Expertise and Sentence Processing

Chapter 8 (pp. 306-323)

Dr. Morten H. Christiansen

© Morten H. Christiansen 2017
Previous Class: Syntactic Ambiguity

- The Modular Perspective
  - Violation of parsing strategies
    - Late closure: Attach to current phrasal/causal node
    - Minimal attachment: Create tree with fewest nodes

- The Interactive Perspective
  - Violation of frequency and semantic expectations
    - Frequency of syntactic structures
    - Animacy expectations
  - Rapid integration of information in sentence processing
    - Head-mounted eye-tracking:
      - Disambiguation using visual context
      - Visual information can override minimal attachment
Looking-While-Listening

At our community lab in Sunnyvale, we conduct longitudinal studies with monolingual and bilingual children growing up in Spanish-speaking families. Our mobile research lab in Northern CA...

What is fluency in understanding?

- LEXICAL: kan-ga -> roo
- SEMANTIC: let's read a book
- MORPHOSYNTACTIC: that's a big [noun]

Adults listen predictively, anticipating how speech will continue by integrating linguistic and contextual information on multiple levels.

Four questions:

- How do we study the development of receptive fluency in very young children?
- How do infants build proficiency in this crucial aspect of language use?
- To what extent does early fluency vary among children, and are these differences consequential?
- Where do such differences come from - both within groups and between groups?

Looking-while-listening procedure:

Fernald, et al. 1998; 2008

Coding gaze patterns using Eyecoder software

Sample coding record for two 4-s trials: Each line indicates time when coder judged a change occurred:

- in the stimuli: pictures on/off, sound on/off
- in the position of the child's fixation: left, off, right, away

Time Line of an Experimental Trial
Processing in Real-Time

Where is the car?
Socioeconomic Status og Processing

Kilde: Fernald, Marchman & Weisleder, Developmental Science, 2013
More Input Improves Processing Independent of Socioeconomic Status

Kilde: Weisleder & Fernald, Psychological Science, 2013
Recap: The Importance of Experience

- Processing is key to vocabulary acquisition
- More input = better processing
- Engaged conversations improve processing
- The right language experience can overcome the influence of socioeconomic status
An Experience-Based View

- Individual differences emerge from complex interactions between biology and language experience
- Many of the individual differences attributed to working memory size are actually caused by different degrees of linguistic experience
- Working memory tasks tap into processing skill, not a separate capacity
Processing Subject and Object Relative Clauses

SR: The reporter that attacked the senator admitted the error.

OR: The reporter that the senator attacked admitted the error.

- King & Just (1991) measured working memory capacity and reading performance on subject and object relative clauses.
Reading Time Data from King & Just (*JML*, 1991)

### Subject Relatives

- (The) reporter that attacked the senator admitted the error.
- Mean RT (msec)

### Object Relatives

- (The) reporter that the senator attacked admitted the error.
- Mean RT (msec)
Subject and Object Relatives Revisited

- Subject relatives pattern with simple sentences:
  SR: *The reporter that attacked the senator admitted the error.*
  Simple: *The reporter attacked the senator.*

- Object relatives are more idiosyncratic:
  OR: *The reporter that the senator attacked admitted the error.*
  Simple: *The senator attacked the reporter.*

- Frequency × Regularity Interaction: Frequency is more important for irregular patterns than regular ones.
Frequency x Regularity Interaction: Word Recognition

- Regularly spelled words are easy to recognize independent of frequency because they are helped by the reader’s experience with similar words.
  - *pave* is rare but is helped by *gave*, *save*, *rave*, *cave*, *shave*, etc.

- Irregular words are very frequency-sensitive.
  - *pint* is harder than *have*.

- Amount of reading experience affects irregulars more than regulars.
Frequency x Regularity Interaction: Sentences

- Subject relatives have standard verb-object order – they are “regular”
- Comprehension of subject relatives aided by experience with similar simple sentences
- “Irregular” object relatives should be frequency sensitive
- Amount of reading experience should affect object relatives more than subject relatives
An Alternative Explanation

- People described as having “high working memory capacity” perform better on object relatives because:
  - They read more
  - Reading more increases exposure to both subject and object relatives
  - Increased exposure is more important for object relatives than subject relatives

- Challenges working memory accounts, but consistent with experience literature (e.g., Stanovich & Cunningham, 1992, 1993)
Recap: Experience Affects Adult Processing of Relative Clauses

- Human and SRN learners benefit from experience with relative clauses in similar ways.
- Variations in adults' experience with relative clauses can explain processing differences previously attributed to working memory capacity.
Next Class
Language Production

Chapter 9 (pp. 329-368) + C&C (2001) (pp. 48-51)

Speech errors at different linguistic levels:
- Syntactic
- Morphological
- Phonemic
- Syntactic priming