Review for Midterm

SPAU 3343
Updated Spring, 2014
IPA

• International Phonetic Alphabet.
• Each symbol represents a single sound.
• We can transcribe any sound of any language with IPA.
Linguistics

• The scientific study of language.
Phonetics

• Part of linguistics. The scientific study of speech sound.
  – Articulatory phonetics: How speech sounds are articulated. → Description and classification of speech sounds.
  – Acoustic phonetics: How speech sounds are generated and how they are transmitted. → The relationship between articulation and acoustic output.
  – Auditory phonetics: How human ears perceive speech sounds.
Phonology

• How speech sounds are used in languages.
• Study of systems of speech sounds and the rules which govern them
Speech sounds

• Sounds are not the same things as orthography.
• The IPA was created to represent actual speech sounds.
• IPA was designed to consider grouping of sounds.
  – Voiced/voiceless
  – Place of articulation
  – Manner of articulation
• Sounds change based on speech context
Phone

• An individual sound of speech; an elementary sound unit.
Phoneme

• The smallest sound unit in a language that distinguishes word meanings.
Minimal pair

- Two words that have exactly the same phonemes except one.
- Minimal pairs are useful for determining which sounds are phonemes in a language.
- EXAMPLES: /pit/ - /bit/
- /pit/ - /pæt/
Vowels – tense, lax

- **Tense vowels** - occur in words with a final so-called silent “e” in the spelling (e.g., “mate”, “mete”, “kite”, and “cute”). These vowels CAN occur in *open* syllables (V, CV, CCV, etc.)

- **Lax vowels** - occur in the words without a “silent e” such as “mat”, “met”, “kit” and “cut”. These vowels CANNOT occur in open syllables, but are only found in *closed* syllables.
Vowels – tense, lax

<table>
<thead>
<tr>
<th>Tense Vowels</th>
<th>Lax Vowels</th>
<th>Most Closed Syllables</th>
<th>Open Syllables</th>
<th>Syllables Closed by [r]</th>
<th>Syllables Closed by [ŋ]</th>
<th>Syllables Closed by [ʃ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>i:</td>
<td>i</td>
<td>beat</td>
<td>bee</td>
<td>beer</td>
<td>sing</td>
<td>(leash)</td>
</tr>
<tr>
<td>eɪ</td>
<td>e</td>
<td>bit</td>
<td>bay</td>
<td>bare</td>
<td>length</td>
<td>fresh</td>
</tr>
<tr>
<td>æ</td>
<td>æ</td>
<td>bet</td>
<td></td>
<td>hang</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ι</td>
<td>ι</td>
<td>hot</td>
<td>pa</td>
<td>bar</td>
<td></td>
<td>crash</td>
</tr>
<tr>
<td>ι</td>
<td>ι</td>
<td>bought</td>
<td>saw</td>
<td>bore</td>
<td>long</td>
<td>slish</td>
</tr>
<tr>
<td>ι</td>
<td>ι</td>
<td>boat</td>
<td>low</td>
<td>(boar)</td>
<td></td>
<td>(wash)</td>
</tr>
<tr>
<td>u</td>
<td>u</td>
<td>good</td>
<td></td>
<td></td>
<td></td>
<td>push</td>
</tr>
<tr>
<td>ι</td>
<td>ι</td>
<td>boot</td>
<td>boo</td>
<td>poor</td>
<td>hung</td>
<td>crush</td>
</tr>
<tr>
<td>aɪ</td>
<td>aɪ</td>
<td>bite</td>
<td>buy</td>
<td>fire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aʊ</td>
<td>aʊ</td>
<td>bout</td>
<td>bough</td>
<td>hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ι</td>
<td>ι</td>
<td>void</td>
<td>boy</td>
<td>(coir)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ju</td>
<td>ju</td>
<td>cute</td>
<td>cue</td>
<td>pure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Allophone – [ ]

• A variant of a phoneme. The allophones of a phoneme form a set of sounds that:
  – Do not change the meaning of a word,
  – Are all very similar to one another, and
  – Occur in phonetic contexts different from one another (for example, syllable-initial as opposed to syllable-final.

