MEMORY ERRORS

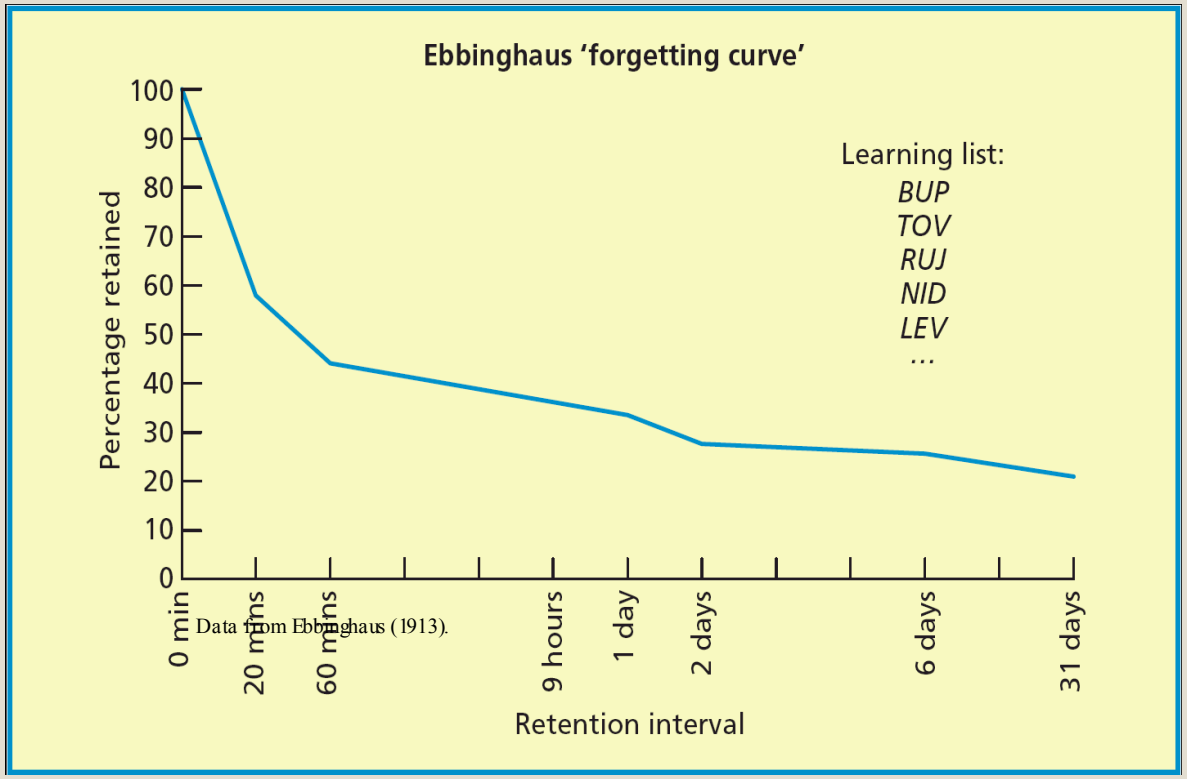
PSY435

Roadmap

- To What extent to we forget?
- Why do we forget?
- What takes the place of original memories?
- What do more serious memory errors look like?

Ebbinghaus' (1913) Forgetting Curve

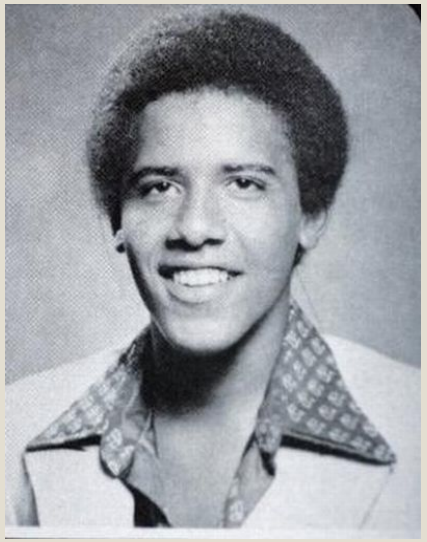
- Ebbinghaus would memorize lists of made-up words.
- He then tested himself on them after periods of time.
- Forgetting is initially rapid, then slows down.

