



# Chapter 9: Language and Thinking

## Module 9.1: Intro., Language Structure and Comprehension

### Psychology 100

#### Introduction to Psychology

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### 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?

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### 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?

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### 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

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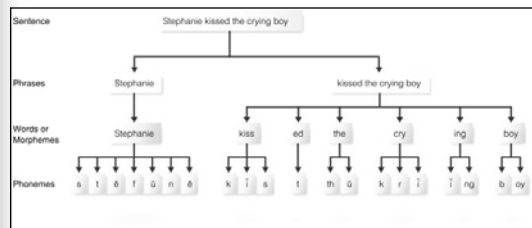
### The Hierarchical Structure of Language

- Phonemes: Smallest significant sound units in speech
  - Example: "ee" as 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

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Fig. 9.1



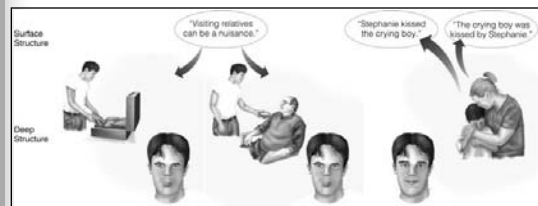
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### The Structure of Sentences

- 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

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Fig. 9.2



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### 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

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Fig. 9.3



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### 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: Coing
  - By 4-6 months: Babbling
  - By 6-18 months: Sounds become more language-like

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### The Beginnings of Communication

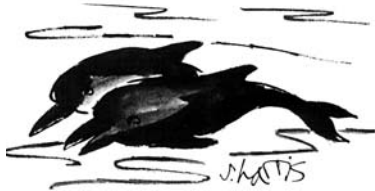
- Grammatical knowledge fine-tuned from 3 to about 6 or 7
  - Preschoolers tend to overgeneralize rules
- Approximate ages for language milestones:
  - 1 year: Simple words
  - 2 years: Vocabulary of around 200 words
    - Comprehension develops even faster; commands and statements are understood
  -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

Fig. 9.4



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Fig. 9.5



*"Although humans make sounds with their mouths and occasionally look at each other, there is no solid evidence that they actually communicate with each other."*

© 1979 by Sidney Harris, American Scientist Magazine

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### 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?

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Fig. 9.6



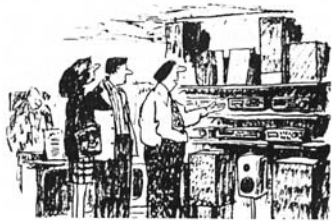
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### Is Language an Adaptation?

- 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

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Fig. 9.7



*"This CD player costs less than players selling for twice as much."*

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