Chapter 4: The sound patterns of language
Phonetics vs. Phonology
Phonetics

- The study of how speech sounds are made, transmitted, and received.
- It requires as its source of data a human being with vocal organs.
- The person's particular language background is not strictly relevant.
Phonology

- gdit/ rpukn

- Its primary aim is to:
  - discover the principles that govern the way sounds are organized in a language
Phonology

• A common methodology is to begin by analyzing an individual language, to determine
  • which sound units are used
  • how they pattern
  • The language's phonological structures
Phonetics vs. Phonology

Whereas phonetics is chiefly concerned with the physical nature of speech sounds, phonology deals with the ways in which sounds behave in languages.
Phonetics vs. Phonology

• The human vocal organs can produce a very wide range of sounds; but only a small number of these are used in a language to construct all of its words and sentences.

• **Phonetics** is the study of all possible speech sounds;

• **Phonology** studies the ways in which a language's speakers (e.g. Arabic) systematically use a selection of these sounds in order to express meaning.
Phonology

• What knowledge do we have about the phonological rules in our language?
• Which sound sequences might be a word in our language?
  • gdit/ rpukn
  • thrim/ blamp
• How to pronounce words we never heard before
• How to change foreign words to pattern like the words in our language
Phonology: The study of the systems and patterns of speech sounds in languages
The Phoneme: The smallest meaning-distinguishing sound unit in the abstract representation of the sounds of a language.

- e.g. /t/ ≠ /d/
  
  mate ≠ made
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 technical terms used in creating the chart are called ‘features’

• Features are marked with sign + & –
  • + ——→ feature is present
  • – ——→ feature is not present
Phonemes

• e.g.  /p/ [− voice, +bilabial, +stop]

  /k/  [− voice, +velar, +stop]

• Sounds which have features in common behave phonologically in some similar ways

• A sound which doesn’t share those features is expected to behave differently.
## Phonemes vs. Phones

<table>
<thead>
<tr>
<th>In the mind</th>
<th>In the mouth</th>
</tr>
</thead>
</table>
| The **phoneme** is the abstract unit  
e.g. /t/ | In actual speech, many different versions of that abstract unit  
e.g. *tar, star, writer, eighth*  
each version = **phone** |
Phones

- Phones are *phonetic units*
- They appear in [ ]

**A Phone:** A physically produced speech sound, representing one version of a phoneme
Phones and Allophones

- A group of several phones (versions of one phoneme) = allophones (of the phoneme)

E.g.
- /t/ = phoneme
- [t] (star) = 1 phone
- [tʰ] (tar) = 1 phone
- [D] (writer) = 1 phone
- [t̪] (eighth) = 1 phone
- [tʰ] & [D] & [t̪] = allophones
Phones and Allophones

- There are more [t]s than you know.
- The [t] in *time* is *aspirated*, but that in *stop* is not.
- All these are allophones of the phoneme /t/.
- These differences are usually expressed using phonological rules.

<table>
<thead>
<tr>
<th></th>
<th>word</th>
<th>transcription</th>
<th>context</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>stop</td>
<td>[stʌp]</td>
<td>After [s]</td>
</tr>
<tr>
<td>2</td>
<td>time</td>
<td>[θɛjɪm]</td>
<td>Syllable initial</td>
</tr>
<tr>
<td>3</td>
<td>butter</td>
<td>[bʌtər]</td>
<td>Between vowels</td>
</tr>
</tbody>
</table>
Phones and Allophones

• Each phoneme may have different versions depending on the context in which it is found

  e.g. consider the different articulations of /s/ (seen ≠ soon)

  • seen — the phoneme /s/ is produced with spread lips, as /i/ follows.
  • soon — the phoneme /s/ is produced with rounded lips, to prepare for the following rounded vowel, /u/
Phoneme vs. Allophones

- Substituting one phoneme for another results in different meaning
- Substituting one allophone for another results in same meaning
  (same word) BUT different (or unusual) pronunciation
- 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 - they function contrastively.
- If one allophone is exchanged with another, e.g. if *seen* is produced with lip rounding, the word, while perhaps sounding a bit strange, is still comprehensible.
Phoneme vs. Allophones

- /i/ seen & seed
  - seen = nasalized = [ɨ]
  - seed = normal [i]
  - [ɨ] and [i] are two phones for one phoneme /i/
  - Both are allophones of /i/

