Chapter 7

Memory Errors and Memory Gaps

Memory Errors

- Dutch people recalled seeing video of El Al flight crashing into apartment building but no video ever made. In another study, Ss confidently reported having seen specific details.
- Brewer & Treyens (1981)
  - Ss asked to wait in office for < 1 min. Then asked to recall what they saw in the office
  - Ss reported chair, desk, etc (which were expected and were present)
  - Ss reported seeing books but no books were present
- Recall guided by knowledge of what is typically found in an office (or knowledge of what happened to plane).

A Hypothesis about Memory Errors

- Memories are not stored in separate files.
- Memory = a network of connections
- An episode = collection of perceptions, thoughts, images etc related to one event
- Episodes get connected to other similar episodes
  - → details from one episode become associated with other
  - → Similar episodes become merged
    - →Parking tickers vs speeding tickets

Understanding Helps & Hurts

- Learning involves making connections
  - Within episode (e.g. words within a list, people & events at a party)
  - Between episode & prior knowledge
  - Between different episodes that are similar or associated
    - Traffic tickets vs speeding tickets
- At retrieval, can't tell whether retrieved info came from target episode, another similar episode, or general knowledge.

Understanding Helps & Hurts

- Helps – connections help locate information
- Hurts – may retrieve information about the wrong episode, information from general knowledge etc.

  →Intrusion errors

Owens, Bower & Black, 1979

- Ss reads passage about anxious student wanting to talk to her professor at a party
- Some Ss read prologue which gave meaningful context. (Students suspected she was pregnant; had been "seeing" the prof.)
- Ss asked to recall passage verbatim

Owens, et al., 1979

Results: Number of propositions recalled

	Theme	Neutral
Studied	29.2	20.3
Inferred	***15.2***	3.7

Context increased recall of studied propositions, but also greatly increased intrusion errors.

DRM Demonstration

- Study the five words on each slide.
- There will be three slides of five words followed by an arithmetic problem.
- Then you will be asked to recall all of the 15 words

- Bed
- Rest
- Awake
- Tired
- Dream

- Wake
- Snooze
- Blanket
- Doze
- Slumber

- Snore
- Nap
- Peace
- Yawn
- Drowsy

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<u>- 16358</u>

- Recall the 15 words in any order

Deese, Roediger, McDermott Paradigm

- Present list of words all associated with "butterfly" or "sleep" or "needle", but don't present these critical words.
- Needle list: thread, pin, eye, sewing, sharp, point, pricked, thimble, haystack, pain, hurt, injection.
- Ss likely to recall target words or recognize these words as having occurred in the list. Ss are "very confident".
- Reliably obtain *intrusion errors* even when Ss warned

Roediger & McDermott

- Ss studied lists of 12 words. all words in a list were high associates of critical word which was not presented.
- Immediate free recall after each list
- Lists presented auditorily. (Get fewer intrusions of target words with visual presentation.
- Recognition test after 6 lists presented.

Roediger & McDermott - 2

- Old words: 65% recalled on immediate test. Target words: 40% recalled.
- Serial position effect, mid list items least well recalled – about 40%
- Recognition test: 12 studied words + 30 new words
  - 6 critical words
  - 12 words unrelated to studied words
  - 12 words weakly related to studied words

Roediger & McDermott - 3

- Ss rated confidence that they had seen words in one of the lists
- Unrelated lure: 2% false alarms
  Weakly related lure: 21% FAs
  Critical lure: 84%
- Participants highly confident that critical words had been in the memory list.

Schematic Knowledge

- Generic knowledge (knowledge of the world) includes knowledge of typical events & situations (going to a movie, going to the doctor, what is found in a typical kitchen or classroom, etc.)
- Generic knowledge organized into schemata – mental structures that contain knowledge related to specific situations, events, places
- Schemata summarize redundancy

Functions of Schemata

- Organize knowledge
- Direct attention – what do you look for in a restaurant?
  - Seat yourself, wait to be seated, or go to counter?
  - Cafeteria or served by waiters?
  - Menu posted or brought by waiter?
  - Is alcohol served?

Functions of Schemata – 2

- Guide understanding: e.g. people bringing brown paper bags obviously containing wine to restaurant without a liquor license are not necessarily alcoholics
- Guide reconstruction in recall
  - Help fill in the gaps
  - May not recall elements that don't fit schema, or may create justification for discrepant elements
  - May recall elements that weren't present but typical for the situation
  - Bias memory towards what is typical or normal in situation.