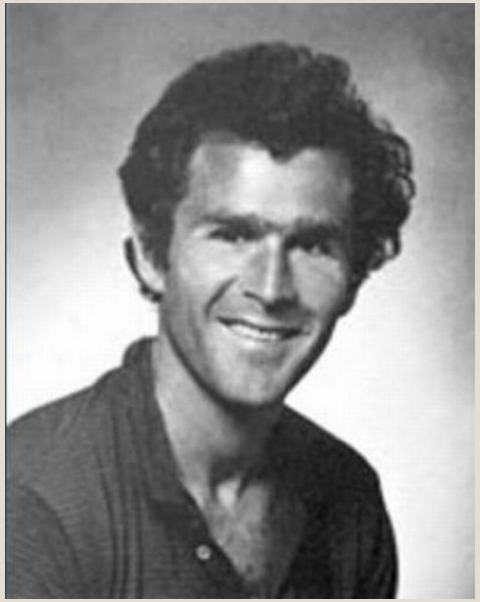


Forgetting Classmates

Bahrick, Bahrick, and Wittlinger (1975)

- Tested nearly 400 high-school graduates on their ability to recognize and name classmates after delays of up to 30 years.
- Relatively unimpaired :
  - Ability to recognize their classmates' faces/names.
  - Ability to match up names to the appropriate portraits.
- Extensively impaired:
  - Ability to recall a name, given a person's portrait.
- Recognition is intact. Recall is impaired.





Forgetting Personal Memories

Meeter, Murre, and Janssen (2005)

- Study aimed to determine the forgetting rate for people's memory of widely publicized events from headlines and TV broadcasts, obtained from verifiable sources.
- Like the Ebbinghaus results, recall for events shows a steep initial drop, followed by a slower forgetting rate.
- Participants' memory was worse for recall than for recognition of the same events.

Flashbulb Memories

- What about emotional intensity of memory?
- Flashbulb memories are distinctly vivid, precise, concrete, long-lasting memories of a personal circumstance surrounding a person's discovery of shocking events.
- "I remember exactly where I was when…"
- While they are qualitatively more vivid, over time they are just as reliable as other memories.

Recall vs Recognition

- Recognition tests are typically more sensitive than recall tests. That is, recognition tests are more likely to reveal that some knowledge is present. Why?

- **Two types of information in memory:**
- (1) **source information**: knowledge about the specific context that a stimulus was encountered in (e.g. a word that was on a specific list to be memorized)
- (2) **familiarity**: the simple feeling that one has encountered something before, even if the precise context is unavailable

- ***Recognition*** can often be guided by ***familiarity alone***, while ***recall*** requires accurate ***source information***.

