The sound patterns of language

Phonology
Chapter 5

This lecture

- There are systematic differences between:
  - What speakers memorize about the sounds of words.
  - The speech sounds that speakers produce when they utter.
  - What speakers store in memory about the sounds of language, and how they translate these patterns into speech sounds.

**Phonology**
Phonetics & Phonology

- **Phonetics** -- What are the sounds? How are they made in the vocal tract?
  - [t] voiceless alveolar stop
  - [p] voiceless bilabial stop

- **Phonology** -- How do sounds combine? How do they affect each other?
  - What happens to [t] when it occurs initially or between vowels?

What is the difference between Phonetics and Phonology?

- **Phonetics** deals with the physical properties of speech sounds, e.g. how the sound is physically produced.

- **Phonology** deals with the sound systems languages
  - How sounds are organized into systems in different languages
  - How sounds are combined
  - The relation between them and how they affect each other.
Definition of Phonology

- The description of the systems and patterns of speech sounds in a language.
- Concerned with abstract or mental aspects of speech sounds.
- Key concepts: Phonemes and Allophones

Phonology

- What knowledge do we possess about the phonological rules in our language?
  - Know which sound sequences might be a word in our language
    thrim/blamp vs. gdit/rpuk
    mipped vs. rtip
  - Pronounce words we never heard before
  - Change foreign words to pattern like the words in our language
  - Apply rules to words we never heard before
The Phoneme

- Transcribe the following words
  - Tip, dip, lip, zip
- The smallest speech sound that distinguishes meaning. It serves to create meaning differences, e.g. /t/ is different than /d/.
- An abstract term, specific to a particular language.
- Forms the structure of sound system in a language.

Phonemes

- An essential property of a phoneme is that it functions contrastively.
  - In English, 2 phonemes /f/ & /v/
  - Contrast:
    - fat ≠ vat
    - fine ≠ vine

**Rule:** If we substitute one sound for another in a word and there is a change in meaning, then the two sounds represent different phonemes.
Phonemes

- Consonant chart lists phonemes in English
- The terms that are used in creating the chart are called ‘features’ which are marked by sign + & -
- E.g [b] + voice + bilabial + stop
  [s] – voice + alveolar + fricative

Phonemes

- /p/ [- voice, + bilabial, + stop]
- /k/ [- voice, + velar, + stop]
- /t/ [- voice, + alveolar, + stop]

Natural class?

- Sounds that have features in common behave phonologically in similar ways.
- /v/ [+ voice, + labiodentals, + fricative]– not the same natural class.
Allophones

- Transcribe the following words
  - Top stop writer kitten eighth hunter
- The [t] is different in each word.
- [t] in ‘top’ is *aspirated* and non-aspirated in ‘stop’
- American English [t] a *flap* in ‘writer’
- [t] in ‘kitten’ is a *glottal stop*
- [t] in ‘eighth’ is *dentalized*
- American English– there is no [t] in ‘hunter’

Allophones of /t/

Aspirated
- Initially
- Top - time

Flap
- Between vowels
- Writer - butter

Glottal stop
- A vowel and syllabic consonant
- Kitten – batman

Dental
- When followed by a Dental
- Eighth

Phone 1

Phone 2

Phone 3

Phone 4
Phonemes vs. Phones

<table>
<thead>
<tr>
<th>In the mind</th>
<th>In the mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>The phoneme is the abstract unit (sound type)</td>
<td>In actual speech, many different versions of /t/</td>
</tr>
<tr>
<td>e.g. /t/</td>
<td>e.g. tar, star, writer, eighth</td>
</tr>
<tr>
<td></td>
<td>each version = phone</td>
</tr>
</tbody>
</table>

The allophone

- Each phoneme may have different realisations depending on the context in which it is found.
  - /s/ in seen and soon.  
    - ‘seen’ is produced with spread lips, as /i/ follows.  
    - ‘soon’ is realised with rounded lips, to prepare for the following rounded vowel, /u/.  
  - This second, rounded /s/ is a variation, or allophone of the phoneme.  
- /p/ in pal and pull  
- /k/ in kill and cool

Allophones are what we actually produce and hear.
Phonemes and allophones

These differences are usually expressed using phonological rules.

If one allophone is exchanged with another, e.g. if *seen* is produced with lip rounding, the meaning does not change but it sounds strange.

If one phoneme is swapped with another, e.g. *seen* is produced with a /b/, instead of a /s/, the meaning of the word changes—**Phonemes function contrastively**
One more example!

