Levels of Language Analysis

Language: Whycome we talk?

Greatest and most advanced evolutionary achievement?
Linguistics is the study of language
- How did language rules develop?
- Grammar and syntax
Psycholinguistics is the study of language and its interaction with cognition
- What processes are involved with using rules to express meaning and how do we comprehend language?
- Mental lexicon
Design Features of Language

<table>
<thead>
<tr>
<th>Design Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Vocal-Auditory Channel</td>
<td>Auditory reception of voice message</td>
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<tr>
<td>Rapid Fading</td>
<td>Disappearance of message over time</td>
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<tr>
<td>Broadcast transmission and directional</td>
<td>Hearing of message by anyone within earshot;</td>
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<tr>
<td>reception</td>
<td>locating by direction</td>
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<tr>
<td>Interchangeability</td>
<td>Reproduction of linguistic message by receiver</td>
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<tr>
<td>Total Feedback</td>
<td>Complete understanding of what has just been said</td>
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<tr>
<td>Specialization</td>
<td>Communication is only purpose of speech transmitter</td>
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<tr>
<td>Semantics</td>
<td>Specific meaning of language results</td>
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<tr>
<td>Arbitrariness</td>
<td>Little or no connection between linguistic symbols and what they represent</td>
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<tr>
<td>Discreteness</td>
<td>Language symbols are categorical, not continuous</td>
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<tr>
<td>Displacement</td>
<td>Communication of ideas that are remote in space and time</td>
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<td>Productivity (generative capacity)</td>
<td>Infinite number of messages can be formed</td>
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<tr>
<td>Traditional transmission</td>
<td>Teaching and learning of ‘detailed conventions’ of language</td>
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<tr>
<td>Reflexivity</td>
<td>Thinking about and communication about language</td>
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<td>Prevarication</td>
<td>Depictive use of language</td>
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<tr>
<td>Duality of patterning</td>
<td>Combining the same limited number of linguistic symbols in different ways</td>
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Levels of Analysis: Phrase Structure Tree

- Discourse Level: Proposition (Cognitive psychologist) **Inference**: S/he’s a scientist
- Syntactic Level: Sentence
  - Noun Phrase: Determiner Adjective Noun Verb Phrase
  - Verb Phrase: Adjective Noun
- Word Level: The cognitive psychologist student selective attention
- Morpheme Level: The cognitive psychology student selective attention
- Phoneme Level: de la logique psychologue étudiant sélective attention
Levels of Analysis: Phonology

- **Phonology** is the study of basic speech sounds
- **Phonemes**
  - **International Phonetic Alphabet (IPA)**

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<tr>
<th>IPA</th>
<th>Ph</th>
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- **Phonemes** are perceived categorically

- **Importance of context**
  - It was found that the *eel was on the axel.
  - It was found that the *eel was on the shoe.
  - It was found that the *eel was on the orange.

Levels of Analysis: Morphology

- **Morphemes** are the basic unit of meaningful language
  - Free morphemes (e.g., car)
  - Bound morphemes (e.g., cars)
  - Content morphemes (e.g., car)
  - Function morphemes (e.g., the)

- **Segmenting speech into words**
  - Sound spectrogram
  - Phonotactic cues
Levels of Analysis: Morphology

- Saffran, Aslin and Newport (1996)
  - We learn probabilities of phoneme transitions within vs. between words
  - Infants heard three-phoneme “nonsense words”
    
    \[ \ldots \text{bidoku/podoti/golabu/bidoku} \ldots \]
  
  - Varied probability that a phoneme would follow another within a “word”
    - \( \text{da} \rightarrow \text{ku} = 100\% \)
    - \( \text{ku} \rightarrow \text{pa} \approx 33\% \)
  
  - Infants then heard same “words” or novel “words”

Levels of Analysis: Morphology

- Speech errors reflect a disconnection of semantics and syntax
  - Word exchange errors
    - Word is substituted for another
      - “writing a mother to my letter”
      - “writing a letter to my mother”
  - Morpheme exchange errors
    - Morphemes substituted during sentence production
      - “The meat should be \( \text{th} \)ried \( \text{sh} \)ly.”
    - “The meat should be sliced \( \text{shi} \)ly.”
  - Phoneme exchange error
    - Phonemes substituted during sentence production
      - “I attended a \( \text{y} \)arty \( \text{at} \) pork.”
      - “I attended a \( \text{p} \)arty \( \text{at} \) York.”

The Mental Lexicon

- Triangle model of lexicon
- Tip of tongue
- Slips of tongue
The Mental Lexicon

- Estes, Evans and Alibali (2007)
  - Examined encoding words into the lexicon
  - Habituation procedure with infants
  - Phase 1: Infants hear a word or non-word paired with an object
  - Phase 2: Words and object presented again, sometimes switched

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<thead>
<tr>
<th></th>
<th>Same</th>
<th>Switch</th>
</tr>
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<tbody>
<tr>
<td><em>Word</em></td>
<td>5.5</td>
<td>7.3</td>
</tr>
<tr>
<td><em>Nonword</em></td>
<td>5.0</td>
<td>4.7</td>
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Producing Meaningful Speech

- Speech is produced “automatically” with little thought
- Levelt’s Stages of Speech Production
  - Conceptualizing—what to say
  - Planning—creating a linguistic plan
  - Articulating—producing speech
  - Self-monitoring—what are we saying and is it made clear?
- Slips of the Tongue
  - Disconnect between conceptualizing and articulating
  - Phoneme-, morpheme-, and word-exchange errors
  - Tend to obey phonological and morphological rules
  - Independence of speech planning stages?

Producing Meaningful Speech

- Motley & Baars (1979): Freud Dude Slips?
  - Does context influence the content of a tongue-slip?
  - Induced subjects to commit slips of the tongue
  - No anxiety, shock anxiety, sexual anxiety
  - Shock slips (cursed wattage for worst cottage)
  - Sex slips (bare shoulders for shore boulders)
Producing Meaningful Speech

> Is self-monitoring semantic or phonological?

> Slevc and Ferreira (2006)
> Stop-signal paradigm
> Named drawings that were followed by a "go-signal" or a "stop-signal"
> Phonologically similar stop-signal (damp)
> Semantically similar stop-signal (light)
> Would people react differently to different stop-signals

> Slevc and Ferreira (2006)
> More difficult to "stop" to phonologically similar stop signals
> Suggests internal monitoring is more phonological

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Bar chart showing Stop Signal RT (ms) for phonological and semantic stop signals, comparing similar and dissimilar conditions.