Chapter 8

Using Knowledge in the Real World

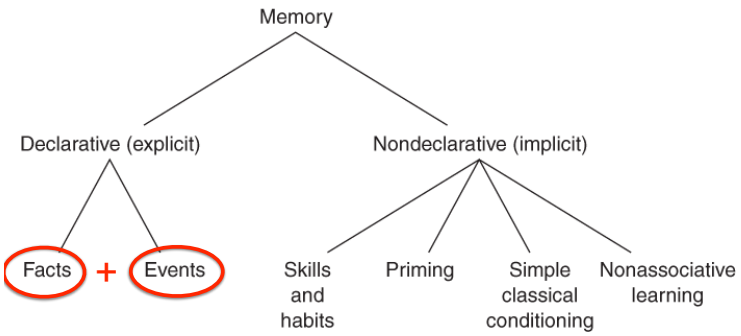
Chapter 8 Outline

- Reductionism & Ecological Validity
- Seven Sins of Memory
- Facts about the World
- Situation Models and Embodied Cognition
- Metamemory
- False Memories
- Autobiographical Memories

Combining Episodic and Semantic Memory

- Reductionism:
  - break down constructs into smaller constructs, study the parts
- Ecological Validity: are findings useful in everyday life?
  - Aka "External Validity"
- Real-life situations use many memory systems

Squire (1993) Taxonomy of Long Term Memory



Combining Episodic and Semantic Memory

- Materials
  - use meaningful information (rather than nonsense syllables)
- Methods
  - Accuracy (rather than RT)

The Seven Sins of Memory (Schacter, 1999)

	Sin	Description
O	**Transience**	Losing access to information across time, whether through forgetting, interference, or retrieval failure
O	**Absent-mindedness**	Everyday memory failures caused by insufficient attention or superficial, automatic processing during encoding
O	**Blocking**	Temporary retrieval failure such as the tip-of-the-tongue state, in either episodic or semantic memory
C	**Misattribution**	Remembering a fact correctly from past experience but attributing it to an incorrect source or context
C	**Suggestibility**	Incorporating information provided by others into your own recollection and memory representation
C	**Bias**	Knowledge, beliefs, and feelings distort recollection of previous experiences and affect current and future judgments and memory
C	**Persistence**	Remembering facts or events, including traumatic memories (one would rather forget). Failure to forget because of intrusive recollections and rumination

Exaptation

- Trait evolved for one function is co-opted for another function
- Example:
  - Bird's Feathers
    - initially for temperature regulation
    - later for flight
- Schacter discusses human memory system "sins" as being side-effects of Exaptation

Facts about the World

Situational Models

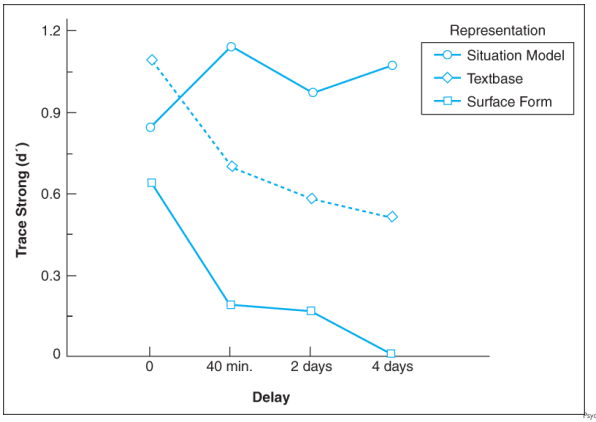
- Memory is not passive
- People *actively* process information about the world
- Making *models* in or to make useful *predictions* of how the world works

Levels of Representation

- Surface Form:
  - The exact words in exact order
- Textbase
  - Propositional representation
- Situational Model
  - the "state of affairs"
  - Example: in a story of a murder, you imagine the thoughts & feelings of the victim and perpetrator, even if not mentioned in the text

Memory vs. Levels of Representation

- Kitsch et al. (1987)

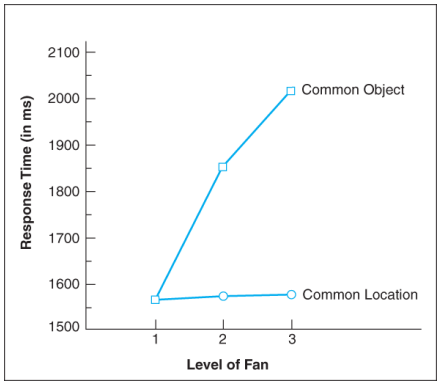


Situational Models & Memory

- Remember these facts:

- The potted palm is in the hotel.
- The potted palm is in the museum.
- The potted palm is in the barber shop.
- The pay phone is in the library.
- The welcome mat is in the library.
- The waste basket is in the library.

