Handout 2: Phonology—the Sound System
June 10 & 11, 2004 (Charles Lin)

1. Phonology is about the abstract sound system that we have in our mind. It is about the mental representations of sounds and the rules that we apply to sounds.

2. In the last lecture, we talked about phonetics—the notational system for the “actual” sounds being produced and perceived. This time, we will talk about sounds at a more abstract level. Remember, we are getting at the knowledge in people’s mind—the linguistic competence. Phonetics is more at the performance level. Now we want to look at what people know about sounds in language.

3. What is a phoneme?
   a. It is the sound segment that would make meaning differences in a language.
   b. Some speech sounds in one language are not distinguished in another. For example, in Mandarin, /p/ and /pʰ/ are two phonemes, but in English, they are one phoneme, known as /p/. (e.g. the ps in put and spot are both realized as /p/.)
   c. Therefore, phonemes are language dependent. Different languages have a different set of phonemes.
   d. Phonemes are enclosed by / /.
   e. A test to see if a segment is a phoneme or not is to find minimal pairs in that language. If there are minimal pairs for a segment, it is a phoneme.

4. What are minimal pairs?
   a. They are pairs of different words that differ only in one segment in sound.
   b. Examples:
      i. /gat/ vs. /gad/
      ii. /lup/ vs. /lip/
   c. These are not minimal pairs:
      i. /fud/ vs. /fit/
      ii. [stap] vs. [stap]
   d. With such semantic distinction, we can be sure that that segment has contributed to semantic difference in the language. Namely, they are contrastive. Therefore, those segments can be taken as phonemes in that particular language.

5. Allophones:
   a. Allophones are sounds that do not contrast in a language.
   b. They are different phonetic realizations of one single phoneme.
   c. Therefore, they should be enclosed by square brackets, [ ], rather than slashes, / /.
   d. Example:
      i. In English, /t/ is a phoneme. We can find minimal pairs like /tam/ and /sam/.
      ii. But /t/ is phonetically realized in many different ways depending on its position in a word. Try to pronounce the following words. Do the /t/s sound the same to you?
         top stop little kitten hunter cut
iii. In English these are allophones of the same phoneme /t/.

iv. Again, this is totally language-specific. What are allophones in one language may be distinguished as phonemes in another.

v. For example, in Mandarin and Hindi, /t/ and /tʰ/ are two phonemes rather than allophones.

e. Allophones are usually in **complementary distribution**, which means they appear at different positions of a word. The phonetic realizations of allophones are **predictable**, since they follow **phonological rules**.

```
spot     pot
spy      pie
speak    peak
```

f. There may also be **free variations**. They are also allophones.

```
top     [tapʰ]
soup    [supʰ]
leap    [lipʰ]
```

6. **Phonological Rules**:

<table>
<thead>
<tr>
<th>Phonemic form</th>
<th>(mental representation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonological Rules</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Phonetic form</td>
<td>(physical representation)</td>
</tr>
</tbody>
</table>

Example: 

```
/n/
```

I can ask
I can see
I can bake
I can play
I can go
I can come

What’s the rule? ________________________________

7. The phonological rules do not apply to individual phonemes only. They often apply to a whole group of phonemes, which form a **natural class**.

a. Consider these examples:

```
Bad dream     hat trick
Head band     hit batsman
Bad guy       night club
```

b. What forms a natural class? ________________________________

c. What’s the common property of the members in this natural class?

d. How can we revise the rule that we proposed in 6?
8. Phonological rules are language-specific, even though certain processes are pretty common across languages when they are physically motivated.

9. Some interesting and common phonological rules:
   a. **Assimilation**
      i. Alveolar stop assimilation (English)
      ii. **Palatalization**
         1. Did you eat?
         2. It’s you.
         3. situation
         4. I miss you.
         5. I’ll ask you about it.
      iii. Vowel harmony (e.g. Finnish) LF p.112
   b. **Dissimilation** LF p.113
   c. Insertion
      Voiceless stop insertion (English) LF p.113
   d. Deletion
      /h/-deletion (English) LF p.113
   e. **Metathesis**—changing the order of sounds
      e.g. ask
   f. Strengthening
      aspiration (English) LF p.114
   g. Weakening
      flapping (English) LF p.114

10. Solving phonology problems is like solving puzzles. It is sometimes bewildering, but always lots of fun!
    a. What is a phonological problem like?
    b. Important things you need to know in order to solve problems:
       i. What are the **phonemes** in the language?
       ii. What could be **allophones**?
       iii. How are sounds distributed? What is the **environment** for certain sounds to occur?
       iv. Can we **predict** the occurrence of certain sounds? If we could, we should be able to state **rules** for them.
       v. Can we put sound changes into **natural classes** so that the rules become more **general**?
    c. Consult the flowchart on LF p. 123. It is very useful.

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**Homework 2** will be due on **June 14, Monday**. This homework will be worth 8% of your final grade. Please do the following exercises in LF. Write your answers legibly on a separate piece of paper to turn in. You don’t have to type this homework given that there may be phonetic symbols involved. The total score is **40 points**.

- p.116 Ex4 (10 pts)
- p.117 Ex5a (5 pts) 5b (5pts)
- p.125 Ex1.3 (10 pts)
- p.127 Ex1.6 (10 pts)

Enjoy the puzzles!

Correct course URL: http://www.u.arizona.edu/~clin/anth276_04/anth276.htm