

False Memory: Distortions and Errors in Mind and Brain

False Memories? M. Romney and 9/11

Mitt Romney describes how he learned about the 9/11 attacks on Sep. 11, 2012 in Reno, Nev.

Mitt Romney **today** (emphasis added):

Like you, I remember where I was on September 11. I was originally planning on being in Battery Park in New York City, not far from the World Trade Center itself, but as it turned out, I was in Washington, DC, to meet with members of Congress about preparations for the security of the upcoming Olympic Winter Games. A colleague and I were working in the office we had in the Ronald Reagan Building. It was just a few blocks from the White House. **Someone rushed into our office and said that a plane had hit the World Trade Center.** I turned on the small TV on our desk there and watched in shock as flames and smoke erupted from the north tower.

Mitt Romney **in 2007** (emphasis added):

We had planned to be in New York City on the 11th. That was the date originally set by our public relations people for announcing the names of our Olympic torchbearers. Our team had planned an elaborate press conference adjacent to the World Trade Center at Battery Park. But we delayed the announcement in New York to accommodate our meeting on Capitol Hill.

Cindy Gillespie had scheduled a meeting with House and Senate appropriators in the U.S. Capitol building for 10:00 a.m. on the 11th. I met Cindy at 8:00 a.m. to put the finishing touches on our presentation. She had an office in the Ronald Reagan building on Pennsylvania Avenue, just blocks from the White House. **I was on the phone to Salt Lake City, doing a radio interview. The interviewer interrupted to say there were reports that a plane had hit the World Trade Center.** I hung up and turned on the small TV in the office.

Like so many other Americans, I watched in horror as flames poured from the North Tower of the World Trade Center.

People Can Come to Believe Memories for Events that Never Occurred

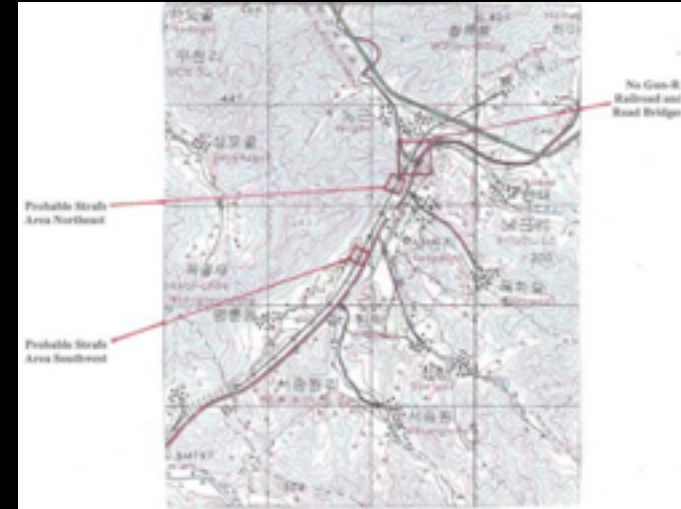
Edward Daily & the No Gun Ri Massacre

Ex-GI Says He Wasn't At No Gun Ri

By CHARLES J HANLEY

AP Special Correspondent

05/25/00 19:59EDT



CLARKSVILLE, Tenn. (AP) -- One of the Korean War veterans who described the U.S. Army killing of refugees at No Gun Ri says he now recognizes he could not have been at the scene and instead learned of it second-hand from soldiers who were there.

Wartime documents found in government archives by The Associated Press show that the ex-soldier, Edward L. Daily, 69, of Clarksville, was in another unit elsewhere in Korea when 7th Cavalry Regiment companies fired on the South Korean civilians in late July 1950.

"I have to agree with your records. I can't dispute them," Daily said in an AP interview after reviewing the relevant documents. Asked whether he agreed the records showed he could not have been at No Gun Ri, he replied simply, "Yes."

Recovered Memories or False Memories?

In 1991, George Franklin, Sr., of San Mateo County in California, became the first person in the USA to be convicted of murder on the basis of only a repressed memory, with absolutely no other corroborating evidence. It was his daughter, Eileen, who provided the memory.

Eileen's "recovered" memory was extremely detailed and very persuasive. However, all the information she gave to the police was freely available in newspaper reports of the murder. She gave no new information. In fact, she "remembered" some information about a ring that the newspapers had inaccurately reported – suggesting that her "memory" may have been largely based on what she had read, not what she had experienced. George Franklin's conviction was overturned in 1996.

If the memory wasn't "real," where did it come from?

False Memories

Can whole, large-scale events be “implanted” in people’s memories?

Can someone be confident in a memory that is not real?

Can real memories be altered?

Can imagination be mistaken for reality?

What situations might lead to false memories?



Implanting False Memories in the Lab

Loftus & Pickrell (1995)

- Subjects (n=24) presented with 3 true stories and 1 false story from the person's past (between ages 4-6). Told events come from parents/older siblings.
- False story (e.g., getting lost in the shopping mall) had realistic details from relatives, along with false details (e.g., being comforted by an older woman).



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- Subjects recalled 68% of true events and 29% of false events.
 - the false events were recalled even two weeks later
- Some subjects clung to the false memory even after being debriefed.
- Differences: True memories = more details and rated as more vivid/clear.

More Implanted False Memories

- Accident at family wedding (Hyman et al., 1995)
- 25% reported false memory for the fictitious event



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False Memory in the Laboratory: Deese – Roediger/McDermott Paradigm

<i>bread</i>	<i>sweet</i>	“Critical lure”
butter	sour	
food	candy	
eat	sugar	
sandwich	bitter	
rye	good	“Studied Associates”
jam	taste	
milk	tooth	
flour	nice	
jelly	honey	
dough	soda	
crust	chocolate	
slice	heart	
wine	cake	
loaf	tart	
toast	pie	

Participation Prompt #6

- Based on what we've discussed about learning and memory, along with reflections on your memory experiences during the task:
- Generate possible mechanisms (causes) for how false memories might come about in the Roediger/McDermott Paradigm.

Can Confidence be High for False Memories: False Recall and False Recognition

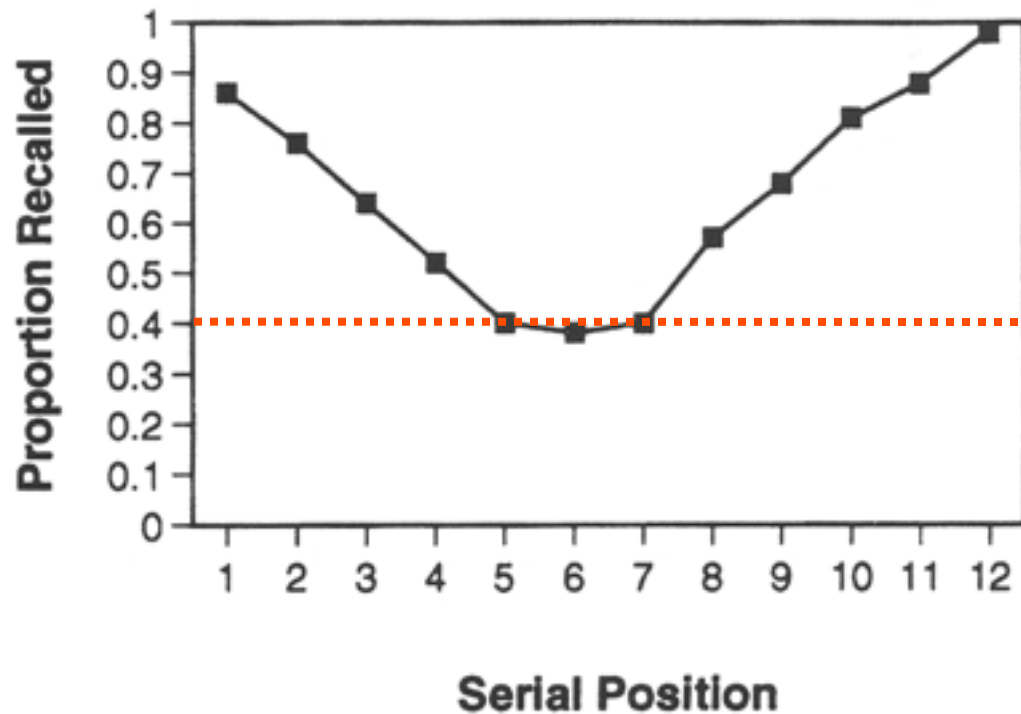
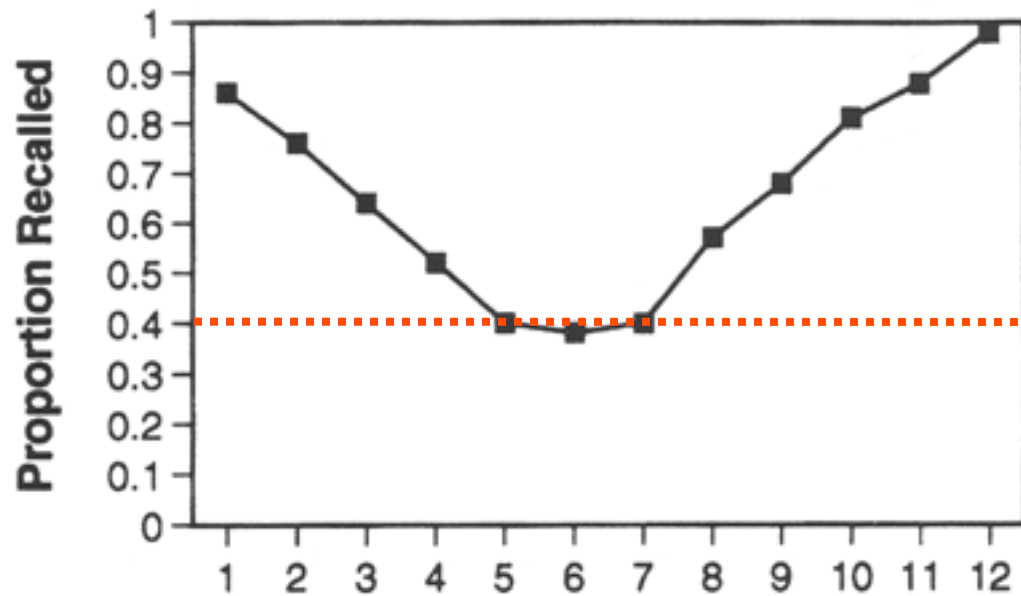


Figure 1. Probability of correct recall in Experiment 1 as a function of serial position. Probability of recall of the studied words was .65, and probability of recall of the critical nonpresented item was .40.