Radvansky (et al. 1993)



Metamemory

- memory *about* a memory
- self knowledge: how *accurate* is my memory?

- Kinds:
  - Source Monitoring…
  - Prospective Memory…
  - Knowing what you Know…

Source Monitoring

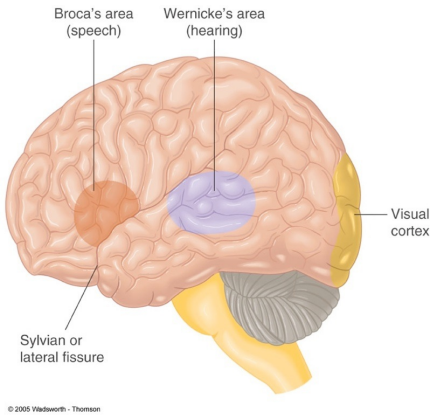
- memory for *where information came from*

- Did Abraham Lincoln really hunt vampires?

- Did I turn off the stove?

Neurobiology of Auditory Hallucinations

- SPECT shows activity in Broca's Area, which is involved in speech Production
- Wernicke's area not active.
- Conclusion - auditory hallucinations are a form of "talking to one's self" rather than "hearing voices that aren't there"



Source Monitoring Accidents

- Cryptomnesia - to plagiarize something w/o conscious awareness.

Prospective Memory

- to remember to do something *in the future*
  - is there a cue?

- Event-based Prospective Memory
  - to remember to do something associated with *a certain event*
  - The event is a cue

Knowing what you Know

- Judgments of Learning
- Prediction: will I remember it later / have I learned it well enough?
- Knowing when to stop studying

- Tip:
  - make the judgment after a delay
  - why? gives time for information to be lost from working memory

Feeling of Knowing

- aka Familiarity
- "will I remember" / "will I recognize it"?
- Tip of the Tongue State

False Memory

- False Memories…
- Semantic Integration…
- Leading Questions & Memory Distortion…
- The Misinformation Effect
- Source Misattribution and Misinformation Acceptance…
- Stronger Memory Distortion Effects…
- Repressed and Recovered Memories…

The DRM Paradigm

- Deese (1959), Roediger & McDermott (1995, 2000)
- Study lists of words
- Test for Recognition or Recall
- Critical Lures: highly related words *which were not studied*

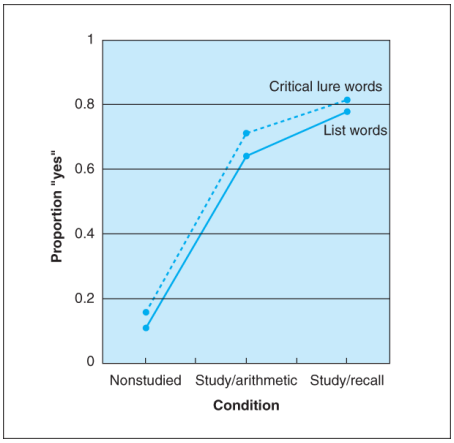
The DRM Paradigm

- Did you "remember" the word "sleep?"
- (40% of people did)
- In recognition, false memory to the lure (sleep) is often as strong as accurate memory for target items (blanket, doze).
- Content versus technical accuracy?

- "False Alarm"

The DRM Paradigm

- if the subject recalls the lure this strengthens the false memory on Recognition test



Technical vs. Content Accuracy

- Technical Accuracy:
  - Recalling or recognizing exactly what was experienced (generally quite poor).
- Content Accuracy:
  - Recalling or recognizing the meaning or content of what was experienced (generally quite accurate).

