

THE MEMORY FACTORY

Elizabeth F. Loftus

University of California, Irvine

Presentation to NRC

February, 2014

Memory and legal cases

Memory Paradigms

Misinformation

Event – PEI - Test

Event: Wallet snatching

← 3500ms →



• • •



• • •



Post-Event Info

A petite girl was walking down Main Street.

She was window shopping and continued walking.

She stopped to look at a video store after passing a hair salon.

• • •

The man bumped into the girl from the front.

While her back was turned, the man reached with his right hand into her pocketbook.

He took her wallet and put it away in his pants pocket.

• • •

The wind blew, and she was cold, so she opened her pocketbook to get her scarf.

Suddenly she realized that her wallet was missing.

Concerned, the woman explained to the girl what she had seen the man do.

Example of Critical item

Events



Post-event



TEST



He took her wallet and put it in his pants pocket.

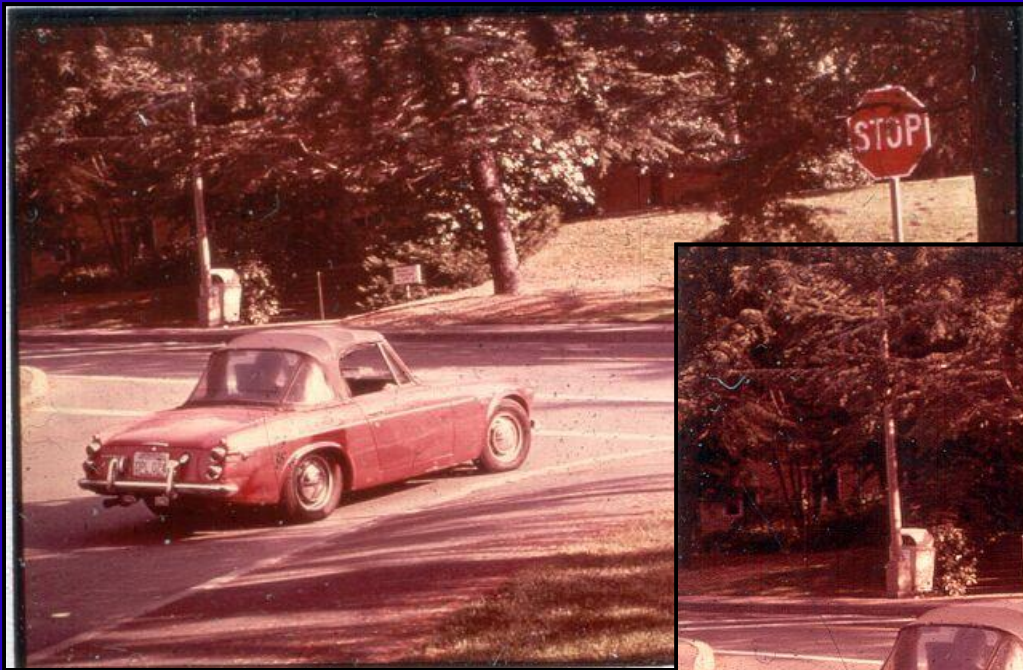
What did you see in the pictures?

Where did the man put the wallet after he stole it from the girl's purse?

- a. Inside jacket pocket
- b. Outside jacket pocket
- c. Pants back pocket

Research on Memory Distortion

Changing Memory for Actual Events



Research on Memory Distortion

The Misinformation Effect

Some research on faces



(Cook, Kwak, Hoffman, & Loftus, Under revision, 2014)

Demonstration

Study Phase







Quiz

Piece of paper

Pick face you saw in study phase.

Mark L or R.



Which face do you recognize from the STUDY PHASE?



Which face do you recognize from the **STUDY PHASE**?

Test



Which face do you recognize from the STUDY PHASE?



Which face do you recognize from the **STUDY PHASE**?



Which face do you recognize from the **STUDY PHASE**?

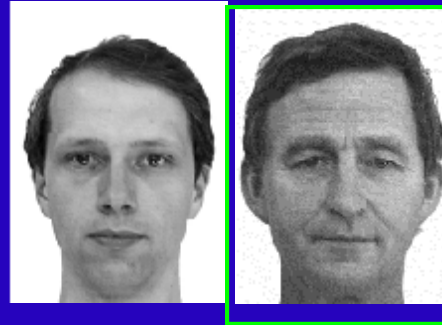
Explaining the Demonstration

STUDY PHASE

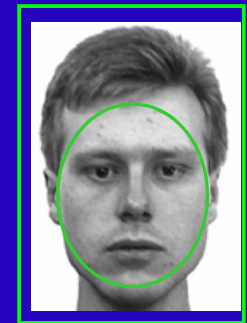
QUIZ

MEMORY TEST

Face #1



Face #2



Face #3



Conclusions

Postevent activity that induces subjects to pick a wrong person affects later ability to accurately identify right person.

