LNGT0101
Introduction to Linguistics

Lecture #7
Oct 3rd, 2011

Announcements

- You should have your HW1 by now. If you have any questions, please do come to my office hours to discuss them.
- Code names for online score sheet.
- A .doc file can also be a .docx file.
- Presentations: LAP or readings.
- Sam's study of a cheating communication system.
- Just a reminder: HW2 is due on Thursday by 12noon, either by e-mail, or in my mailbox in Farrell House. Delay policy applies.

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Questions

- Online transcription tool.

Any questions on HW2 or otherwise?

Agenda

- Finish talking about prosodic features.
- Phonology: Introduce phonemes and allophones. (What do speakers know when they know the phonology of their language?)
- How to figure out the phonological features of a language based on a set of data, whether you know or don't know the language. (Problem-solving skills)
- (On Wednesday) How do we write phonological rules in formal notation? (Formalization skills)

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Prosodies (aka Suprasegmentals)

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Suprasegmental features

- In addition to "segmental" features, e.g., place of articulation, voicing, tongue height, etc., other phonetic features may "ride on top of" these segmental features.
- Four of these are: length, tone, intonation, and stress.

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Length

- The duration of a sound may be influenced by the sounds around it, e.g., compare your pronunciation of the two words in each pair below:
  seat vs. *seed*
  leak vs. *league*
  leaf vs. leave
- In narrow phonetic transcription, length is typically marked by a colon ":" after the lengthened sound.

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Vowel length in Finnish

- In some languages, the long-short contrast is crucial, since substituting a long segment for an otherwise identical short segment in a word can result in a change of meaning. Consider these data from Finnish:
  [muta] "mud"
  [muːta] "some other"
  [muta:] "but"

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Consonant length (gemination) in Italian

- Italian shows the same length effect for consonants:
  fato [fatɔ] "fate" vs. fatto [fat:ɔ] "fact"
  casa [kasa] "house" vs. cassa [kas:a] "box"

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Pitch

- Depending on the tenseness of the vocal folds and the amount of air passing through the glottis, we may get either a high or a low pitch.
- Pitch is an auditory property of a sound that allows us to put it on a scale that ranges from low to high.
- Two kinds of controlled pitch movement found in human language are ***tone*** and ***intonation***.

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Tone

- In many languages, the pitch at which the syllables in a word are pronounced can make a difference in the meaning of the word. These are called ***tone languages*** (e.g., Thai, Zulu, Igbo, and Navajo).
- We use the uppercase letters H, M, and L, to stand for high, mid, and low tones. Consider this example from Mandarin:

[ma]	H	"mother"
[ma]	MH	"hemp"
[ma]	MLH	"horse"
[ma]	HL	"scold"

Link to Thai tones Thai tongue twisters

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Intonation

- Intonation is the pattern of rises and falls in pitch across a stretch of speech such as a sentence.
- For example, the same string of speech could be interpreted either as a statement or as a question, depending on its intonation contour:
  Max is studying linguistics. (falling intonation)
  Max is studying linguistics? (rising intonation)
  Max is studying linguistics, ... (level intonation)

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Stress

- Stress refers to the perceived prominence of a particular syllable relative to syllables around it.
- In essence, stress is the combined effect of pitch, loudness, and length.
- In some languages, stress placement is predictable, e.g., in Czech stress almost always falls on the first syllable, whereas in Welsh stress falls on the next to last syllable.

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Stress

- In other languages, like English and Russian, stress is unpredictable and has to be learned for every word.
- In such languages stress placement may also create a difference in meaning:

  export could be [ˈɛkspɔɹt] or [ɛksˈpɔɹt]

  present could be [ˈpɹɛzn̩t] or [pɹəˈzɛnt]

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Phonology

Phonology

- While phonetics studies how speech sounds are articulated, what their physical properties are, and how they are perceived, phonology studies the organization of speech sounds in a particular language.
- As it turns out, while two or more languages may have the same sounds, no two languages organize their sound inventories in the same way.

[s] and [ʃ] in Japanese vs. English

- In both English and Japanese we hear the sounds [s] and [ʃ]:

  Japanese: [ʃimasu] “do”

  English: [slæʃ] “slash”

[s] and [ʃ] in Japanese vs. English

- In English, however, the occurrence of each sound is **unpredictable**.
- Given [_oɹ], which sound do you think should occur in the blank?
- Either one can, giving us two words with two different meanings:

  [ʃoɹ] “shore” vs. [soɹ] “sore”

[s] and [ʃ] in Japanese vs. English

- By contrast, in Japanese, we do not find pairs where [s] and [ʃ] create a difference in meaning.
- In Japanese, if we have [_imasu], and a choice of [s] and [ʃ] , we predict that only [ʃ] may occur in the blank: [ʃimasu] "do".
- Similarly, if we have [_an], we predict that only [s] may occur in the blank: [san] "three"
- If we make the wrong choice in the blank, we do not get a word with a different meaning. Japanese does not have [simasu] or [ʃan].

