

Human Parsing

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Why is this interesting...to us?

- So far, we still beat computers at parsing!
- Ultimately, we want computers to be able to mimic perfectly our judgments.
- If we're doing something that computers can do, we want to know.

Problems in Parsing

- Basic syntax--not interesting
- Ambiguity--very interesting
 - Sentence ambiguity
 - The women kept the dogs on the beach.
 - The complex houses married and single students and their families.
 - Phrase ambiguity
 - wooden French onion soup bowl handle

Garden Paths

- The complex houses

Garden Paths

- The complex houses married and single students and their families.
- The student forgot the solution

Garden Paths

- The student forgot the solution was

Garden Paths

- The student forgot the solution was in the back of the book.
 - Confusing!
 - Humans, however, handle it pretty well, given the entire sentence and an extra few milliseconds.

Theories of Human Parsing

- Modularist
 - Syntax is the basis of the first interpretation
 - Semantic, thematic, discourse knowledge come in later to revise the interpretation
 - Frazier and Clifton, 1996

Theories of Human Parsing

- Interactionist
 - Interpretation formed based on interaction of multiple kinds of information, including syntax, semantic, thematic, & discourse knowledge
 - MacDonald, 1994; MacWhinney, 1987; Pearlmutter & MacDonald, 1992; etc, etc, etc

Theories of Human Parsing

- Probabilistic (computers love that!)
 - Multiple parallel interpretations are computed
 - Each interpretation assigned a probability based upon thematic, semantic, and syntactic probabilities of each sentence
 - “The student forgot *that* the solution was in the back of the book” loses after the first three words of the garden path sentence

Theories of Human Parsing

- Correct interpretation can be eliminated because of the probability after the first three words
- This explains the confusion caused by garden path sentences

QUESTIONS?