



Cognition

PSYC 2040

W3: (more) cognitive limitations



logistics: schedule

- no office hours today
- no class next Tuesday
- before next Thursday:
 - read & annotate chapter
 - complete activities
 - submit project mini-milestone

3	T: February 4, 2025	<u>W3: Cognitive limitations</u>
3	Th: February 6, 2025	W3 continued...
3	Su: February 9, 2025	Quiz 3 due
4	T: February 11, 2025	<u>W4: Learning and association</u> No Class!
3	W: February 12, 2025	Project: Group Contract due
4	Th: February 13, 2025	W4 continued...
4	Su: February 16, 2025	Quiz 4 due
4	Su: February 16, 2025	Jennifer's Office Hours (7-9 pm, Kanbar 200)
5	T: February 18, 2025	<u>W5: Categorization</u>
5	Th: February 20, 2025	President Safa Zaki Guest Lecture!
5	Su: February 23, 2025	Quiz 5 due
6	M: February 24, 2025	Project: SPARK due

logistics: project groups

- groups of 3
- shared group folder
 - meeting doc
 - topics and schedules
- milestone 1b: group contract

Project Milestone 1b: Group Contract ↗

Start Assignment

Due Wednesday by 11:59pm Points 1 Submitting a website url

By now, you should have been notified via email about your groups for this course. Projects in this course will focus on real-life implications of an aspect of cognition. In this mini-milestone, we need you to have met with your group, discussed the topics you are interested in and start to converge on a single topic. We also need you to assign roles, commit to a weekly meeting time, and start thinking about the next milestone ([SPARK summary ↗](#)).

Create a document in your shared drive folder titled "Project Milestone 1b: Group Contract". Answer the following questions as a group (one person per group makes the submission) and then [submit the link to the document here](#).

1. Come up with a group name for yourself!
2. Based on the topics you are all interested in, which ONE aspect of cognition would you like to focus on for this project?
3. Please assign the following roles (note: these roles are in ADDITION to the work you will all do for the milestones and have more to do with project management):
 1. **Communication Coordinator:** Who will be responsible for responding to emails, reaching out with questions to the LA or Professor, submitting the final assignments, and making sure feedback from different milestones is adequately integrated into the final project?
 2. **Workflow Lead:** Who will be responsible for keeping track of assigned tasks (who does what) for a given milestone, making notes during meetings in the shared meeting document, and coordinating everyone's contributions?
 3. **Quality Manager:** Who will be responsible for community building within the group, proofreading, and making sure the project's "final copy" is in its best version?
4. What is your group's WEEKLY meeting time? Please note that meeting weekly is important and strongly encouraged so that you are making steady progress on your milestones. Meeting for at least 30 minutes-1 hour is recommended.
5. What's the plan for next week?

how to get the most out of a group project

- reflect on your own strengths and weaknesses
- work on an accountability contract
- meet in person every week (30 minutes - 1 hour)
 - have a shared google doc for meeting notes
 - have a meeting agenda and pre-assigned tasks
 - meet 1-2 weeks before milestone deadlines to assign tasks/roles
 - meet on the day of submission for final touches
 - collaborate & engage; don't divide and conquer!
- communicate effectively and often
- push yourself and others!



milestone 2 (SPARK)

[project details](#) [journals](#)

ule Grading Project SPARK Additional Resources

Milestone 2: SPARK for review article or podcast (3 points)

This assessment will help you organize your literature review and structure your analysis and/or writing/designing. With your group, you will find a review article or podcast relevant to your project and submit a [SPARK](#) summary of the article or podcast. Review articles and podcasts typically summarize the existing literature on a particular topic. This will help you understand the topic you are interested in detail, and enable you to ultimately connect ideas across readings.

Picking a review article: You must find and read a broad review article from [one of the journals listed on the course website](#) and then submit a SPARK summary for the same.

Picking a podcast: You must find and listen to a podcast from one of the following sources and then submit a SPARK summary for the same:

- [Speaking of Psychology](#)
- [All Things Cognition](#)
- [Under the Cortex](#)
- [Many Minds](#)
- [Science Vs](#)
- [Complexity](#)
- [Hidden Brain](#)

schedule before next milestone

- **week 3**
 - group contract
 - converge on topic
- **week 4**
 - everyone reads 2 review papers/podcasts + writes mini summary
- **week 5:**
 - go over each other's work
 - decide on final paper/podcast for SPARK
 - divide SPARK sections
- **week 6**
 - proofread! edit!

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more on attention



Speaking of Psychology

Why our attention spans are shrinking, with Gloria Mark, PhD

These days, most of us live our lives tethered to our computers and smartphones, which are unending sources of distraction. Research has shown that over the past couple of decades people's attention spans have shrunk in...

00:00:00



- [podcast link](#)

more on attention

- [paper link](#)

On the relationship between mind wandering and mindfulness

[Angelo Belardi](#)  [Leila Chaieb](#), [Alodie Rey-Mermet](#), [Florian Mormann](#), [Nicolas Rothen](#), [Juergen Fell](#) & [Thomas P. Reber](#)

[Scientific Reports](#) **12**, Article number: 7755 (2022) | [Cite this article](#)

6268 Accesses | **15** Altmetric | [Metrics](#)

Abstract

Mind wandering (MW) and mindfulness have both been reported to be vital moderators of psychological wellbeing. Here, we aim to examine how closely associated these phenomena are and evaluate the psychometrics of measures often used to quantify them. We investigated two samples, one consisting of German-speaking unpaid participants (GUP, n = 313) and one of English-speaking paid participants (EPP, n = 228) recruited through MTurk.com. In an online experiment, we collected data using the Mindful Attention Awareness Scale (MAAS) and the sustained attention to response task (SART) during which self-reports of MW and meta-awareness of MW were recorded using experience sampling (ES) probes. Internal consistency of the MAAS was high (Cronbachs α of 0.96 in EPP and 0.88 in GUP). Split-half reliability for SART measures and self-reported MW was overall good with the exception of SART measures focusing on Nogo trials, and those restricted to SART trials preceding ES in a 10 s time window. We found a moderate negative association between trait mindfulness and MW as measured with ES probes in GUP, but not in EPP. Our results suggest that MW and mindfulness are on opposite sides of a spectrum of how attention is focused on the present moment and the task at hand.

more on attention

Does BeeLine Reader's gradient-coloured font improve the readability of digital texts for beginning readers?