Phonology

- Phonology addresses these questions:
- Which sounds are predictable and which ones are unpredictable in a particular language?
- What is the phonetic context that allows us to predict the occurrence of these sounds?
- How can we "formalize" speakers' phonological knowledge in terms of rule notation?
- We discuss this today.

Subconscious phonological knowledge

- Native speakers of a particular language typically treat certain sounds as being the same, even when they are phonetically different, e.g.,

  the [l] in *lay* and *play*

  the [t] in *top* and *stop*
- But other sounds are considered different even when they sound the same:

  [ɹaɪɾəɹ] 'rider' and [ɹaɪɾəɹ] 'writer'

Phonemes vs. allophones

- Phonologists explain the difference by invoking a distinction between **phonemes** and **allophones**.
- A phoneme is a sound that distinguishes meaning in a language, whereas an allophone is a phonetic variant of a particular phoneme that does not affect meaning.

Minimal pairs

- Phonemes are **contrastive**. They create words that differ in meaning.
- But how do we know if two sounds are contrastive in a particular language?
- Answer: **Minimal pairs**.
- A minimal pair is two words with different meanings that are identical except for one sound that occurs in the same place in each word, e.g.,

  seed [sid] and *seat* [sit]

Phonemes or allophones?

- So, bearing this in mind, let's consider more examples from English.
- Based on the minimal pair *light* [laɪt] and *right* [ɹaɪt], are the [l] and [r] phonemes or allophones in English?
- Based on the minimal pair *pan* [pæn] and *ban* [bæn], are the [p] and [b] phonemes or allophones in English?

Phonemes or allophones?

- Based on the minimal pair *shore* and *sore* (remember spelling is irrelevant to phonology), are the [s] and [ʃ] phonemes or allophones in English?
- How about these further minimal pairs?
  seat and *sit*
  fool and *full*
  sip and *zip*
  leaf and *leave*

Phonemes or allophones?

- Now, let's consider the following minimal pairs:
  a. *tar*: [t^haɹ] vs. *[taɹ]
  b. *star*: [staɹ] vs. *[st^{h}aɹ]
- Now, here's the question: Are the two sounds [t^h] and [t] phonemes or allophones in English?
- Since [t^h] and [t] are **not contrastive** in English, they are two allophones of the same phoneme, which we might represent here as **/t/**.
  (Notice the slash, rather than the square bracket, notation.)

Phonemes or allophones?

- Let's consider another example:
  play: [pl̥eɪ] vs. [pleɪ]
- Here's the question: Are [l̥] and [l] phonemes or allophones in English?
- Right. Since they are not contrastive, then they are allophones of the same phoneme, which we may represent here as /l/.

Phonemes or allophones?

- How about nasal vowels in English? Are they phonemes or allophones?
- First, let's try to find (or construct) a couple of minimal pairs:
  a. *pin* [p^hĩn] vs. *[p^hɪn]
  b. *pit* [p^hɪt] vs. *[p^h ĩt]
- Is the contrast here phonemic or allophonic?

So, how do languages differ, then?

- One reason why human languages differ in their sound inventory is that what is considered a phoneme in one language is an allophone in another, and what is an allophone in one language is a phoneme in another.
- So, for example, the aspiration variation is allophonic in English, but is phonemic in Thai.

[paa] "forest"	[p^haa] "to split"
[tam] "to pound"	[t^ham] "to do"
[kat] "to bite"	[k^hat] "to interrupt"

So, how do languages differ, then?

- Now, consider nasal vowels in French:
  gars [ga] "lad" *gant* [gã] "glove"
- Are they phonemes or allophones?
- How about Akan, a Ghanaian language?

[ka] "bite"	[kã] "speak"
[tu] "pull"	[tũ] "den"
[pam] "sew"	[pãm] "confederate"

Distribution: contrastive vs. complementary

- From all these examples, you should've noticed that different allophones occur in different environments, that is, where one of them occurs, the other doesn't, and vice versa, which is not the case with phonemes.
- We say that allophones occur in **complementary distribution,** whereas phonemes occur in **contrastive distribution.** And this is one main distinction between a phoneme and an allophone.

Phonemes are abstract entities

- So, phonemes are meaning-distinguishing sounds, whereas allophones are phonetic variants of the same phoneme that occur in specific contexts.
- Notice that this means that phonemes are actually **abstract** entities in your head rather than actual sounds that come out of your mouth. Such physical sounds are allophones, the concrete manifestations of the abstract phonemes.

Phonemes are abstract entities

- The psychological existence of phonemes can be noticed in native speakers' slips of the tongue, e.g., *key chain* [ki tʃejn] may come out as [tʃi kejn], but never as [ti kʃejn].
- This shows that [tʃ] is stored in the mind as a single unit, just as [k] is.

