



Memory 3

Psyc 364: Oct 19th 2016

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If any one faulty of our nature may be called more wonderful than the rest, I do think it is memory. There seems something more speakingly incomprehensible in the powers, the failures, the inequalities of memory, than in any other of our intelligences. The memory is sometime so retentive, so serviceable, so obedient; at others, so bewildered and so weak; and at other again, so tyrannical, so beyond control! We are, to be sure, a miracle in every way; but our powers of recollecting and of forgetting do seem peculiarly past finding out.

-Jane Austen

Autobiographical Memory

Autobiographical memory—memory for events and issues related to yourself

- Ecological validity
- Gist vs. details
- Schemas & consistency bias

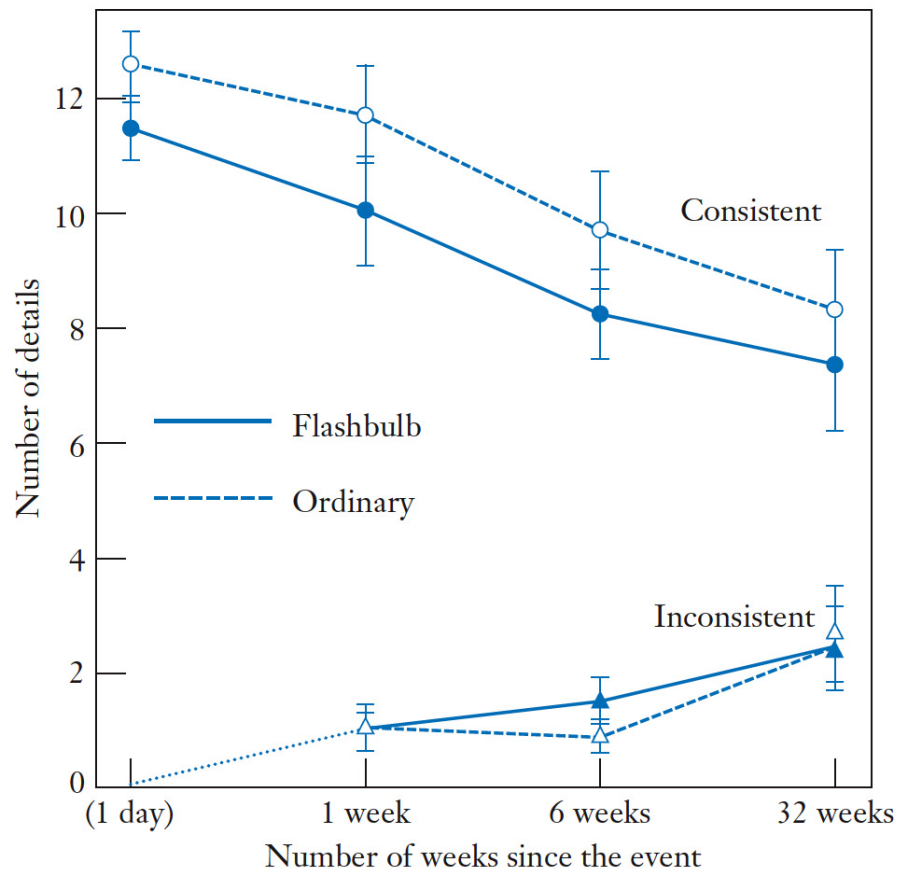
Autobiographical Memory

- source monitoring—trying to identify the origin of a particular memory
- reality monitoring—trying to identify whether an event really occurred or was imagined

Flashbulb Memories

- Flashbulb memory—memory for the circumstances in which you first learned about a very surprising and emotionally arousing event
- Many people believe that they can accurately recall all the minor details about what they were doing at the time of this event.





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Figure 5.3

False Memory

Memory is imperfect:

- dynamic
- reconstructive
- adaptive process

➔ *False memories are part of a normal memory system*

Examples of False Memory

- Brian Williams, NBC Nightly News

<https://www.youtube.com/watch?v=VTjqywVKiKo>

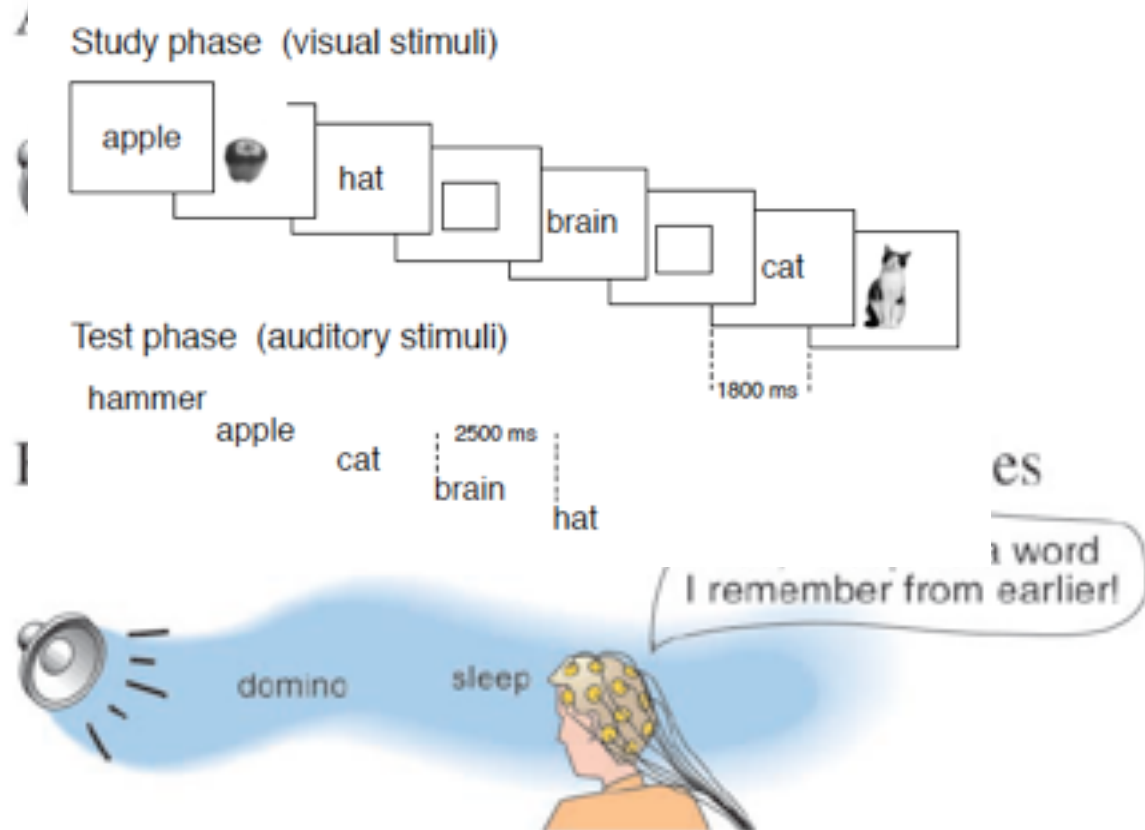
- Hillary Clinton, Presidential Candidate

