INTD0112
Introduction to Linguistics

Lecture #7
March 8th, 2007

Announcements

➢ I will post your scores online once I'm done grading Homework 1. For this purpose, every one of you will be assigned a code name (a technical term from linguistics). Make sure you know what your code name is.
➢ Homework 3 will be posted later this evening.

Summary of Tuesday's discussion

➢ **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, which are represented formally as **phonological rules**.

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:

$$X \rightarrow Y / \_\_\_ Z$$

➢ **Basic definitions**: the "→" means "changes to"; the slash "/" means "in the environment of"; and the "___" 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:

$$X \rightarrow Y / Z \_\_\_$$

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

➢ As in your textbook, 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?

$$X \rightarrow Y / \underline{\quad} (Z) \sigma$$

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:

$$X \rightarrow Y / \underline{\quad} \begin{Bmatrix} Z \\ \# \end{Bmatrix}$$

➢ 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?

$$/l/ \rightarrow [l̥] / \sigma \text{ [voiceless stop]} \underline{\quad}$$

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] → [aspirated] / σ ___

Vowel nasalization

➢ Now, vowel nasalization:

   "In English, vowels become nasalized when they are followed by a nasal consonant."

➢ Rule notation:

   V → [nasal] / ___ [nasal]

➢ Ok, but how about vowel nasalization in Scots Gaelic? Remember the rule?

Deletion

➢ How about deletion rules?

➢ For these, we use the symbol Ø 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, as in *police* [p̥lís].

➢ How do we represent this in rule notation?

   [ə] → Ø / C_0 ___ σ C_0 $V_{stressed}$

Epenthesis

➢ The Ø comes in handy for phonological rules that insert sounds as well. The key difference here is that the Ø 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:

   Ø → [ə] / [l] ___ C σ

So, which one 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 one 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 the surface form. The underlying form, thus, is typically the **elsewhere** form.

So, which one 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?

Steps for solving phonology problems

➢ Given two sounds and a set of data, the task is to determine if the two sounds are separate phonemes or allophones of the same phoneme. To do that, we proceed methodically.

Minimal pairs?

➢ Step 1:
See if there are any minimal pairs in the data where the two sounds in question contrast. If yes, then the two sounds are phonemes. If not, then proceed to step 2.

Overlapping or complementary?

➢ Step 2:
Find out if the two sounds are in overlapping or in complementary distribution. If overlapping, then the two sounds are phonemes. If complementary, then the sounds are likely to be allophones, in which case state the phonological environments in which each occurs and then move to step 3.

Which is underlying, and which is derived?

➢ Step 3:
Once you determined the environments in which each sound occurs, it is time to determine which one is the underlying form and which one is derived. In most cases, the sound that appears in more environments can be taken to represent the underlying phoneme.

Write a rule!

➢ Step 4:
Now, you are in a position to write a phonological rule that shows the process whereby the allophones are derived from the underlying phoneme.

How to solve phonology problems?

➢ Consider the following Finnish words:
   1. [kudot] "failures"   2. [katot] "roofs"
   3. [kate] "cover"   4. [kade] "envious"
   5. [madon] "of a worm"   6. [ratas] "wheel"
   7. [maton] "of a rug"   8. [radon] "of a track"

➢ Question: Are [t] and [d] two different phonemes or two allophones of the same phoneme in Finnish?

How to solve phonology problems?

➢ Now, consider these Tagalog words:

1. [datiŋ] "to arrive"	6. [daɾaʔiŋ] "will complain"
2. [dami] "amount"	7. [maɾumi] "dirty"
3. [dumi] "dirt"	8. [maɾami] "dirty"
4. [daɾatiŋ] "will arrive"	9. [daʔiŋ] "to complain"
5. [manduɾukot] "pickpocket"	10. [mandukot] "to go pickpocketing"

➢ Question: Are [d] and [ɾ] phonemes or allophones?

More phonology problems

➢ More phonology problems from Sindhi, Italian, Spanish, Russian, Burmese, Korean, Same, and Totonac.

Next class agenda

➢ Phonology cont. : Features and syllable structure