Committing to the PEI produces larger effect, but mere exposure without choosing also impairs memory.

Real world situation: photos then lineup

Field Studies at Survival School



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International Journal of Law and Psychiatry
27 (2004) 265–279

INTERNATIONAL JOURNAL OF
LAW AND
PSYCHIATRY

Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress

Charles A. Morgan III^{a,*}, Gary Hazlett^b, Anthony Doran^c, Stephan Garrett^d, Gary Hoyt^e, Paul Thomas^f, Madelon Baranoski^f, Steven M. Southwick^g

^a Associate Professor of Psychiatry, Department of Psychiatry, Yale University School of Medicine, Connecticut Mental Health Center, Law and Psychiatry Division, 34 Park Street, New Haven, CT 06519-1187, USA

^b Major, JFK Special Warfare Training Center and School, United States Army, Fort Bragg, NC, USA

^c Lieutenant Commander, United States Navy, FASOTRAGRULANT, Naval Air Station, Brunswick, ME, USA

^d Physician Associate, Yale University School of Medicine, New Haven, CT, USA

^e Lieutenant Commander, United States Navy, FASOTRAGRUPAC-N2, Naval Air Station, North Island, Coronado, CA, USA

^f Assistant Clinical Professor of Psychiatry, Department of Psychiatry, Yale University School of Medicine, Connecticut Mental Health Center, Law and Psychiatry Division, 34 Park Street, New Haven, CT 06519-1187, USA

^g Professor of Psychiatry, Department of Psychiatry, Yale University School of Medicine, Connecticut Mental Health Center, Law and Psychiatry Division, 34 Park Street, New Haven, CT 06519-1187, USA



Over 20 years there have been over 2000 scientific investigations on the reliability of recollection (Cutler & Penrod, 1995). The majority of studies have been conducted in the laboratory using videotapes or live simulations of crime events; only a handful have been field studies with actual witnesses and eyewitnesses of real crimes. Laboratory studies are limited because crime scenes do not entail the degree of personal "threat" or "alarm" that an individual may experience during threatening events (Penrod et al., 1995). A major limitation of extant field studies is the lack of control for specific factors (such as severity and intensity of traumatic events) that may affect human memory. Limitations notwithstanding, the relevant literature supports the notion that memory formation is better in response to events that are perceived to be as stressful, threatening, and that elicit adequate physiological arousal or alarm (Gold, 1992; Camli et al., 1997). In contrast to this general consensus are the findings from recent studies suggesting that memories reported by combat veterans who have been exposed to life-threatening events may be inconsistent and subject to substantial error (Southwick et al., 1997; Roemer et al., 1998). To explain this phenomenon, some have proposed that during exposure to potentially

Author's Tel.: +1-203-974-7420; fax: +1-203-974-7177.
E-mail: charlesamorgan@yale.edu (C.A. Morgan).

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0160-2876/\$ - see front matter

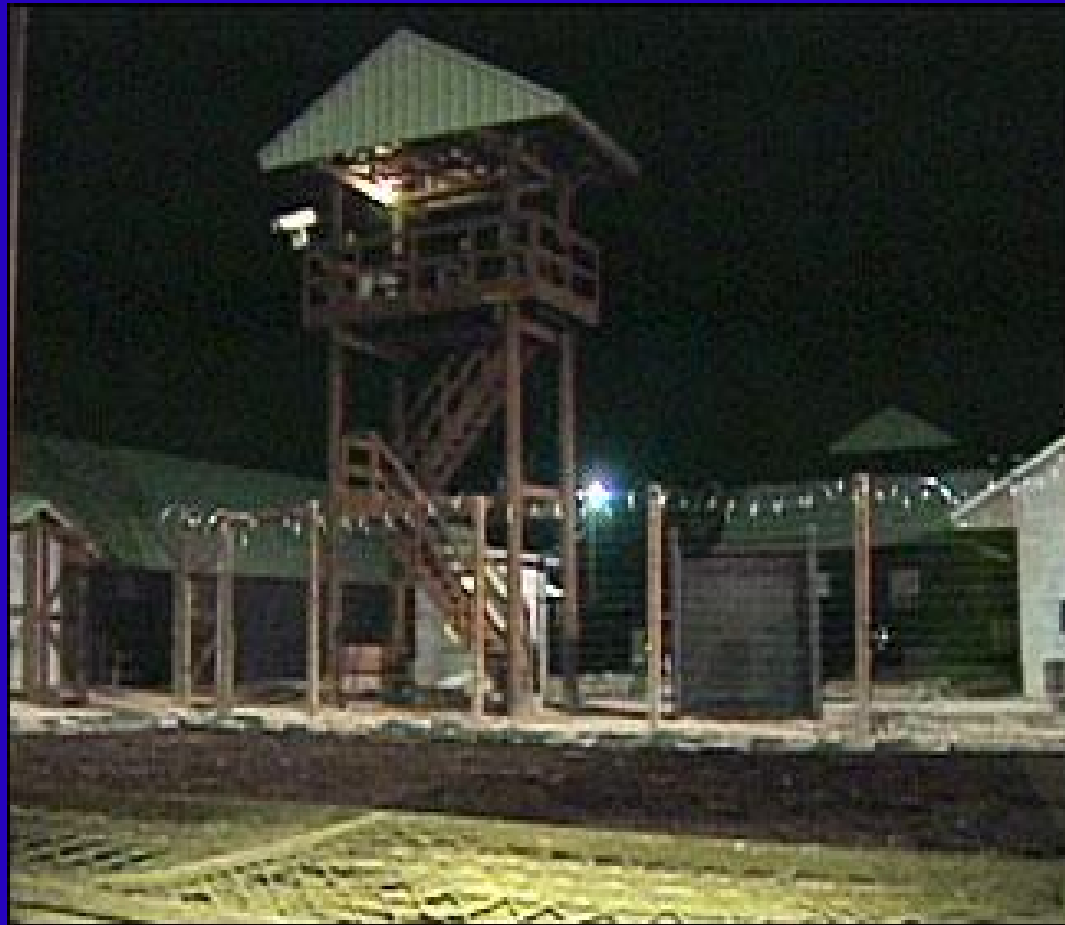
Survival Training: Survive, Evade, Resist, Escape (SERE)