Can Confidence be High for False Memories: False Recall and False Recognition



RECOGNITION

	Old		New	
	HC	LC	LC	HC
Studied	.75	.11	.09	.05
Nonstudied				
Unrelated lure	.00	.02	.18	.80
Critical lure	.58	.26	.08	.08

Can People “Remember” False Memories?

	Proportion of Old Responses		
	Overall	Remember	Know
STUDIED	.79	.57	.22
NONSTUDIED			
Unrelated Lure	.11	.02	.09
Critical Lure	.81	.58	.23

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Can real memories be altered?

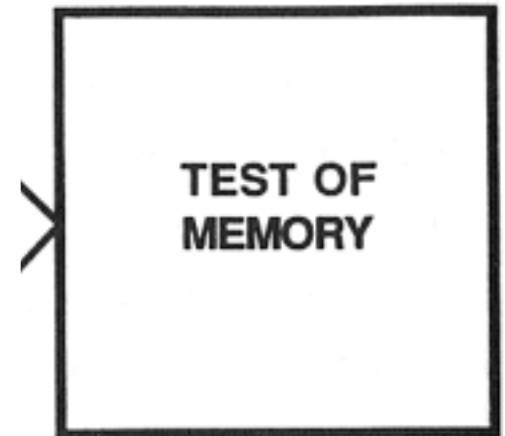
Can imagination be mistaken for reality?

What situations might lead to false memories?



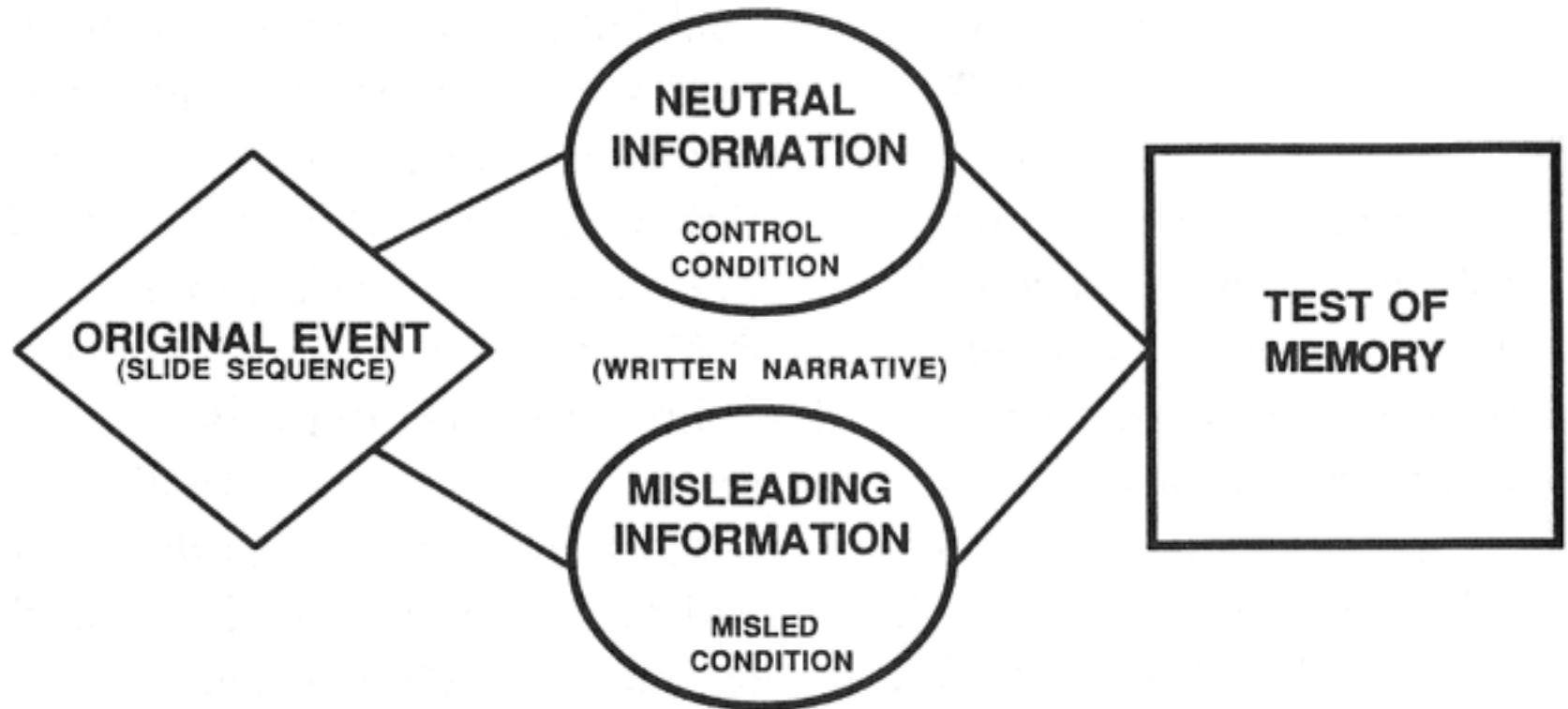
Can Real Memories Be Altered?

The Misinformation Effect



Can Real Memories Be Altered?

The Misinformation Effect



- Are there real-world analogs to this paradigm?

Can Real Memories Be Altered?

The Misinformation Effect



Retrieval practice / eyewitness questionnaire

- “Did another car pass the Datsun while it was stopped at the *intersection*?”
(neutral)
- “Did another car pass the Datsun while it was stopped at the *stop sign*?”
(consistent)
- “Did another car pass the Datsun while it was stopped at the *yield sign*?”
(misleading)

(Loftus et al., 1978)

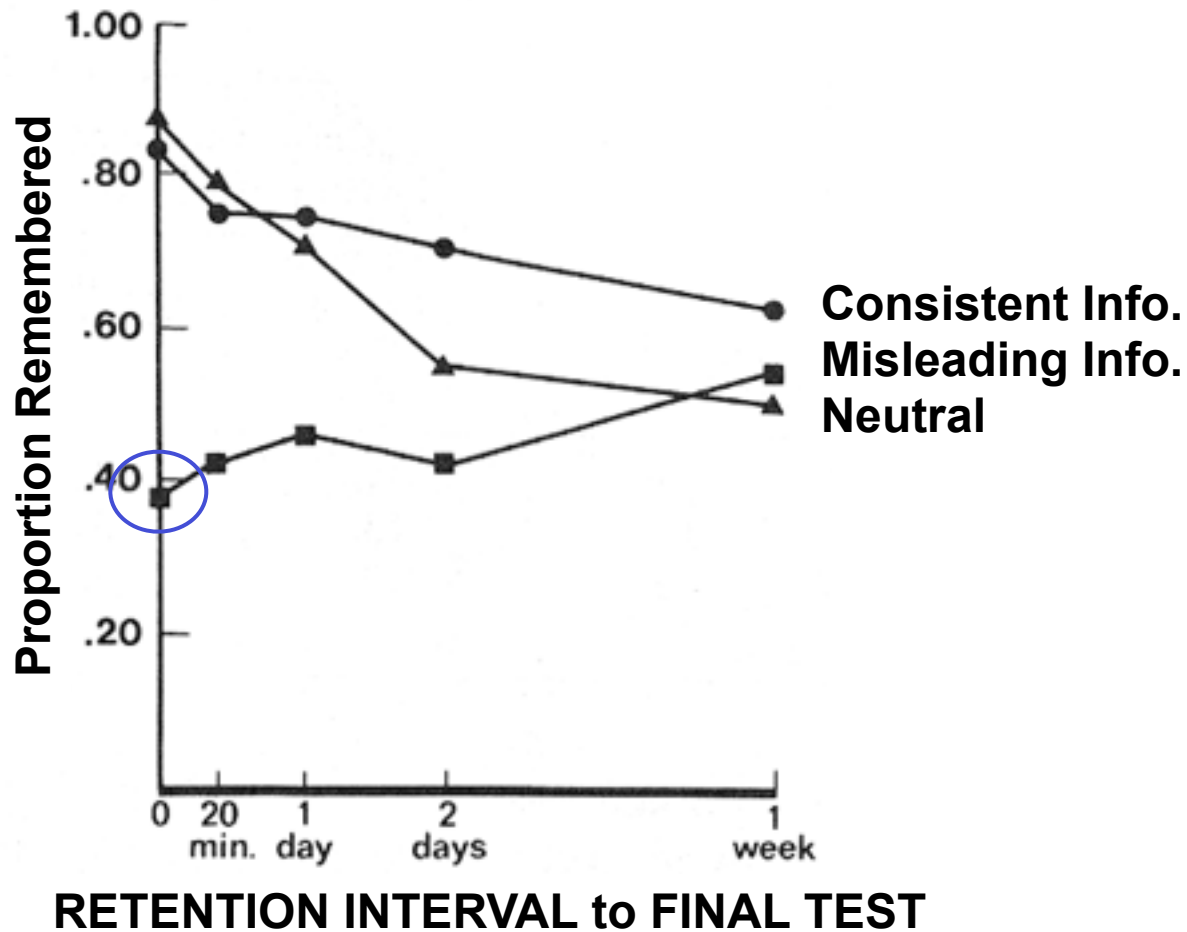
Can Real Memories Be Altered? The Misinformation Effect