Arnout Koornneef^{a 1}  , Astrid Kraal^{b 1} 

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<https://doi.org/10.1016/j.chbr.2022.100197> 

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Highlights

- BeeLine Reader increases the reading speed of second-grade readers for texts with a difficult layout.
- BeeLine Reader decreases the reading speed of second-grade readers for texts with an easy layout.
- BeeLine Reader can hamper reading comprehension for third-grade readers.
- Beginning readers prefer a black font over a BeeLine font.
- Digital reading applications should be formally tested before they are applied in educational settings.

TECHNOLOGY

Reading Bee-tween the Lines: BeeLine Reader and Spritz Raise Research Questions

By Brennan Klein

May 27, 2014

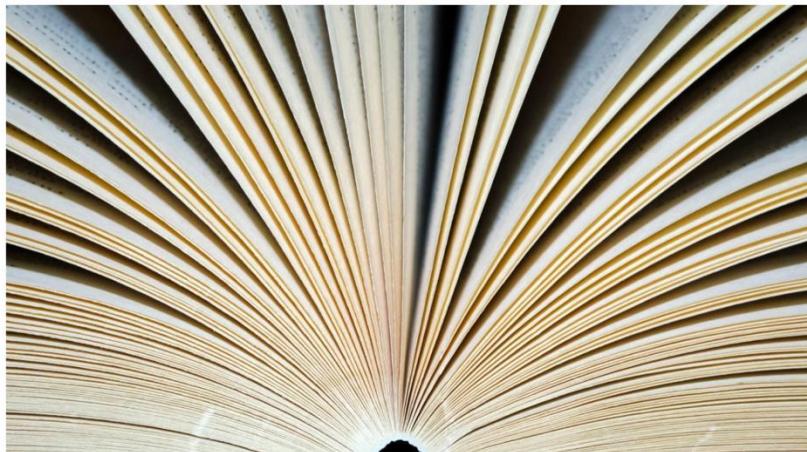


Image: George Hodan/Public Domain Pictures

For readers with language-based learning disabilities (LBLD), a major challenge is reading printed text accurately and fluently. One underlying deficit contributing to text difficulty may be in the area of visual attention span, which is the number of elements that can be processed in parallel within a brief temporal window (Bosse, 2007). In this study, we explored the effect of five text modifications on reading rate and accuracy on digital text samples in high school students with LBLD. These modifications are purported to improve reading outcomes in struggling readers, and some are particularly targeted to students with visual-attention span deficits. The goals were to investigate whether modifying text presentation could positively impact reading ability, to determine how visual-attention span was related to this relationship, and how students perceived the impact of each modification on their reading. Results indicated that digital text manipulations of increased inter-letter spacing, decreased line width, *Dyslexie* font, and alternating size gradient significantly improved oral reading accuracy, but no condition reached significance for oral reading speed. In contrast to previous research, visual-attention span was not found to correlate to single word or passage reading efficiency. A significant small to moderate positive correlation between student perception of oral reading speed and words-correct-per-minute was found across all conditions, but no significance was found for perceptions of accuracy and errors-per-minute. Implications for theoretical models underlying LBLD and visual-attention span are discussed.

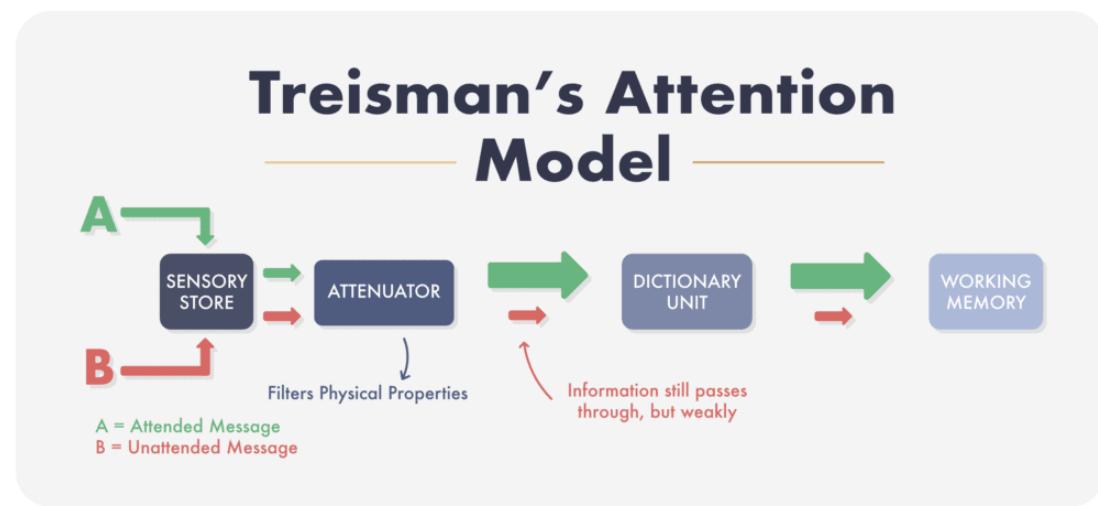
[paper](#)

[story](#)

[thesis](#)

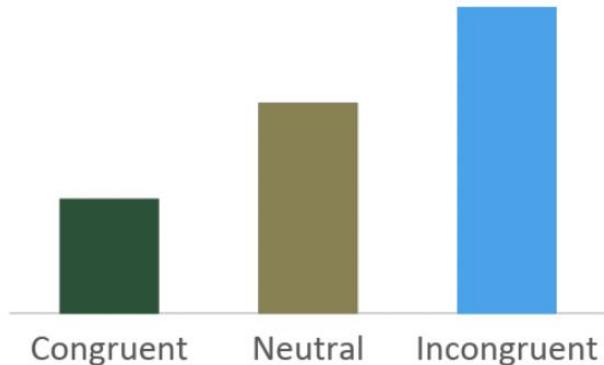
lingering question

- I'm a little unsure how the attenuation model selects what information can be let into the higher-level processing. Do we select the source and it lets in a little bit of info from other sources?



lingering question

- If participants were illiterate would there be no Stroop effect?