• The differences among allophones can be stated in terms of phonological rules.
## Consonants of GAE

<table>
<thead>
<tr>
<th>Manner</th>
<th>Voicing</th>
<th>Voiceless</th>
<th>Place of Articulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop (nasal)</td>
<td>+</td>
<td>-</td>
<td>m</td>
</tr>
<tr>
<td>Stop (oral)</td>
<td>-</td>
<td>-</td>
<td>p</td>
</tr>
<tr>
<td>Stop (oral)</td>
<td>+</td>
<td>-</td>
<td>b</td>
</tr>
<tr>
<td>Fricative</td>
<td>-</td>
<td>-</td>
<td>f, θ</td>
</tr>
<tr>
<td>Fricative</td>
<td>+</td>
<td>-</td>
<td>v, ø</td>
</tr>
<tr>
<td>Affricate</td>
<td>-</td>
<td>-</td>
<td>tʃ, dʒ</td>
</tr>
<tr>
<td>Affricate</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Approximant</td>
<td>+</td>
<td>-</td>
<td>ɹ, j, w, hw</td>
</tr>
<tr>
<td>(lateral)</td>
<td>+</td>
<td>-</td>
<td>l, ɹ</td>
</tr>
</tbody>
</table>

Also: /ʔ/, /ɾ/
GAE Vowel Quadrilateral
Monophthongs vs. Diphthongs

**Monophthongs**
- A vowel in which there is no appreciable change in quality during a syllable, as in “father.”

**Diphthongs**
- A vowel in which there is a change in quality during a single syllable, as in “high.”
Diphthongs

/ai/

/ɔɪ/

/au/
Tense vowels with a little bit of offglide

But these are not full diphthongs.

\[ /e/ = /e/ \]
\[ /i/ = /ij/ \]
\[ /o/ = /ou/ \]
\[ /u/ = /uw/ \]
Diphthong /aɪ/

- As in “high, buy,” moves toward a high front vowel, but in most forms of English it does not go much beyond a mid front vowel.
Diphthong /au/ 

• As in “how”
• Usually starts with a very similar quality to that at the beginning of “high”
Diphthong /ɪɔ/  

• As in "boy"
Connected speech

• The way we talk daily.
• Our talk is “connected” because we do not separate each word as we talk.
• Connected speech is not like citation form.
Citation form

• Citation form is a teacher type of talk. Each word is articulated separately.
• We rarely talk in citation form.
Feature theory

Markedness – mark only unusual cases

- Voicing, place and manner ➔
  Consonants are assumed to be:
  - Central instead of lateral ➔ Therefore, “lateral” is a marked feature. You don’t have to mark “central.”
  - Oral instead of nasal ➔ Therefore, “nasal” is marked. You don’t have to mark “oral.”
Binary vs. Graded Features

• **Binary features:**
  – In a binary system, a state is either “on” or “off.” For example, “voiced” or “voiceless”.
  – Binary codes are used for computers.

Binary features are:
  • Graspable
  • Intuitive

• **Graded features:**
  – Like prosody (the melody of language), it cannot be explained by clear-cut binary features.
Coarticulation

- Coarticulation ➔ Sounds before/after influence the next/previous sounds.
  - **Anticipatory coarticulation** ➔ “look-ahead” ➔ future sounds influence the present sound. When you say “I said ‘su’ again”, your mouth prepares for articulation of /u/ before it finishes producing /s/.
  - **Perseverative coarticulation** ➔ “carryover” ➔ previous sound still influences your present sound.

- Coarticulation is **language dependent**.
  - French speakers can anticipate 6 segments.
  - English speakers anticipate 1-2 segments.
Electropalatography (EPG)

- Subjects wear the unit on the upper surface of the mouths.
- Platinum electrodes record points of tongue contact.
Syllable

- A unit of speech consisting of either a single vowel (or a syllabic consonant) or a vowel and one or more consonants associated with it.
- The syllable is often used to describe patterns of stress and timing in speech.
  - **Open syllable** \(\rightarrow\) starts with one or more consonants and ends with V
    - CV
  - **Closed syllable** \(\rightarrow\) consonants at the end.
    - CVC, CVCC (etc.)
Diacritics

• A small mark that can be used to distinguish different values of an IPA symbol.

• For example, the addition of /~/ distinguishes a velarized from a non-velarized sound.

