Psych 229: Language Acquisition

Lecture 3
Acquisition & Levels of Representation

Stages of acquisition

Knowing more than they say

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Discussion question: relation with numerical cognition (Emily)

Discrete vs. continuous substances = failure from syntactic cues

“Can you hand me the wugs?” [discrete]

“Can you hand me the wug?” [continuous]

Since children are sensitive to these cues, what does it mean that they fail? Might there be other causes? How might these relate to numerical cognition?

Getting to children’s knowledge

Grammar!
Organization of mental grammar

Functionalism

To help you see what functionalism is about, let’s think about the following example. In order to use TV programs, a television must have a code that expresses certain dimensions, and this code must be stored in terms of various one-dimensional patterns of organizing a tape, so we can tell how the code could be organized so that the television can do its job. As a parallel, it doesn’t mean we must search whether we put the code on a magnetic tape or an一年一度, it can be put on a line on a paper. We just need a code that can be a part of a system. By the way, Functionalism: a branch of psychology that views behavior as a product of adaptation to the environment. Briefly, we can study the processing of speech words and rules, the differences and similarities among them, and their characteristics in understanding—as a certain degree independently of the mental machinery in which they are traditionally encoded.

Finding out properties of the grammar

Visual & linguistic experiments

Back to the functionalist approach

Speech perception, speech production, & phonology
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Syntactic structure

Ambiguity from structure to meaning

Describing vs. Explaining

Levels of Representation Marr (1982)
**The three levels**

<table>
<thead>
<tr>
<th>Computational Theory</th>
<th>Representation and algorithms</th>
<th>Software implementation</th>
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<tbody>
<tr>
<td>What is the goal of the computation, who is it appropriate for, and what is the basis of the real world?</td>
<td>How can the computational model be implemented in the real world?</td>
<td>How can the program be written and executed?</td>
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- Cash register computation

- Mapping the framework: Computational Theory of Language

- A question

- Discussion question: levels of hierarchy and Jackendoff (Erin)

  Is it possible to work on the levels simultaneously? Jackendoff seems to propose this for language. Are there any pitfalls that would be associated with this?

- Mapping the Framework: Algorithmic Theory of Language Learning

  The “how” of language learning: want computational-level description of the problem (word segmentation, speech perception, word learning, sentence structure, metrical stress, etc) and what the algorithm is that a learner could use to solve it (input, output, and process that takes input to generate output)

  Considerations: input available, hypotheses available for generating output, psychological plausibility of algorithm
Framework for language learning

What are the hypotheses available (for generating the output)?

Ex:
- Adjective before noun (e.g. English)
  - Red apple
- Noun before adjective (ex: Spanish)
  - manana roja / apple red

What data is available, and should the learner use all of it?

Ex:
- Ignore special use of adjective before noun in Spanish
- If the adjective is naturally associated with the noun
  - a blanca never (the white acre - snow is naturally white)

How will the learner update beliefs in the competing hypotheses?

Ex:
- Probabilistic update, based on data intake (Bayesian, Linear reward-penalty)