Day 3: Phonetics

Ling L303/L503: Introduction to Linguistic Analysis

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What is phonetics?

Phonetics

Definition

The scientific study of human speech sounds

- Articulatory phonetics: how sounds are produced
- Auditory phonetics: how sounds are perceived
- Acoustic phonetics: the physical properties of sounds
- …but also for signed languages

Videos

Some videos to watch

- ~~'Phonetics', from Human Language series~~
- "Why did Ken set the soggy net on top of his deck?"

Goals

Goals for Phonetics section:

- Be able to *identify* human speech sounds
- Learn symbols used for *transcribing* speech sounds
- *Describe* and classify sounds according to articulatory properties
- Understand basic *analytical* methods used by phoneticians

Decoding the speech stream

- How many words in this sentence?

Decoding the speech stream

"Boy, he must think we're pretty stupid to fall for that again."

Decoding the speech stream

- How many sounds in these words?

Example

‘leaf’ ‘feel’

- ‘leaf’ [lif] vs. ‘feel’ [fil]
- ‘feel’ [fil] vs. ‘fael’ [fil] (‘leaf’ backwards)
- ‘lull’ vs. ’llul’ (‘lull’ backwards)

- Sounds in a string are continuous
- …but we hear them as discrete, separate sounds

Anatomy of the vocal tract

What basic organs go into producing speech?

- Lungs
- Larynx
- Tongue
- Oral cavity
- Nasal cavity

Anatomy of the vocal tract

Structures used for articulation

What are the major articulators used to produce speech sounds?

Structure (noun)	Descriptor (adjective)
lips	labial
teeth	dental
alveolar ridge	alveolar
hard palate	palatal
velum (soft palate)	velar
nasal cavity (nose)	nasal
glottis	glottal

Anatomy of the vocal tract

Active and passive articulators

Definition (Active articulator)

Active articulator — Moves during articulation

Definition (Passive articulator)

Passive articulator — Remains stationary during articulation

Examples

[v] — active: lower lip, passive: upper teeth
[s] — active: tongue tip, passive: alveolar ridge
[k] — active: back of tongue, passive: velum

Articulatory Description

Consonants

For consonants, three-part classification system:

- voicing
- place (of articulation)
- manner (of articulation)

Example

voiced labiodental fricative = [v]

Articulatory Description

Voicing

Definition (Voicing)

What's going on at the larynx—vocal folds vibrating or not

- Vocal folds spread = not vibrating = voiceless
- Vocal folds together = vibrating = voiced

Articulatory Description

Voicing

Voicing pairs

Voiceless	Voiced
[p] pat	[b] bat
[t] tie	[d] die
[k] kill	[g] gill
[f] fat	[v] vat
[s] sip	[z] zip
[θ] thigh	[ð] thy
[ʃ] dilution	[ʒ] delusion
[tʃ] etch	[dʒ] edge

Articulatory Description

Place

Definition (Place of articulation)

Where in the vocal tract constriction is made

- Bilabial — both lips [b], [p], [m], [w](, [w̥])
- Labiodental — lower lip and upper teeth [f], [v]
- Interdental — tip of tongue between the teeth [θ], [ð]
- Alveolar — tip or blade of tongue on near alveolar ridge
  - [t], [d], [n], [l], [ɹ], [s], [z]
- (Alveo-)Palatal — blade of tongue at or near hard palate
  - [ʃ], [ʒ], [tʃ], [dʒ], [j]
- Velar — back of tongue at or near soft palate
  - [k], [g], [ŋ]
- Glottal — vocal fold approximation
  - [h], [ʔ]

Articulatory Description

Manner

Definition (Manner of articulation)

How the air is being modified as it moves through the vocal tract

- Stops — full obstruction in the oral cavity
  - [p], [b], [t], [d], [k], [g], [ʔ]
- Fricatives — partial obstruction, with turbulence
  - [f], [v], [θ], [ð], [s], [z], [ʃ], [ʒ]
- Affricates — stop followed by fricative
  - [tʃ], [dʒ]
- Nasal — full obstruction in the oral cavity, velum lowered
  - [m], [n], [ŋ]
- Liquid — partial obstruction, but no turbulence
  - [l] (lateral), [ɻ] (retroflex)
- Glide — some constriction
  - [w], [j]

Phonetic Alphabets

Why use a phonetic alphabet

Why use a phonetic alphabet?

- Some languages have no writing system
- There's no one-to-one correspondence between letters and sounds:
  - Same letter, different sounds:
    dad, father, about, many
  - Same sound, different letters:
    believe, people, amoeba, tree
  - Single sound, multiple letters:
    shoot, nation, chord, chip
  - Multiple sounds, single letter:
    box, use
  - Letters without sound:
    gnaw, sword, debt, damn, bomb

Phonetic Alphabets

IPA

The IPA

Definition (IPA)

The International Phonetic Alphabet