Note on transcription

- Remember the distinction between broad phonetic transcription and narrow phonetic transcription? We can now understand this better in terms of phonemic vs. phonetic transcription.
- In phonemic transcription, only phonemes are transcribed. In phonetic transcription, the allophones of each phoneme are transcribed.

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 in a language. 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 are in **contrastive** distribution. 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 likely to be two different phonemes.
  - If **complementary**, then the sounds are allophones of the same phoneme, in which case state the phonological environments in which each allophone occurs and then move to step 3.

Which is underlying, and which is derived?

- Step 3:
  Once you determine 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.

Some 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?

Some 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. [mandurukot]	"pickpocket"	10. [mandukot]	"to go pickpocketing"

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

Sindhi

24. Sindhi
The following data are from Sindhi, an Indo-European language of the Indo-Aryan family, spoken in Pakistan and India. Examine the distribution of the phones [p], [pʰ], and [b]. Determine if the three are allophones of separate phonemes or allophones of the same phoneme. What is your evidence? Is the relationship among the sounds the same as in English? Why or why not?

a.	[pənu]	'leaf'	**g.**	[təru]	'bottom'
b.	[vədʒu]	'opportunity'	**h.**	[kʰətɔ]	'sour'
c.	[ʃeki]	'suspicious'	**i.**	[bədʒu]	'run'
d.	[gədɔ]	'dull'	**j.**	[bənu]	'forest'
e.	[dəru]	'door'	**k.**	[bətʃu]	'be safe'
f.	[pʰənu]	'hood of snake'	**l.**	[dʒədʒu]	'judge'

Standard Italian

25. Standard Italian

Consider the following data from Standard Italian, an Indo-European language of the Romance family, spoken in Italy. Answer the questions that follow.

a.	[tinta]	'dye'	**g.**	[tiŋgo]	'I dye'
b.	[tɛnda]	'tent'	**h.**	[tɛŋgo]	'I keep'
c.	[dantsa]	'dance'	**i.**	[fuŋgo]	'mushroom'
d.	[nɛro]	'black'	**j.**	[bjaŋka]	'white'
e.	[dʒɛnte]	'people'	**k.**	[aŋke]	'also'
f.	[sapone]	'soap'	**l.**	[faŋgo]	'mud'

i. Are there any minimal pairs? If so, what are they, and what can you conclude to be true of Italian from those minimal pairs?

ii. State the phonetic environments in which the sounds [n] and [ŋ] appear. Identify any natural classes of sounds that appear in the environments you've provided.

iii. Given what you know about the distribution of sounds and the environments you listed in (ii), are [n] and [ŋ] in complementary or contrastive distribution? Please explain your answer.

Standard Spanish

26. Standard Spanish

Standard Spanish is an Indo-European language of the Romance family. Examine the phones [d] and [ð]. Determine whether they are allophones of one phoneme or of separate phonemes. If they are allophones of one phoneme, identify the type of distribution. If they are in complementary distribution, state a rule that describes the distribution. If [d] and [ð] are allophones of separate phonemes, give minimal pairs that prove this.

a.	[drama]	'drama'	**g.**	[komiða]	'food'
b.	[dolor]	'pain'	**h.**	[anda]	'scram'
c.	[dime]	'tell me'	**i.**	[sweldo]	'salary'
d.	[kaða]	'each'	**j.**	[durar]	'to last'
e.	[laðo]	'side'	**k.**	[toldo]	'curtain'
f.	[oðio]	'hatred'	**l.**	[falda]	'skirt'

Russian

27. Russian

Russian is an Indo-European language of the Slavic family, spoken in Russia. Determine from the following Russian data whether [a] and [ɑ] complement each other as allophones of the same phoneme or whether they are in contrast as allophones of separate phonemes. If they are allophones of separate phonemes, provide evidence for your claim. If they are in complementary distribution, pick one allophone as the basic sound, and give the conditioning phonetic contexts for its allophones. ([ɬ] represents a velarized [l], [sʲ] a palatalized alveolar fricative, and [mʲ] a palatalized voiced bilabial nasal.)

a.	[atəm]	'atom'	**f.**	[upaɬ]	'he fell'
b.	[dva]	'two'	**g.**	[daɬ]	'he gave'
c.	[dar]	'gift'	**h.**	[pɑːɬkə]	'stick'
d.	[masʲ]	'ointment'	**i.**	[ukraɬə]	'she stole'
e.	[mʲatə]	'mint'	**j.**	[braɬ]	'he took'

Summary

- **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**. We discuss these on Wednesday.

Next class agenda

- Look at the phonology problems on Sindhi, Standard Italian, Standard Spanish, and Russian, that I gave out in class today (they are also given on the previous slides, though probably too small to read), in preparation for class discussion. Feel free to also look at the rest of problems.
- Phonological rules. Read the section on phonological rules in Chapter 7, if you haven't done that already.