Semantic Integration

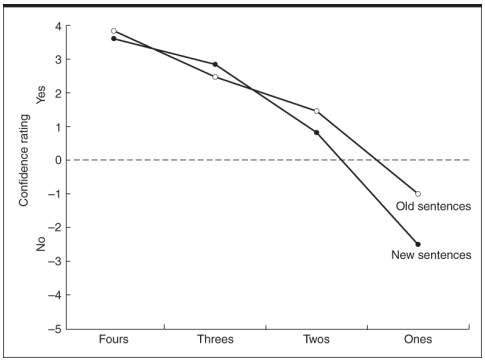
- Bransford and Franks (1971)
- Subjects studied simple sentences that together told a story:
  - The ants were in the kitchen.
  - The ants ate the Jelly.
  - The jelly was sweet.
  - The jelly was on the table.

Semantic Integration

- At test, subjects "remembered" seeing complex sentences that captured the meaning of the simple sentences that were actually present at study:
- *The ants in the kitchen ate the sweet jelly on the table.*
- The simple sentences were integrated into one sentence that captured the story's gist.

Semantic Integration

- Memory for complex sentences not actually seen was higher than for simple sentences that were seen.



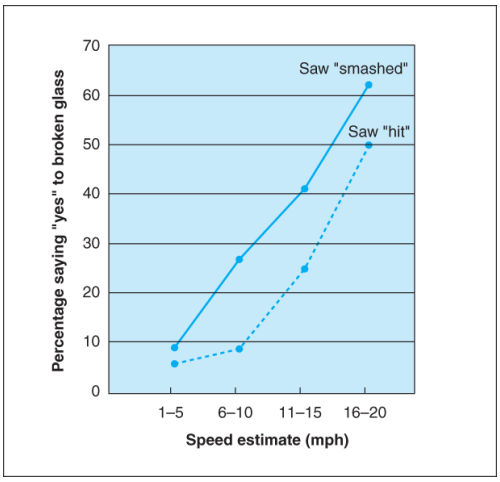
Leading Questions & Memory Distortion

- Loftus & Palmer, 1974
- Subjects saw the same film of a car accident
- Later, different subjects were asked: How fast were the cars going when they:
  - smashed?
  - collided?
  - bumped?
  - contacted?

Leading Questions & Memory Distortion

- Subjects estimates of speed varied with the verb they got in the question phase of the experiment.
- Subjects who got the stronger verb "remembered" the cars were going faster.
- Two weeks after the film: Did you see the broken glass (note: No glass was present in the original film)?

Leading Questions & Memory Distortion



Leading Questions: Possible Explanations

- Memory Impairment:
  - A genuine change in memory of an experienced event as a function of some later event.
- The Response Bias Explanation:
  - No memory impairment– subjects use the verb to infer that the cars must have been traveling faster (or slower) than previously remembered.
- The broken glass expt. suggests the former

Misinformation Effect

- Two groups see pictures of car accident, showing Stop Sign
- One group gets misinformation mentioning "Yield Sign"
  - Results in 20% lower accuracy
  - … and faster to respond with the incorrect answer
- Three factors
  - Source Misattribution…
  - Misinformation Acceptance…
  - Overconfidence…

Source Misattribution

- inability to remember or judge *where* information came from
- Sense of *familiarity* can be confused with *truth*

False Fame Effect

- Jacoby et al. (1989)
- Subjects read list of non-famous names
- Later asked to judge who is "famous"
- Many of the non-famous names picked
- Probably due to recency / familiarity

Misinformation Acceptance

- Secondhand memories or information *after the fact* are remembered with the original event
- Theory of Reconsolidation:
  - when memory is *remembered* it becomes *malleable* - easier to edit or change

Implanted Memories

- Loftus & Hoffman (1989)
- Researchers ask subject's parents for childhood events
- Question subjects about the events
- One of the events is a fake

- By third questioning, 25% of subjects remember the fake memory

Implanted Memories: Hot Air Balloon Ride

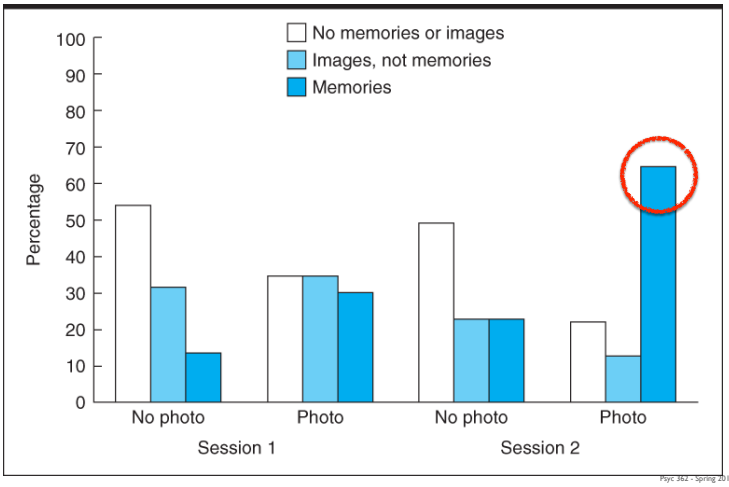
- Wade et al. (2002)
- Digitally altered childhood photos to include a hot-air balloon ride picture
- 50% of subjects later reported it happened

- But wait - why should they doubt the memory?

Green Slime

- Lindsay et al. (2004)
- No altered photo. Fake story about putting green slime in teacher's desk
- Subjects who saw a (genuine) class photo: 70% remembered the slime event after second visit.

Green Slime



Memory Overconfidence

- Most people vastly overestimate how accurate their own memories are

Memory Distortions

- Things that increase memory distortion:
  - repetition
  - imagining it yourself
  - trying hard to remember
  - being asked questions

- Things that don't decrease memory distortion:
  - knowing about the phenomenon
  - being warned about misinformation

Issues

- If memory is malleable and unreliable…
- Can we ever trust it?
  - e.g. Eyewitness testimony in trials

Repressed and Recovered Memories

- Freud's theory of the unconscious
  - our mind represses (forgets or hides) pain/ trauma
  - Evidence for this is weak but probably exists
- Recovering memories
  - imagery
  - suggestive questioning
  - repetition

McMartin Preschool Trial

- Preschool run by McMartin family in Manhattan Beach CA
- In 1983, student's mother Judy Johnson reported son had been raped and made allegations of bestiality (sex with animals).
- Police sent form letter to parents advising them to "Please question your child to see if he or she has been a witness to any crime…"
- Hundreds of children interviewed by CII (an abuse therapy clinic)

McMartin Preschool Trial - 2

- More allegations arose, many "bizarre":
  - Chuck Norris was an abuser, hot-air balloon rides given, witches were seen, underground tunnels, students flushed down toilets, ritual slaughter of animals, satanic rituals.
- Case went to trial in 1987
- Jury acquitted on all counts in 1990
- Cost $15 million

McMartin Preschool Trial - 3

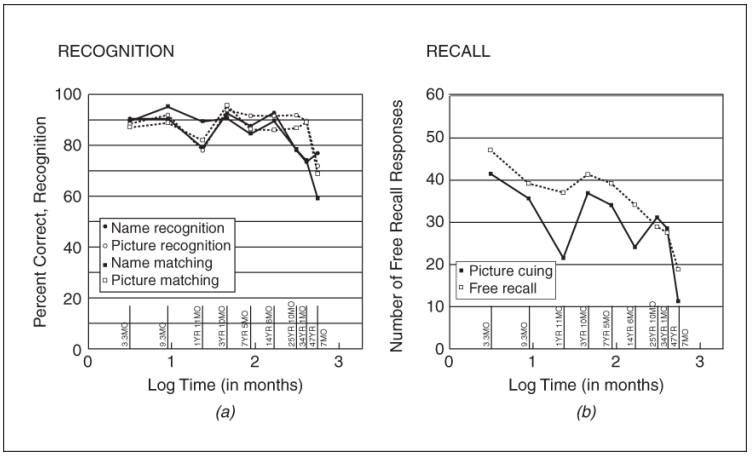
- Judy Johnson diagnosed with schizophrenia, died of alcoholism before the trial.
- Former student in 2005:
  "Never did anyone do anything to me, and I never saw them doing anything. I said a lot of things that didn't happen. I lied. ... Anytime I would give them an answer that they didn't like, they would ask again and encourage me to give them the answer they were looking for. ... I felt uncomfortable and a little ashamed that I was being dishonest. But at the same time, being the type of person I was, whatever my parents wanted me to do, I would do"

Autobiographical Memories

Autobiographical Memories

- The study of one's lifetime collection of personal memories.
- Bahrick's study on very-long-term memory of high school classmate's names and faces: *Fifty years of Memory for Names and Faces*
- Used six different types of memory tests.
- Recognition held up nicely through the years, but recall performance was poor.
- Picture Recognition remained in 80%-90% range for over 35 years

Bahrick's Results



Prolonged Acquisition

- Why Bahrick's results so much better than laboratory studies?
- Overlearning
- Distributed practice: Extended period of time in which to learn information (as opposed to Massed Practice)

Other Autobiographical Studies

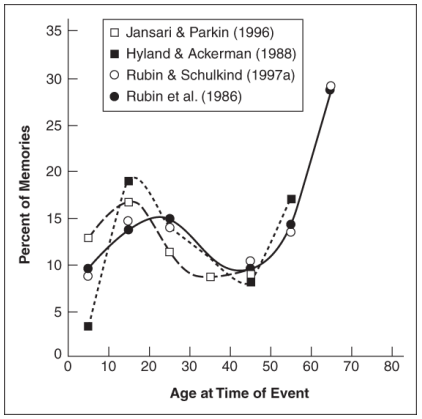
- Psychologists testing their own memories (e.g. Linton 1975, Wagenaar 1986 and others)
- Methods:
  - kept journal of daily events
  - later tested memory with recall with various cues
- Findings:
  - pleasant events remembered better
  - few events truly forgotten

Infantile Amnesia

- Most people's first clear memory is age 2-4
- Freud believed it was true forgetting of traumatic content.
  - no evidence for this
- Modern theories
  - information not forgotten
  - memory systems simply not developed so good Episodic LTM is impossible

Reminiscence Bump

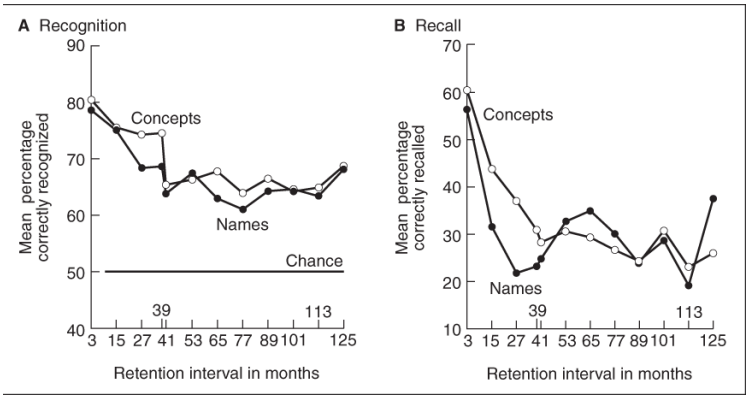
- Superior memory for events between ages 15-25
- Theories:
- "first times" easier to remember
- Cultural scripts?



Memory for Cognitive Psychology

- Conway et al. (1991)
- Tested student's memory of cognitive psychology topics 3 months to 12 years after the course.
- Although recall dropped (from 60% to 25%), recognition only dropped a bit (80% to 70%)
- Conclusion: we are overly pessimistic about our long term memory abilities (recall)
  - recall is worse
  - recognition and relearning are better

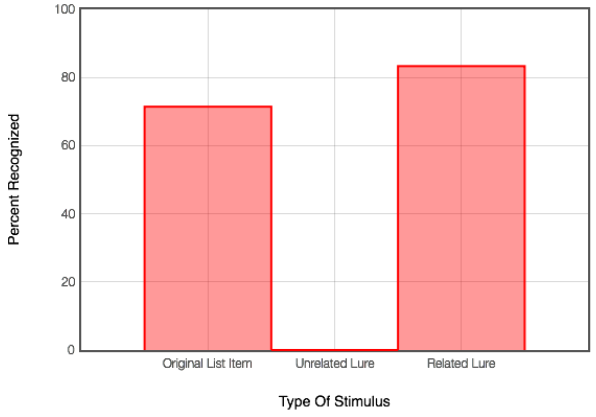
Memory for Cognitive Psychology



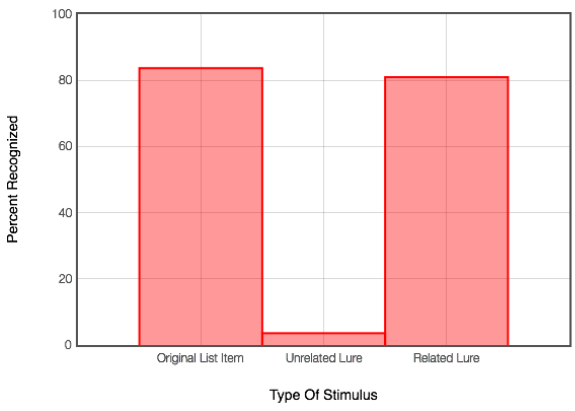
CogLab 8: False Memory

- Methods:
  - Word Lists
  - Recognition Test
- Independent Variable
  - Kind of word: old, lure, unrelated
- Theory
  - Semantic Node Activation of neighboring concepts will activate Lure
- Prediction
  - subjects will recognize the Lure even though it was never seen

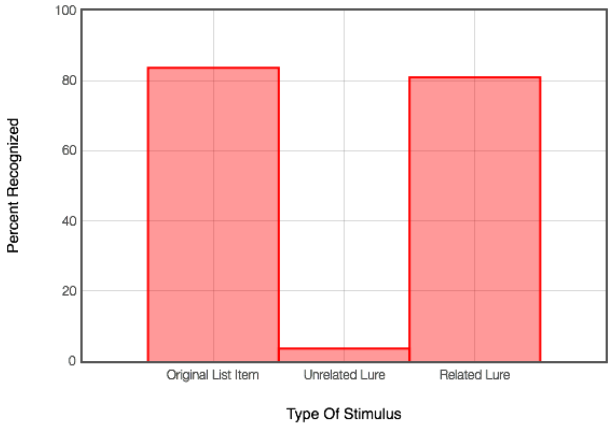
CogLab 8: My Data



CogLab 8: Group Data



CogLab 8: Global Data



Roediger & McDermott (1995)

- Experiment 1
  - Free Recall then Recognition
- Experiment 2
  - Half of lists included Recall test, Half did not (did math problems)
  - DV:
    - "Remember" : Vivid Memory (Explicit)
      vs
      "Know" : Feeling (Implicit)
- Hits: 65% (in Study + Math condition)
- False Alarms: 72% (in Study + Math condition)

Roediger & McDermott (1995)

- "How robust is this effect? Are there limits to this effect?
- "The effect is quite robust and perhaps most surprisingly, it works well even when participants know what the experiment is about (i.e., you were asked to do a lab on false memory, read background information about the phenomenon, and then still most likely exhibited false memory)."

Roediger & McDermott (1995)

- Also noticed Serial Position Curve

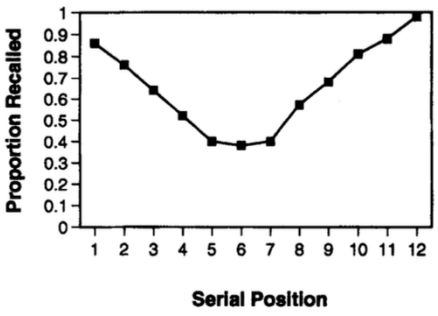


Figure 1. Probability of correct recall in Experiment 1 as a function of serial position. Probability of recall of the studied words was .65, and probability of recall of the critical nonpresented item was .40.

Roediger & McDermott (1995)

- Probability of Intrusion more likely towards later recall

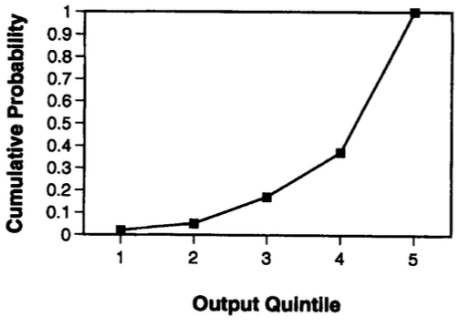


Figure 2. Recall of the critical intrusion as a function of output position in recall. Quintiles refer to the first 20% of responses, the second 20%, and so on.

CogLab 8: False Memory

- Debriefing
  - Methods
    - differences?
  - Predictions?
  - Robust? Limitations?

Clinical Evidence