Soldiers learn how to:

- Evade enemy
- Escape if hunted down
- Resist if captured, imprisoned, or tortured



SERE



A Mock Prisoner of War (POW) Camp

SERE

Once captured:

- Hooded
- Strapped together
- Stripped of identities



SERE

3rd World Toilets



No toilet paper!

SERE

If jungle too dense to land in,
in, extracted by helicopter



SERE

When done.. A flood of emotions

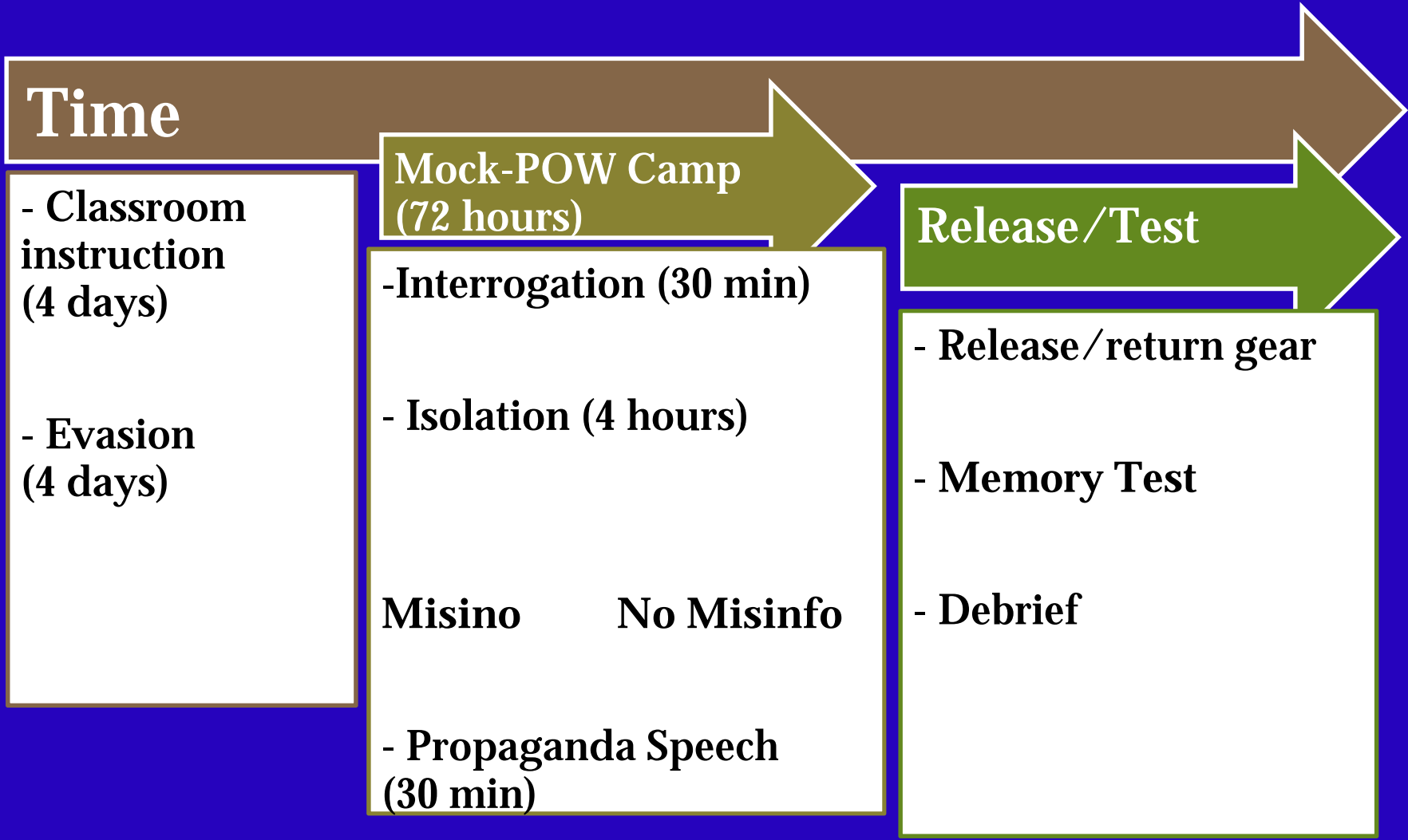


Misinformation at Survival School



Morgan, Southwick, Steffian, Hazlett, Loftus (*IJLP*, 2013)

Method



Method Briefly

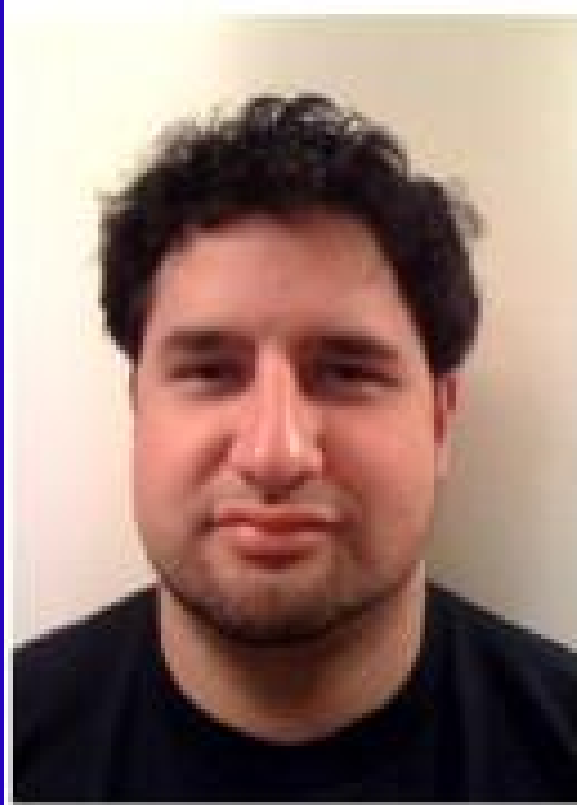
Stressful interrogation (30 min)

Isolation stress (Misinfo photo introduced 1 hr into this period: “Look at this photo. Did your interrogator give you anything to eat? A blanket? Let you speak to others?)

Other activities for approx 4 + hrs

Memory test

Misinformation in the form of a photograph



Actual Perp



Foil (misinfo photo)



Results (Target-Absent Lineup)

	No Misinformation	Misinformation
False IDs		
Pick Key Foil		

Results (Target-Absent Lineup)

	No Misinformation	Misinformation
False IDs	53%	
Pick Key Foil	15%	

Results (Target-Absent Lineup)

	No Misinformation	Misinformation
False IDs	53%	91%
Pick Key Foil	15%	84%

Results

No Misinfo



10%



3%



2.5%

Results

No Misinfo

Misinfo



10%

98%



3%

27%



2.5%

20%

Some Findings from Sere studies

- Highly trained soldiers make false IDs
 - High confidence
 - Misinfo leads to more false IDs
 - Soldiers more likely to pick key foil
- Misinformation leads to other false memories