CLINICAL ISSUES

Alternative to the Stroop Color-Word Test for Illiterate Individuals

Thelma Kulaif & Luiz E. R. Valle

Pages 73-83 | Accepted 15 Dec 2006, Published online: 09 Mar 2011

[Cite this article](#) <https://doi.org/10.1080/13854040601186964>

[Full Article](#)

[Figures & data](#)

[References](#)

[Citations](#)

[Metrics](#)

[Reprints & Permissions](#)

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Abstract

An alternative to the Stroop Color-Word Test (SCWT), denominated the Colored Numbers Test (CNT), was developed to evaluate the selective attention of illiterate individuals. A total of 30 volunteers with basic education (control group) and 30 illiterate volunteers (experimental group) performed the SCWT and the CNT. Volunteers had to name the color of the rectangles in the CNT neutral condition, and in the critical condition they had to either name the color of the numbers or, when the numbers were black, read the numbers. An interference index (II) was calculated for both tests by subtracting the time taken to complete the task in the neutral condition from the time taken to complete the task in the critical condition. The control group showed an II of 14.9 s in the SCWT and of 19.1 s in the CNT, and the experimental group, which practically presented no interference in the SCWT (II = 0.2 s), showed an II of 18.7 s in the CNT. These findings suggest that the CNT can be used to evaluate selective attention. Further work should confirm its validity. Its advantage over the SCWT is that it does not depend on the ability to read words, being then suitable for illiterate individuals.

Rel

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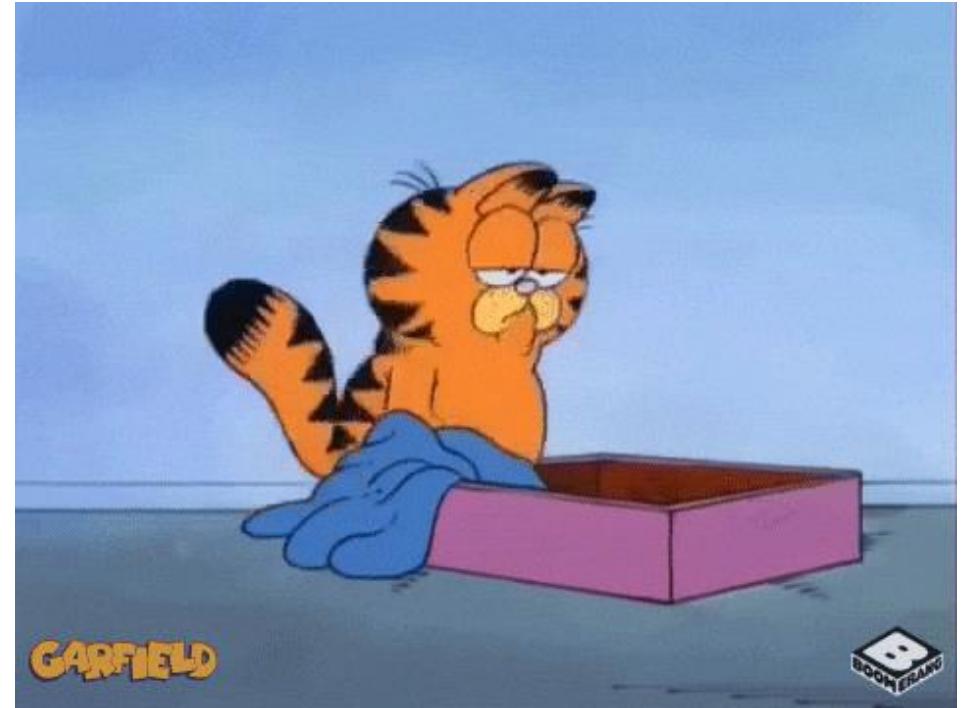
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today's agenda: more limitations

- interference effects on learning
- seven sins of memory



proactive interference

- prior learning influences new learning
- evidence: Underwood (1957)
 - a “meta-analysis” of several studies
 - y-axis: percent of items recalled from a current list
 - x-axis: number of previous lists learned
 - recall was worse as more lists were learned before current list

INTERFERENCE AND FORGETTING

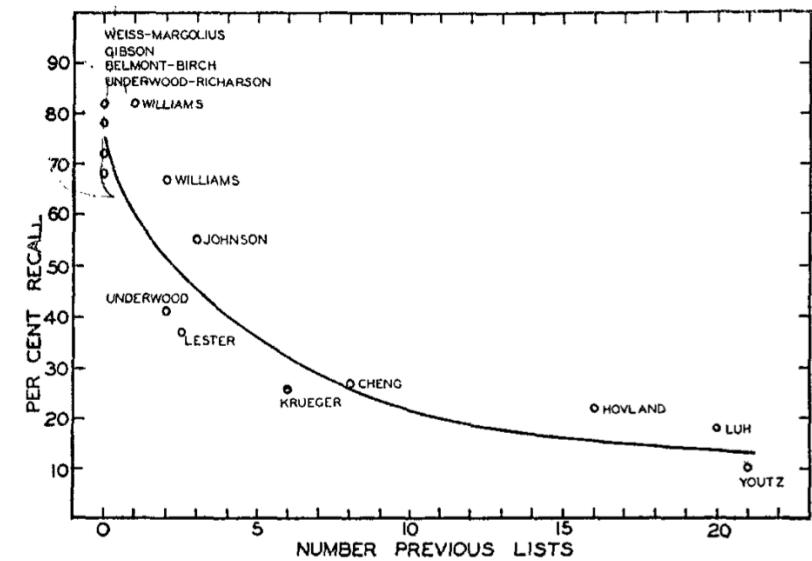


FIG. 3. Recall as a function of number of previous lists learned as determined from a number of studies. From left to right: Weiss and Margolius (35), Gibson (9), Belmont and Birch (3), Underwood and Richardson (33), Williams (36), Underwood (27, 28, 29, 30), Lester (17), Johnson (14), Krueger (16), Cheng (6), Hovland (11), Luh (18), Youtz (37).

retroactive interference

- newer events influence prior learning
- evidence: Postman (1952)
 - original learning: participants encoded 24 nonsense syllables and were tested
 - interpolated learning: 24 new nonsense syllables (**experimental** group) OR New Yorker magazine (**control** group)
 - final phase: participants were tested on original syllables
 - participants were better on original test than final test
 - **experimental group** showed more forgetting than **control group**, due to interference from the second list of nonsense syllables
- activity in pairs: what would a plot of these findings look like?