- In English, the nasalized version is not meaningfully contrastive.
- In French, it is. e.g. beau [bo] ≠ bon [bõ]
Minimal Pairs

- A minimal pair is a pair of words that have different meanings and which differ in only one phoneme.

  e.g. (English):
  - sip [sɪp] / zip [zɪp]
  - pat [pæt] / bat [bæt]
  - Other examples: bet/bat – site/ side

  e.g. (Arabic)
  - [qæːl] & [gæːl] = same meaning = allophones of /q/
  - [mæːl] & [qæːl] = different meaning = minimal pair
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 and Sets

Four golden rules:

1. They must have the same number of sounds
2. They must be identical in every sound except for one
3. The sound that is different must be in the same position in each word
4. The words must have different meanings
Homework

P. 49: (1, 2, & 3)

Thank you
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 patterns 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

- \([f\text{sig}] / [r\text{mig}]\)
- Do not and will never exist.
- Formed without obeying some constraints on the sequence or position of English phonemes.
- Such constraints/rules = Phonotactics

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

A syllable: a unit of sound consisting of a vowel and optional consonants before or after the vowel.

A syllable must contain a vowel or vowel-like sound, including diphthongs.

![Figure 4.1](image)
Syllables

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**

*Figure 4.1*
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

Figure 4.1
Open vs. Closed Syllables

• The basic structure of the kind of syllable found in English words like:

• green (CCVC), eggs (VCC), and (VCC), ham (CVC), I (V), do (CV), not (CVC), like (CVC), them (CVC), Sam (CVC), I (V), am (VC) is shown in Figure 4.1 below
Consonant Clusters

• Both the onset & the coda can consist of more than one consonant.

• e.g. /st/ = consonant cluster (CC)

• /st/ = CC = an onset in \textit{stop}

• /st/ = CC = a coda in \textit{post}
Consonant Clusters

• 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 Clusters

• English can have larger onset clusters
e.g. stress, splat (3 initial consonants = CCC)

• the phonotactics here are not too difficult to describe!

1. 1st consonant = /s/
2. -v stop = (/p/, /t/, /k/)
3. a liquid or a glide = (/l/, /r/, /w/)

• splash, spring, strong, scream, square, exclaim
• exclaim = /ik-sklem/
• Remember: it’s the onset of the syllable that is being described (not the beginning of the word)
Coarticulation Effects

• Our talk is often fast and spontaneous
• Our articulators move from one sound to the next without stopping.

**Coarticulation**: The process of making one sound almost at the same time as the next sound

• There are two well-known co-articulation effects:
  • assimilation & elision
Assimilation is a common phonological process by which the features of a sound becomes more like that of an adjacent sound.

- articulation = easier, quicker

e.g.
- *have* /hæv/ by itself
- *I have to go* in everyday speech
- As we start to say the -v /t/, we tend to produce a voiceless version of the preceding sound, resulting in what sounds more like /f/ than /v/.
- *[hæfte]*
**Assimilation**

- Vowels are also subject to assimilation
- In isolation, we pronounce [ɪ] and [æ] without any nasal quality
- Try saying: *pin* and *pan*
- [ɪ] and [æ] → [ɨ] and [ã̃].
- **Phonological rule:** Any vowel becomes nasal whenever it immediately precedes a nasal.
Assimilation

Other examples:

• *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]

• *[ajkəŋgo]*

• Notice: *æ* became *ə*

• *and* [ænd]

• *you and me* [juənmi]
Elision

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

Elision: The process of leaving out a sound segment that might be present in the deliberately careful pronunciation of a word in isolation

- More examples: p. 48
Elision

- In consonant clusters, especially in coda position, /t/ is a common casualty in this process
  - e.g.
    - [æspɛks] = aspects
    - [himəsbi] = he must be.
    - [wiæstəm] = we asked him
- Vowels also disappear
  
  - e.g. [ɛvri] = every, [ɪntrɪst] = interest, [kæbnaɪt] = cabinet,
Normal Speech

- Assimilation & elision occur in everyone’s normal speech
- They should not be regarded as sloppiness or laziness in speaking
- Constantly avoiding the regular patterns of assimilation & elision would result in extremely artificial-sounding talk.

Remember:
- The point of investigating these phonological processes is not to arrive at a set of rules about how a language should be pronounced,
- but to try to come to an understanding of the regularities and patterns which underlie the actual use of sounds in language.
References


Homework

P. 49: (4, 5, & 6)

Thank you