Phonetics & Phonology

Phonetics is the study of human speech sounds. Articulatory phonetics deals with the articulation of speech sounds: how the human vocal tract physiology produces speech. Acoustic phonetics deals with the product of speech, that is, with speech sound itself, usually by means of instrumental records of sound waves. Auditory phonetics deals with the human perception of speech sounds, typically by experiments in perception or by study of the human auditory system.

Aim: KNOWLEDGE MODEL, part of theory of generative grammar:
‘What does it mean to know a language?’
‘How is that knowledge acquired?’
‘What aspects of linguistic knowledge are shaped or determined by properties of the brain, and which by properties of the vocal tract or ears?’
‘What limits are there on possible human languages?’

Parts of the standard generative model of phonology:
1. A theory of the mental representation of linguistic information. How are speech sounds represented in the mind? What are the cognitive primes out of which knowledge of speech is constructed?
2. A theory of the mental computations manipulating that information. How is this information manipulated by the mind, specifically, what is the relationship between what is stored mentally and the actions undertaken by the articulators to create speech manifestly? What kinds of computations must the mind perform in order for the body to speak as it does?

Model of Phonological Knowledge

1. information stored in memory
2. non-trivial phonological computations
3. intentions about articulation

Model of a (specific) Speech Event

1. intentions about articulation
2. actualization of intentions
3. articulatory actions

To differentiate among these, consider how something could ‘go wrong’ during any of these states or transitions.
1. Information forgotten
2. Faulty cognitive processing; information can’t be accessed or properly processed by the brain
3. Slip of the tongue (articulation error)
4. Ordinary articulator motions or cavities constrained (e.g. jaw wired shut, phlegm in pharynx ...)
5. Speaking in helium, under water, during helicopter landing ...

/p/: what does this mean?
It could be:
1. Part of a set of symbols used to designate mental representations.
   a. memorized information: underlying form
   b. intentions about articulation: surface form/phonetic representation
2. A symbol to denote an articulatory event: transcription.
3. A symbol to denote an acoustic event: transcription.

Transcription is a record of physical events. It obviously can vary in the details recorded.
The same symbols that are used in transcription are also frequently employed as symbols in the model of mental representation that linguists use. But there is a crucial difference. Transcription substitutes for any other kind of physical record of the speech event such as a tape recording. But the same symbols in phonology designate hypotheses about mental representation.

Phonological Computations.

<table>
<thead>
<tr>
<th>Arabic ‘Sun’ and ‘Moon’ Letters.</th>
<th>Predict the form of the definite article for these words</th>
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</thead>
<tbody>
<tr>
<td>al-qamr the moon</td>
<td>ra3ul man</td>
</tr>
<tr>
<td>al-faras the mare</td>
<td>xaatam ring</td>
</tr>
<tr>
<td>al-kitaab the book</td>
<td>baab gate</td>
</tr>
<tr>
<td>al-harb the war</td>
<td>sana year</td>
</tr>
<tr>
<td>al-ʔab the father</td>
<td>mawt death</td>
</tr>
<tr>
<td>af-fams the sun</td>
<td>harab escape</td>
</tr>
<tr>
<td>ad-daar the house</td>
<td>daq tongue tip</td>
</tr>
<tr>
<td>az-zayt the oil</td>
<td>walad boy</td>
</tr>
<tr>
<td>an-nahr the river</td>
<td>ti3aara commerce</td>
</tr>
<tr>
<td>aθ-θawb the garment</td>
<td>laban milk</td>
</tr>
<tr>
<td></td>
<td>ʔada lunch</td>
</tr>
</tbody>
</table>
Five Hypotheses about the Knowledge Arabic Speakers must have to generate these forms

Hyp 1. For each word, Arabic speakers memorize the form the article takes.

Hyp 2. Arabic speakers memorize different forms of the article /al, aʃ, ad, az, an/ etc. and a rule which says where to use each form.
   a. Use /aʃ/ before a word beginning with /ʃ/
   b. Use /an/ before a word beginning with /n/ ...
   c. Use /al/ before a word beginning with /f, k, h/ etc.

Hyp 3. Arabic speakers memorize different forms of the article /al, aʃ, ad, az, an/ etc. and a rule which says where to use each form, the rules take the form
   a. Use /aʃ/ before a word beginning with /ʃ/
   b. Use /an/ before a word beginning with /n/ ...
   c. Use /al/ before a word beginning with everything else

Hyp 4. Arabic speakers memorize a single form of the article /al/ and a set of rules which change /al/ to /aʃ, ad, az/ etc.
   a. /al/ → /aʃ/ before a word beginning with /ʃ/
   b. /al/ → /an/ before a word beginning with /n/

Hyp 5. Arabic speakers memorize a single form of the article /al/ and a single rule which changes the last segment of /al/ into the following consonant if that consonant belongs to the class ‘CORONAL’, all of which are articulated with the front part of the tongue.
Generative character of language.
The computations imputed to the mind can in principle be applied to new forms. Thus they are not mere abbreviations of the data; the data is used to discover the computational system.

More phonological computations and representations:

English hypocoristic (nickname) formation in -y

Jennifer → Jenny, *Jey, *Jennify
Victoria → Vickie, *Vicktie
Barbra → Barbie, *Barrie, *Barbrie

• how do speakers ‘know’ which nickname is correct? Are there any interesting generalizations about the forms that these nicknames take?

• What can this tell us about the primes of phonological representation and the nature of phonological computations?