

Education 173
Cognition and Learning in
Educational Settings

Cognitive Processes

Fall Quarter 2007

Cognitive Processes and
Cognitive Structure

- We Can Understand Cognitive Processes, Such As . . .
 - Learning
 - Remembering
 - Perception
 - Attention
- . . . In Terms of Information Flow Within the Cognitive Structure
 - Working memory
 - Long-term memory

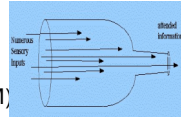
Perception

- Dividing and Organizing the Sensory Field
 - Visual
 - People, objects; Figure and ground
 - Auditory
 - Speech is a continuous sound stream
- Top-Down & Bottom-Up Processing
 - Bottom-up begins with sensory details
 - Top-down begins with expectations derived from prior experience
- Perception Creates Meaningful Units (Chunks) in Working Memory



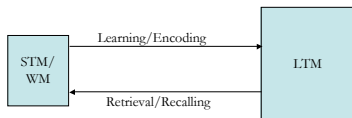
Attention

- Processing Some Information
- Filtering Out Other Information
 - Example: Cocktail party phenomenon
- Influenced By
 - Goals
 - Prior knowledge
- Attention is Gateway to STM (WM)
- Implications for Teaching
 - You must have students' attention; otherwise, no learning (LTM change)
- Attending Means to Hold Information in Working Memory



Encoding

- Type I Encoding: Rehearsal
 - Simple repetition
 - Rote learning (not meaningful)
 - Write Time from WM to LTM: About 10 seconds per chunk
- Type II Encoding: Elaborative Encoding
 - Making meaningful connections



Encoding Specificity

- The Context for Learning (Encoding) Affects Retrieval
- Examples of Encoding Specificity
 - Physical context
 - Baddeley's scuba study
 - Emotional context
 - Bower's experiments
 - Semantic (meaning) context

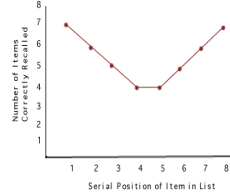


carry	cat
lift	dog
tote	llama
bear	tiger
convey	bear
drag	wolf
move	camel

Example Source:
<http://intropsych.mcmaster.ca/intropsych/1a3/Cognition/lec2-2.htm>

The Serial Position Curve

- Primacy and Recency Effects
- Interference
 - Proactive near the end
 - Retroactive near beginning
 - Both where?
- Value of Curve for Teaching?
 - The beginning and end of a lesson are crucial
 - Try to reduce informational distractions before and after learning, and so *create* primacy and recency effects



Forgetting

- Several Possible Explanations
 - Decay
 - Inadequate Retrieval Cues
 - Reconstruction Error
 - Adding plausible but incorrect information to the memory
 - Can be influenced by “leading” questions
 - Eyewitness testimony
- Is Forgetting Adaptive?
 - Zeigarnik effect-- “flushing”
 - Eidetic memory
 - Extremely rare
 - Not necessarily adaptive