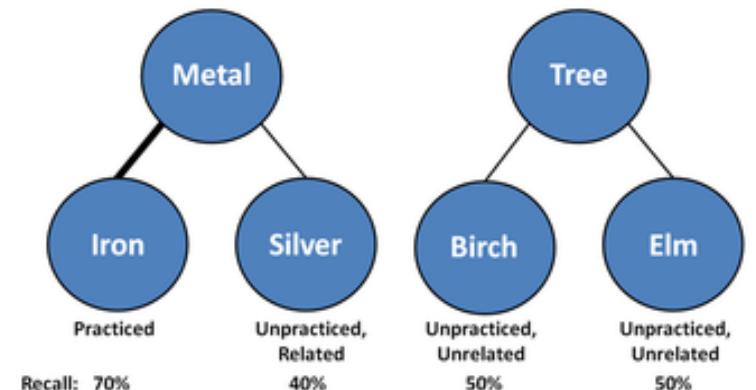
retrieval-induced forgetting

METAL-iron
TREE-birch
METAL-silver
TREE-elm

- retrieval causes forgetting of other information in memory
- evidence: Anderson, Bjork, & Bjork (1994)
 - study phase: participants first study pairs of category labels and words (METAL-iron, METAL-silver, TREE-birch, TREE-elm)
 - retrieval practice phase: a subset of items are tested (e.g., METAL-ir???)
 - test phase: all items are recalled/recognized
 - unpracticed but related items are forgotten more than the unpracticed unrelated items

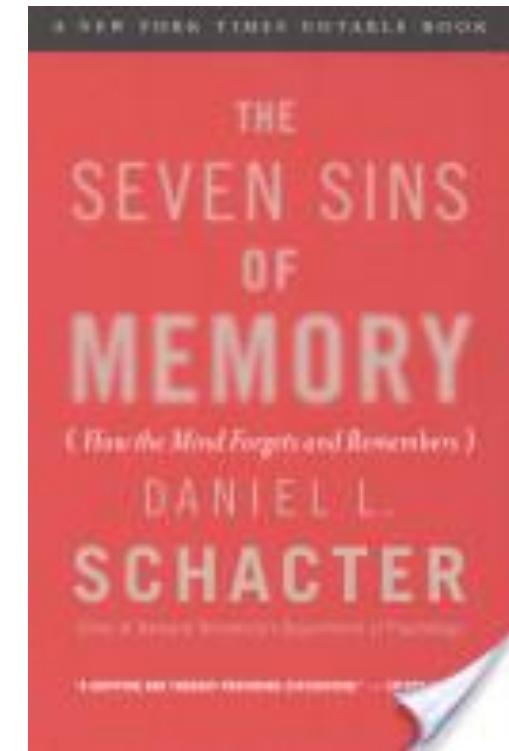
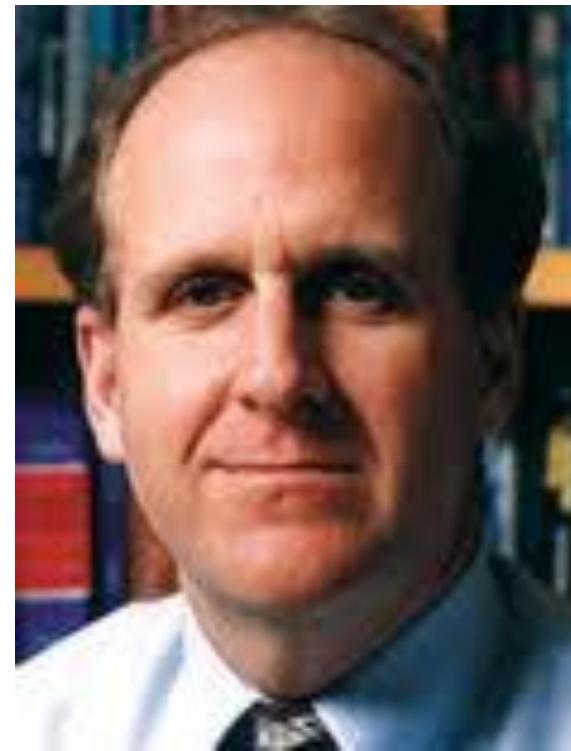
METAL-ir???

METAL-ir??
TREE-bi??
METAL-si??
TREE-e??



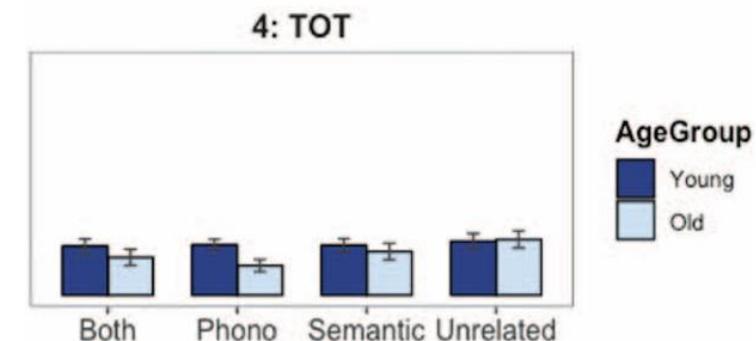
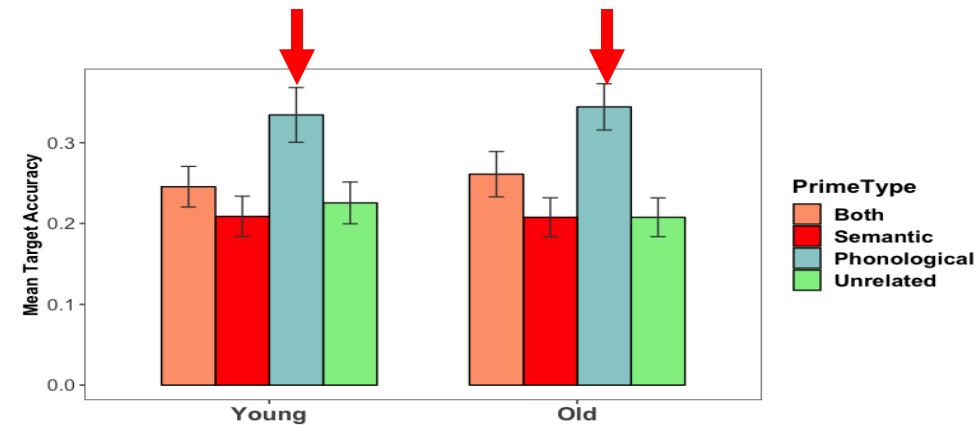
seven “sins” of memory

- transience
- absent-mindedness
- blocking
- misattribution
- suggestibility
- bias
- persistence