<https://www.youtube.com/watch?v=rZHO1vo762c>

False Memories

- DRM
- Imagination inflation
- Misinformation Effect

DRM

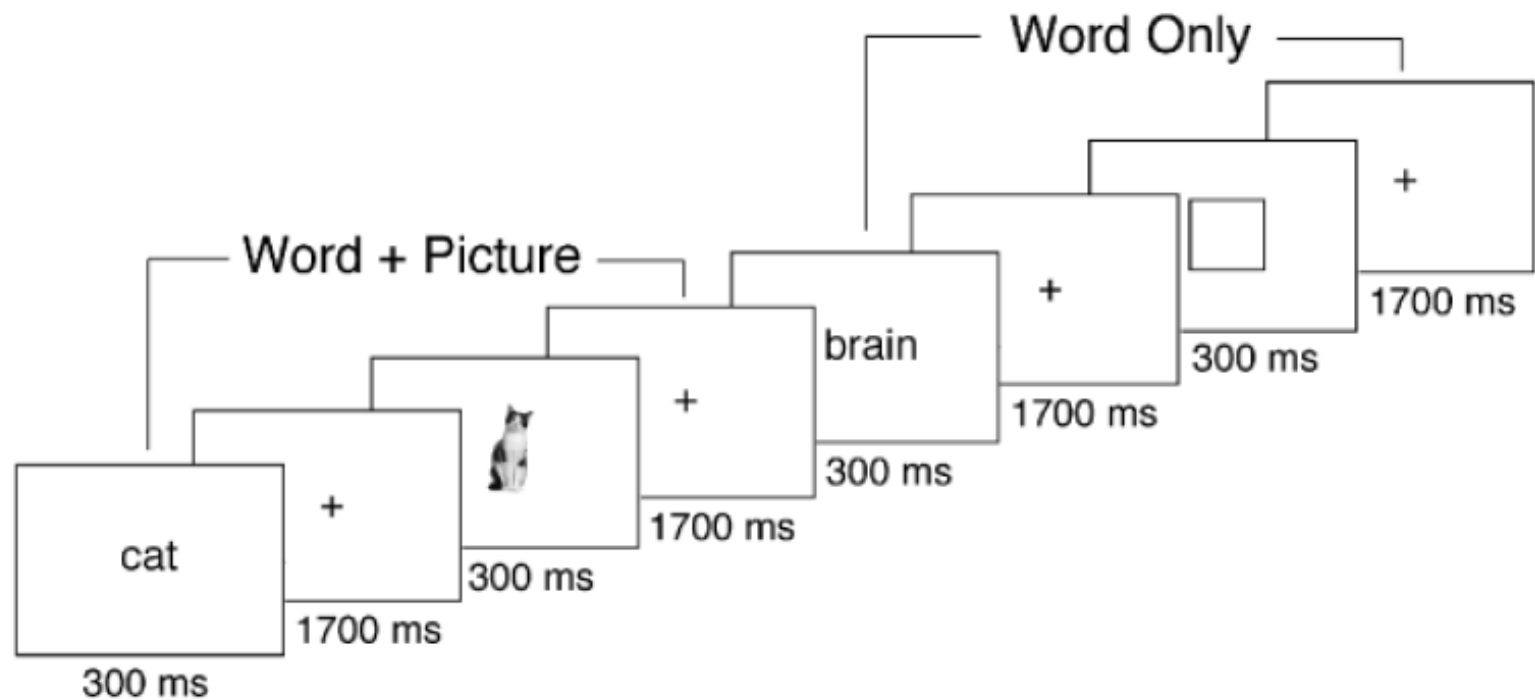


Results: Recognition

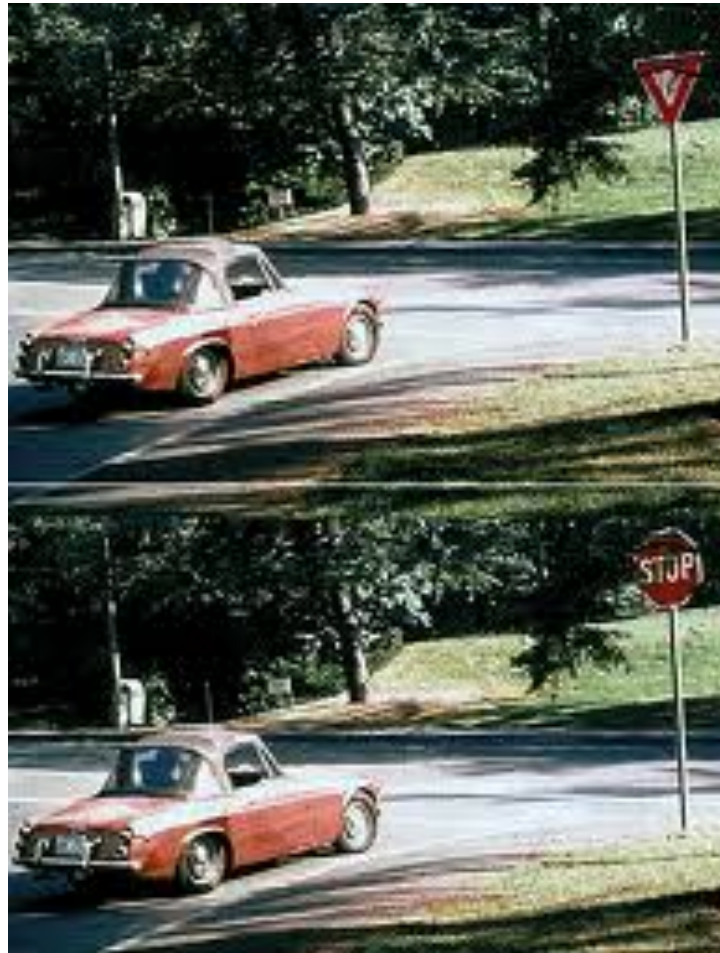


Imagination Inflation

Vivid Imagining & False Remembering



The Misinformation Effect



Can neural activity during encoding predict false memory?

Critical Item

Control Item



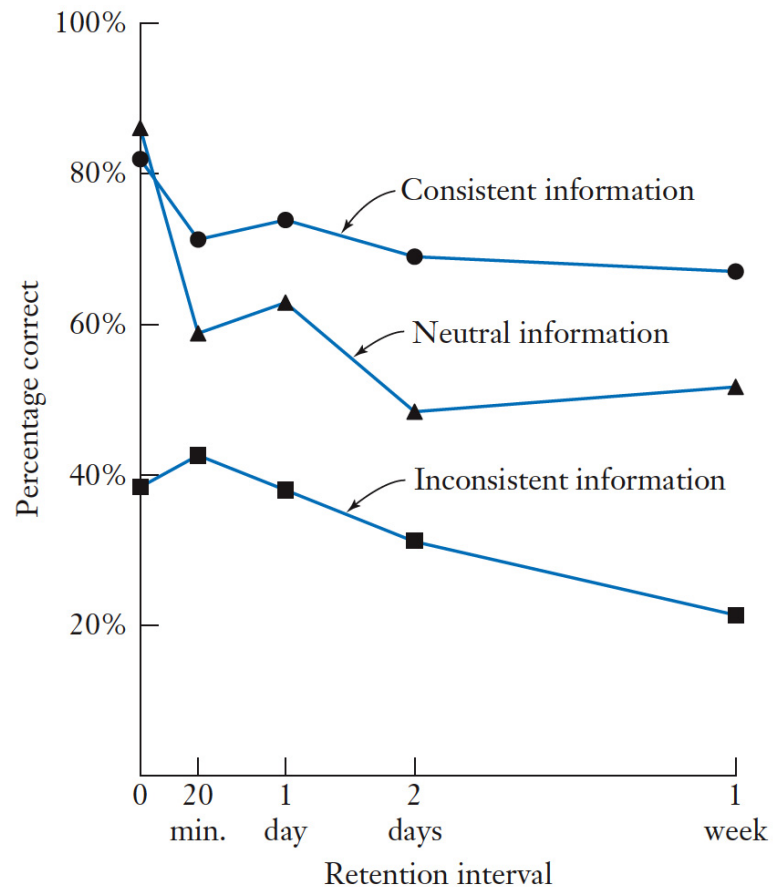
...

Original
Event Phase



...