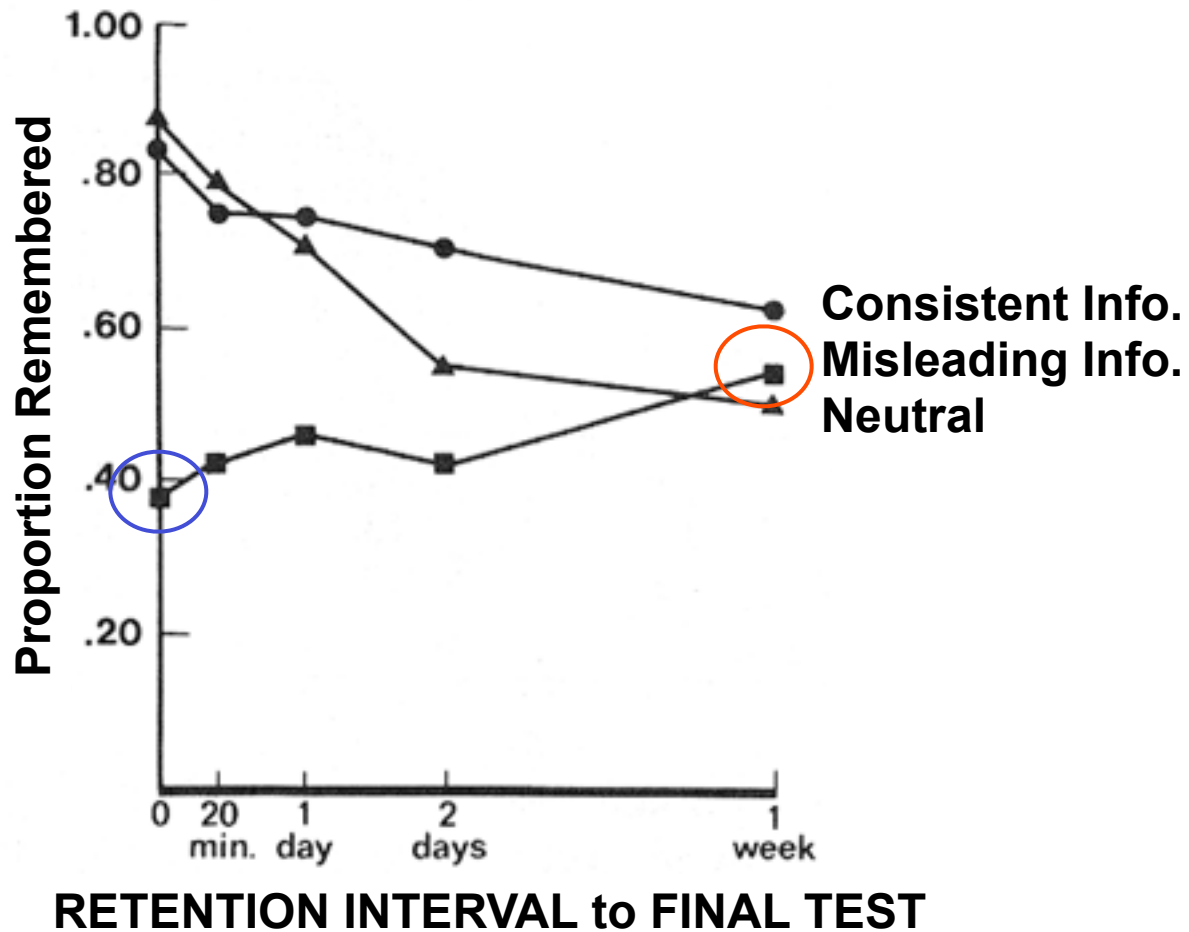
Test Phase



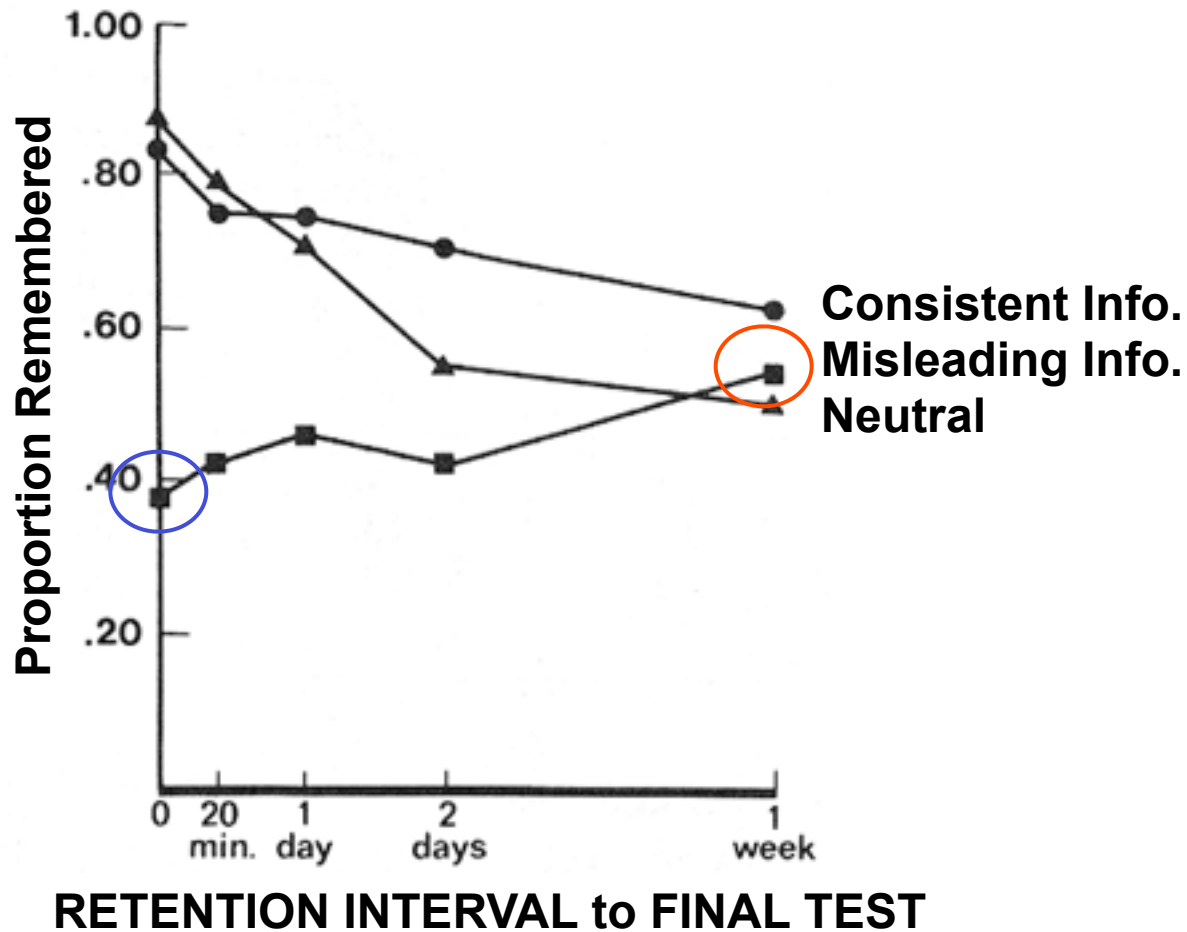
The Misinformation Effect



The Misinformation Effect



The Misinformation Effect



- People can have difficulty distinguishing where they acquired knowledge (**source confusion**)
- Source memory errors can increase with time (**sleeper effect**)
 - how related to Estes's model?

Can Real Memories Be Altered?

Bias & the Suggestion Effect

Study

watch a film of a car accident

Test

eyewitness questioning using different language

“About how fast were the two cars going when they VERB HERE each other?”

contacted	
hit	
bumped	
collided	
smashed	

Can Real Memories Be Altered?

Bias & the Suggestion Effect

Study

watch a film of a car accident

Test

eyewitness questioning using different language

“About how fast were the two cars going when they VERB HERE each other?”

contacted	31.8 mph
hit	34 mph
bumped	38.1 mph
collided	39.3 mph
smashed	40.8 mph

Memory is Reconstructive: A week later, the subjects receiving the “smashed” question were more likely to (incorrectly) report broken glass

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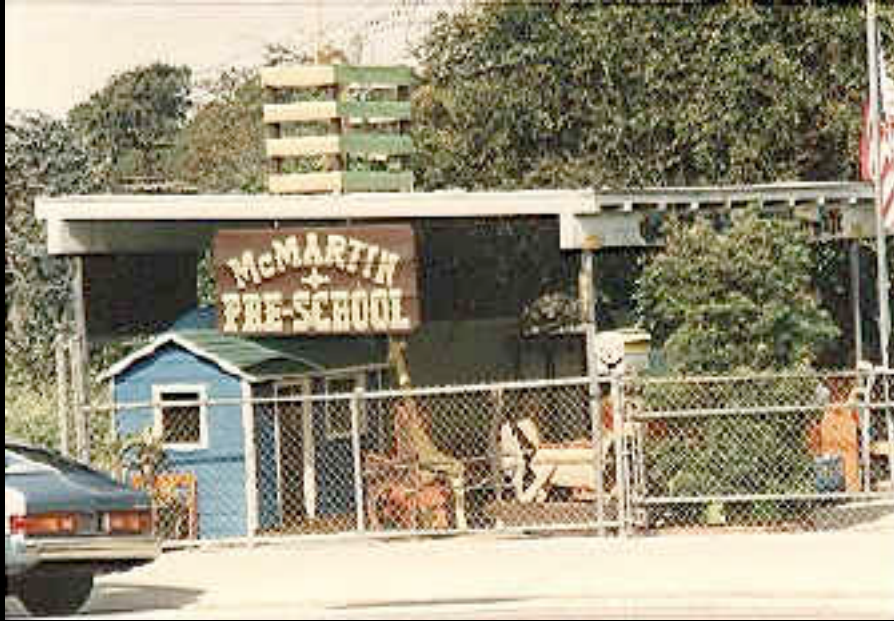
Can real memories be altered?