- Bartlett Demonstration

Interference: Leading Questions

Misinformation Effect

- General procedure: Ss perceive event. Later exposed to misleading information about the event.
- Retention interval. Then Ss' retention for event is tested.
- Many Ss incorporate misleading information into event.
- False memories created through misleading info.
- → Error in source memory. Misleading information attributed to original event rather than subsequent discussion of event.

Elizabeth Loftus: Misleading Information

- Ss observed slides or video of car accident or theft of wallet from woman's purse
- Ss exposed to information or leading questions after viewing slides or video
  - E.g. Did the thief put the blue wallet into his pocket? (Wallet was red.)
  - E.g. How fast were the cars going when they collided (smashed)?
  - E.g. How fast was the car going when it went through the stop sign? (Picture has shown a yield sign.)

Elizabeth Loftus: Misleading Information - 2

Results

- "Smashed" vs. "collided": speed estimates 41 mph vs 34 mph
- One week later: More Ss reported seeing broken glass in "smashed" condition (32%) than in "collided" condition (14%)
- In stop vs yield sign experiment, Ss remembered seeing yield sign. When told they were wrong, they were equally likely to select stop sign and one-way sign (not previously seen).
- Wallet recalled as being blue, when in fact it was red

Limits on Misinformation Effect

Hyman, Husband, & Billings

- Parents of college students interviewed for events that had happened in students' childhoods.
- Students tested on recollection of events that had actually happened plus events made up.
- 1st recall: 80% of actual events recalled; 2nd recall: 90% recalled.
- Bogus events: none 'recalled' on first recall test; 3rd trial, 25% of students recalled the event.
- Ss could 'recall' with confidence many events that never happened to them.

Misinformation Effect

Variables increasing the likelihood of a false memory

- Young children very susceptible to misinformation
- Plausibility of the event that never happened
- Repeating the false information
- Having S make visual image or imagine how the event happened
- Fictional event described as happening long ago
- Individual differences

Accuracy of Human Memory

- Yuille & Cutshall (1986)
- Interviewed witnesses to a crime 4 – 5 months after event
- Details of actions recalled 83% accurately; details about objects 90%
- Memory for childhood events similarly good

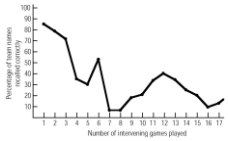
The Causes of Forgetting

- Recall or recognition decreases the longer the ***retention interval*** (the time between learning and test)
  1) Decay – almost impossible to separate passage of time from effects of intervening events
  2) Interference
     - Episodes become confused
     - Loss of source memory
     - More reliance on generic knowledge
     - New learning interferes with old
  3) Retrieval Failure
  4) Destructive updating – replacement of old material by new

Baddeley & Hitch (1977)

- Asked rugby players to recall names of teams they had played during rugby season.
- Some players missed games. Can separately examine amount of time and number of games intervening between a game and the recall test
- Results: Number of games had bigger effect than amount of time. (See graph)

Baddeley & Hitch (1977) - 2



Undoing Forgetting

1. Hypnosis: hypnotized Ss say more, but much is not true
   - hypnotized Ss are very suggestible – false memories easily induced
2. Drugs – reduce inhibitions or judgement
   Ss less guarded and say more.
   - danger of inducing false memories
3. Brain stimulation – patients report long lost memories. Can't verify the facts.
4. Retrieval Cues – interview techniques that have S reinstate the context of the target event & provide different retrieval cues seem to be effective
   - can't undo interference or misinformation effect

Accuracy & Confidence

- Warning people about memory errors, instructions to avoid errors have little effect.
- In misinformation effect studies, no correlation between confidence and memory accuracy
  - Ss highly confident about false memories, recall of words not studied in DRM task

Accuracy & Confidence - 2

- Memory accuracy & confidence affected by different variables.
- Ss asked to identify perpetrators of simulated crime & given positive feedback. Later asked to identify culprits from line-up. Ss given feedback more confident but not more accurate.

Variables promoting confidence but not accuracy

- Familiarity with general theme
- Retrievability of memory – practice reporting false memory
- Previously imagining the event
- External support – someone telling you that you have identified the "perp"

Predicting Memory Accuracy

- Predict that clear detailed memories should produce faster responses than vague memories requiring inference from feeling of familiarity, but …
- Little or no difference in speed of response between correct and incorrect responses
- False memories just as emotional as real memories
- Feeling of remembering (recalling details of episode) vs. feeling of knowing (familiarity)
  - Some evidence that "remember" judgements more likely for real memories than false memories, but …
- not reliable indicator of accurate or false memory

Predicting Memory Accuracy - 2

- Reisberg, 3rd ed., Page 232:
- "Memories that contain errors, or memories that are wholly false, can be just as vivid, just as detailed, just as emotional, and recalled with just as much speed and confidence as memories that are completely accurate."

