Chapter 9: Language and Thinking
Module 9.1: Intro., Language Structure and Comprehension

Overview of the Adaptive Problems

• How do we communicate with others?
• How do we classify and categorize objects in our world?
• How do we solve problems and reach goals?
• How do we make decisions when confronted with a set of alternatives?

Communicating with Others: Overview

• Structure of language
  • Language rules: Grammar
    • Includes phonology, syntax, and semantics
  • The hierarchical structure of language:
    phonemes, morphemes, words, phrases, and sentences
  • The structure of sentences
    • Surface structure and deep structure

• Language Comprehension
• Language Development in Children
• Language in Nonhuman Species
• Is language an adaptation?

The Structure of Language

• What sets language apart from other communication systems: Grammar
  • Set of rules that allow the communicator to combine arbitrary symbols to convey meaning
  • Three aspects:
    • Phonology: Rules for word sounds
    • Syntax: Rules for combining words to make sentences
    • Semantics: Rules used to communicate meaning
      • Example: “Colorless green ideas sleep furiously” is syntactically OK, but violates semantics

The Hierarchical Structure of Language

• Phonemes: Smallest significant sound units in speech
  • Example: “ee” in “feet”
  • Note: Not the same as a written letter
• Morphemes: Smallest units of language that carry meaning
  • Examples: “do,” “un”
• Words, phrases, and sentences
  • Words combine to make phrases
  • Example: “the interesting class” is a noun phrase

Fig. 9.1
The Structure of Sentences

- Rules of syntax determine how words combine into phrases, and phrases into sentences
- Set of rules used to do this isn’t known
- Even if it were -> wouldn’t explain all nuances
- Chomsky’s idea of how sentences work:
  - Surface structure: Superficial appearance, literal ordering of words
  - Deep structure: Underlying representation of meaning
- Producing sentences requires transformation of deep structure into a surface structure

Language Comprehension

- How do we decide what another person is trying to communicate?
- Understanding speech depends on top-down as well as bottom-up processing
- Communication depends on common knowledge among speakers
- Pragmatic rules: How practical knowledge is used to comprehend speaker’s intention, produce an effective response
- Example pragmatic guidelines (Grice): Be informative, tell the truth, be relevant, be clear

Language Development

- Is language a product of genes or experience?
- Many researchers believe babies have some inborn preparation for language
- Babies follow similar milestones all over the world
- Babies are born producing phonemes appropriate for many languages, but soon narrow these down
- By 3-5 weeks: Coos
- By 4-6 months: Babbling
- By 6-18 months: Sounds become more language-like

The Beginnings of Communication

- Grammatical knowledge fine-tuned from 3 to about 6 or 7
- Preschoolers tend to overgeneralize rules
- Approximate ages for language milestones:
  - 1 year: Simple words
  - 2 years: Vocabulary of around 200 words
  - Comprehension develops even faster; commands and statements are understood
  - 3 years: Telegraphic speech
Language in Nonhuman Species

• Nonhuman animals definitely communicate
  • But recall: Not all communication is language
  • Attempts to teach chimps to speak failed
• Signs/symbol communication in chimps:
  • Washoe: Uses about 160 signs
  • Sarah: Uses plastic shapes to make "sentences"
  • Kanzi: Understands speech over headphones
• Is it really language?
  • Can they generate new combinations?
  • Can they learn from other chimps?

Is Language an Adaptation?

• Why don’t most species use language, if it’s so beneficial?
  • One view: Natural selection caused this special ability to develop
  • Another: Developed because we have large brains, generally sophisticated thinking ability
• Evidence for adaptation view includes special brain regions for language, specially developed vocal tract
  • However: Fossil record can’t show how or when it developed, or why