Can imagination be mistaken for reality?

What situations might lead to false memories?



False Memories: The McMartin Preschool Case



Manhattan Beach, CA

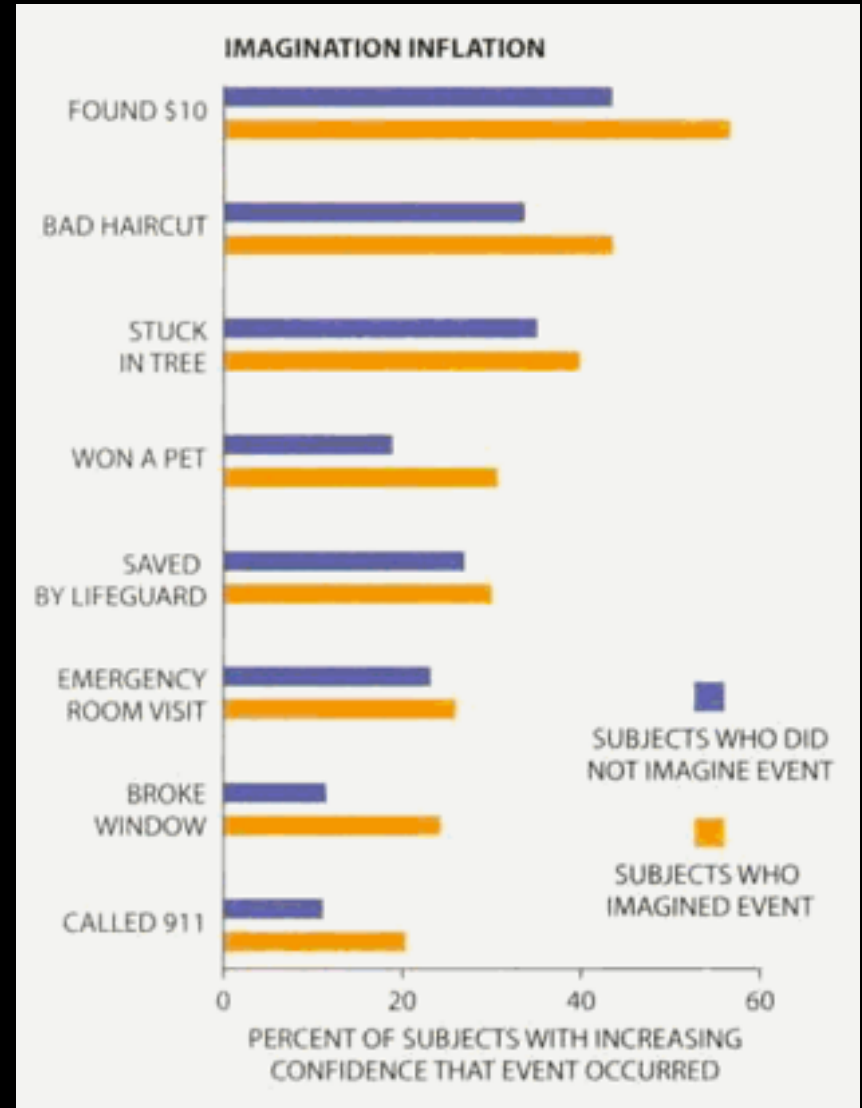


Implanting False Memories in the Lab: Imagination Inflation

Participants are told to imagine an event: e.g., playing inside at home after school, hearing a strange noise outside, running toward the window, tripping, falling, reaching out and breaking the window with their hand.

Participants were asked questions about the contents of their imagination: e.g., "What did you trip on? How did you feel?"

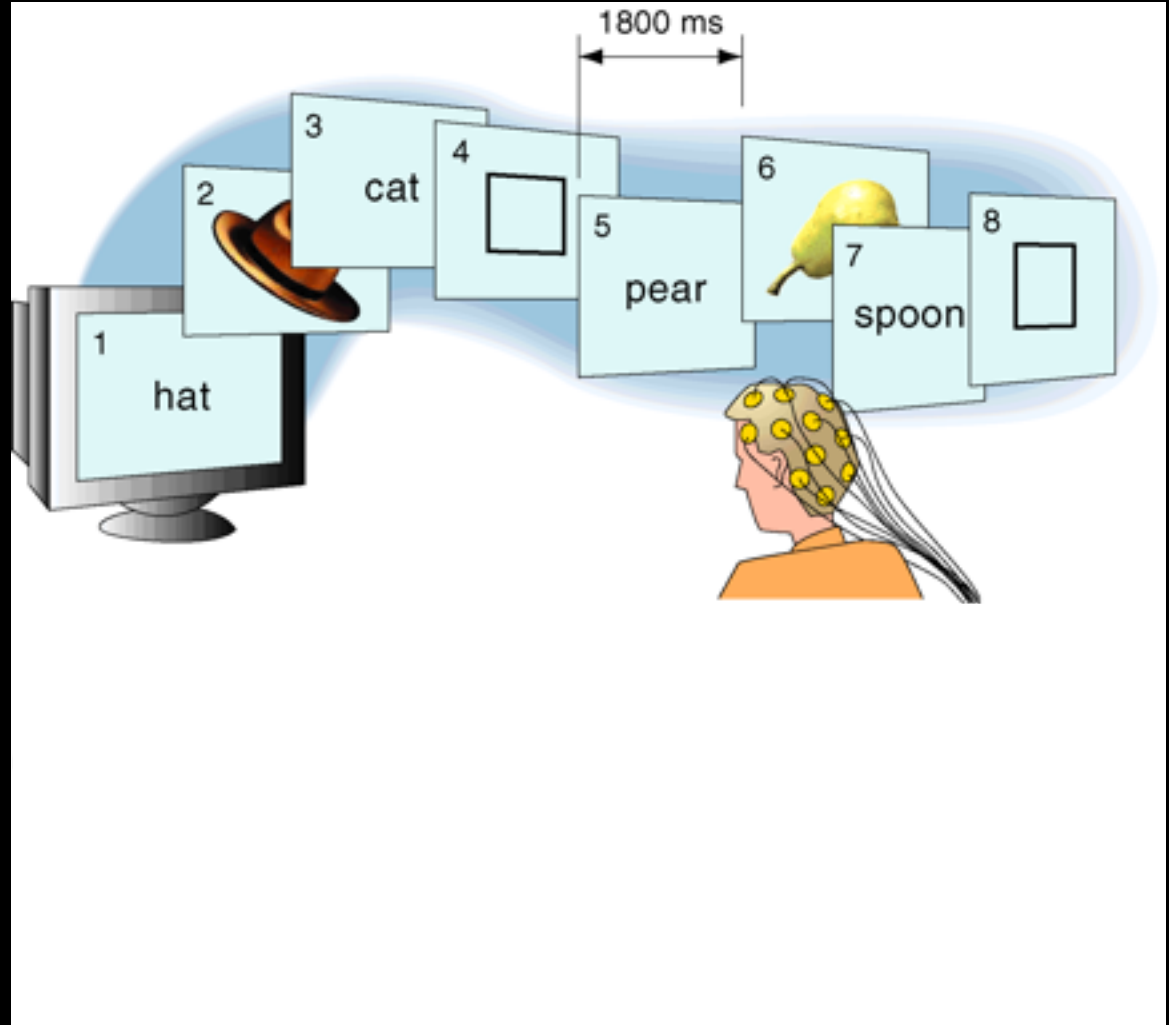
Later, participants were asked the likelihood that the event had actually occurred



Can Imagination be Mistaken for Reality?