Misinformation
Phase

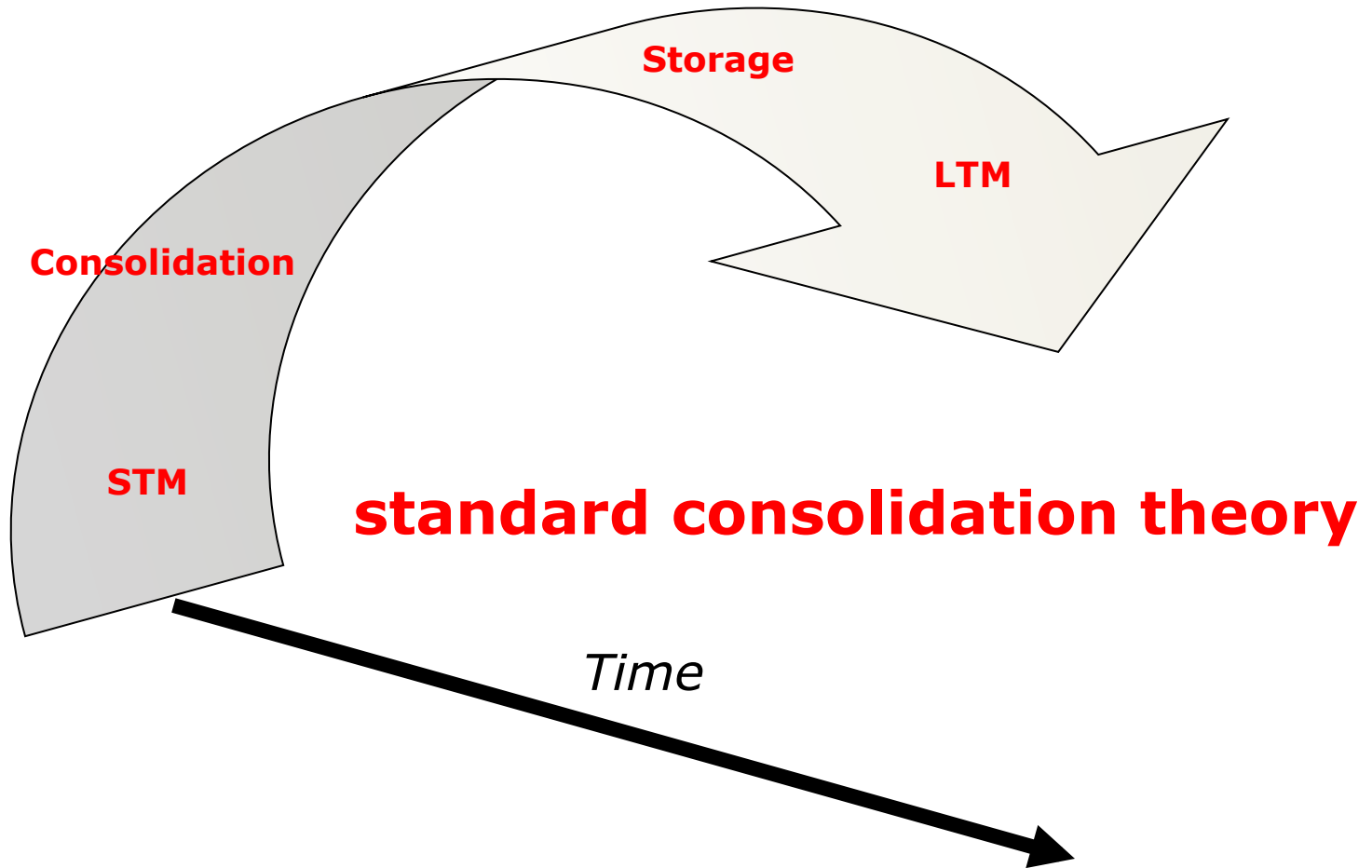


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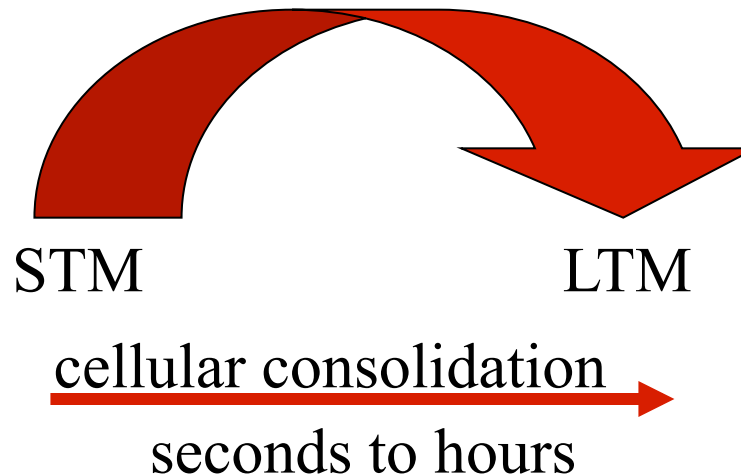
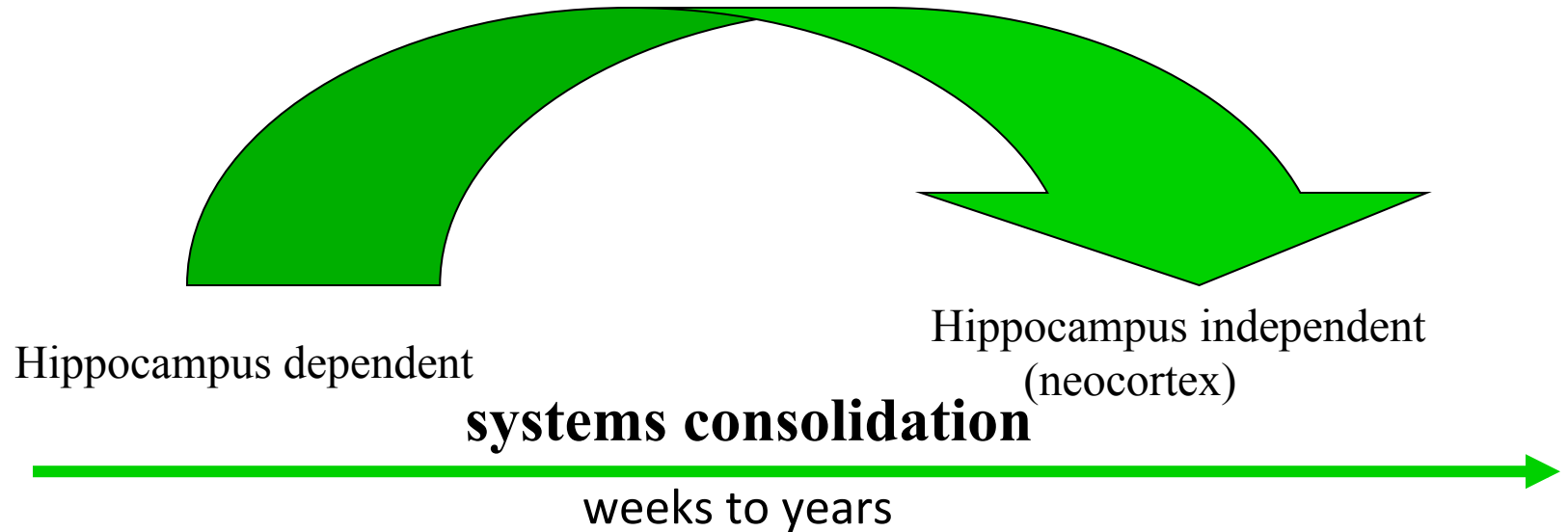
Figure 5.4

Consolidation

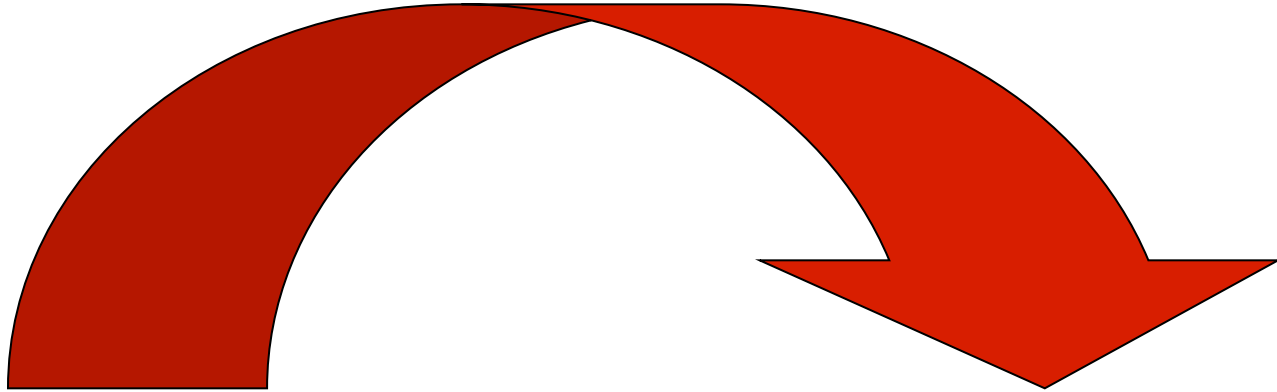
Short-term memory is converted to stable long-term memory via consolidation, which happens just once