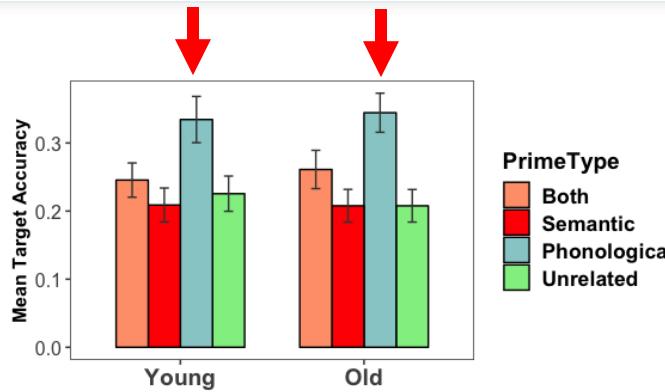


lexical retrieval: key findings

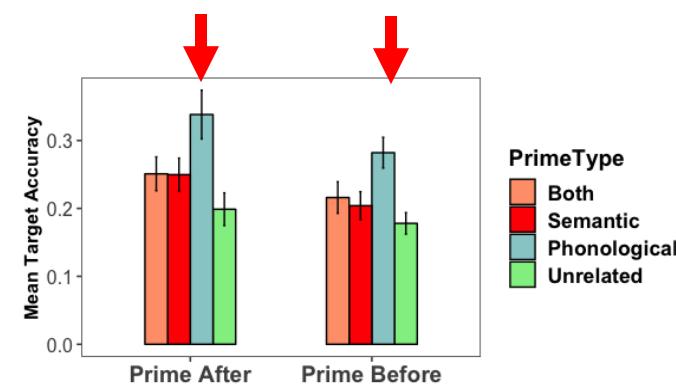
- phonological facilitation
- more TOTs in unrelated & semantic conditions compared to both/phonological conditions



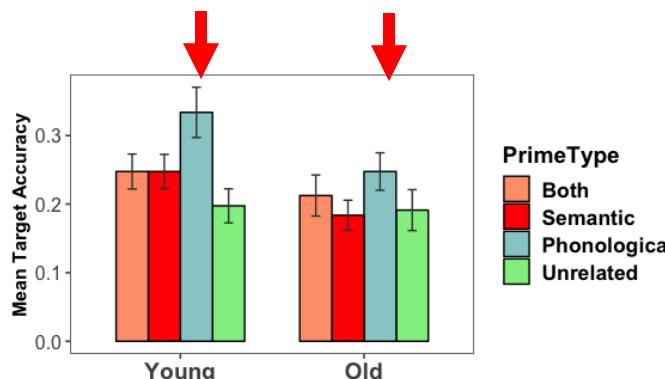
robust phonological facilitation



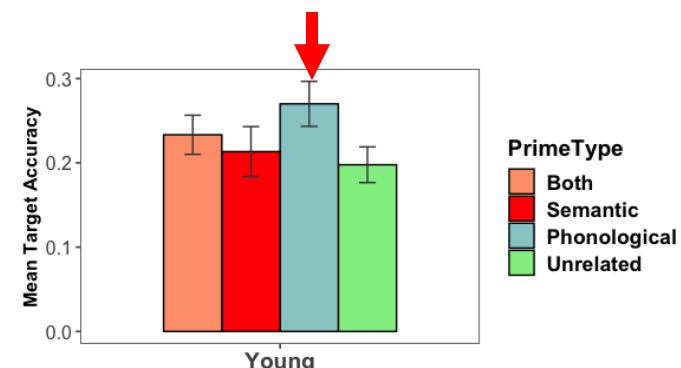
No Instructions
about the Prime



Switching the
position of the
Prime (before or
after definition)



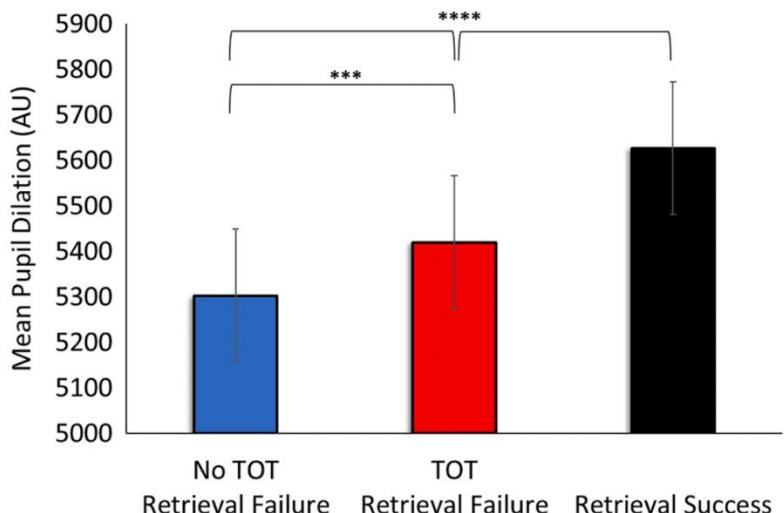
With Instructions
that the Prime is
not the answer



Threshold
Priming (48 ms)

TOT features

- partial recollection
- affective glow hypothesis



[paper](#)

Likelihood of Reporting a TOT Across Conditions

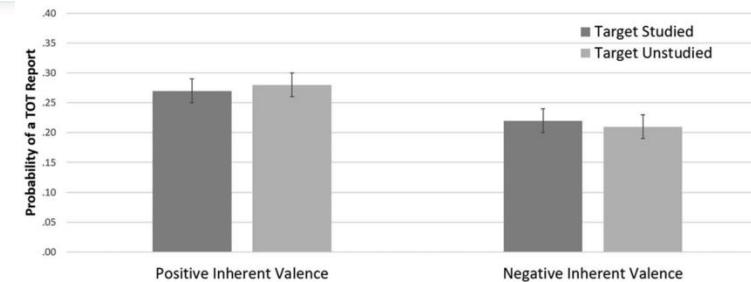


Figure 1. The probability of reporting a tip-of-the-tongue (TOT) state as a function of inherent target valence. Participants were more likely to report experiencing a TOT state among more positively valenced targets than among more negatively valenced targets.

