Memory and Aging

Chapter 7

Sensory Rehearsal

WM

Working Memory

Autobiographical

Prospective

Other types: source memory, false memory, meta-memory, memory for discourse, memory for pictures, everyday memory, recent vs. remote LTM

Memory and Aging Questions

- What are the changes in memory as we age?
- When do the changes take place?
- What are the different types of memory?
- Why do the changes take place?
- Where do the changes take place?
- What is responsible for the change?
- How do the changes take place?

Memory

- Memory performance depends on three stages:
  - Encoding: learning
  - Storage: retention
  - Retrieval: finding information when needed

- Code of information in memory:
  - Verbal (acoustic)
  - Visual-spatial (picture)
  - Semantic (meaning)

Salthouse (2004)

What and When of Cognitive Aging
Memory dissociations

- Short-term memory vs working memory
  - Pure storage vs. storage plus processing
  - Digit recall vs. reading span task
- Semantic vs episodic
  - Knowledge vs specific learned event
  - Vocab test vs list recall test
- Implicit vs explicit
  - Effortful and conscious recollection vs memory without awareness
  - Recognition test (multiple choice) vs perceptual identification

Baddeley & Hitch (1974)
- Resource sharing

Bopp & Verhaeghen (2005): Meta-analysis

Bahrick, Bahrick, & Wittlinger (1975)
- "Fifty years of memory for faces and names"
- 17 – 74 years old: retention for HS graduating class

Hoyer, Rybash, & Roodin (1999)
- Recognition vs. Recall across lifespan
- Cross-sectional data

Read pairs
- BALANCE – CHAIR
- MOLD – BREAD
- KIND – STICK
- RIPE – APPLE
- DELICATE – FRAGILE
- COVERING – BLANKET
- KNEE – BEND
- JAIL – STRANGE
- BED – SHEET
- DRYER – BLOCK
- TABLE – WOOD
- CUP – MOVIE
- DOOR – BOOK
Semantic memory research
- Structure: How do we represent words and word meanings in memory?
- Process: How do we retrieve such knowledge?
- Semantic tests:
  - Sentence verification task
    - RT: True or false "A robin is a bird"
  - Vocabulary
  - Fact recall
  - Comprehension

Episodic tests
- Free recall
- Paired-associate recall
- Prose recall
- Action recall
- Recognition

Episodic and Semantic memory
Ronnlund, Nyberg, & Backman (2005)

Retrieval
- Tip of the tongue phenomenon
  - Retrieval problem even for familiar information
  - TOTs increase with age
- Accessibility vs availability
  - Accessibility: retrieving info
  - Availability: storage of info

Explicit vs. Implicit memory
- Explicit memory
  - Effortful, conscious recollection
  - Memory tasks:
    - Recall
    - Cued-recall
    - Recognition
- Implicit memory
  - Remembering without awareness
  - Memory tasks:
    - Word-stem or word-fragment
    - Perceptual identification
    - Repetition priming

Implicit measures
- Word-stem or fragment completion
  - See list of words (e.g. rose)
  - Fill-in with first thing that comes to mind (e.g. r__e)
- Word identification (perceptual identification)
  - See list of words
  - Word flashed (38ms), asked to identify it
- Repetition priming
  - See list of words (e.g. fruit)
  - Judge if correct pair (e.g. fruit – apple or fruit – dog)
  - Faster when previously exposed to word
Warrington & Weiskrantz (1970)
Implicit vs. Explicit memory

False memory study: Recall only after I have given the signal, “Go.”

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False memories
- Roediger & McDermott (1995)
- DRM list learning paradigm: semantically similar
- False memory for critical lure (40%)
  - Middle serial position for studied words: Recall 40%
  - Recognition (below): 4 = sure old, 3 = probably old

Jacoby’s: Misinformation effect
- False fame effect
  - Effect of familiarity on recollection
  - Explicit and implicit memory can work together for better memory
  - Or can work against each other to create errors
  - Ironic effect of implicit memory
- I told you so” scam
  - Guessing
  - Rely on familiarity, not recollection

Read these non-famous names
- Valerie Marsh
- Sebastian Weisford
- Linda Whalen
- Adrian Marr
- Lucca Richards
- Daniel Tucker
- Harold Evans
- Kylie Shea
- Charlie McFadden
First memories / Remote memory

- What is your first memory of your life?
- First memory approx when 4-7yrs old
  - Infantile amnesia
  - No age differences
- Age of first memory correlated with intelligence!

Reminiscence bump

- Remember recent events and events from 11 – 20 years old (Rubin, 1987)

Reminiscence bump

- Three reasons to explain effect
  - Life-narrative hypothesis
    - Develop identity and schemas
  - Cognitive hypothesis
    - Brain is more efficient
  - Cultural life script
    - Novel, unique, important experiences
- Schrauf & Rubin
  - Emigrants: Bump at 16-24 and again when emigrated
  - Interpretation?

Schuman & Scott (1989)

- "the most important public or political event of past 70 years"

Flashbulb memories

- Highly detailed, vivid memory for event
  - Surprising, emotional (pos or neg), important event
- What is remembered (Brown & Kulik, 1977)?
  - Where were you?
  - What were you doing when found out?
  - Who told you? Or how you found out
  - How did you and others feel?
  - What was it like afterwards?
- Research:
  - Accuracy
  - Effect of emotionality
  - Effect of rehearsal
  - Direct or non-direct experience
- Are flashbulb memories different than other memories?
- Age differences are NOT specific to flashbulb memories

Graf & Uttl (1993): Episodic spatial memory

- Exhibit on human memory at local science center
- Intentional vs. incidental encoding
  - 15yrs – 74yrs
- Fill-in letters in picture to right (photo book)
- DV: # correct
Graf & Uttl (1993): Episodic spatial memory

Episodic memory age difference in real-life situation

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Strategies to improve memory

- Strategies rely on:
  - Attention
  - Connections to already stored info
  - Visualization
  - Good retrieval cues

- EIEIO framework
  - Explicit vs implicit
  - External vs internal memory aid
  - Elaborative rehearsal
  - Chunk information
  - Repetition and spacing effect
  - Memory drugs (Ginkgo!)

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WHY? Sources of age differences

- General slowing
  - 1.5 to 1.7 times slower than younger adults

- Speed of processing
  - Each operation on memory info takes longer so...
  - Info decays (assembly line)
  - Info not encoded (juggling)

- Processing resources
  - Storage deficit

- Inhibition theory
  - Irrelevant information takes up processing resources

- Common cause hypothesis
  - Reduction in sensory function (visual/auditory acuity)

- Working memory or executive function deficit
  - How much info we can simultaneously store and manipulate
  - Degraded information or partially integrated into LTM
  - Depends on type of information and task