr>
<td>kuŋgak</td>
<td>‘kookaburra’</td>
</tr>
<tr>
<td>kařúk</td>
<td>‘bandicoot’</td>
</tr>
<tr>
<td>níb-ug</td>
<td>‘for what reason’</td>
</tr>
<tr>
<td>mbērb-ul</td>
<td>‘wild dingo-erg.’</td>
</tr>
<tr>
<td>kuŋgag-ul</td>
<td>‘kookaburra-erg.’</td>
</tr>
<tr>
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Do you think [p] and [b] represent different phonemes or are allophones of the same phoneme in Mbabaram? If they’re allophones of the same phoneme, in what contexts does each allophone appear?
More on rules...

*The Parenthesis notation:*
Parenthesis are used to indicate optionality.
More on rules...

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How would you represent the following rule in formal representation?
“Delete a vowel that appears before a word final consonant. However, delete the first vowel if there are two consecutive vowels before that consonant.”
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1. V -> Ø/ __ VC#
2. V -> Ø/ __ C#

The rule schema expands into these two rules (in that order – with the longer rule preceding the shorter)
More on rules...

**The Parenthesis notation:**
Parenthesis are used to indicate optionality.

\[ V \rightarrow \emptyset/ \_\_ (V) C# \]

1. \[ V \rightarrow \emptyset/ \_\_ V C# \]
   The rule schema expands into these two rules (in that order)
2. \[ V \rightarrow \emptyset/ \_\_ C# \]

The rules that a schema expands into are disjunctively ordered. Informally, you try to apply the first one first. If the structural description is met, you apply that first rule and don’t try any of the rules from the same schema. If not, move on to the next rule and proceed in the same fashion. **You never apply two rules of the same schema to a single word.**
More on rules...

- How does the rule above apply to /bauk/?
Braces (curly brackets):
Braces are used to indicate multiple possibilities.

How would you represent the following rule in formal representation?
“Delete [i] or [o] that appears before another vowel.”
More on rules...

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\begin{align*}
\{i \quad o\} & \rightarrow \emptyset / \_ \_ V
\end{align*}
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\[
\begin{align*}
\{ i \\
\text{o} \}
\rightarrow \emptyset / \_\_ V
\end{align*}
\]

1. /i/ \rightarrow \emptyset / \_\_ V

2. /o/ \rightarrow \emptyset / \_\_ V

The rule schema is expanded into these rules (in this order)
Expand the following rule schemata into sequence of rules.

\[ A \Rightarrow B/ \_\_ ( C ( \begin{array}{c} D \\ E \end{array} ) ) F \]
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\[ A \rightarrow B / \_ ( C ( D ) ) F \]

\[ A \rightarrow B / \_CDF \]
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\[ A \rightarrow B / \_\_CEF \]
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\[ A \rightarrow B / \_\_CF \]
\[ A \rightarrow B / \_\_F \]
More on rules...

Lower case Greek letters:
Lower case Greek letters stand for +, -, or whatever the theory says some feature can take.

How would you represent the following rule in formal representation?
“A consonant becomes voiced in between two voiced consonants”

How about “A consonant becomes voiceless in between two voiceless consonants”? 
More on rules...

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Lower case Greek letters stand for +, -, or whatever the theory says some feature can take.

How would you represent the following rule in formal representation?
“A consonant becomes voiced in between two voiced consonants”
\[ C \rightarrow [+\text{voice}] / [+\text{voice}] \quad [+\text{voice}] \]

How about “A consonant becomes voiceless in between two voiceless consonants”?
\[ C \rightarrow [-\text{voice}] / [-\text{voice}] \quad [-\text{voice}] \]
More on rules...

How would you generalize this rule?

C → [α voice] / [α voice] ___ [α voice]
Write formal notation for the following.

“Delete the last vowel in a word (NOT the last segment in the word which could be a consonant too)”
More on rules...

*Subscripts:*
Used when you want to specify a sequence of common elements.
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For e.g., $C_0$ means 0 or more Cs.
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For e.g., $C_0$ means 0 or more Cs.

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$V \rightarrow \emptyset / \_ C_0 \#$

Note: We apply the longest rule whose structural description matches.
More on rules...

- *How does this rule apply to /talaikt/?*
Reading assignment for Thursday

- Chapter 4 (Feature Theory)