COGS 1

Week 3

Language and the Science of Meaning
Announcements

• Midterm: Thursday, February 4th
• Midterm review session!
  • Monday, Feb 1st @ 7-7:50 PM
  • PCYNH 109 (Pepper Canyon Hall)
  • Come with questions! (Start studying)
<table>
<thead>
<tr>
<th>This Week’s Questions: Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What are some differences between human and animal language?</td>
</tr>
<tr>
<td>• What is the FOXp2 gene? How/why does it affect language?</td>
</tr>
<tr>
<td>• What is the superior longitudinal fasciculus?</td>
</tr>
<tr>
<td>• What is the McGurk effect?</td>
</tr>
<tr>
<td>• How does human language differ from animal communication systems?</td>
</tr>
</tbody>
</table>
Forms Of Communication

- Moths and butterflies
  - Protective coloration
- Vervet
  - Alarm calls
- Kanzi
Infant Word Learning

• What is statistical word learning?
• What sort of vocabulary are we talking about?
• Is memory the whole game?
  • What structure makes language meaningful?
“Language Organ” In The Brain
Brain Damage & Language
“Gene For Language”
Integrated System

Diagram showing a graph with different conditions and species on the x-axis. The conditions include Imitation, Control over respiration, Control over articulators, Sequencing, Memory, Sociability, Auditory processing, and Predictive learning. The species range from Bonobo, Macaque, Human, Songbird, to Termite.
This Week’s Questions: Embodied Language

- What is Mentalese?
- How (and what) do honey bees communicate with each other?
- What is the relationship of the motor cortex to language comprehension?
- What is the difference between mental imagery and mental simulation?
- How does the pattern of brain activity spread during different sorts of language comprehension? (written vs. spoken language and/or listening to vs. petting a cat)
- How do we measure “good” and “bad” driving in the driving simulator?
Mentalese

• The language of thought
• The way that the mind represents language without using words
• Thought to be housed in Wernicke’s Area
Embodied Simulation

The motor strip

Differential activity while listening to sentences about foot, hand, and mouth actions
Embodied Simulation
Driving & Hands-free Device

- **Independent (Conditions)**
  - 1. Motor imagery (opening jar)
  - 2. Visual imagery (letter orientation)
  - 3. Abstract (freedom)
  - 4. Control (TRUE)

- **Dependent**
  - Braking time: Increased reaction time means greater distraction
  - Following distance: further distance between cars means greater distraction
Results – Reaction Time

Results – Following Distance

Application in HCI