

INTD0112

Introduction to

Linguistics

Lecture #9
Oct 5th, 2009

Announcements

- Comments on HW1.
- HW3 is now posted. It's due next Wednesday in class, or no later than 5pm by e-mail.
- Endangered language code names.

Phonology: One piece of the puzzle

- Remember that our goal in linguistics is to answer the following question:
“What is it that we know when we know a language?”
- The study of phonology is one step towards this goal: It reveals to us the kind of subconscious knowledge that native speakers have about the sound system of their language.

Summary of Wednesday's class

- **Phonemes** are meaning-distinguishing sounds. They are unpredictable. They are abstract entities.
- **Allophones** are phonetic variants of the same phoneme. They are predictable. They are the physical sounds we produce.
- Phonemes become allophones via phonological processes (e.g., aspiration, nasalization, etc.). These processes are represented formally as **phonological rules**. We discuss this today.

Formalizing our phonological knowledge

Phonological rules

- Informally speaking, a phonological rule takes an underlying form as **input**, **operates** on it, and derives a surface form as **output**. The operation of the rule, however, is subject to a main restriction: it has to occur in a certain phonological **environment**.

Phonological rule notation

- Abstractly, we can represent this in the following notation:
 $X \rightarrow Y / \underline{\quad} Z$
- **Basic definitions:** the “ \rightarrow ” means “changes to”; the slash “/” means “in the environment of”; and the “ $\underline{\quad}$ ” positions the input in the environment (that is before or after the relevant segments that determine the phonological change).
- What this rule simply says is that an input X is changed to Y when it occurs before Z.

Phonological rule notation

- Suppose instead that we want to say that X changes to Y *after* (rather than *before*) Z. How do we do that?
- Well, a simple change will get us the required result:

$$X \rightarrow Y / Z \underline{\quad}$$

Phonological rule notation

- Suppose further we want to place a certain restriction on the occurrence of the segment. For example, that it has to occur “syllable-initial” or “at a word boundary.”
- Again, we can come up with two simple notations to indicate this:

Phonological rule notation

- By convention, we will use “ σ ” to indicate a syllable boundary, and “#” to indicate a word boundary.
- Now, read the following rules. Can you figure out what they mean?

$$X \rightarrow Y / \sigma \underline{\quad}$$

$$X \rightarrow Y / \underline{\quad} \#$$

Phonological rule notation

- In some cases an element in the environment may be optional. How do we represent that in the notation of our rules?
- **Brackets** will do the trick. Consider this rule. What does it mean?
 $X \rightarrow Y / \underline{\quad} (Z) \#$

Phonological rule notation

- Sometimes we might have more than one context for the application of a rule. How do we indicate that using our rule notation?
- **Braces** come to the rescue, as in this rule:
$$X \rightarrow Y / \underline{\quad} \left\{ \begin{matrix} Z \\ \# \end{matrix} \right\}$$
- The above rule simply means that “X changes to Y **either** before Z **or** at word boundary.”

- Ok, so why don't we look at some concrete examples to see how this works?

[l]-devoicing

- Let's start with the rule for /l/ devoicing in English. Informally put, the rule says “/l/ gets devoiced when following a syllable-initial voiceless stop.”
- How do we represent this in phonological rule notation?
 $/l/ \rightarrow [l] / σ$ [voiceless stop] ____

Aspiration

- How about aspiration of voiceless stops in English?
 “Voiceless stops become aspirated in English when they occur syllable-initially.”
- How do we represent that in formal rule notation in phonology?
 $[voiceless stop] \rightarrow [aspirated] / σ$ ____

Challenging the aspiration rule

- But now, consider this:
 Usain Bolt runs [fæstər] than any other human being.
- Why no aspiration here?

Vowel nasalization

- Now, vowel nasalization:
 “In English, vowels become nasalized when they are followed by a nasal consonant.”
- Rule notation:
 $V \rightarrow [nasal] / __ [nasal]$
- Ok, but how about vowel nasalization in Scots Gaelic? Remember the rule?

Vowel length in English

- Remember the rule for vowel length in English?
- Vowels are lengthened before voiced consonants, but not before voiceless consonants:

bad	[bæ:d]	bat	[bæt]
leave	[li:v]	leaf	[lif]
- How would the rule look like in formal notation?

Vowel length in English

- But now consider these cases:
obey [owbeɪ]
redo [rɪdu]
- Why is there no vowel lengthening here?

Deletion

- How about deletion rules?
- For these, we use the symbol \emptyset in the output of the rule (i.e., after the arrow).
- For example, English speakers delete the [ə] in an open syllable when it is followed by a stressed syllable, giving us [p'lis] from [pə'lɪs].
- How do we represent this in rule notation?

$[ə] \rightarrow \emptyset / C __ \sigma C V_{\text{stressed}}$

Epenthesis

- The \emptyset comes in handy for phonological rules that insert sounds as well. The key difference here is that the \emptyset will be in the input to the rule.
- For example, in some English dialects, consonant clusters of [l] and another consonant are not allowed in syllable-final position. Speakers of these dialects, therefore insert a [ə] to fix the syllable, e.g., *milk* [milək].
- In rule notation, this would be represented as:
 $\emptyset \rightarrow [ə] / [l] __ C \sigma$

So, which form is derived from the other?

- Question: Given two allophones of one phoneme in the language, how do we decide which one is the underlying form and which one is the surface form? In other words, which one is *derived* from the other?
- As a case in point, we assumed that oral vowels in English get nasalized before nasal consonants. But what would go wrong if we assume instead that nasal vowels get “oralized” before nonnasal consonants?

So, which form is derived from the other?

- The rule of thumb is this: The form that occurs in a larger number of phonetic contexts is most likely to be the underlying form. The form that is restricted in its occurrence to particular contexts is most likely to be a derived form. The underlying form, thus, is typically the *elsewhere* form.

So, which form is derived from the other?

- For example, in English oral vowels occur initially, finally, as well as before nonnasal consonants. Nasal vowels, by contrast, occur only before nasal consonants.
- Conclusion: English vowels are underlyingly oral.
- Can you extend this reasoning to aspiration in English?

Revisiting earlier phonology problems

- Italian.
- Spanish.
- Russian.
- Ukrainian.

Next class agenda

- Morphological analysis: Chapter 3 cont.
- Morphology cont. : The lexicon and processes of word formation. Chapter 4.