Mean Ratings of the Likelihood that the Pictured Celebrity was Ethical

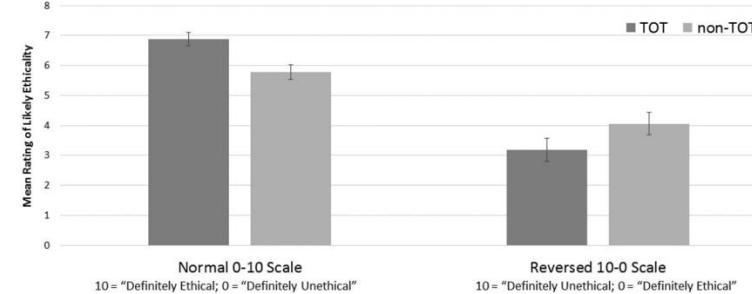
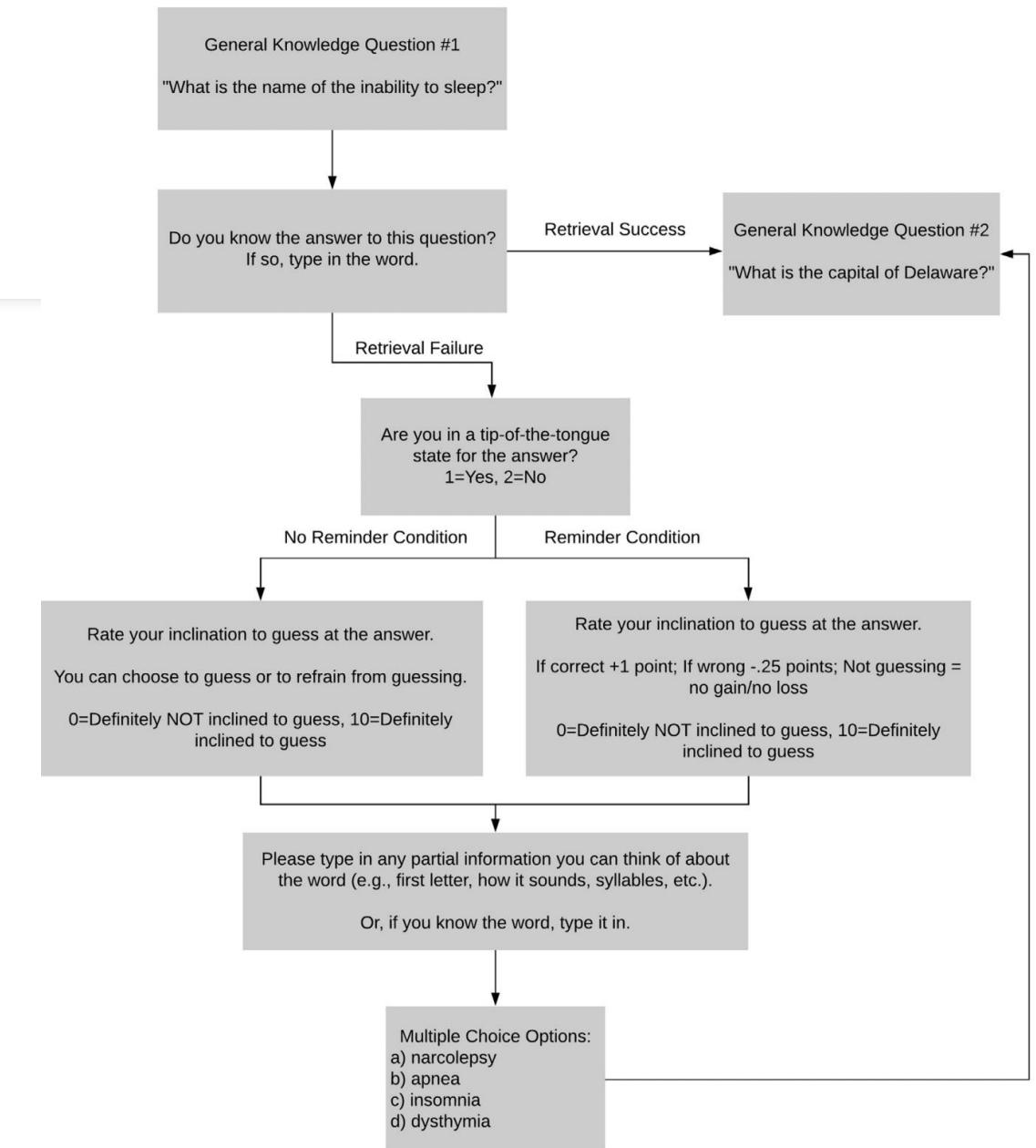
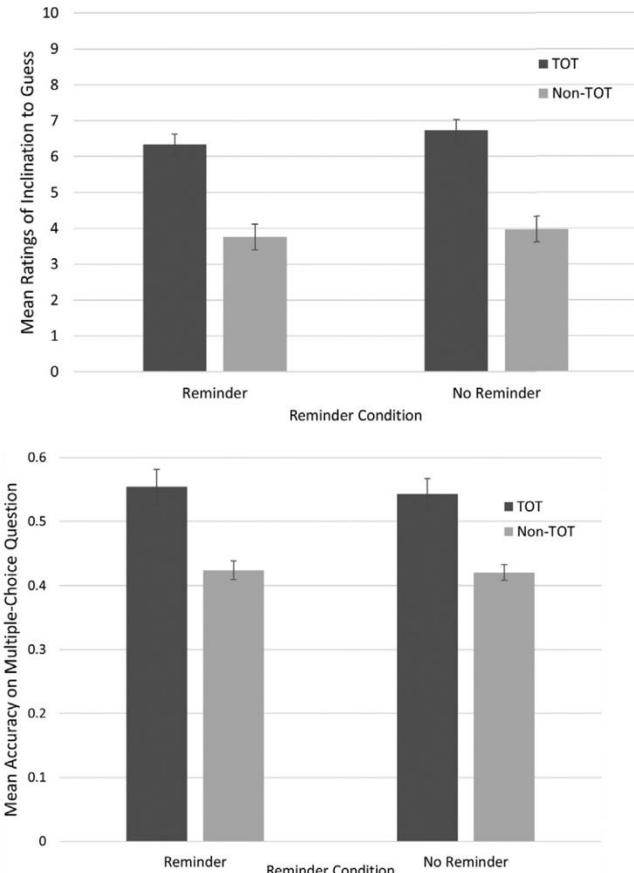


Figure 4. Mean ratings of the likely ethicality of the pictured celebrity as a function of reported tip-of-the-tongue (TOT) state for the person's name for Experiment 3a (normal 0–10 scale) and Experiment 3b (reversed 10–0 scale). Regardless of the nature of the scale used, participants exhibited a TOT positivity bias. They judged there to be a greater likelihood that the pictured celebrity was an ethical person during reported TOT states than non-TOT states.

