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COGNITION 9th Edition (Reed/Cengage)

Chapter 11: Comprehension and Memory for Text

Fundamentals of Cognitive Psychology

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Van Selst (Reed Chapter 11: Comprehension)
Building comprehension requires:

1. laying a foundation
   - building new or using existing information
2. mapping information onto the foundation
3. shifting to build new structures

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Building Comprehension
(Bransford & Johnston, 1973)

Read this passage, then recall what you can….

If the balloons popped, the sound wouldn’t be able to carry since everything would be too far away from the correct floor. A closed window would also prevent the sound from carrying, since most buildings tend to be well insulated. Since the whole operation depends on a steady flow of electricity, a break in the middle of the wire would also cause problems. Of course, the fellow could shout, but the human voice is not loud enough to carry that far. An additional problem is that a string could break on the instrument. Then there could be no accompaniment to the message. It is clear that the best situation would involve less distance. Then there would be fewer potential problems. With face to face contact, the least number of things could go wrong. (p. 719)

… most people can only recall 3.6/14 meaning elements when their participants were not given any prior context

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Providing (prior) context increases comprehension and recall

\[ M = 8.0/14 \text{ idea items with context} \]
\[ M = 3.6/14 \text{ idea items without context} \]

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# The role of context in Memory (review of chapter 6)

## Ebbinghaus
- Ran carefully controlled experiments in the laboratory.
  - He was criticized for focusing on narrow issues and phenomena.
  - He largely ignored how memory works in the real world.
- He went to lengths to strip study materials of any pre-existing meaning (e.g., nonsense syllables) – not avoiding meaning but avoiding familiarity confounds.

## Bartlett
- Studied the recall of complex material (e.g. drawings and folk tales) – *War of the Ghosts*
- Examined recall errors to understand encoding and storing processes.
  - Used informal testing methods
  - Stressed participants’ *effort after meaning.*
- Assumed *schemas:* long-term structured knowledge used to make sense of new material and subsequently store and recall it.
  - Schemas are influenced by social and cultural factors.
Gerald Martin strove to undermine the existing government to satisfy his political ambitions. Many of the people of his country supported his efforts. Current political problems made it relatively easy for Martin to take over. Certain groups remained loyal to the old government and caused Martin trouble. He confronted these groups directly and so silenced them. He became a ruthless, uncontrollable dictator. The ultimate effect was the downfall of his country

(from Sulin and Dooling, 1974, p.256)
Thematic Relatedness and False Recognition

**Hypothesis:**
- Schema-driven errors are more likely at longer retention intervals because schematic information is more durable than rote recall.

**Method**
- Presented all participants with the same story about a dictator, whose name was either: *Gerald Martin* (an unknown) or *Adolf Hitler* (someone well known historically).

**Task and Results:**
- Asked participants whether they remembered reading a statement that the dictator “hated Jews,” which did not appear in the story.
- Delay time was varied:
  - Short (*5 minutes*): No difference between groups
  - Long (*1 week*): Participants who read about Hitler were more likely to incorrectly agree that they had read a statement about Jews, influenced by schematic knowledge about the real Hitler.
One method for studying the difficulty of comprehension is to measure reading speed

- unfamiliar words and long sentences → harder to comprehend = slower
- Kintch’s model uses both reading time and comprehension to assess readability (accommodates interaction with information processing capabilities)
- Reinstatement searches (when new information cannot be integrated with the active proposition in working memory), inferences, word frequency all impair readability

“speed reading” works for already familiar information but does not work well for new information or for information without context

Assessments of knowledge retrieval can be facilitated by perspective cueing (Andersen and Pichert, e.g., “as a criminal” or “as a house-buyer”)
Global and Local Coherence

Global:
• the main events in a story
• what is happening to the main characters

Local:
• most recent events
• Integrate new ideas with immediately prior ones

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Organization of Text

Global and Local coherence

Story Structure (cf., Thorndike: $\rightarrow$ goal to end = ?)

- Setting
- Theme
- Plot
- Resolution
  - Obstacle

Causal Connections

- Causal Relations
Reading Comprehension Strategies

- Predict (via preview)
- Evaluate (Settings, Characters, Story Structure)
- Monitor (Active Comprehension requires engagement)
- Question (Stop to reread and initiate comprehension)
- Fix it (look back, reread if necessary)
- Image (mental imagery is a powerful mnemonic tool)
- Infer (connect ideas)
- Synthesize (combine sequence details; make meaning)
- Summarize (find main ideas and draw conclusions)

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Conceptual-Propositional Hypothesis (language-based evidence for propositions)

• we analyze and comprehend a sentence by determining the semantic roles played by the words in the sentences

• we construct a proposition based on the semantic roles and relationships

• we store the results of the analysis in memory in the form of propositions
On-Line Tasks: Gaze Duration and Reading

- **Immediacy Assumption** (p.241) [you attempt to understand or integrate concepts as you encounter them, you do not wait for the entirety of the sentence or passage] (p.241)

- **Eye-Mind Assumption** (p.241) [you are thinking about the thing that you are looking at]
  - Longer fixations on "important" words and on "low frequency" words
  - Return to pronoun referent & garden path

Cognition

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The strong version of the Sapir–Whorf hypothesis is that language determines thought. It is incorrect. The most common view is that the language influences thought.

Current work examines how language affects thought. Earlier, the bulk of the research was concentrated on testing the hypothesis; the experimental data have not been able to disprove it. (Lucy 1992; Gumperz & Levinson 1996)

- The brain stores associations between semantic concepts (like the idea of a house) and phonetic representation (the sounds that make up the word "house").
- The initial sounds are more important for recall purposes than later sounds.
- Relationships between semantic concepts are also stored and will produce priming.
- Indirect relationships between unrelated concepts can be inadvertently triggered by a "bridge" through a phonetic relationship.
- For example, the recall of the idea of a house can be sped up by exposure to the word "mouse" because they have a similar phonology.
Key Terms (partial list)

- Causal Relation
- Global Coherence
- Inference
- Local Coherence
- Obstacle
- Perspective
- Plot
- Propositions
- Readability
- Readability Formulas
- Reading Speed
- Reinstatement Search
- Resolution
- Setting

- Situation Model
- Speed Reading
- Theme
- Thematic Relatedness
- Word Frequency

- Conceptual-Propositional Hypothesis
- Eye-Mind Assumption
- Immediacy Assumption
- Sapir-Whorf Hypothesis

Cognition

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