Types of Consolidation



Cellular Memory Consolidation



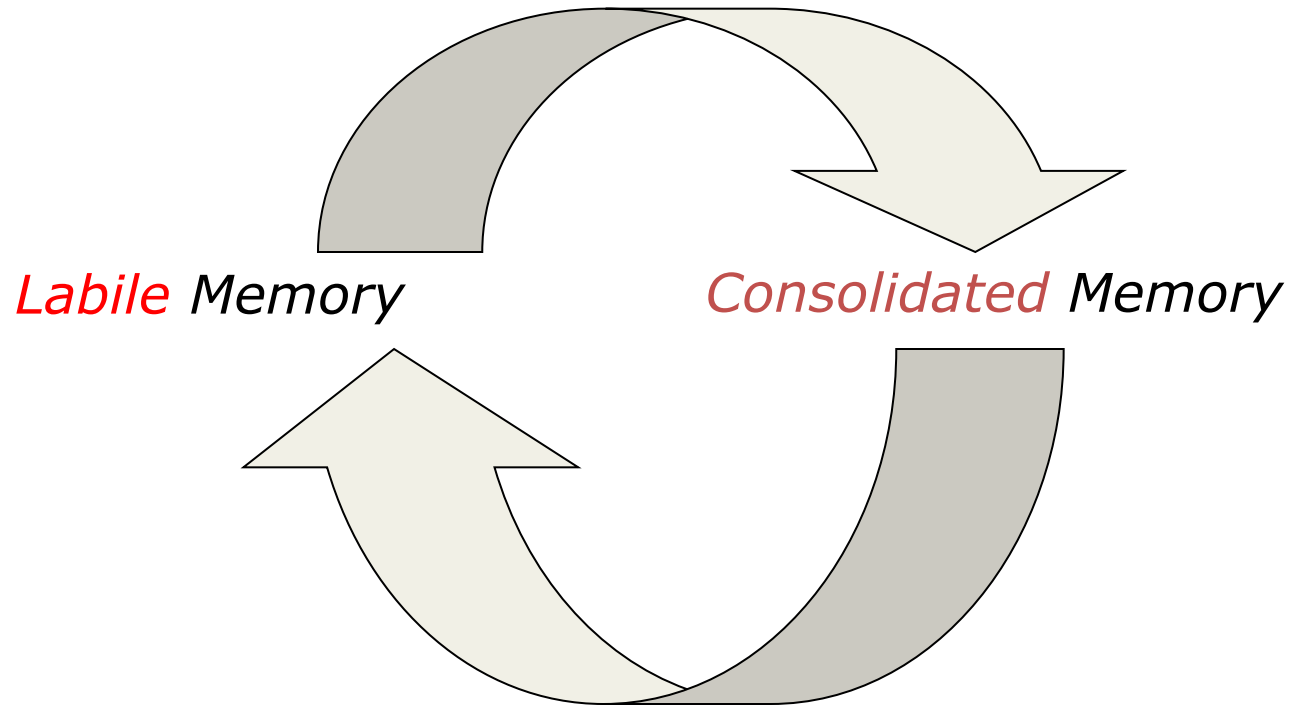
Short-Term Memory

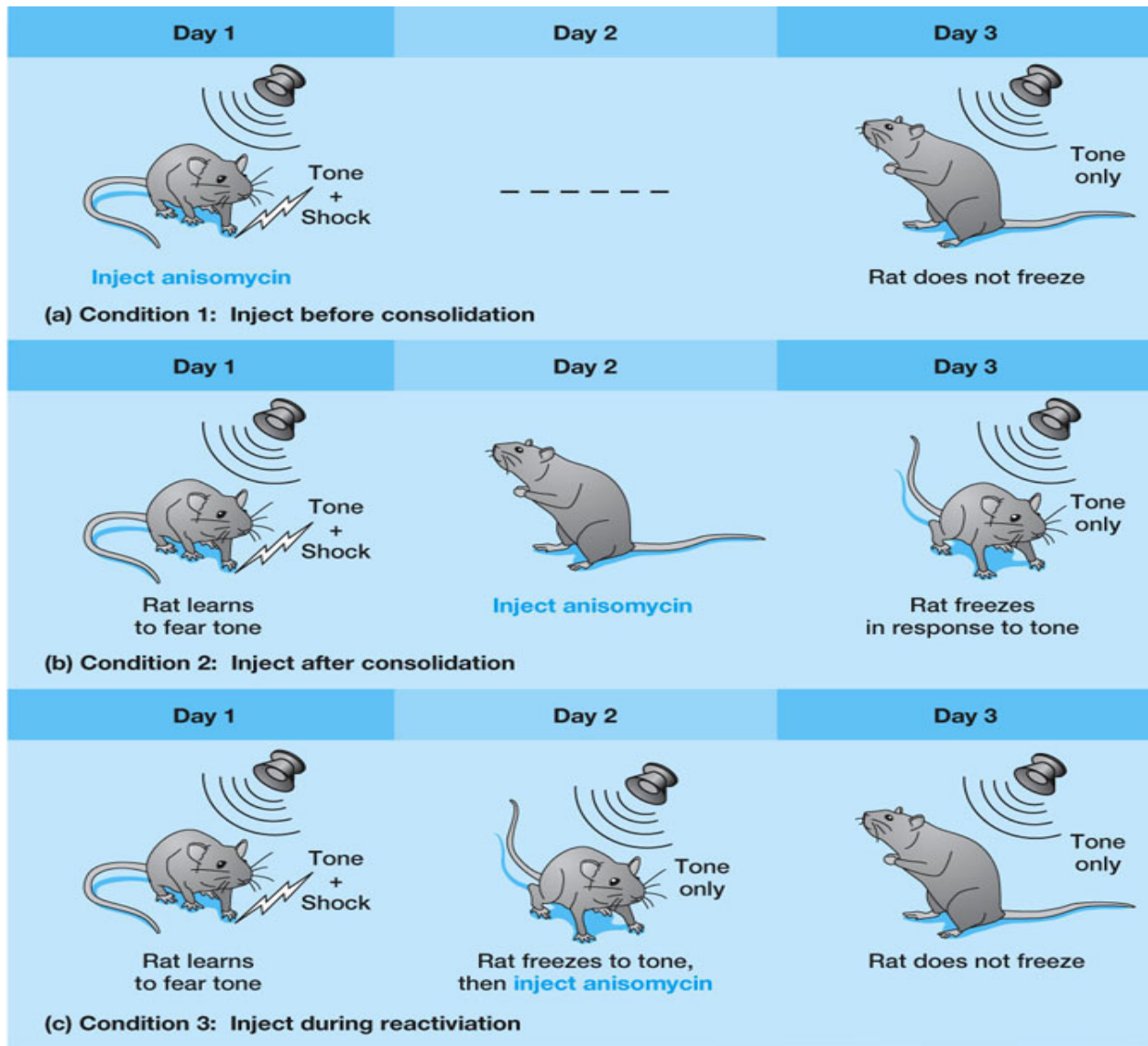
- Seconds to Hours
- "Labile" (sensitive to disruption)
- Does not require new protein synthesis