[paper](#)

TOTs and learning



activity

- I will read out a list of words
- try to remember them

Deese-Roediger-McDermott (DRM)

- Roediger & McDermott (1995) conducted an experiment designed to test “false memories”
- presented word lists to participants with **critical “lures”**
- found high rates of recalling and recognizing words that were **never presented!**



Roddy Roediger



Kathleen McDermott

Two experiments (modeled after J. Deese's 1959 study) revealed remarkable levels of false recall and false recognition in a list learning paradigm. In Experiment 1, subjects studied lists of 12 words (e.g., *bed, rest, awake*); each list was composed of associates of 1 nonpresented word (e.g., *sleep*). On immediate free recall tests, the nonpresented associates were recalled 40% of the time and were later recognized with high confidence. In Experiment 2, a false recall rate of 55% was obtained with an expanded set of lists, and on a later recognition test, subjects produced false alarms to these items at a rate comparable to the hit rate. The act of recall enhanced later remembering of both studied and nonstudied material. The results reveal a powerful illusion of memory: People remember events that never happened.

DRM Paradigm

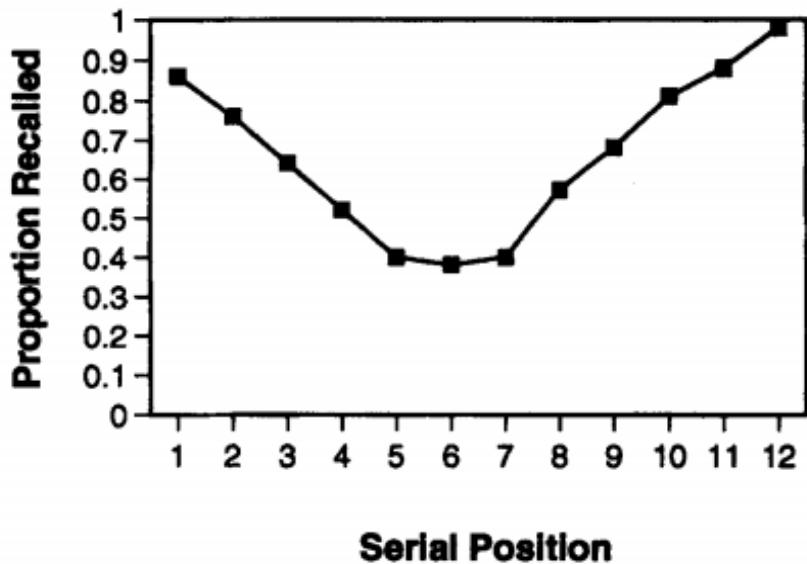


Figure 1. Probability of correct recall in Experiment 1 as a function of serial position. Probability of recall of the studied words was .65, and probability of recall of the critical nonpresented item was .40.

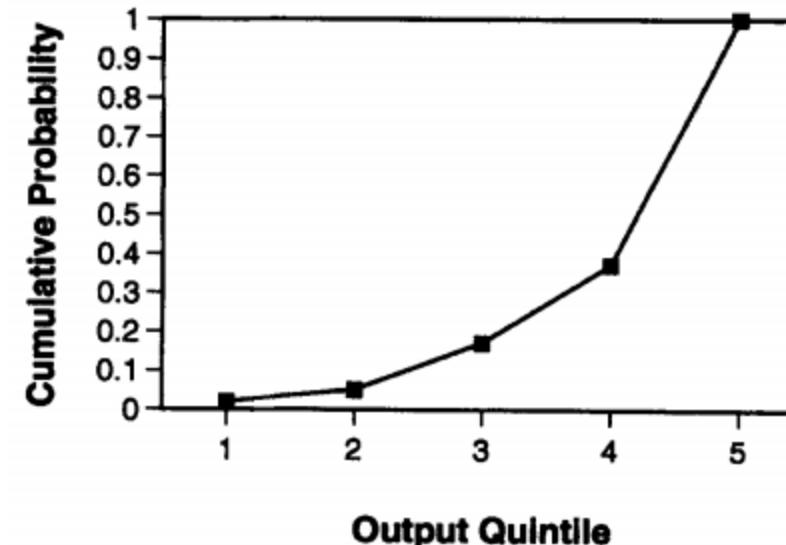
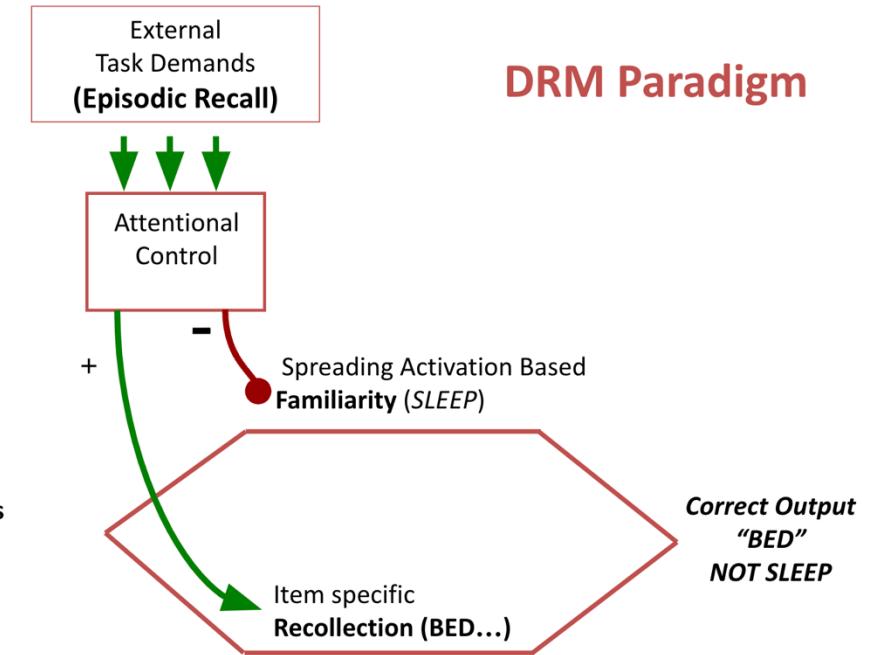


Figure 2. Recall of the critical intrusion as a function of output position in recall. Quintiles refer to the first 20% of responses, the second 20%, and so on.

why do we do this?