Two reasons for forgetting

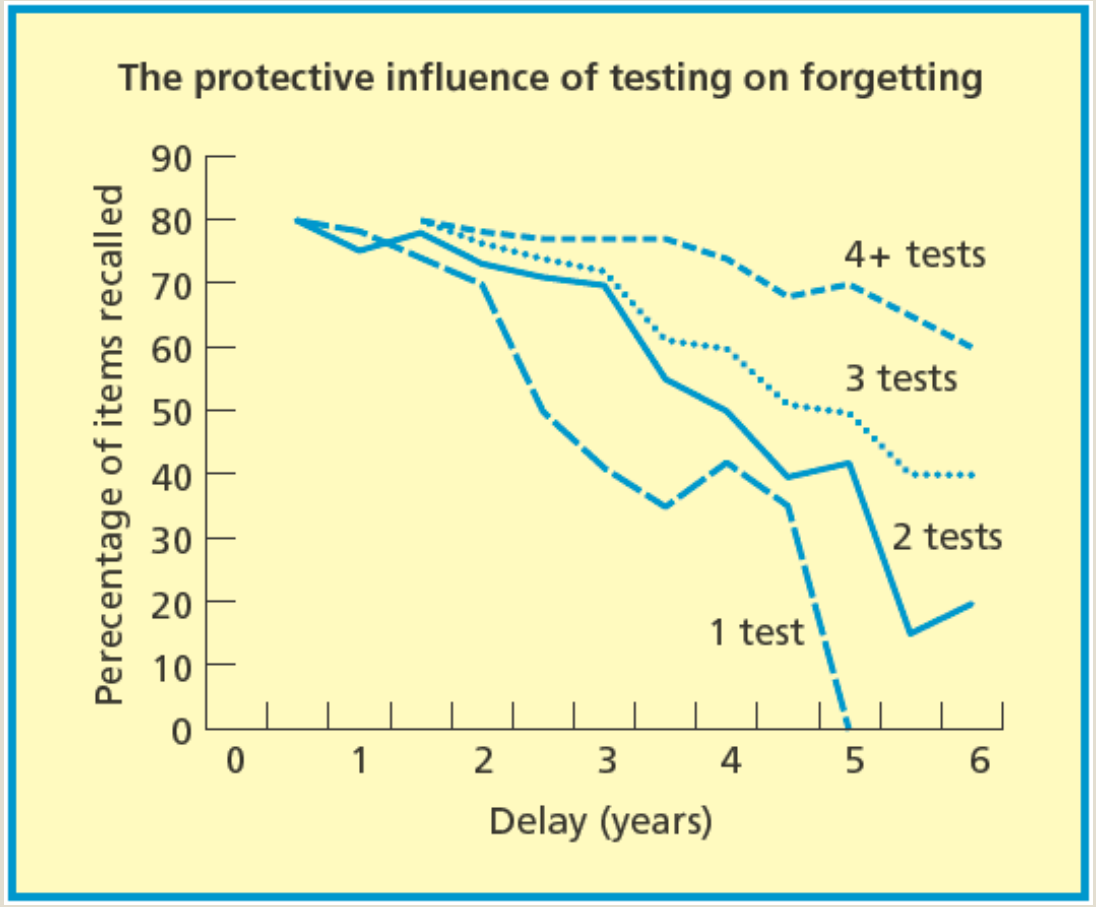
- **Availability**:
  - Whether or not an item is in the memory store.
- **Accessibility**:
  - Whether the memory can be retrieved, assuming that it is stored.
- It is difficult to **prove definitively** that a memory is truly unavailable.
- Because we cannot differentiate between unavailable and inaccessible memories they are both said to be *forgotten*.

Factors that Discourage Forgetting

- Better initial learning leads to better retention.
- Repeated retrieval attempts (i.e. testing) builds up resistance to forgetting (Linton, 1975).
- All else equal, older memories are more durable and forgotten less rapidly than newer memories.
- It is now widely believed that new traces are initially vulnerable to disruption until they are **consolidated** into memory.

Repeated Testing is Protective

- The probability of remembering something depends on the number of times it has been retrieved or called to mind. Recalling an event reduces the rate of forgetting.



WHY do we forget things?

- Four main possibilities:
- 1. Decay of Traces
- 2. Retrieval Failure
- 3. Interference from other memories
- 4. False memories