Study Phase

- Word-only
[imagine picture]
- Word+Picture



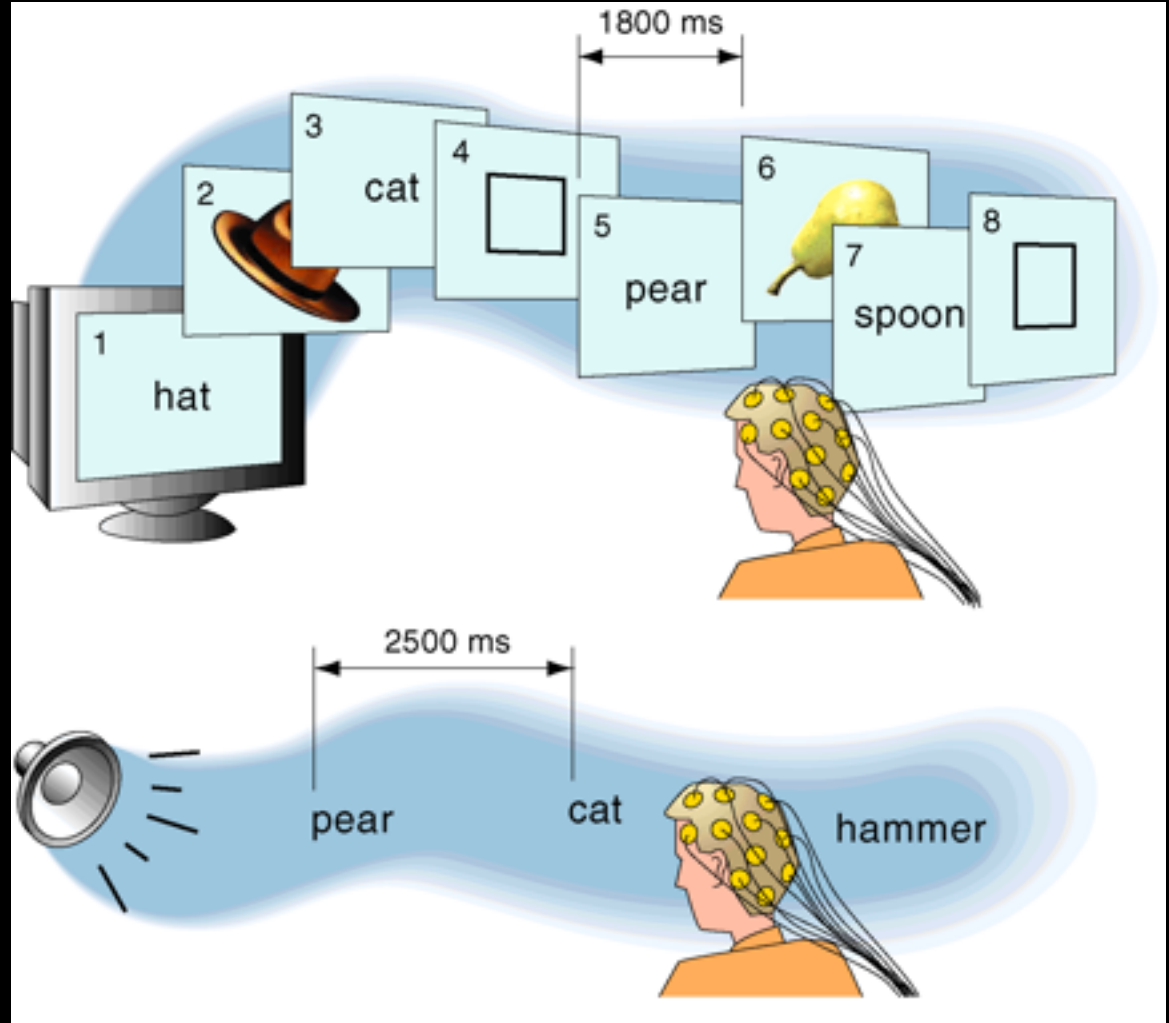
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Study Phase

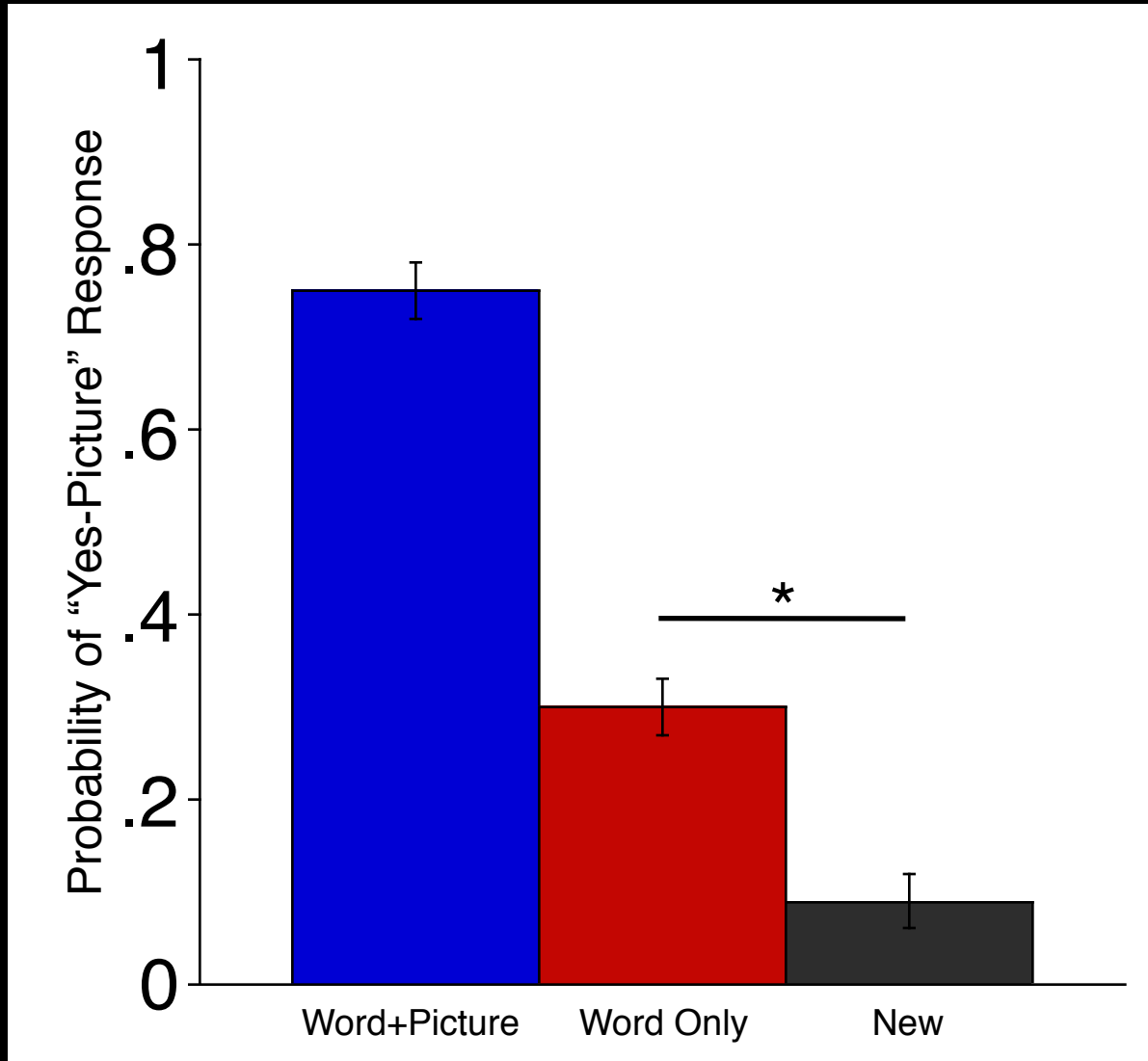
- Word-only
[imagine picture]
- Word+Picture

Test Phase

- Did you see a
picture of this item?



Imagination Inflation: Remembering “Seeing” What You Imagined

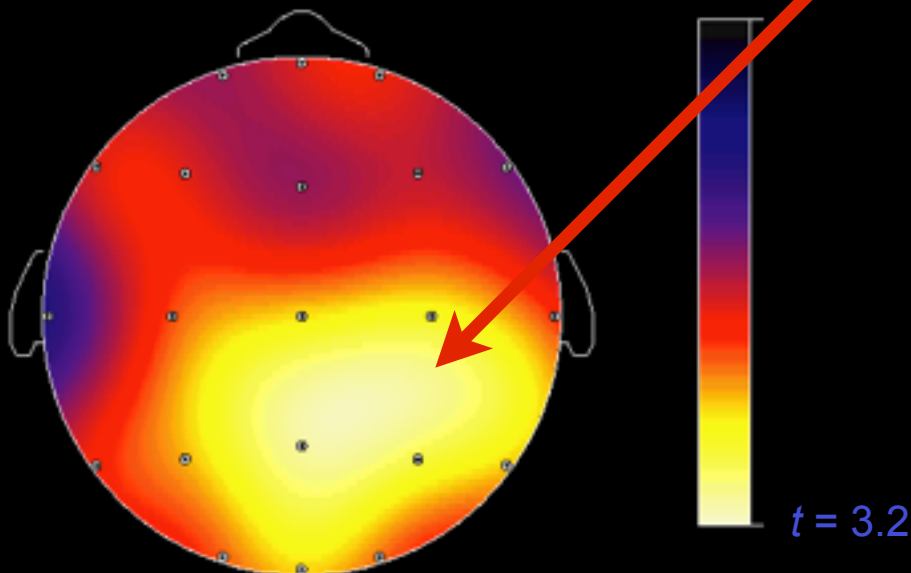
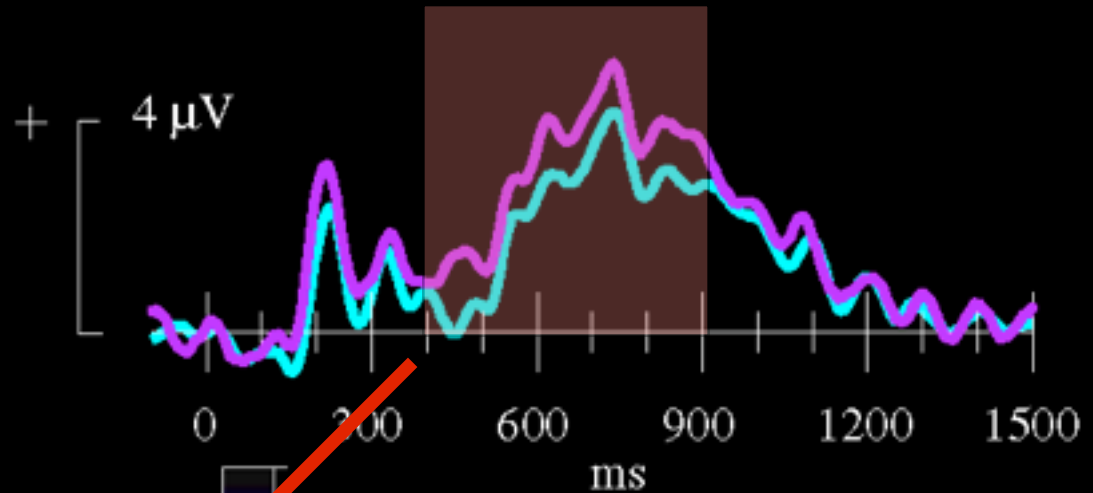


Encoding Responses Predict Later False Memory

Study-phase ERPs to Word-Only trials:
amplitude over visual cortex predicts later false memories

— Later false memories

— Later correct rejections



Understanding Imagination Inflation

Rich vivid imagery creates a memory that resembles the contents of a memory for real experiences

During retrieval, the reactivation of these rich imagery details is falsely attributed to having seen the stimulus rather than to having imagined it

A form of **source memory confusion** (aka, *source amnesia*)

- Did I think it or did I see it?
- The closer our imagination gets to perception, the higher the likelihood of confusion

Source Memory Failures

*After serving as editor for former president Reagan's memoir, Korda (1997) recounts "we had to convince Reagan not to include the story about how he recorded atrocities at the German death camps...a story that he told Yitzhak Shamir, bringing tears to Shamir's eyes, because as it happens, Reagan had spent the entire war in Hollywood...He had seen some of the first footage taken by Army cinematographers of the... camps and had somehow convinced himself that he'd been there" (p. 93)
[From Senkfor et al. 2002]*

External-External Source Discrimination

Person A vs Person B

TV vs Web

Heard vs Seen

Time 1 vs Time 2

Internal-External Source Discrimination (Reality Monitoring)

Thought vs Did

Imagined vs Experienced

False Memories? H. Clinton and Bosnia



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Clinton Bosnia Account Comes Under Fire

March 24, 2008 3:14 PM

ABC News' Eloise Harper and Nitya Venkataraman Report: Sen. Hillary Clinton, D-N.Y., has been receiving heat for her account of a trip she took to Bosnia as First Lady, most recently in [a clip that splices her account with CBS footage of the 1996 visit](#) being circulated by the Obama campaign.

Email Share

It has been disputed whether Clinton was embellishing the risk she faced during the landing in Tuzla and the trip overall. Most recently, Clinton said they landed in an "evasive maneuver" "under sniper fire".

At an event in Washington last Monday, Sen. Clinton said, "There was supposed to be some kind of a greeting ceremony at the airport but instead we just ran with our heads down to get into the vehicles to get to our base."

After CBS video surfaced of the 1996 visit to Bosnia showing no visible threat and a calm greeting ceremony on the tarmac in Tuzla - Clinton's account was again called into question.

Today on a conference call with reporters, Clinton Communications Director Howard Wolfson, defended Clinton but said that she may have "misspoke" in her most recent description of the trip.



Frontal Lobes and Source Memory Failures

Study → presented 20 novel trivia facts

- *The name of the dog on the Cracker Jacks box is Bingo*

Retention Interval → 6–8 days

Test → Cued recall + source assessment

- *What is the name of the dog on the Cracker Jacks box?*
- If know the answer, then:
 - *Can you tell me where you learned the answer?*
 - *When was the last time you heard that information?*

Frontal Lobes and Source Memory Failures

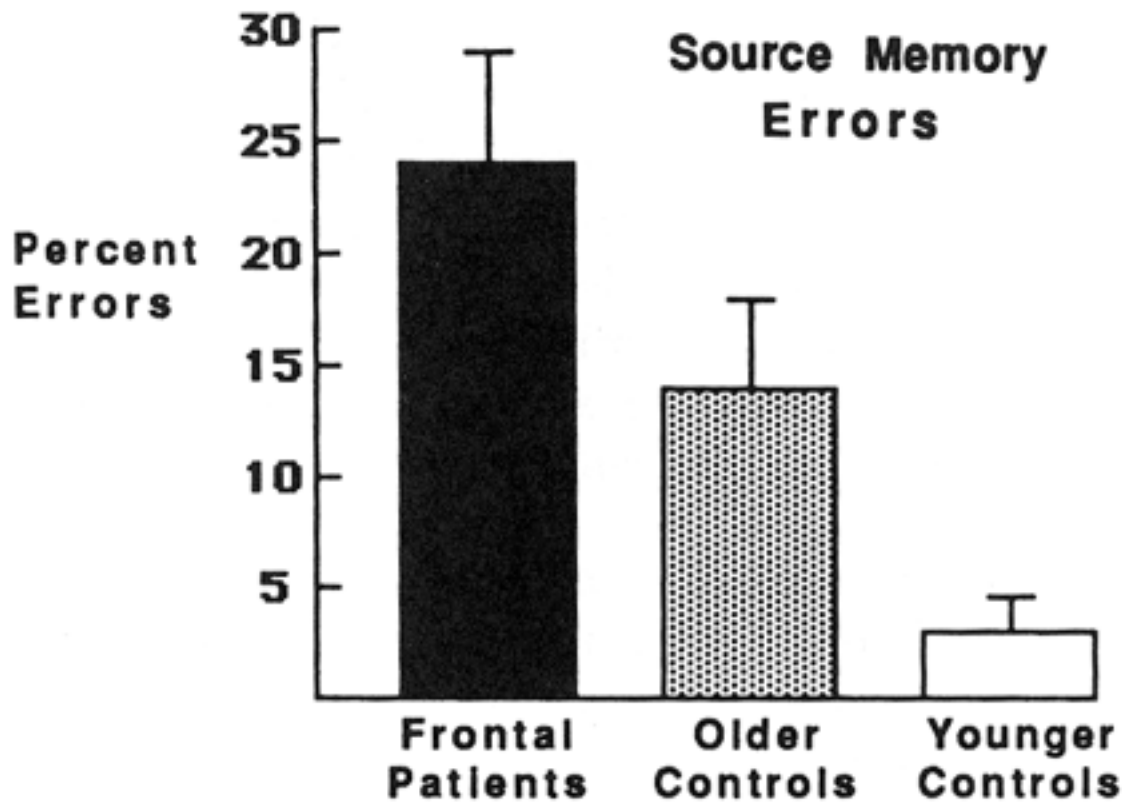


FIGURE 51.6 Source memory performance by patients with frontal lobe lesions (mean age, 64 years), age-matched control subjects (mean age, 62 years), and younger control subjects (mean age, 49 years). Source errors represent instances when a subject failed to recall the time and place a fact was presented. (Data from Janowsky, Shimamura, and Squire, 1989, experiment 2)

Source Confusion and the Deese – Roediger/McDermott Paradigm?

bread

butter

food

eat

sandwich

rye

jam

sweet

sour

candy

sugar

bitter

good

taste

“Critical lure”

“Studied Associates”

Internal-External Source Confusion:
Does the Critical Lure come to mind during study of the list, and then the subject confuses their generation of the CL for having actually seen the word?

loaf

toast

tart

pie

False Memories

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What other mechanisms might cause false memories?



False Memory due to Memory for Gist?

Source Confusion

- e.g., DRM false memories due to reality monitoring / internal–external source confusion

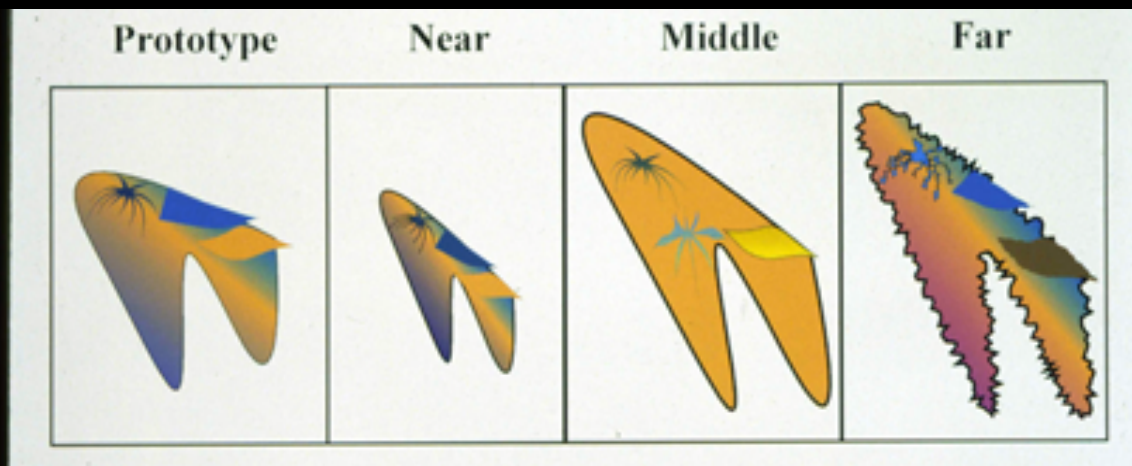
Memory for *gist* (*central tendency of past experience*)

- false remembrance based on similarity between current stimulus and central tendency/gist of past experiences

False Memory due to Memory for Gist?

Study Phase: View exemplars that were distortions of a prototype

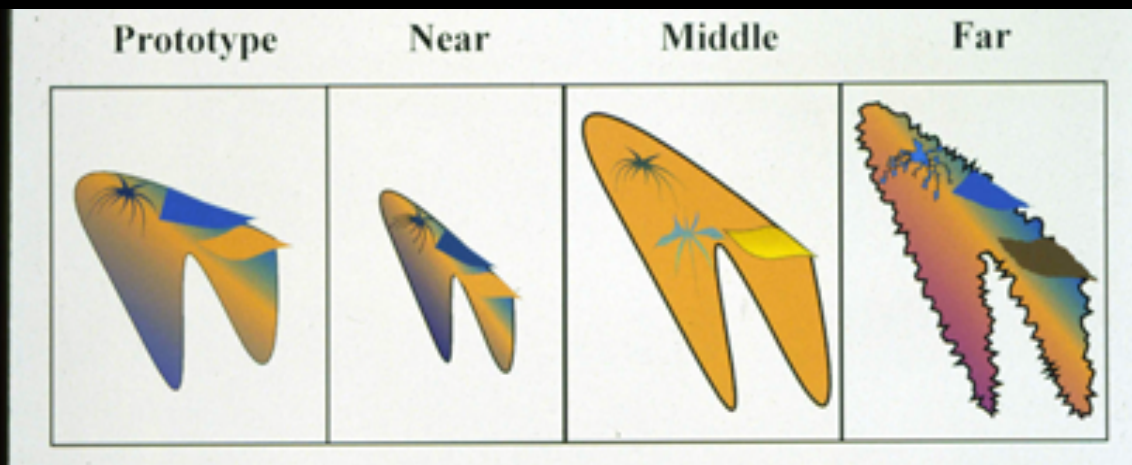
Test Phase: Old/new recognition on (a) studied exemplars, (b) unstudied exemplars that were near, mid, and far distortions of prototype, and (c) the unstudied prototype



False Memory due to Memory for Gist?

Study Phase: View exemplars that were distortions of a prototype

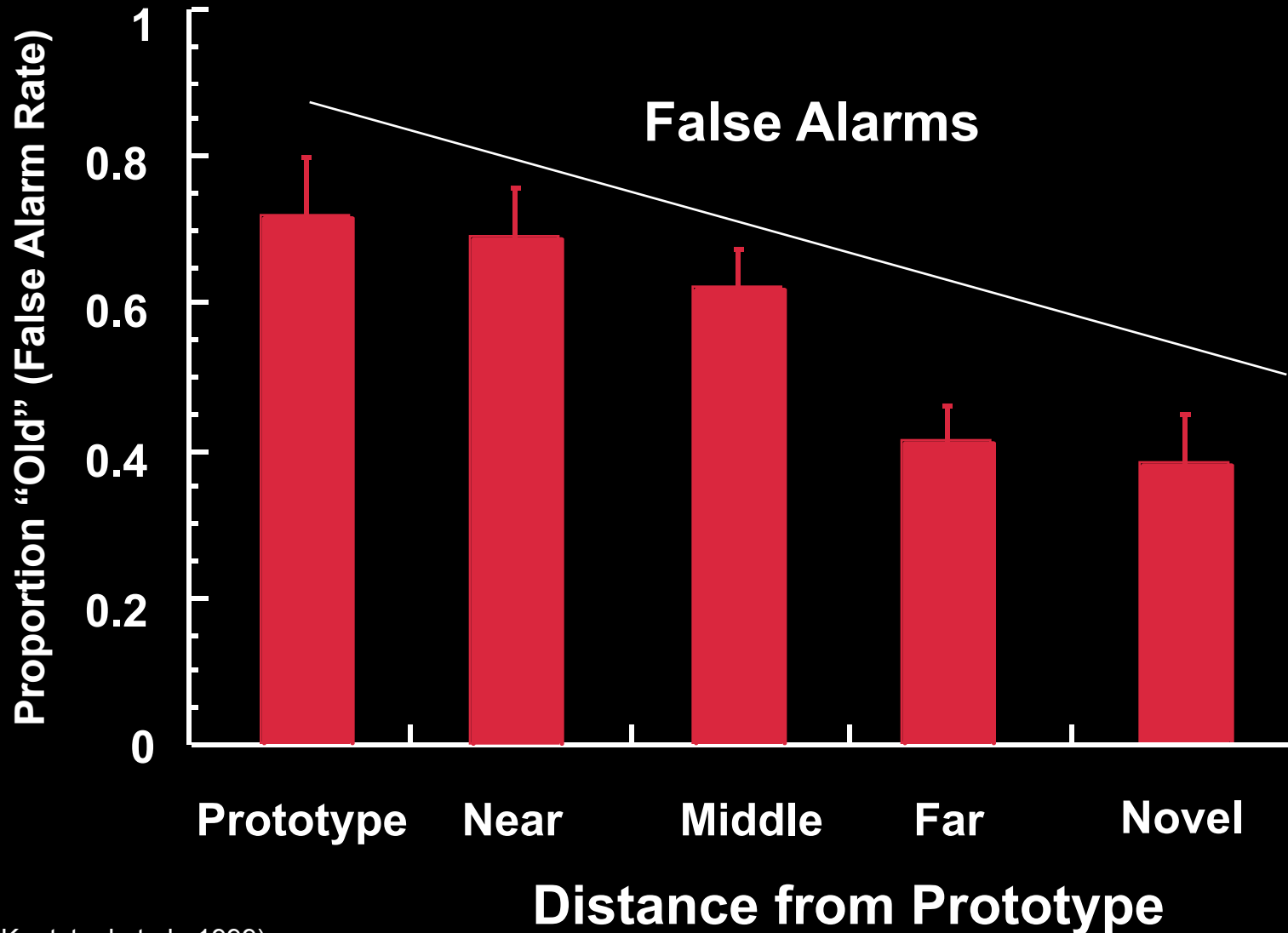
Test Phase: Old/new recognition on (a) studied exemplars, (b) unstudied exemplars that were near, mid, and far distortions of prototype, and (c) the unstudied prototype



Logic

- People are not likely to self-generate (i.e., imagine) the near, middle, and far exemplars nor the prototype during study
- If memory for 'gist' can drive false recognition, then false memory should depend on the similarity of novel images to the prototype (from which the studied exemplars were generated)

Similarity-Based False Memory due to Memory for Gist

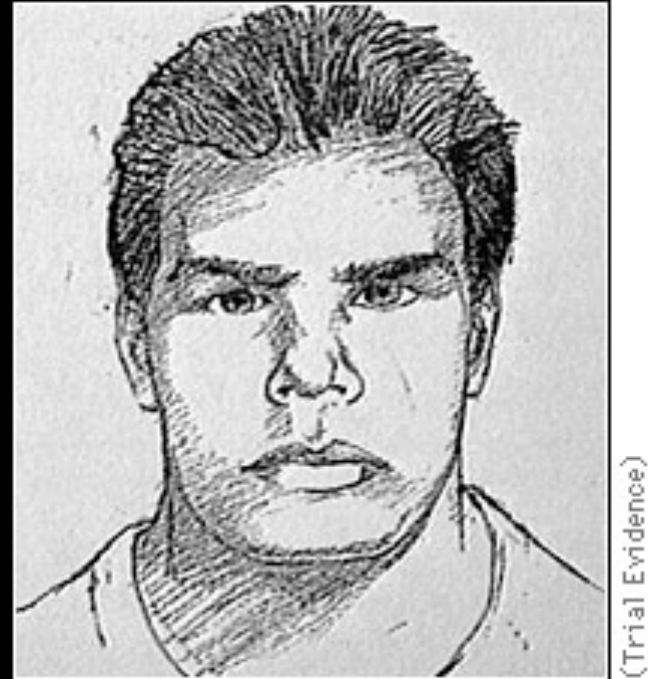


False Memory due to Memory for Gist

∴ Under some situations, false memory does not reflect source confusions

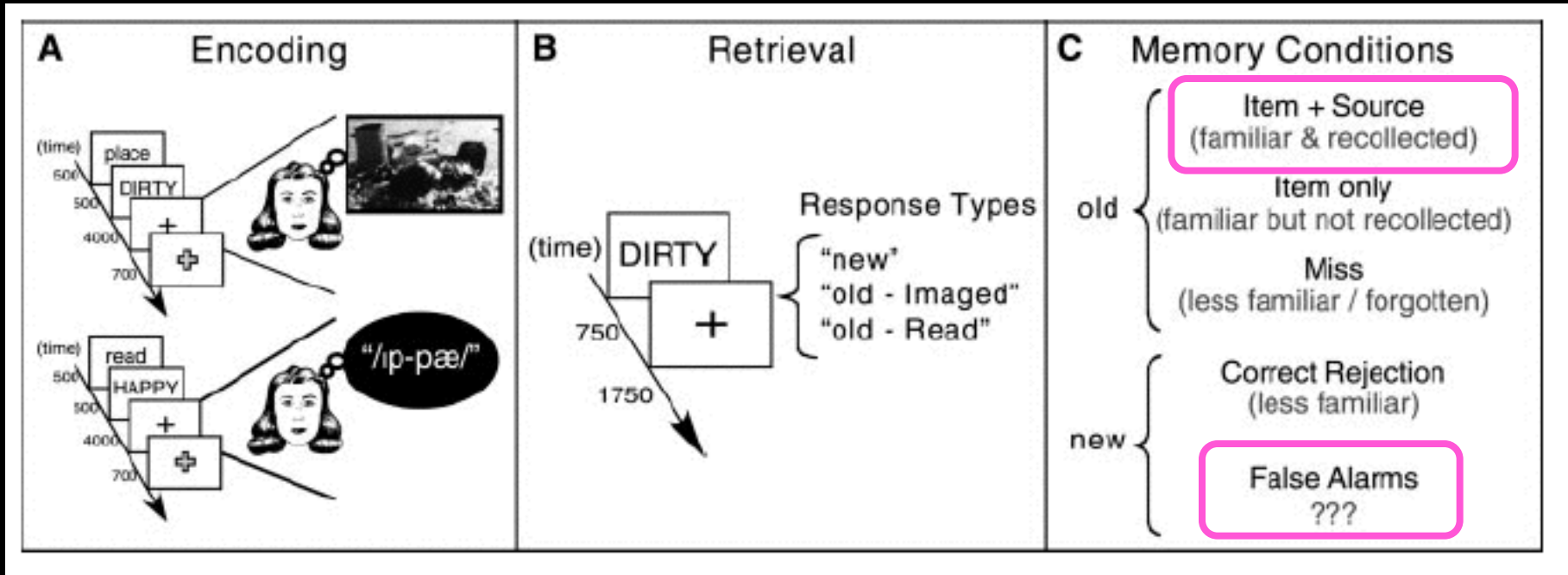
- False memory occurs when a new stimulus is similar to those we've previously encountered
- Reveals that recognition memory decisions are partially based on **item familiarity**, and that **familiarity** depends on the **similarity** of a test probe to stored representations of the encountered items

Sometimes False Memories are Due to False Recollection

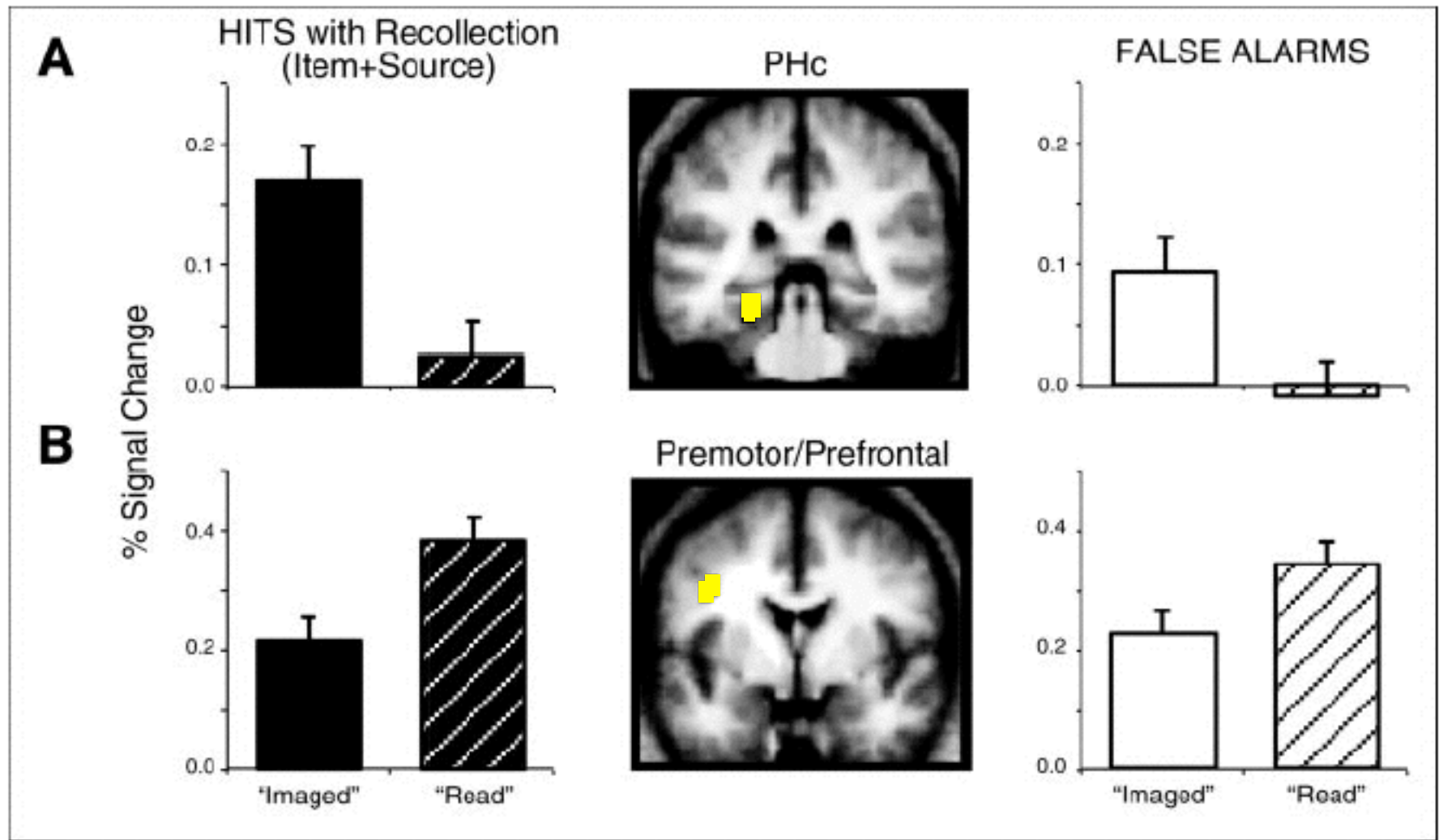


Oklahoma City bombing, 1995
John Doe #2: Product of a memory error

Sometimes False Memories are Due to False Recollection – Cortical Reinstatement



Sometimes False Memories are Due to False Recollection – Cortical Reinstatement



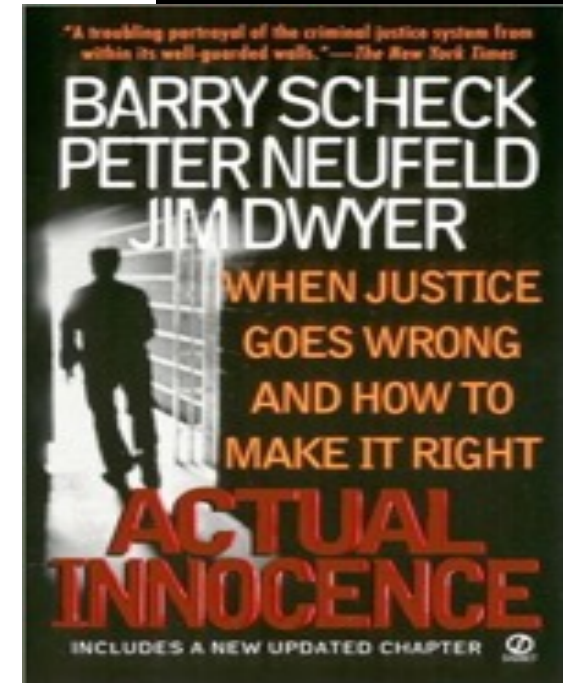
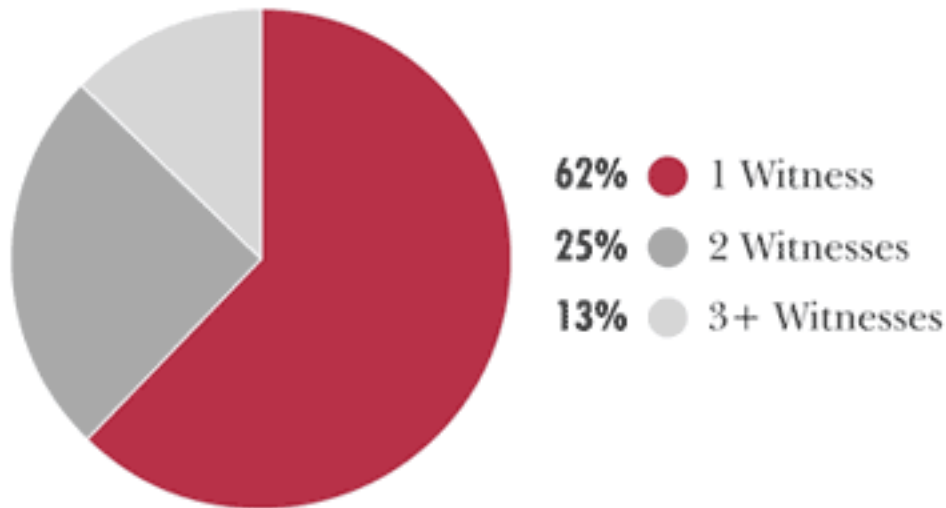
General Conclusions About False Memory

- I. Memory is often a **reconstructive** process, and thus is prone to bias / distortion
- II. **Multiple factors** can foster conditions of increased false memory
 - source memory failures (e.g., imagination inflation)
 - judgments based on similarity / gist
 - false recollection / cortical reinstatement
- III False memories can be **nearly indistinguishable** from true memories
 - Phenomenologically (claim HC or to 'remember')
 - Neurally (cortical reinstatement)

Prevalence & Consequences of False Memories

DNA exonerations & Eyewitness Testimony

Number of witnesses misidentifying
the same innocent defendant
(based on 175 eyewitness misidentification cases
in the first 239 DNA exonerations)



Eyewitness misidentification is the single greatest cause of wrongful convictions nationwide, playing a role in more than 75% of convictions overturned through DNA testing. – The Innocence Project

Imagined vs. Real Memories

“Ten thousand different things that come from your memory or imagination -- and you do not know which is which, which was true, which is false.”

— Amy Tan

“It isn’t so astonishing, the number of things that I can remember, as the number of things I can remember that aren’t so.”

— Mark Twain