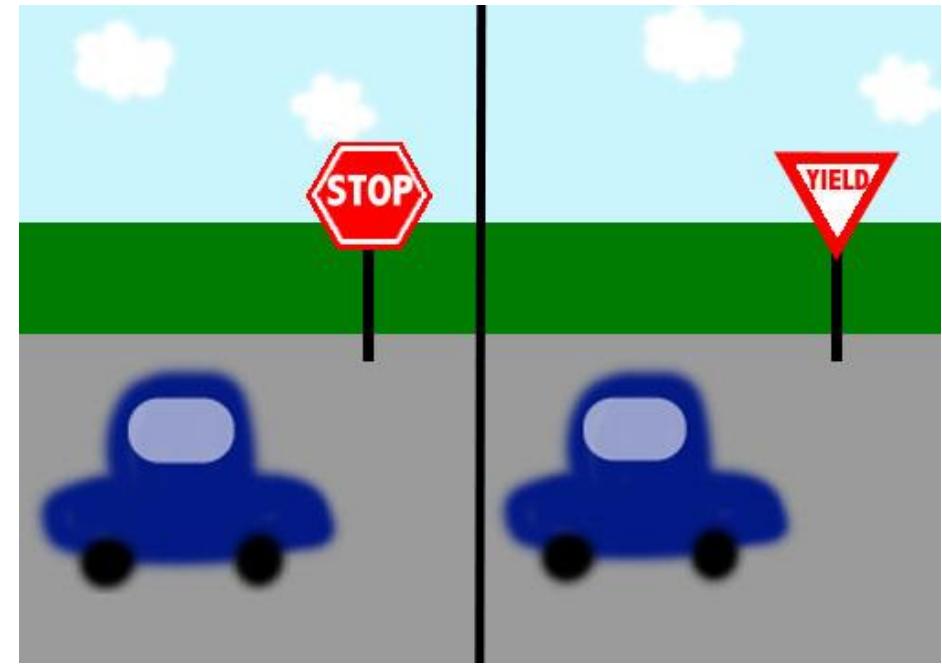
- decades of research on DRM!
- two-process account:
 - automatic activation (familiarity)
 - source monitoring (recollection)



Balota et al., 1999

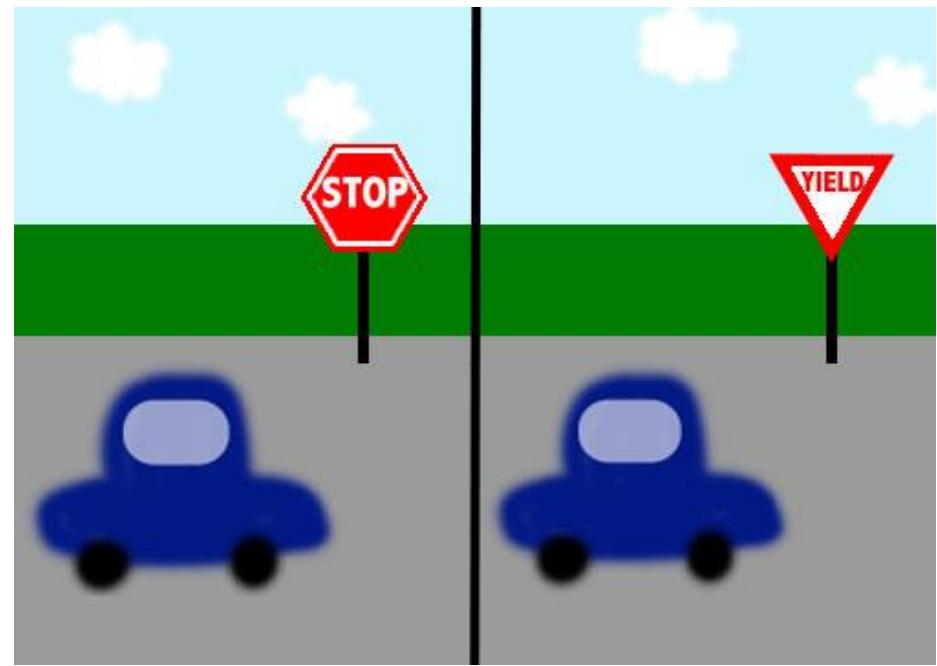
Loftus, Miller, and Burns (1978)

- participants were presented 30 color slides, half saw **stop** sign, half saw a **yield** sign
- after viewing the slides, they answered 20 questions, with one critical question, number 17
- varied when the questionnaire was presented (immediate vs. delayed) as well as the question itself



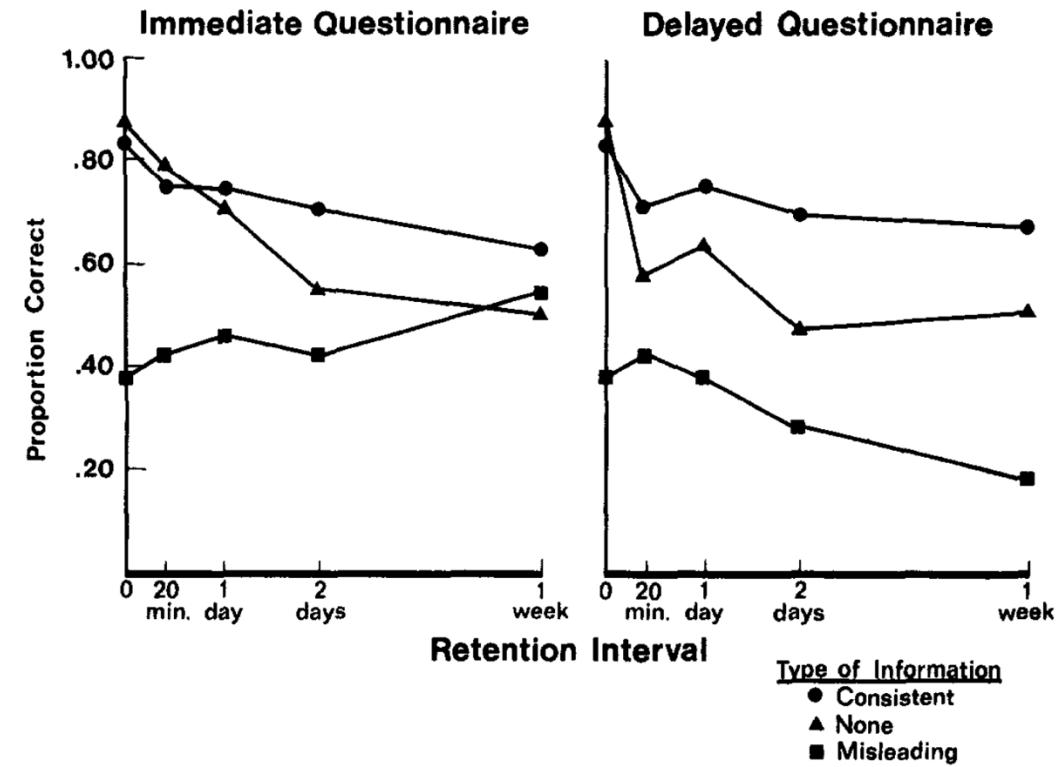
Loftus, Miller, and Burns (1978)

- