Experiment Design and Analysis

- Dependent Variable: what's measured, e.g., blood pressure.
- Independent Variable: what the experimenter manipulates, e.g., salt intake
- Experimental Condition and Control Condition
- Hypothesis / Null Hypothesis
- In some experiments, each subject contributes to more than one condition: comparisons are made within subjects.
- Otherwise each subject is in only one condition: comparisons are made between subjects.
- Noise
- Confounding factors

Speech Perception and Word Segmentation

- The Lack of Invariance Puzzle
- Speaker variability
- Segment Variability
- Coarticulation
- Formants, Formant Transitions, Cues for consonant and vowel perception
- Categorical Perception (CP)
  - Good between category discrimination.
  - Poor within category discrimination.
- High Amplitude Sucking (HAS) procedure
- Conditioned Head-Turn procedure
- Infants' perception of non-native contrasts and the loss of discrimination
- Duplex Perception
- Dichotic listening experiments
- McGurk Effect
- Motor Theory of Speech Perception
- Strategies for word segmentation / cues to word boundaries

Word Recognition

- Bottom up processing
- Top down processing
- The effect of meaningful contexts
- Phoneme restoration effect
- Shadowing experiments
  - The effect of meaningful contexts on shadowing latency (speed of response)
The effect of meaningful contexts on unconscious corrections of mispronounced words
- The effect of word frequency on word recognition
- Phonological neighborhood size and its effect on word recognition
- The Cohort Model of word recognition
- Uniqueness point

Phonology
- What are the building blocks of words—phonological units?
- What kinds of evidence for these linguistic units can we observe?

<table>
<thead>
<tr>
<th>Phonological Units</th>
<th>Phonological Patterning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gesture</td>
<td>Phonotactics</td>
</tr>
<tr>
<td>Segment</td>
<td>Harmony</td>
</tr>
<tr>
<td>Syllable</td>
<td>Deletion</td>
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<tr>
<td></td>
<td>Metathesis</td>
</tr>
<tr>
<td>Onset, Rime, Nucleus</td>
<td>Reduplication</td>
</tr>
<tr>
<td>(homework)</td>
<td>Language Games</td>
</tr>
<tr>
<td>Stress Foot</td>
<td>Verse</td>
</tr>
<tr>
<td>Phrase</td>
<td>Infixation</td>
</tr>
</tbody>
</table>

- Hierarchical Structure
  Hierarchical (tree-structure) representation of phonological structure
  (handout from class or section or type this link into your browser & print sail.usc.edu/~dbyrd/phon_morph handout_03.pdf)

Morphology
- the study of how words are formed and what their meaningful components are
- Word: an (arbitrary) relation between some particular phonological structure and some particular meaning.
  - Diagnostics:
    - Potential pause
    - Smallest bit that can stand alone as an utterance
  - “Word” not defined in terms of meaning
  - Morpheme: smallest unit of meaning
  - Word Constituent Structure
  - Kinds of Morphemes: Content vs. Function
    - Function Morpheme Uses
  - Open vs. Closed Class
• Variability of Phonological Form
• Bound vs. Free Morphemes
  o Ways of conjoining bound morphemes with content morphemes:
    • Affixation
      o prefix, suffix, infix, circumfix
      o prespecified form affix or stem-dependent form affix
    • Prosody
      o Stress
      o Nasalization
      o Phonation Type
      o Tone
    • Stem Mutation
  • Interlacing (concatenation)
    o Semitic morphology

• The mental lexicon
  o The set of arbitrary relations among: phonological structure, meaning, grammatical function
  o Must be learned by each speaker of a language.

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A Gestural Model of Speech Production: Articulatory Phonology--
Catherine Browman and Louis Goldstein

• Phonological units defined:
  o In terms of articulatory goals
    achieved by articulatory constriction systems
    (not exact movements of individual articulators)
  o As intrinsically temporal, lasting in time and coordinated with one another in time
  o No translation between symbolic units in mental lexicon and an execution of such units.
• Gesture: A goal-directed action (e.g. the formation of a constriction) of the vocal tract.
• Two Functions of Gestures --simultaneously
  o units of contrast/information
  o units of action
• How gestural representations can be contrastive
• Gestural diagrams (e.g. homework)
• What aspects of speech production are controlled by the brain at an organizational level?
  o Vocal tract tasks
• English consonant gesture combinations
• Temporal structure/patterning is language specific (i.e. learned)
• Gestural Atoms and Gestural Molecules (or structures):
  o characteristics of gestural molecules:
    ▪ recur in many words,
- are systematically patterned,
- are temporally cohesive

- Variability at word edges
  - Connected-speech processes or phenomena
- Deletion as Gestural Hiding
  - can result from increased gestural overlap in casual/connected speech
  - when a closure obscures a constriction with which it is overlapped, i.e. There is no acoustic evidence of the overlapped constriction –it is perceived as having been deleted--even though it is still articulated and not in fact deleted from the word’s phonological representation

- Insertion as Gestural Exposure
- Advantages of Gestural Representation
  - Conforms to observed articulatory behavior
  - No cognitive component that translates between phonology and phonetics
  - Can explain why no 1-to-1 relationship between segments and gestures
  - Can (help) explain word form variability