Interference & Decay

- Interference happens with new experiences

  …which require the passage of time

- Decay happens with time

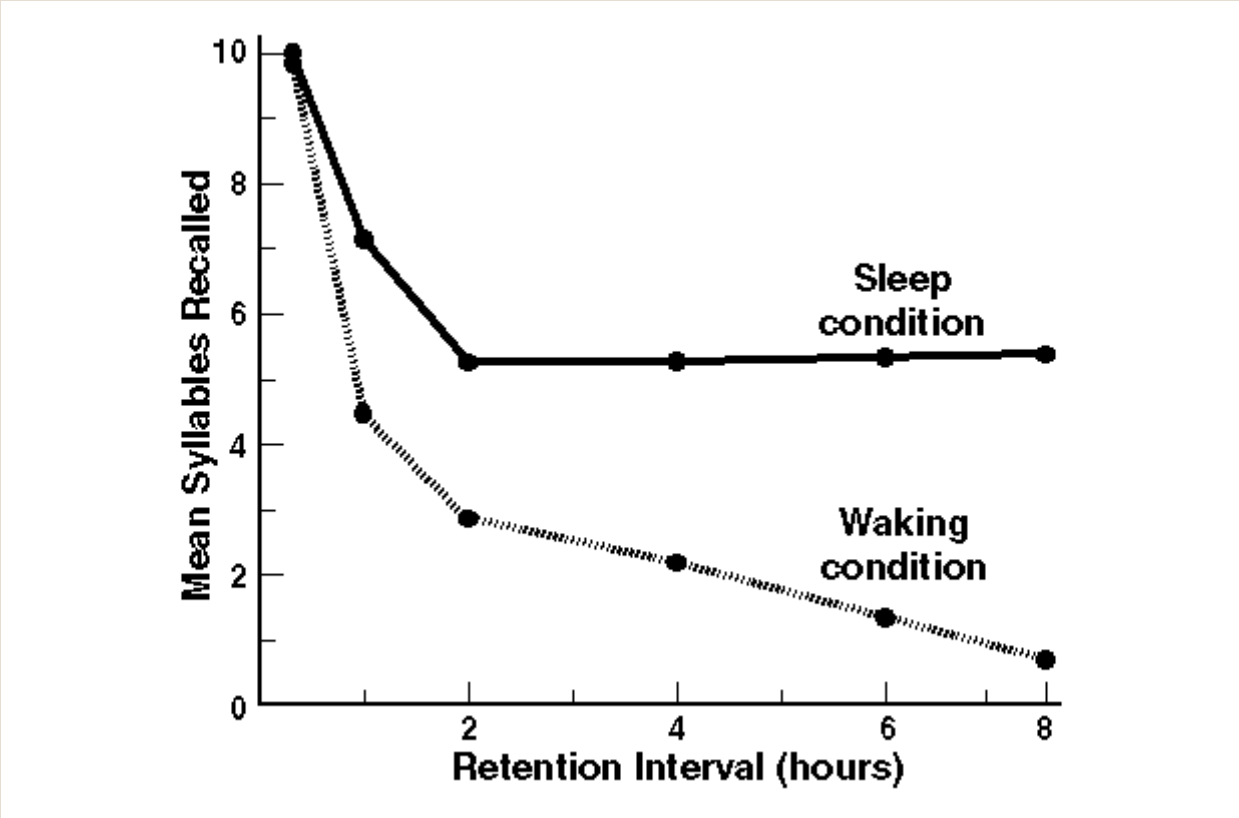
  …which requires new experiences

- How can we tell the two apart?

Evidence suggesting interference instead of decay...