Autobiographical Memory

- Episodic memory – memory for specific events in our own life, located in specific time and place
- Generic Memory – decontextualized knowledge. Knowledge of how the world works.
- Autobiographical memory – subset of episodic memory
  - Memories of childhood, important events in our life
  - Usually some emotional component

Self-Reference Effect

- Information relevant to oneself better remembered
  - Remember things you said rather than things someone else said (unless they were about you
    - Better memory for places you have visited than those not visited
- Attention effect?
- Self-schema – we know ourselves, know how we are likely to behave & can reconstruct what we did
- Self schemata bias memory.
  - People who believe they haven't changed recall their past in ways consistent with not changing.
  - People who believe they have changed recall their past accordingly.

Self-Reference Effect - 2

- Self Image – recall events which make us look good
  - College students more accurate at recalling high grades in high school than low grades
    - 89% of As remembered; 29% of Ds remembered
  - High grades probably rehearsed more - bragging
  - Biased retrieval or biased reconstruction

Memory and Emotion

- Emotional events tend to be remembered well.
- Emotional events → response in amygdala → increase in norepinephrine
  → increase in blood glucose
  → memory consolidation
  → amygdala has role in retrieval
- Tend to pay attention to potentially emotional events
- Tend to "mull over" emotional events → rehearsal

Memory and Emotion – 2

- Arousal level: High arousal → narrowing of attention; moderate arousal → broad range of attention
- Kahneman (1973) – high arousal → disruption in attention allocation
  - Focus on central aspect of event (e.g. the weapon used in the crime)
  - Have good memory of central (attended) details, poor memory of peripheral events (what person next to you looked like)
- Narrowing produced by stimulus-based arousal (e.g. perception of weapon) not just emotional state

Flashbulb Memories

- What were you doing when you learned President Kennedy had been shot? When you learned that Princess Diana had been killed? Sept 11, 2001 Etc.
  - People who were around remember what they were doing, whom they were with, etc. Very confident about memories.
- Neisser & Harsch (1992)
  - Interviewed college students one day after the Challenger space shuttle explosion and again 3 years later.
  - Very little agreement between immediate & delayed recall, but Ss very confident.
- McCloskey et al. (1988) Ss remembered a great deal:
  - 81% recalled where they were, 70% remembered who told them.

Flashbulb Memories - 2

- *Consequentiality* of event may predict memory accuracy
  - 1998 San Francisco earth quake better remembered by people living near than people living far away.
  - Memory for Margaret Thatcher's resignation remembered by people who rated this event as important to them.
- Influence of television coverage – repeated videos???

Traumatic Memories

- Sometimes people "relive" traumatic memories → memory enhancement. High arousal levels during the event.
  - Post-traumatic stress syndrome
- Sometimes traumatic memories are forgotten
  - Early childhood memories (good & bad) are forgotten)
    - Childhood amnesia
- Traumatic memories often accompanied by stress, alcohol or drug use, head injury, etc. which disrupt memory
- Recovery may reflect willingness to discuss the traumatic event rather

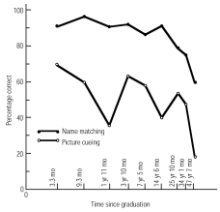
Traumatic Memories - 2

- "Forgetting" may be retrieval failure; recovery may reflect good retrieval cues
- Recovered traumatic memories may be false memories implanted by therapist.
- Traumatic memories usually remembered well.
  - Arousal & limbic system activation → consolidation processes
- Individual differences between people: some people may dwell on traumatic memories; other people want to forget.
- No evidence of Freudian repression

Very Long-term Remembering

- Bahrick et al. (1975) showed high school graduates photos of classmates who selected names → 90% correct
  - Recall of names much lower but still quite high
- Performance dropped very slowly over 25 years & then faster
- Recall of names when given faces not as good: 70% declining to 60% after 7 years

Bahrick et al. (1975)



Long, Long-term Remembering - 2

Conway, Cohen, & Stanhope (1991)

- Tested knowledge from cog. psych. course
- Forgetting of names & specific concepts over 3 years
- Fairly steady performance after 3 years
- → ***permastore***

Permastore

- Bahrick: Permastore more likely if …
  - Material very well learned
  - Learner continues to learn in same field

Linton

- Kept diary, tested & retested her own memory for events recorded
  - 65% of events remembered after 3 or 4 years
- Testing (=rehearsal of memory) promoted later retention
- Other evidence that retrieval practice (without re-exposure to events) helps later recall.

Permastore: Linton
Note: Graph is not in 4th ed.