Sentence Processing (II): Syntactic Ambiguities

Chapter 7 (pp. 213-222)

Dr. Morten H. Christiansen
Previous Class Sentence Processing

- The immediacy of interpretation
- Two approaches to sentence processing
  - Modular
  - Interactive
- Methods for studying sentence processing
  - Off-line vs. on-line.
- Lexical ambiguity in sentence processing
  - Selective access vs. multiple meaning access.
- Complexity effects in sentence processing
  - Grammatical sentences are not always rated better than ungrammatical sentences.
Syntactic Ambiguities

• Being led up the garden path (GP):

The horse raced past the barnfell.   GP

The horse[that was] raced past the barn fell.

The florist sent the flowers[was] very pleased.   GP

The florist sent the flowers to the elderly widow.
The Modular Approach

Lexical Access → Syntactic Parsing → Semantic Processing

Input (words) → Syntactic Ambiguity → (interpretation) Output
The Modular Perspective on Syntactic Ambiguities (I)

• GP sentences violate basic syntactic parsing strategies.
  • Use the simplest possible phrase-structure tree to reduce cognitive load.

• Late Closure: Attach incoming material to the phrase/clause currently being processed.
  • Jessie put the book Kathy was reading in the library…
The Modular Perspective on Syntactic Ambiguities (II)

- Minimal Attachment (MA): New clauses should be attached so as to create the legal syntactic tree with the fewest nodes.

- The spy saw the cop with the binoculars but …
The Interactive Approach

Lexical Access → Syntactic Parsing → Semantic Processing

(interpretation)
Output

Input (words)
The Interactive Perspective on Syntactic Ambiguities (I)

- GP sentences involve low-frequency syntactic structures:
  - Different syntactic structures are activated in parallel.
  - Activation resting levels are determined by frequency.
    1. The horse \textbf{raced}_{\text{main verb}} past the barn. (MA freq)
    2. The horse \textbf{raced}_{\text{past part}} past the barn fell\textsubscript{MV.} (-MA infreq)

- RTs:
The Interactive Perspective on Syntactic Ambiguities (II)

- Semantic information may inhibit the activation of some structures.
- Expectations
  3. The couple admired the house with a friend … (MA -expt)
  4. The couple admired the house with a garden … (-MA +expt)
- RTs:
- Animacy
  5. The defendant_{ANIM} examined by the lawyer was unreliable.
  6. The evidence_{INANIM} examined by the lawyer was unreliable.
- RTs:
Head-Mounted Eye-tracking
Rapid Integration of Information in Sentence Processing (I)

- Head-mounted eye-tracking:
  - Eye movements are recorded as people listen to instructions and manipulate objects.
  - Put the saltshaker on the envelope in the bowl.
    - Ambiguous - MA: on the envelope → where to place the saltshaker
  - Put the saltshaker that's on the envelope in the bowl.
    - Unambiguous
  - Subjects integrated visual information so rapidly that they were not misled by MA.
Rapid Integration of Information in Sentence Processing (II)

• People can rapidly integrate visual, auditory, syntactic and semantic information
  • People determine the appropriate reference for a word within ~50 msec of offset (= 1/20 sec).
• This integration ability is acquired gradually in development.
  • 5-year-olds have not yet learned to integrate visual context.
Next Class
After Spring Break

Sentence Processing (III):
Beyond Literal Sentence Meaning

Chapter 7 (pp. 222-233)

• Speech Acts.
• Grice's Conversational Maxims.
• Figurative Interpretation
  • The Three-Stage View
  • The Single-Stage View
• Metaphors