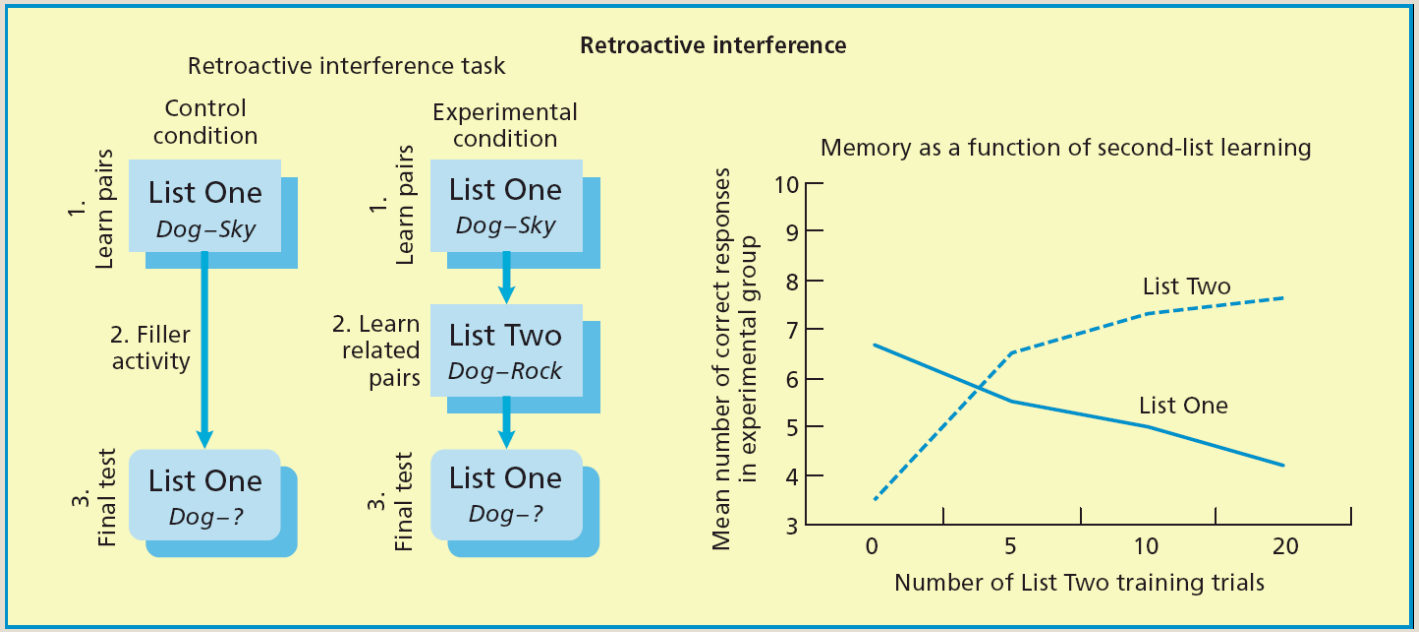
Jenkins & Dallenbach, 1924

- The big difference between the "Sleep" and "Waking" conditions suggests that time is not the key factor in forgetting...
- Of course, memory consolidation takes place during sleep.



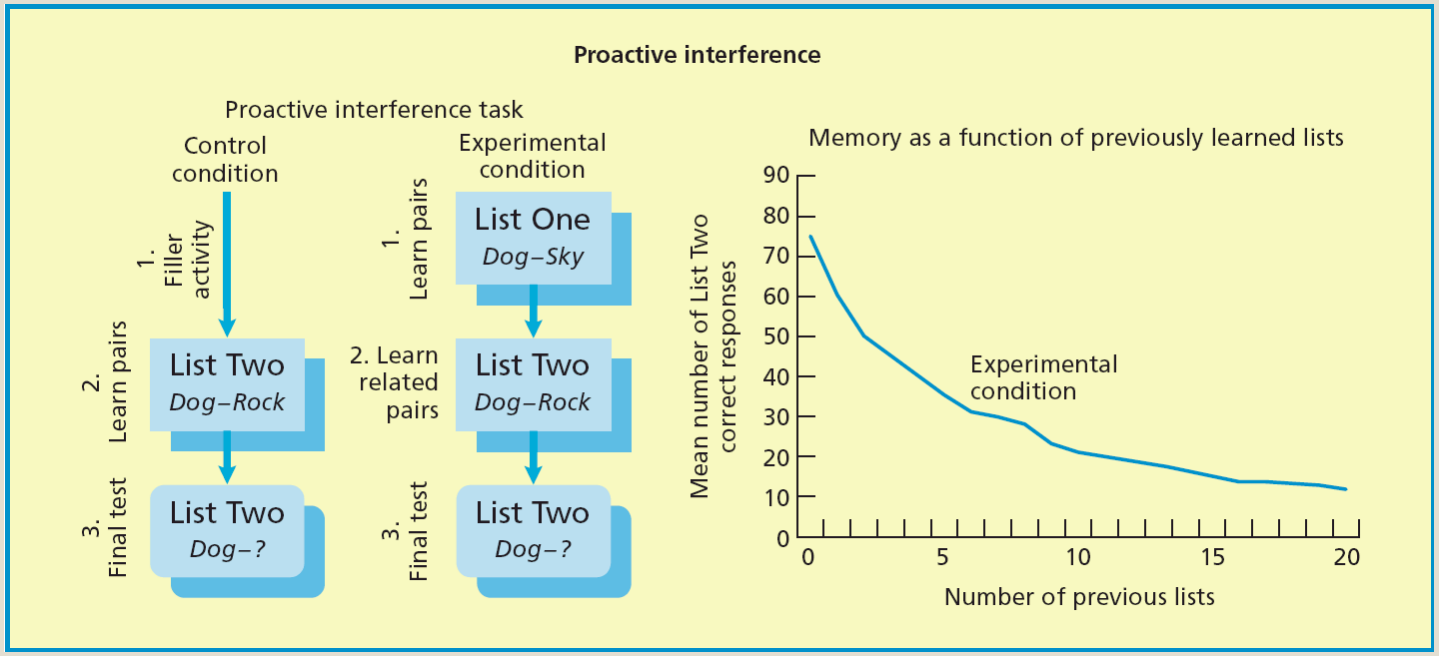
Retroactive Interference

- Forgetting of **old** information caused by learning **new** information
- More training on the second list results in more first list impairment.