Long-Term Memory

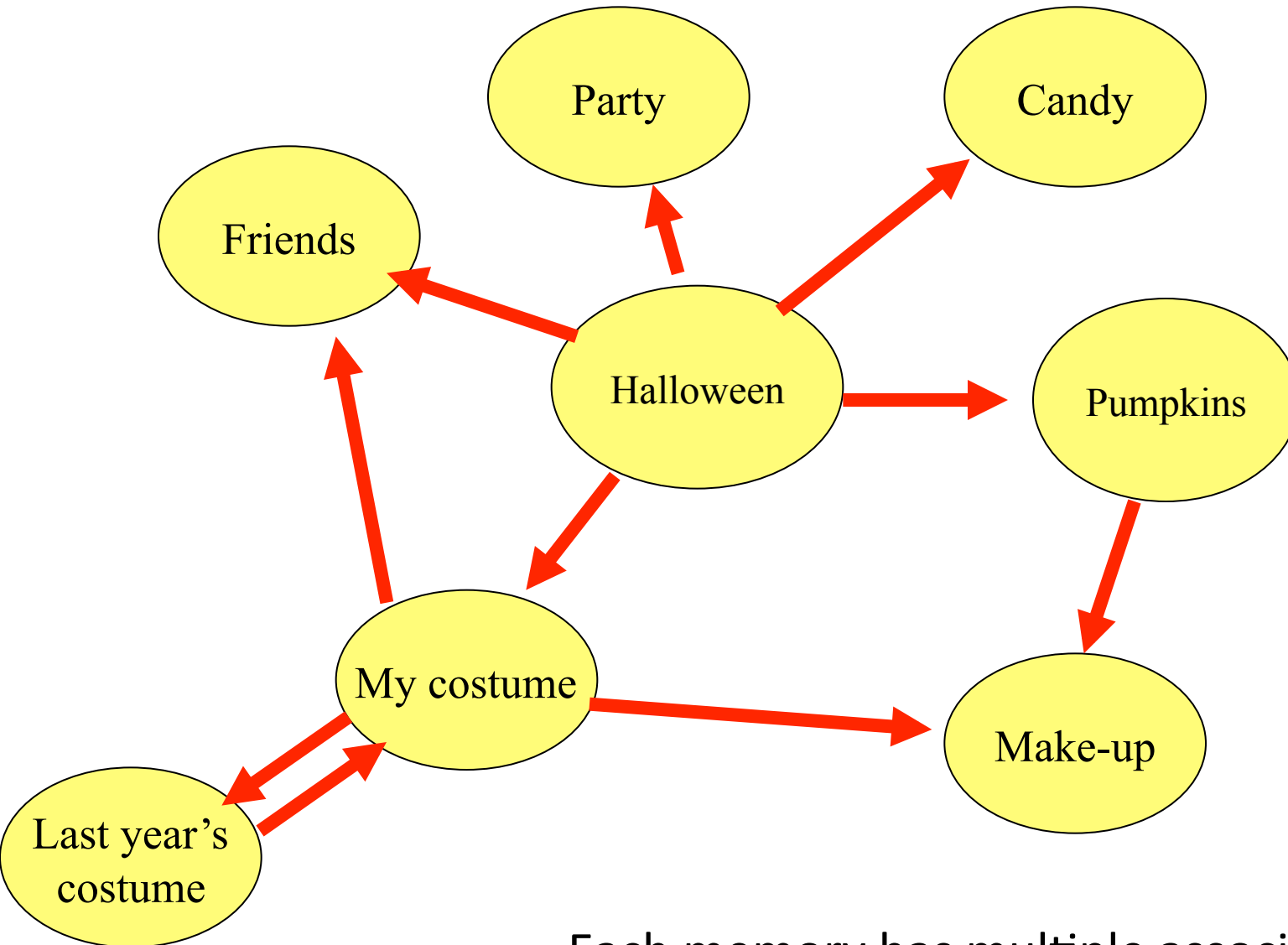
- Days, Weeks, lifetime
- Consolidated (insensitive to disruption)
- Requires new protein synthesis

The Reconsolidation Hypothesis



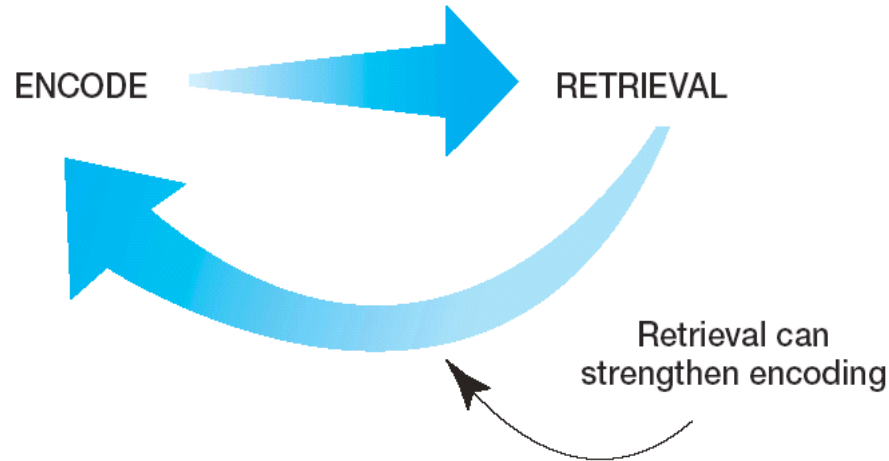


Multiple Trace Theory



Each memory has multiple associations

Multiple Trace Theory



- Reactivation creates a new memory trace in hippocampus
- Multiple traces strengthen older memories
- Successful retrieval of an event requires hippocampus regardless of age of memory

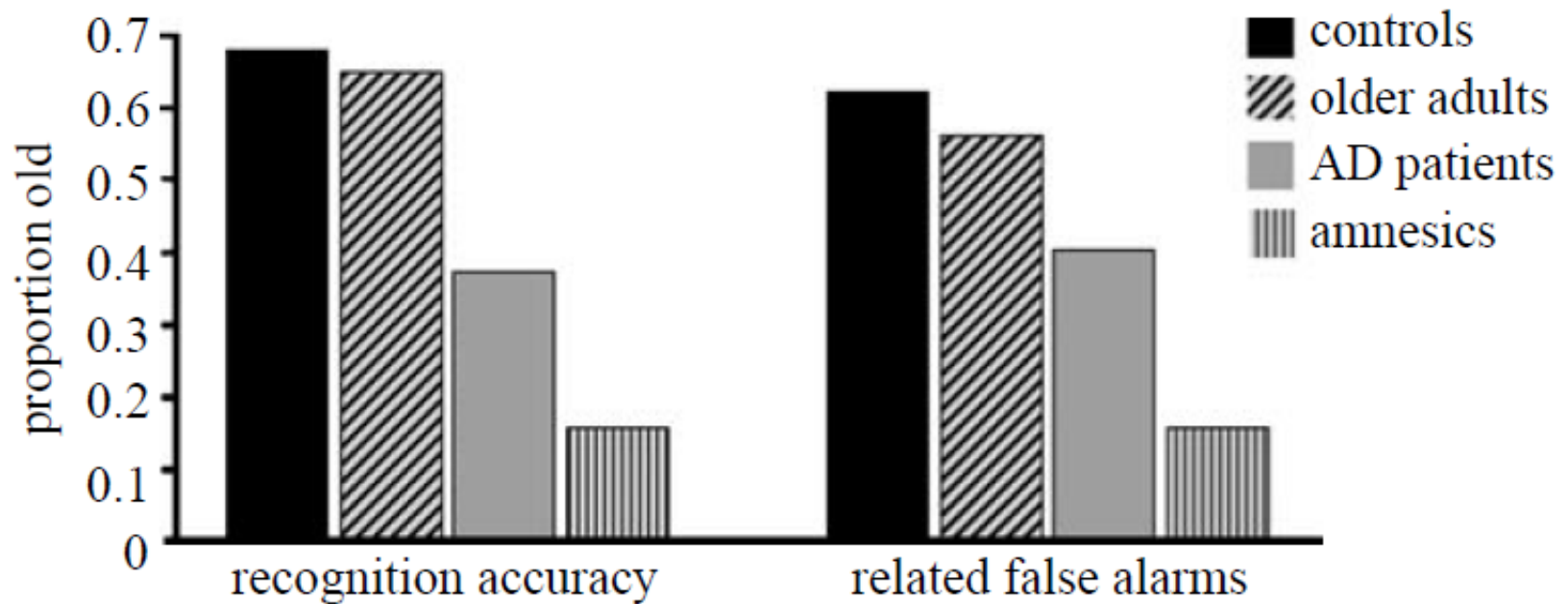
Susceptibility to False Memory

The DRM

- 12 amnesic patients (hippocampus and MTL)
- 12 age matched controls
- + AD patients & older adults (Budson et al. 2000)

Amnesic patients are less prone!

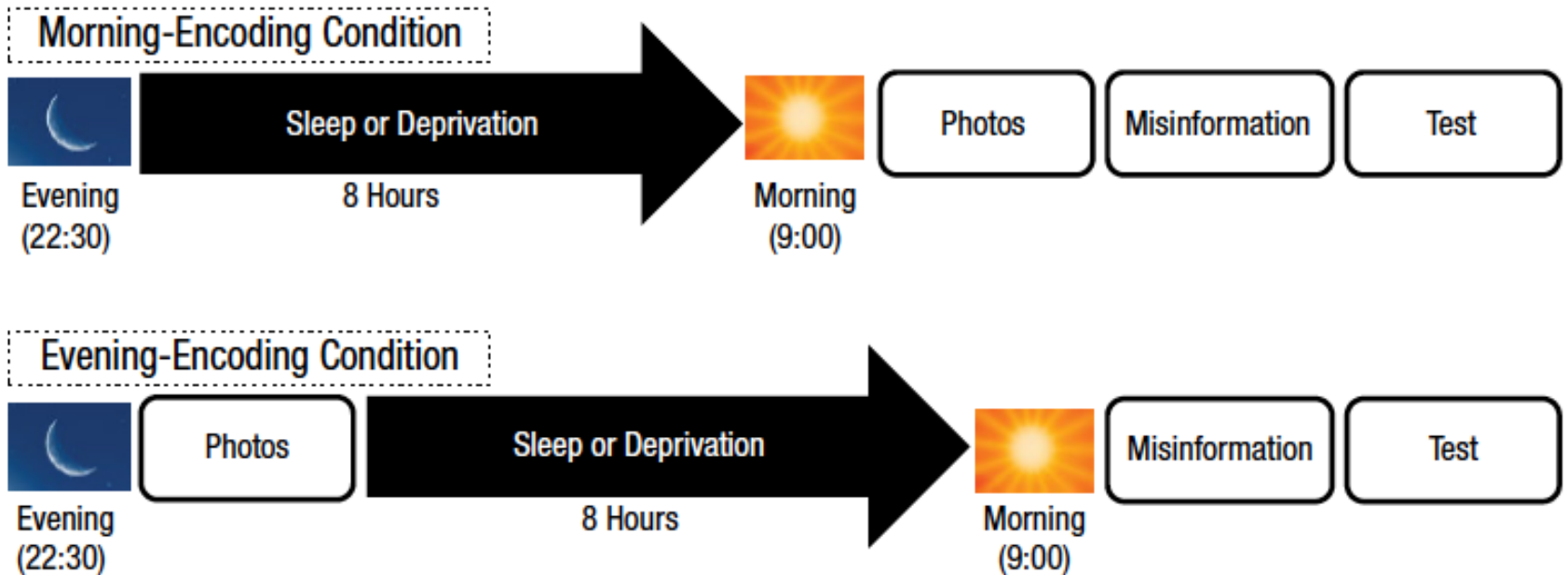
reduced false recognition in dementia and amnesia



A Healthy Memory System

- A decrease in error vs. increase with brain damage
- False recognition is indicative of healthy (adaptive) memory system instead of a flawed or malfunctioning one

Sleep Deprivation and Misinformation



Sleep Deprivation and Misinformation

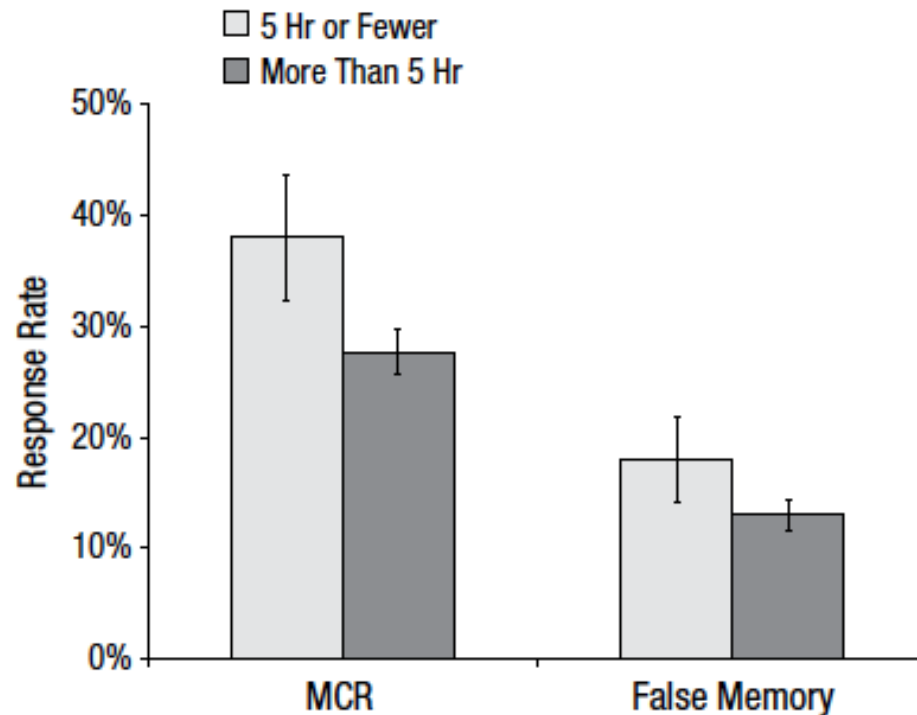


Fig. 2. Results from Experiment 1: mean misinformation-consistent response (MCR) and false memory rates in participants who had slept 5 or fewer hours the night before (restricted-sleep group) and those who had slept more than 5 hr (reference group). Error bars represent ± 1 SEM.