• Try saying “lēmon” and “pul[l]” to feel the different locations for producing the lateral sounds.

• For specific diacritics, refer to the pages about 12 phonological rules.
Source Filter Theory

• A theory in which energy from a source is modified by a set of filters.

• **Source** ➔ The basic source of power for speech is the respiratory system pushing air out of the lungs.

• **Filter** ➔ The larynx, pharynx, nasal cavity, and oral cavity (= supralaryngeal vocal tract)
Vocal Folds

Pharynx

Larynx

Trachea
Geminate consonant

• Long consonants that can be analyzed as double are called geminates.
• E.g. middle of Italian “folla”
• Careful: many English words are spelled with two consonants, but these are usually NOT geminates (e.g., “running”)
homorganic

• Two sounds that have the same place of articulation.
• For example, /d/ and /n/, as in English “hand,” are homorganic. They are both articulated on the alveolar ridge.
Transcription methods

• **Broad** ➔ a transcription that uses a simple set of symbols.

• **Narrow** ➔ Transcription that shows more phonetic detail, either just by using more specific symbols or by also representing some allophonic differences.

• **Phonemic** ➔ A transcription made by using letters of the simplest possible shapes, and in the simplest possible number (generally goes with “broad”)

• **Systematic phonetic** ➔ A transcription that shows the allophones in very detailed manners (generally goes with “narrow”)

• **Impressionistic** ➔ A transcription that only indicates general phonetic value, e.g. when transcribing foreign, child, or disordered speech – the more impressionistic, the more broad.
Voice

- **Breathy voice** (murmur) ➔ A type of phonation in which the vocal folds are only slightly apart so that they vibrate while allowing a high rate of airflow through the glottis, as in *Hindi* /bʰ/ or /া/. 

- **Creaky voice** (laryngealization) ➔ A type of phonation in which the arytenoid cartilages hold the posterior end of the vocal folds together so that they can vibrate only at the other end, as in *Hausa* /ã/.
Airstream mechanism

- **Airstream mechanism**: The manner in which an airstream is set in motion for the purposes of speech.

- Airstream mechanisms may produce **ingressive** (inward) or **egressive** (outward) airflow.

- An airstream mechanism consists of the movement of an initiator. Speech sounds are produced with one of three airstream mechanisms, or occasionally by a combination of two of these.
## Airstream Mechanism

*(pg. 239)*

<table>
<thead>
<tr>
<th></th>
<th>Pulmonic</th>
<th>Glottalic</th>
<th>Velaric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egressive</td>
<td>Plosives (/p, t, k, b, d, g/)</td>
<td>Ejectives (/p', t', k'/)</td>
<td>NONE</td>
</tr>
<tr>
<td>Ingressive</td>
<td>NONE</td>
<td>Implosives (/b, d, g/)</td>
<td>Clicks (/\emptyset,</td>
</tr>
</tbody>
</table>
### Pulmonic, Glottalic and Velaric airstreams

<table>
<thead>
<tr>
<th>Name</th>
<th>Initiator</th>
<th>Egressive</th>
<th>Ingressive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonic</td>
<td>lungs</td>
<td>most speech sounds</td>
<td></td>
</tr>
<tr>
<td>Glottalic/Pharyngeal</td>
<td>closed glottis</td>
<td>ejectives</td>
<td>voiceless implosives</td>
</tr>
<tr>
<td>Velaric/Oral</td>
<td>velar closure</td>
<td></td>
<td>clicks</td>
</tr>
<tr>
<td>Pulmonic + Glottalic</td>
<td></td>
<td></td>
<td>voiced implosives</td>
</tr>
</tbody>
</table>
Ejective vs. Implosive sounds

- **Ejective** ➔ A stop made with an egressive glottalic airstream, such as Hausa /t’/.

- **Implosive** ➔ A stop made with an ingressive glottalic airstream, such as Sindhi /ɓ/.
Different Languages

• Review the examples of languages discussed in class exemplary of interesting phonetic and linguistic features.
  – Language with click sounds ➔ !Xhosa
  – Bilabial implosive ➔ Sindhi
  – Ejective (glottal egressive airstream mechanism) stops ➔ Lakhota, Hausa
How to describe vowels

Main classification

• Tongue height ➔ high, mid, or low.
• Tongue advancement ➔ front, central, or back.