Proactive Interference

- The tendency for **older** memories to interfere with the retrieval of **new** experiences and knowledge.



Effects of Inference in LTM

- Pathological?
  - We create memories that aren't real.
- Adaptive?
  - Allows us to use prior knowledge and expectation to gain a greater *understanding* of current situation.

False Memories

Original event

Memory of event

Causes of False Memories

Precision of memory – Memory not recorded in much detail

Misinformation – Additional information changed original memory.

Inference – Other information confuses original memory.

Neurological Damage (Korsakoff's & Alzheimer's) – brain becomes physically unable to maintain proper memories

Misinformation Experiments (Elizabeth Loftus)

1 - see event

2 - misinformation

3 - memory test

To what extent can memories be altered by later misinformation?

Why is memory important?

- **Eyewitness Testimony**
- An eyewitness is only major evidence in ~ 80,000 cases / year (Goldstein et al., 1989)
- Mistaken eyewitness is #1 cause of false convictions (Huff et al., 1986)
- Claim: False eyewitness IDs --> ~ 2000 wrongful convictions / year (Loftus & Ketcham, 1991)

Loftus' Misinformation Effect

Procedure

Study

Participants saw film of two-car accident.

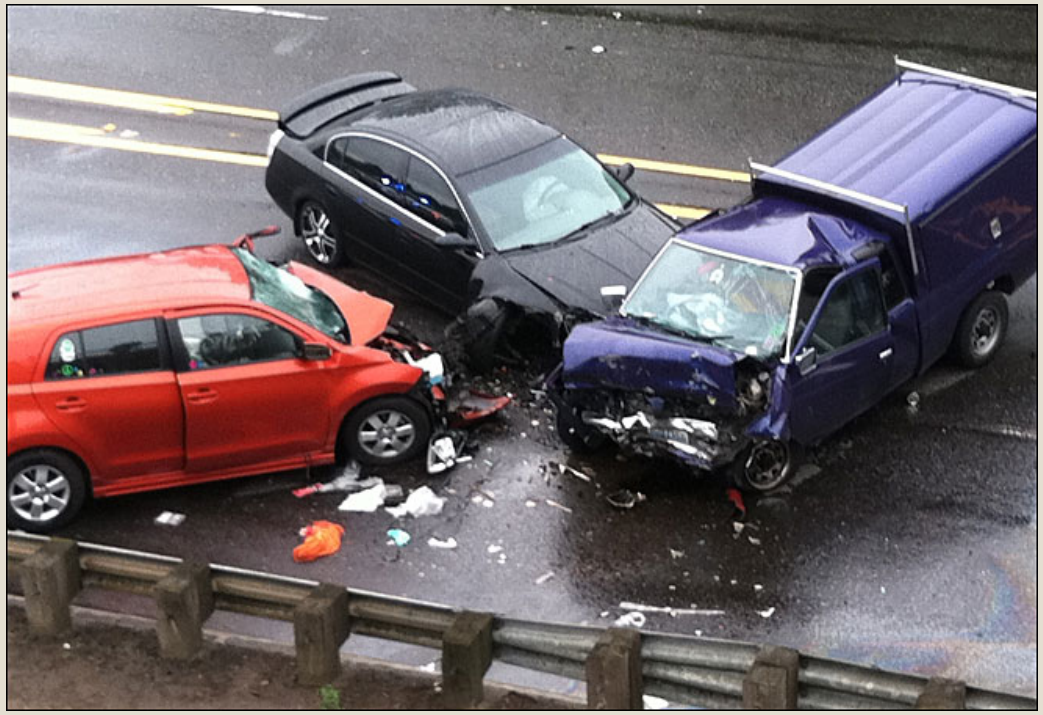
Misinformation

Participants were asked to estimate speed of cars when the cars ...

a) "smashed into each other" (41mph)

<u>or</u>

b) "hit each other" (34mph)



Test
1 week later, Ss were asked if they saw broken glass.

Results

	"smashed" Ss	"hit" Ss
% yes (incorrect)	32%	14%

Conclusion: Misinformation causes false memory !

(Loftus & Palmer, 1974)

Another Example of Misinformation

Procedure

Study: Ss saw film of accident at intersection w/ stop sign

Misinformation: Ss estimate speed of car "as it passed…

"stop sign" (non-mislead Ss)

or

"yield sign" (mislead Ss)

Test: Ss were asked whether car passed stop sign or yield sign

Results

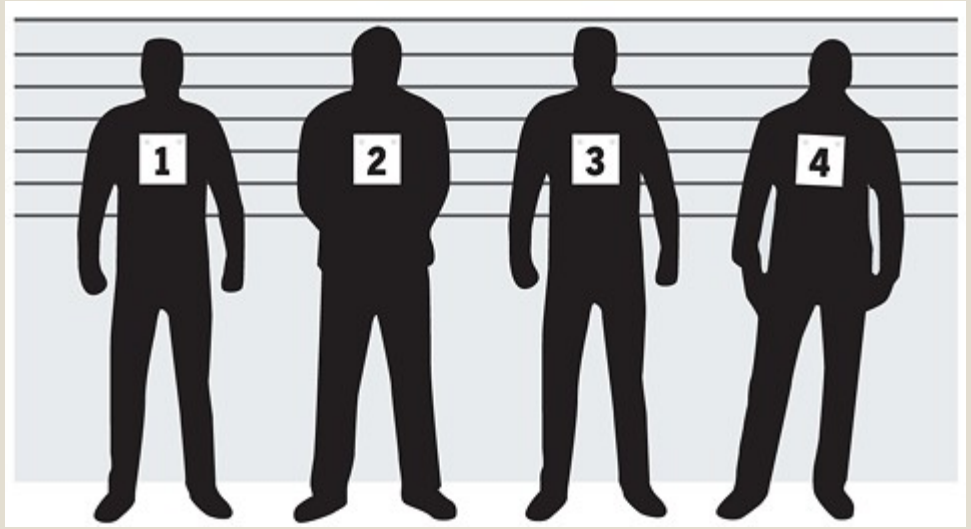
- Misled Ss more likely to answer incorrectly (“yield sign”)
- Incorrect “misled Ss” responded faster than correct “misled Ss”

Conclusions

- Misinformation creates false memory.
- Fast RT is not good predictor of accuracy.

Relevance to Criminal Justice System

- Most obvious case:
- crime --> study
- picture of suspect, leading questions, newspaper stories --> misinformation
- lineup --> test



Some better ways:

- Do not let potential witnesses see suspects.
- Interrogate without asking leading questions.

Creating False Memories

- Loftus & Pickrell (1995) – "Lost in the mall" study use three real events and one false event. About 25% of Ps reported some recollection of the false experience.
- DuBreueil et al. (1998) –
  - Participants told hospitals used mobiles over cribs around the time they were born
  - Hypnotized, told to go to the day they were born
  - Reports of mobiles; believe it is a real memory
  - Researchers were able to created false memories of events in infancy – crib mobile with 61% reported seeing the mobile in the crib. About 33% reported that this was a real memory.

It works with pictures too…

Wade, Garry, Read, Lindsay

Memory Contamination & Psychotherapy

- Therapist repeatedly asks child about abuse at day care center. Eventually, child "remembers" abuse.
- Therapist repeatedly asks woman about childhood abuse.
- Eventually, woman "recovers repressed memory" of abuse.
- Are these repressed memories or false memories?

More cases of false memories

- George Franklin, Sr.
- Convicted in 1989 of murder of 8-yr old 20 years earlier, based exclusively on “recovered” memory of his daughter Eileen.

- Dale Akiki case (SD)
- Charged with molesting dozens of children in day-care center. Videotapes showed that therapists badgered children until they reported abuse. Acquitted after brief deliberations.

Children's Suggestibility (Ceci & Huffman, 1997)

- 3-4 yr olds more vulnerable than 5-6 yr olds
- Some children resist debriefing, argue that events really occurred
- "Experts" unable to distinguish accurate from inaccurate reports

Repression does exist however…

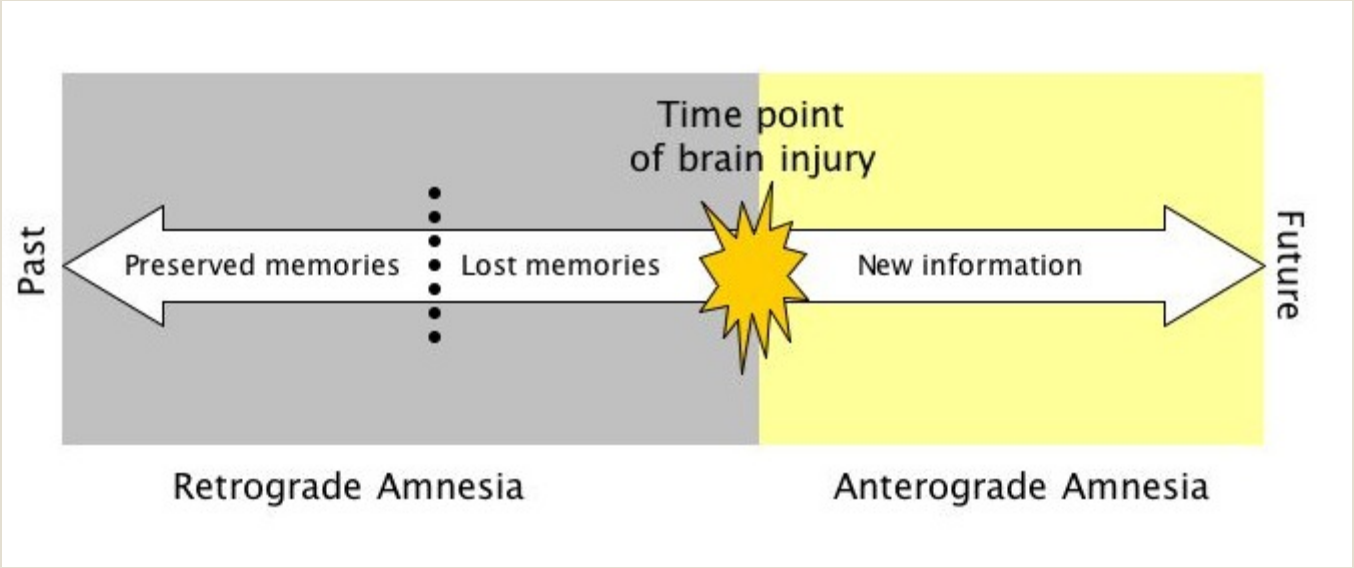
- There are documented reports of people forgetting and later remembering traumatic events that were confirmed by others.

- Memory repression is almost certainly a real phenomenon. However, memories are malleable (recovered or continuously held) and should be treated with caution and care when presented as court testimony and should be independently verified when possible.

Types of Amnesia

- Retrograde
  - Loss of memories prior to amnesic event.
  - Damage to distributed brain areas
  - Alzheimer's Disease

- Anterograde
  - Loss of memories after amnesic event.
  - Damage to hippocampus
  - HM & Clive Wearing



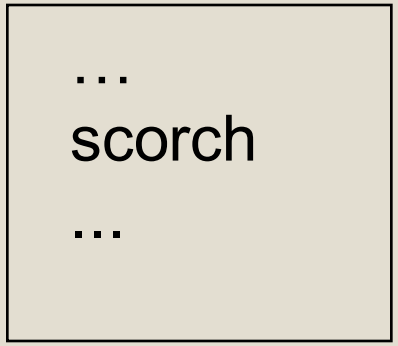
Clive Wearing (Anterograde)

- https://www.youtube.com/watch?v=Vwigmktix2Y

Spared Forms of LTM Storage in Amnesics

Procedure

Ss rate words as pleasant or not:



Later, Ss tested by either:

1. **Recognition**
   [e.g., Was “scorch” on study list?]
   or
2. **Word Stem Completion**
   [e.g., Complete sco_ _ _
   (*could be:* scorch, scores, scones, scopes)]

Results

Recognition: Amnesics ***are worse*** than Controls
Stem completion: Amnesics ***are just like*** Controls
(i.e. amnesics are just as likely to complete stems with words that were observed earlier.

Conclusion
Initial exposure "primed" the words, increasing the chance of them coming to mind during stem completion.

The right tests show that amnesics have some preserved memory. They even show normal repetition priming effects.
(Graf, Squire, & Mandler, 1984)
(Warrington & Weiskrantz, 1968)

Alzheimer's Disease

https://www.youtube.com/watch?v=yJXTXN4xrl8

Midterm Questions?