Sleep Deprivation and Misinformation

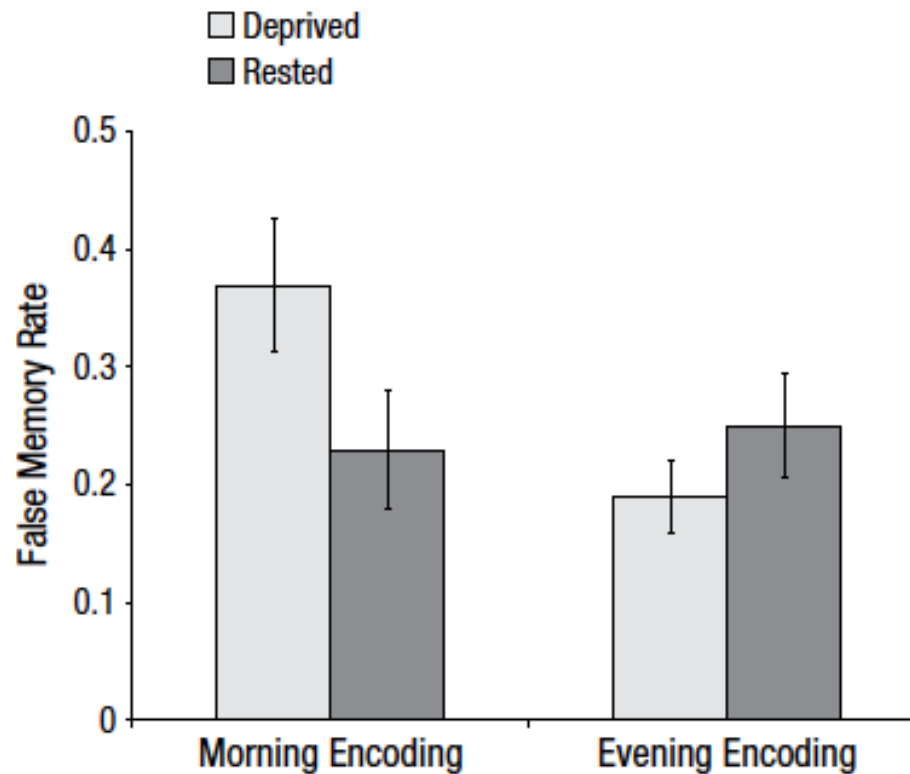
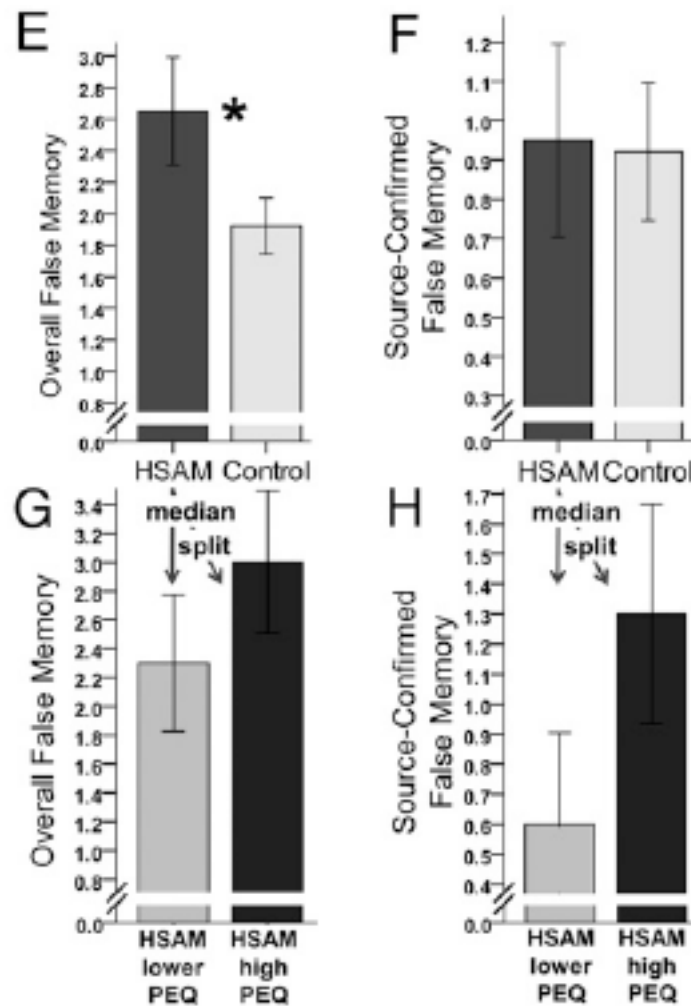
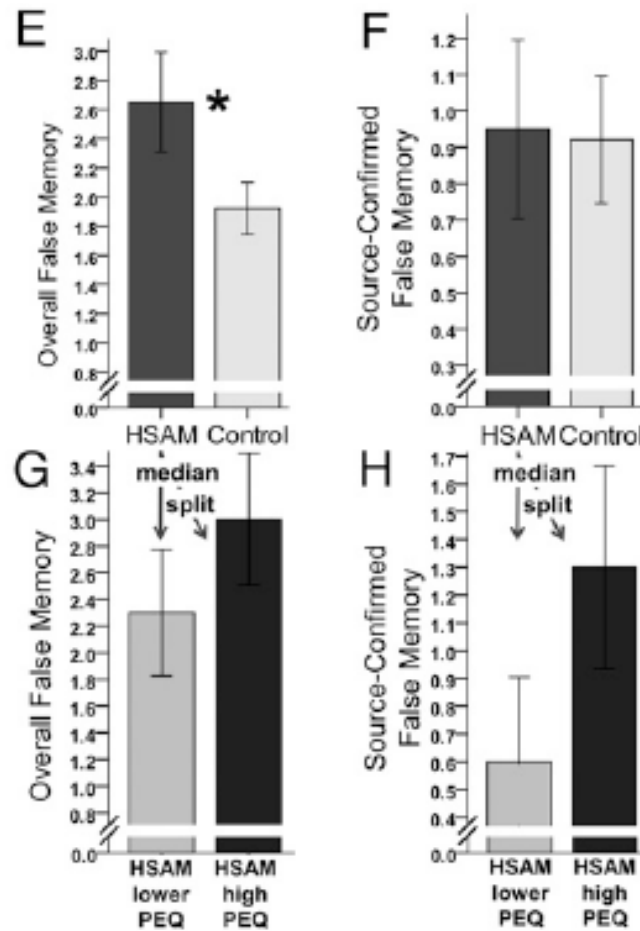


Fig. 3. Results from Experiment 2: mean false memory rates of rested and sleep-deprived participants in the two encoding conditions. Error bars represent ± 1 SEM.

Superior Autobiographical Memory and DRM



Superior Autobiographical Memory and Misinformation



Malleability of Memory

- Encoding of memory
 - Mostly the gist is retained
- Reconstruction process
 - Fill-in the gaps based on previous experiences, beliefs, expectations,
- Retrieval goes as far as the last attempt
 - never to the original

The Gist

“In a world of constantly changing environment, literal recall is extraordinarily unimportant.”

“So long as the details which can be built up are such that they would give a “reasonable” setting, most of us are fairly content, and are apt to think that what we build we have literally retained.”

The Gist

- Adaptive – details unimportant
- Prone to errors
- Sacrifice in accuracy

Memory

Event → Encode → Maintain → Retrieve

- Update?

- Memory is an active, reconstructive process

Eyewitness Testimonies

General Factors:

1. People may create memories that are consistent with their schemas.
2. People may make errors in source monitoring.
3. Post-event misinformation may distort people's recall.

Eyewitness Testimonies

- Details
- Emotions
- Confidence

Eyewitness Testimonies

- Stress
- Delay
- Misinformation
- Social pressure
- Feedback

- Others?

- Eyewitness testimony:

<https://www.youtube.com/watch?v=rSzPn9rsPcY>

- *Extra, if interested. How reliable is your memory:*

<https://www.youtube.com/watch?v=PB2Oegl6wvl>

The Memory Wars

The Two Contrasting Positions in the Controversy

- recovered memory perspective:
 - Memory for traumatic events (such as childhood sexual abuse) may be forgotten for many years and then come flooding back into consciousness.
- false memory perspective:
 - Most recovered memories are actually incorrect memories, constructed stories about events that never occurred.

Beliefs about Memory

Table 2. Statements used and percentage of respondents giving each response, with the expert ($N = 16$) and the full Psychonomics sample ($N = 73$) percentages given for comparison.

Statement	Group	Strongly Agree	Mostly Agree	Mostly Disagree	Strongly Disagree	Don't Know
Amnesia: <i>People suffering from amnesia typically cannot recall their own name or identity.</i>	Public	47.8	34.9	10.1	3.7	3.7
	Experts	0.0	0.0	12.5	87.5	0.0
	Psychonomics	0.0	1.4	31.5	57.5	9.6
Confident testimony: <i>In my opinion, the testimony of one confident eyewitness should be enough evidence to convict a defendant of a crime.</i>	Public	11.2	25.9	35.1	24.7	3.1
	Experts	0.0	0.0	6.2	93.8	0.0
	Psychonomics	0.0	0.0	11.0	87.7	1.4
Video memory: <i>Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later.</i>	Public	23.9	39.1	23.4	11.3	2.4
	Experts	0.0	0.0	6.2	93.8	0.0
	Psychonomics	0.0	0.0	2.7	97.3	0.0
Hypnosis: <i>Hypnosis is useful in helping witnesses accurately recall details of crimes.</i>	Public	15.0	39.6	26.9	10.4	8.1
	Experts	0.0	0.0	18.8	68.8	12.5
	Psychonomics	0.0	0.0	15.1	69.9	15.1
Unexpected events: <i>People generally notice when something unexpected enters their field of view, even when they're paying attention to something else.</i>	Public	27.2	50.3	18.3	2.1	2.1
	Experts	0.0	18.8	31.2	50.0	0.0
	Psychonomics	2.7	15.1	35.6	43.8	2.7
Permanent memory: <i>Once you have experienced an event and formed a memory of it, that memory does not change.</i>	Public	16.5	31.1	34.7	14.1	3.6
	Experts	0.0	0.0	0.0	93.8	6.2
	Psychonomics	0.0	0.0	6.8	91.8	1.4

Each question has been given a short label (in bold) for ease of exposition in the text. Numbers corresponding to each item for the public sample represent the percentage of the weighted respondents giving each response.

doi:10.1371/journal.pone.0022757.t002

Table 3. Percentage of public sample agreeing with each statement, by level of education reported.

Statement	No college (N=342)	Some College (N=610)	College Graduate (N=261)	Graduate School (N=277)	Linear contrast
Amnesia: <i>People suffering from amnesia typically cannot recall their own name or identity.</i>	87.4	87.4	87.8	78.8	$t(1431) = 2.8, p = .005$
Confident testimony: <i>In my opinion, the testimony of one confident eyewitness should be enough evidence to convict a defendant of a crime.</i>	48.0	40.7	35.6	24.7	$t(1439) = 6.7, p < .001$
Video memory: <i>Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later.</i>	78.2	69.4	55.6	46.7	$t(1450) = 9.1, p < .001$
Permanent memory: <i>Once you have experienced an event and formed a memory of it, that memory does not change.</i>	64.9	47.4	43.4	40.6	$t(1431) = 6.0, p < .001$
Hypnosis: <i>Hypnosis is useful in helping witnesses accurately recall details of crimes.</i>	68.4	59.9	56.6	50.2	$t(1365) = 4.4, p < .001$
Unexpected events: <i>People generally notice when something unexpected enters their field of view, even when they're paying attention to something else.</i>	83.5	76.1	78.0	82.9	$t(1453) = 0.0, p = .996$

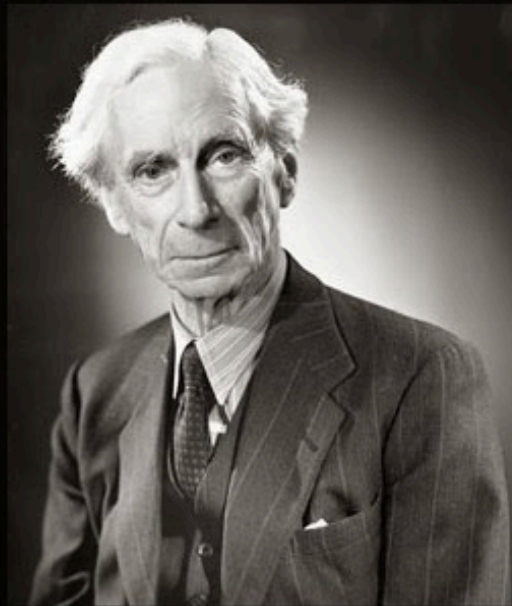
The parentheses under each education category show the weighted number of respondents out of the 1490 who answered the education item (the equivalent of 10 weighted participants did not answer this item).

doi:10.1371/journal.pone.0022757.t003

Table 1. Results From Study 1: Percentage of Undergraduates Who Agreed With Eight Statements About Memory

Statement	Agreement (%)
Traumatic memories are often repressed.	81.0
Repressed memories can be retrieved in therapy accurately.	70.0
Memory can be unreliable.	85.9
Hypnosis can accurately retrieve memories that previously were not known to the person.	44.6
Memory is constantly being reconstructed and changed every time we remember something.	90.8
Memory of everything experienced is stored permanently in brain, even if we can't access all of it.	66.7
Some people have true "photographic memories."	87.7
With effort, we can remember events back to birth.	15.1

Note: Participants responded to each statement on a fully anchored 6-point Likert scale with the following anchors: *strongly disagree*, *disagree*, *slightly disagree*, *slightly agree*, *agree*, and *strongly agree*. Participants who chose *slightly agree*, *agree*, or *strongly agree* were counted as agreeing with a statement.



The whole problem with the world is that fools
and fanatics are always so certain of
themselves, and wiser people so full of doubts.

(Bertrand Russell)

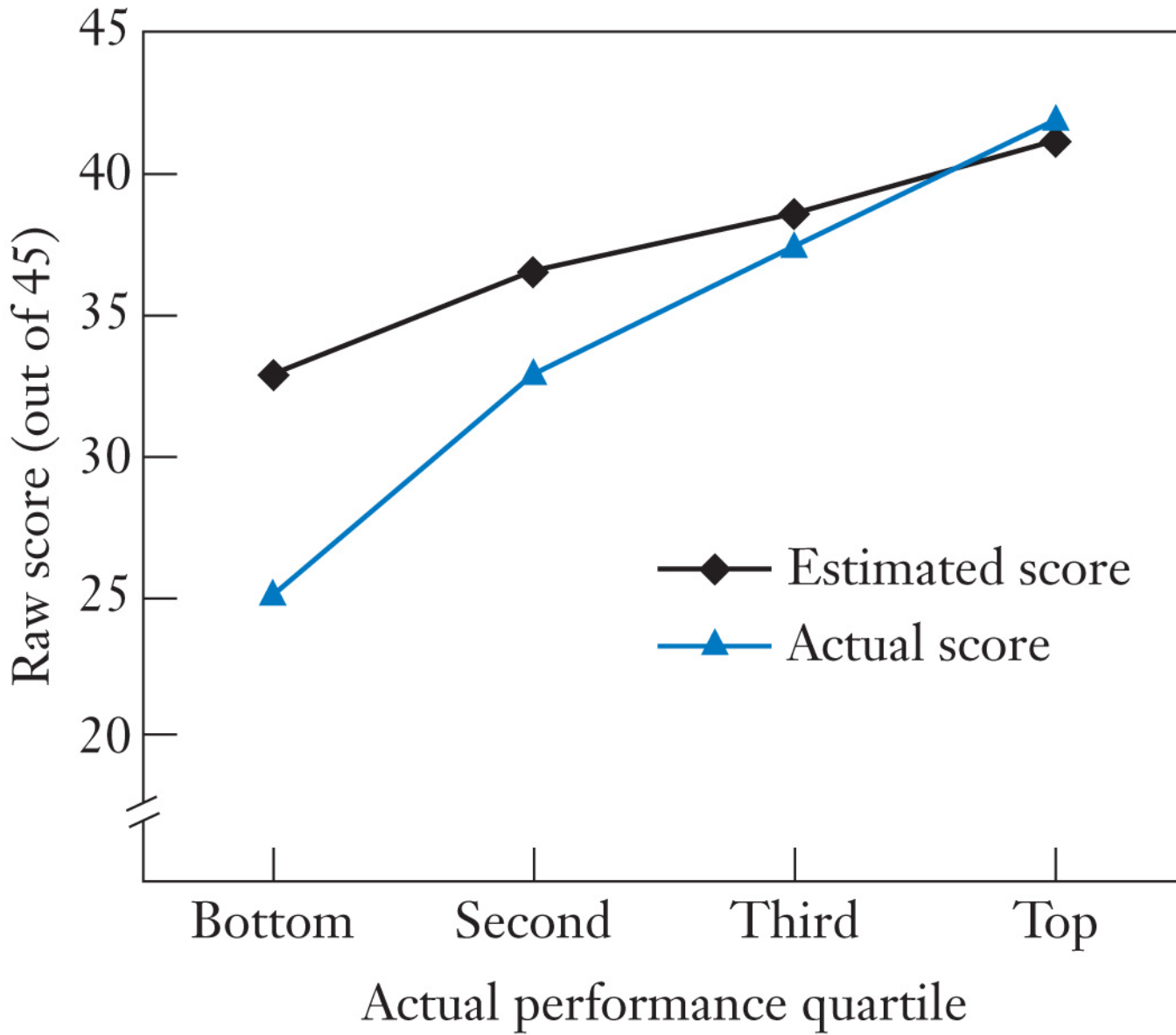
izquotes.com

Metacognition

- your knowledge and control of your cognitive processes
- supervises the way you select and use your memory strategies
- includes self-knowledge, metamemory, metacomprehension

Metamemory

- Prediction errors:
 - Individual items
 - Delay



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Figure 6.4

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Metcomprehension

- **Metacomprehension**

- metacomprehension—thoughts about language comprehension

- ***Metacomprehension Accuracy***

- College students
- generally are not very accurate in metacomprehension skills
- may not notice inconsistencies or missing information in a passage

Metacomprehension

– *Metacomprehension Accuracy*

- College students
- believe they have understood something because they are familiar with its general topic
- fail to retain specific information
- overestimate how they will perform when tested

Metacomprehension

– *Metacomprehension Accuracy*

- Pressley and Ghatala (1988)
- reading comprehension using SAT; essay followed by multiple-choice questions
- students rated how certain they were that they had answered each question correctly
- little difference between estimates on correct and incorrect items

Metacomprehension

– *Metacomprehension Accuracy*

- students believed that they understood the material, even when they answered the questions incorrectly
- irrelevant features (e.g., photos) may lead students to overestimate their understanding of a textbook passage.
- metacomprehension accuracy and reading comprehension scores are significantly correlated.

Prospective Memory

- remembering that you need to do something in the future
- requires remembering that you need to do something AND remembering the content of what you need to do

Comparing Prospective and Retrospective Memory

- Prospective memory typically focuses on action.
- Retrospective memory is more likely to focus on remembering information and ideas.
- Research on prospective memory is more likely to emphasize ecological validity.
- Both will be more accurate if you use both distinctive encoding and effective retrieval cues.
- Both kinds of memories are more accurate when you have a short delay prior to retrieval.
- Both rely on the frontal lobe.