- /i/ seen & seed
- seen = nasalization = ~
- seed = normal [i]
- 2 phones for one phoneme /i/
- Both are allophones of /i/

- In English, the nasalized version is not meaningfully contrastive.
- In French, it is.

Finding Phonemes

- Minimal pairs of words
- A pair of words that have different meanings and which differ in only one sound.
- Here is an example from English:
  - Sip [sɪp]
  - Zip [zɪp]
Minimal sets

- When a group of words can be differentiated, each one from the other, by changing one phoneme (in the same position in the word), we can have a minimal set.

  e.g.
  - feat/ fit/ fat/ fate/ fought/ foot (vowel phonemes)
  - big/ pig/ rig/ fig/ dig/ wig (consonant phonemes)

Minimal pairs

- Four golden rules for minimal pairs:
  - Have the same number of sounds
  - Identical in every sound except for one
  - The sound that is different must be in the same position in each word
  - The words must have different meanings
Phonotactics

- big/ pig/ rig/ fig/ dig/ wig
- The above minimal set doesn’t include (lig/ vig)
- They are not English words
- But they could be!
- Our phonological knowledge of the pattern of sounds in English would allow us to consider them acceptable.
- In the future! (I think Joe is one very ignorant guy. ~ Yeah, he’s a big vig)

Phonotactics

- [ʃɪɡ] / [rɪɡ]
- Do not and will never exist.
- Formed without obeying some constraints on the sequence or position of English phonemes.
- Such constraints on the sequence or position of phonemes / rules = Phonotactics

Phonotactics: the permitted arrangements of sounds in a language.
Syllables

- A syllable: a phonological unit that contains more than one phoneme
- A syllable **must** contain a vowel or a vowel like sound (e.g. [w], [j]).
- The basic elements of the syllable are: Onset + Rhyme

- **Onset** = one or more consonants
- **Rhyme** = Nucleus + Coda
- **Nucleus** = a vowel
- **Coda** = one or more consonants

Open vs. Closed Syllables

- Open syllables = an onset + a nucleus (but no coda)
  - e.g. me, to, no
- Closed syllables = the coda is present
  - e.g. up, at,
  - cup, hat, Sam, dip
Consonant cluster

- Both the onset & the coda can consist of more than one consonant.
- e.g. /st/ = consonant cluster (CC)
- /st/ = CC = a onset in stop
- /st/ = CC = a coda in post

Consonant cluster

- There are many CC onset combinations permitted in English phonotactics:
  e.g. black, flat, bread, trick, throw, twin
  Note: liquids (/l/, /r/) & a glide (/w/) are in 2nd position
Consonant cluster

- English can have larger onset clusters
  - e.g. stress, splat (3 initial consonants = CCC)
- the phonotactics here are not difficult to describe!
  1. 1st consonant = /s/
  2. -V stop = (/p/, /t/, /k/)
  3. One of these liquids or glides = (/l/)

Co-articulation effects

- Our talk is often fast and spontaneous
- Our articulators move from one sound to another without stopping.

**Co-articulation**: The process of making one sound almost at the same time as the next sound

- There are two well-know co-articulation effects: assimilation & elision
Assimilation

Assimilation is a common phonological process by which the phonetics of a speech segment (a sound) becomes more like that of an adjacent sound.

- articulation = easier, quicker

  e.g.

  Phonological rule: “Any vowel becomes nasal whenever it immediately precedes a nasal.”

  - *lap* [læp] vs. *fan* [fæn]

Another example:

- *can* [kæn]
- *I can go*
  - Because of the velar stop [g] in *go*, the alveolar nasal [n] in *can* will be the velar nasal [ŋ]
  - *[ajkæ]ŋgo]*

  - Notice: *æ* became *ə*
  - *and* [ænd]
  - *you and me* [yʊənmi]
Elision

- *you and me* [yuənmi]
- Where is the [d]?
- The stop [d] between two nasals [n] & [m]
- *Friendship* [frɛŋʃɪp]

Elision: The process of not pronouncing a sound segment that might be present in the deliberately careful pronunciation of a word in isolation

- More examples: p. 49

Normal speech

- Constantly avoiding the regular patterns of assimilation & elision would result in extremely artificial-sounding talk.
Key terms

- Phonology
- Phonemes & allophones
- Minimal pairs and sets
- Phonotactics
- Syllables
- Co-articulation effects

See you next class 😊
Please read chapter 6