Research on Memory Distortion

The Misinformation Effect

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U.S. \$4.95 / CANADA \$5.50

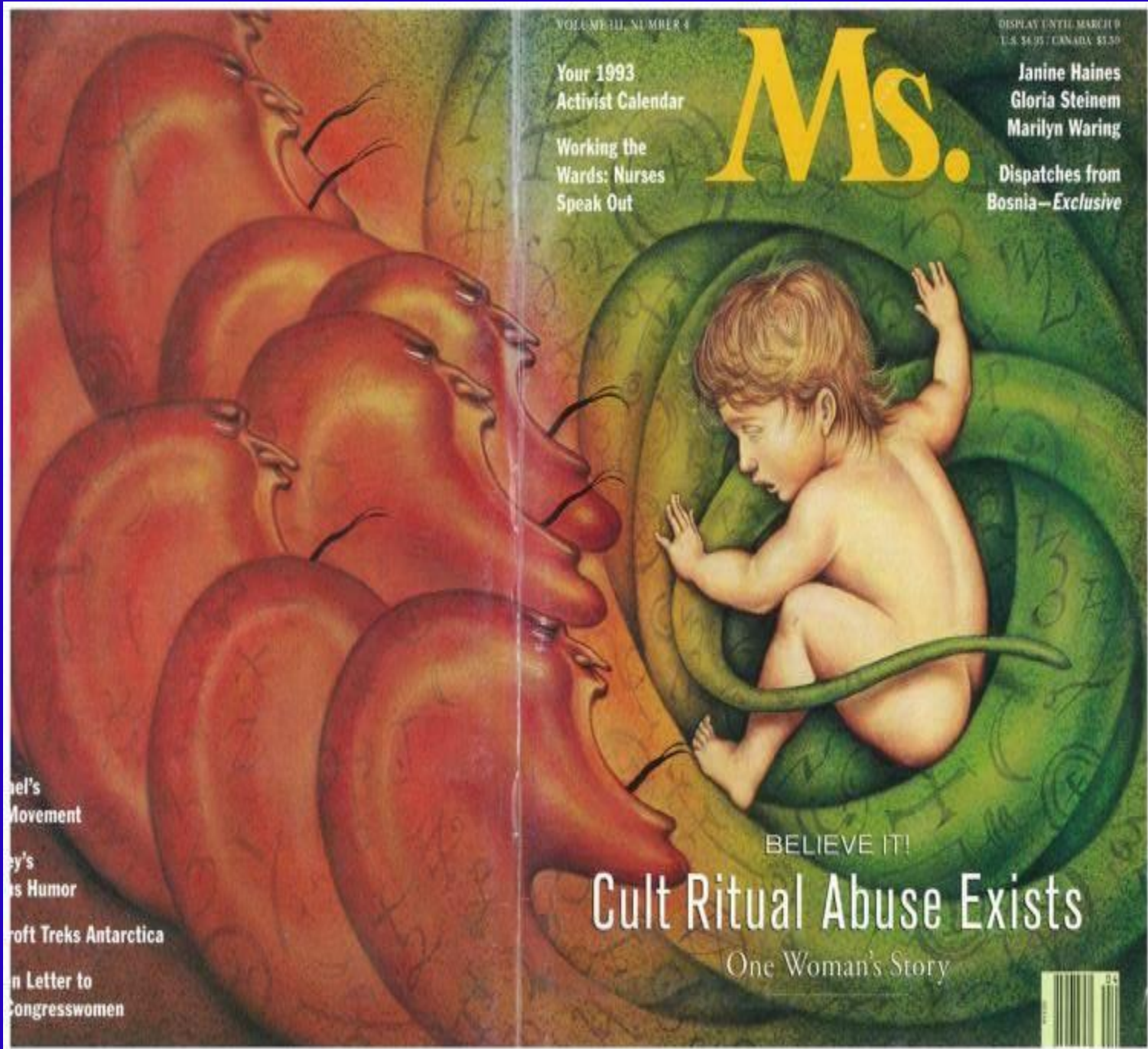
Your 1993
Activist Calendar

Working the
Wards: Nurses
Speak Out

Ms.

Janine Haines
Gloria Steinem
Marilyn Waring

Dispatches from
Bosnia—*Exclusive*



Shel's
Movement

ey's
Humor

roft Treks Antarctica

in Letter to
Congresswomen

BELIEVE IT!

Cult Ritual Abuse Exists

One Woman's Story



Memory Paradigms

Misinformation

Event – PEI - Test

Rich False Memory

No event

Suggestion about past

--- Test



Customer Service

الهدية المثالية خلال فترة الأعياد متوفرة في مكتبة خدمة الزبائن

chrome

GERRY WEBER

TOPMAN

UNITED COLORS

50

NEW LOOK



OTHER TECHNIQUES FOR PLANTING FALSE MEMORIES

Imagination

Dream Interpretation

Hypnosis

Exposure to other people's memories

False information

Doctored Photographs

CONSEQUENCES OF FALSE MEMORY



TRUE VERSUS FALSE MEMORIES



Are true memories
more emotional?



Laney & Loftus, *Memory*, 2008; Nebraska Symposium, 2010.

Conclusions

- False memories can be emotional.
- In fact, they can be just as emotional as true memories.
- So, emotion is no guarantee of memory accuracy.

True vs. False Memories

Neuroimaging During Report



Okado, Stark, Loftus , *Learning and Memory* , 2010

Functional Magnetic Resonance Imaging (fMRI)



Findings

- TM and FM similar in terms of brain activity.
- TM – more activity in visual cortex, FM – more in auditory

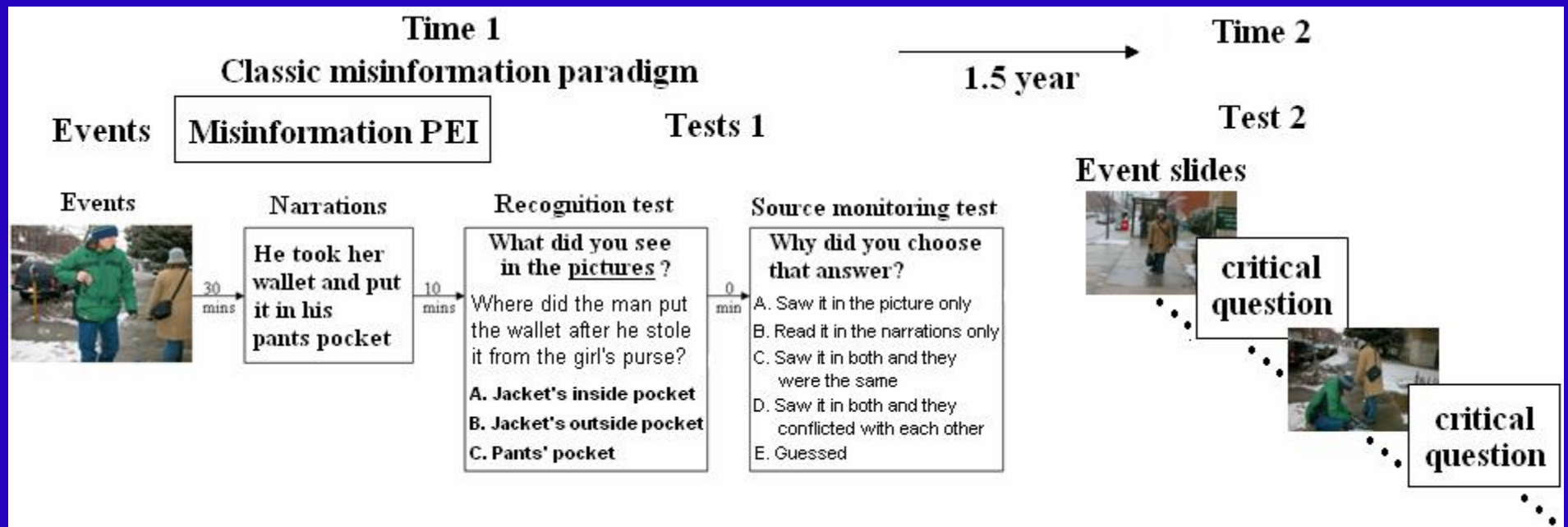
**DO FALSE MEMORIES
PERSIST?**

Persistence....



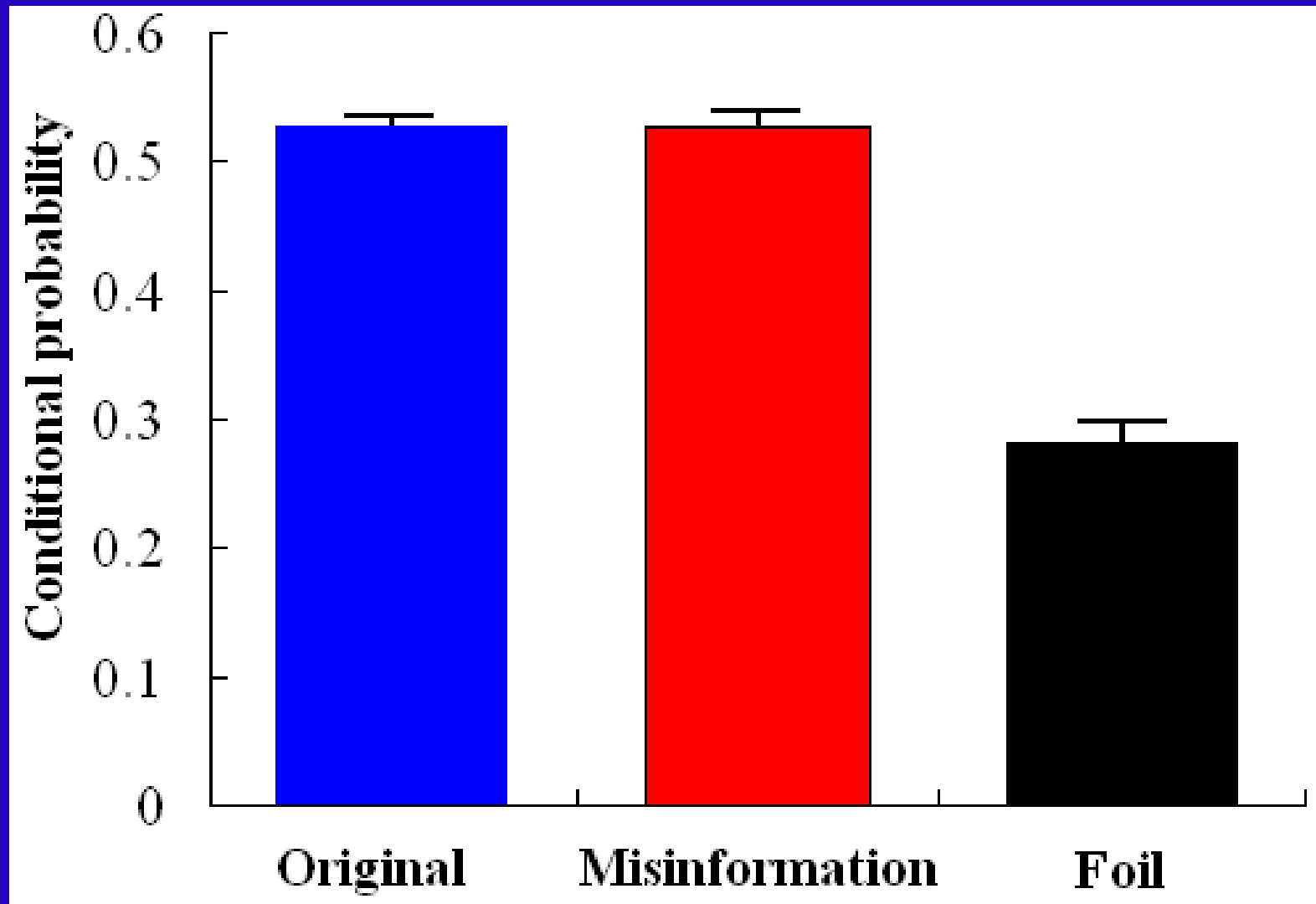
Zhu, Chen, Loftus, Xue, Lu, Dong et al *Memory*, 2010

Do false memories persist?



Zhu, Chen, Loftus, et al. , *ACP*, (2012)

Persistence of true and false memories



When are people more
susceptible?

Sleep Deprivation



Frenda, Patihis, Loftus, Lewis & Fenn *Under review*

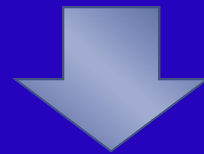


SLEEP

OR



SLEEP DEPRIVATION



Event



He took her wallet and put it in his pants pocket

PEI

Where did the man put the wallet after he stole it from the girl's purse?

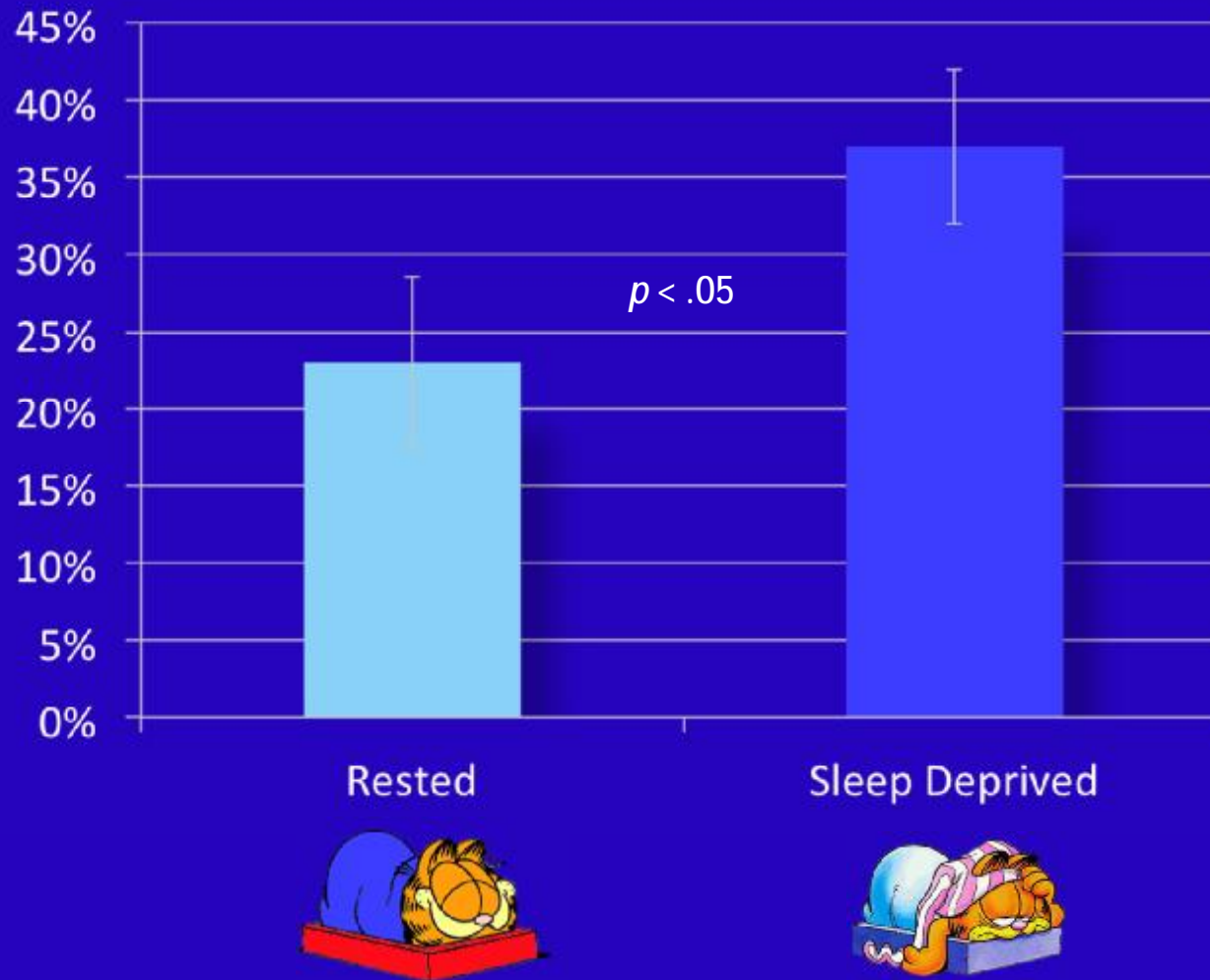
- a. jacket inside pocket
- b. jacket outside pocket
- c. pants pocket

Tests

Why did you choose that answer?

- a. saw it in the picture only
- b. read it in narrations only
- c. saw it in both and they were the same
- d. saw it in both and they conflicted with each other
- e. guessed

False Memory Rate in Rested and Deprived Subjects



Is everyone susceptible?

Memory Distortions in People with Superior Memory



Patihis, Frenda, LePort, Petersen, Nichols, Stark, McGaugh, Loftus.
PNAS (2013)



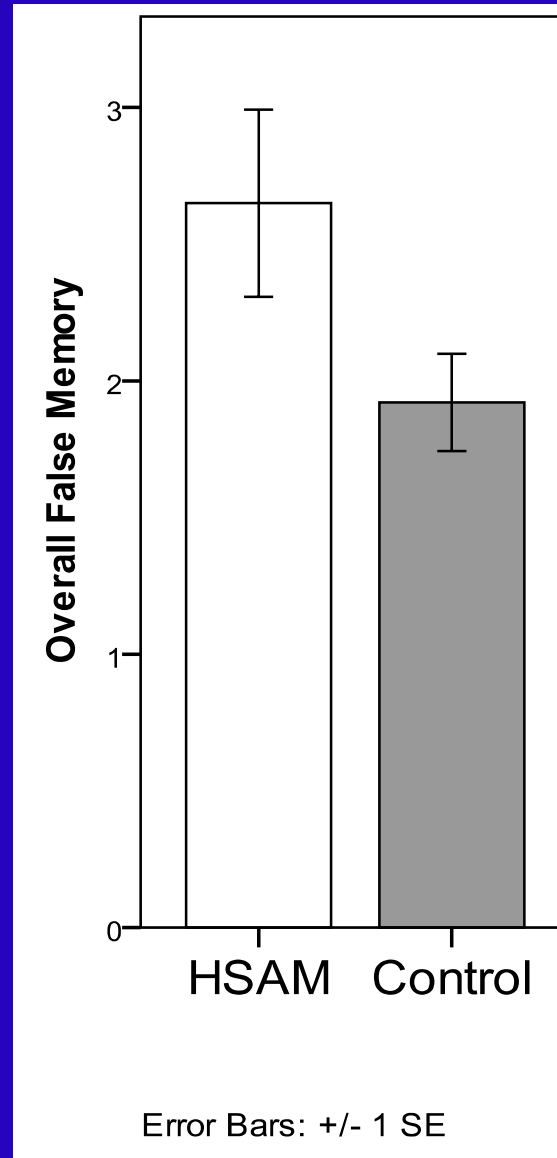
People with Superior
Memory

VS.



People with Normal
Memory

Misinformation: HSAM v Control



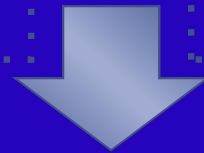


People with Superior
Memory

VS.



People with Normal
Memory



People with extraordinarily strong autobiographical memory were nevertheless still vulnerable to a number of different memory distortions.

Just like people with normal memory.

FINAL REMARKS

Implications

- ; The malleable nature of memory
- ; False Memory Recipe

Ethical issues

- .. when should we use this kind of mind technology?
- .. should we ever ban its use?

One take home lesson:

Confidence

Detail

Emotion

Memory—like liberty—is a fragile thing