Also, we talk about…

• Tenseness ➔ tense or lax
• Lip rounding
Describing the vowels…

/i/ is a (high, mid, low) (back, central, front) vowel.
Describing the vowels…

/i/ is a (high, mid, low) (back, central, front) vowel.
Describing the vowels…

/u/ is a (high, mid, low) (back, central, front) vowel.
Describing the vowels...

/u/ is a (high, mid, low) (back, central, front) vowel.
Basic Speech Anatomy
Basic Speech Anatomy
Vocal Cord

- **Glottis** is the space between the vocal folds.
- **Vocal folds** are the two moving parts.
Stress placement

• The symbol /ˈ/ is a stress mark that has been placed before the syllable carrying the main stress.

• Stress should always be marked in words of more than one syllable.
Tone

• A pitch that conveys part of the meaning a word. In Chinese, for example, /ma/ pronounced with a high-level tone means “mother” and with a high falling tone means “scold.”
• Tones occur in relative balance of the sounds.
Two types of tone languages

1. **Register tone**: e.g., high/mid/low
2. **Contour tone**: include *rising, falling, dipping* (with slopes)
13 Phonological Rules

• Of English
Phonological Rule 1

Voiceless stops become aspirated when stressed and syllable initial.

• Diacritic: 

• Examples: [pʰɪt], [ɛnˈkʰuθ]

• Pg. 132
Phonological Rule 2

Voiceless stops become unaspirated after /s/ at beginning of syllable.

• Diacritic: none
• Examples: [stue]

• Pg. 134 “Aspiration blocked by /s/”
Phonological Rule 3

Approximants become (partially) devoiced after aspirated stops.

• Diacritic: [̊]
• Examples: [pʰəe]

Pg. 134-5 “Approximant partial devoicing”
Phonological Rule 4

Stops are unreleased before stops.

• Diacritic: [ʰ]
• Examples: [ɾískʰ t], [hʌmʰ p]

• Pg. 136
Phonological Rule 5

Vowels are proceeded by glottal stops at the start of an utterance

- Diacritic: [ʔ]
- Examples: ['ʔiʔɳ], ['ʔʌʔo]

- Pg. 137 “Glottal stopping at word beginning”
Phonological Rule 6

Voiceless stops are preceded by glottal stop after a vowel and at the end of a syllable. Also applies to syllable-final voiceless affricates.

• Diacritic: [ʔ]
• Examples: [stiʔp], [pʰɪʔtʃ]

• Pg. 137 “Glottal stopping at word end”
Phonological Rule 7

Voiceless alveolar stops become glottal stops before a nasal in the same word.

- Diacritic: [ʔ]
- Examples: [t'ʔiʔã̃]

- Pg. 138 “Glottal stopping before nasals”
Phonological Rule 8

Alveolar stops *(note: /t/ or /d/)* become a voiced flap between a stressed vowel and an unstressed vowel.

- Diacritic: [ɾ]
- Examples: ['glɑɾtʃ], ['bɛɾɪ], ['dæɾɪ]

- Pg. 139 “Tapping your alveolars”
Phonological Rule 9

Nasals become syllabic at the end of a word and after an obstruent (fricatives, stops, affricates).

• Diacritic: [ʼ]  
• Examples: [ʼbekʔə]  

• Pg. 139. “Nasals become syllabic”
Phonological Rule 10

Liquids become syllabic at the end of a word and after a consonant.

• Diacritic: [ݭ, ݯ]
• Examples: [ˈʃrɔl], [ˈʃɑrd]
Phonological Rule 11

Alveolar become dentalized before dentsals.

• Diacritic: [ⁿ]
• Examples: [¹ʰ⁰̊θ], [ŋθ]

• Pg. 141
Phonological Rule 12

Laterals become velarized after a vowel and before a consonant or at the end of a word.

• Diacritic: [~]
• Examples: [ʼwɔf], [sɪlk]

• Pg. 141 (NOTE – includes final consonant clusters!)
Phonological Rule 13

Vowels become nasalized before nasals.

• Diacritic: [˜]
• Examples: [sĩm], [sũn]

• Pg. 142
GOOD LUCK!!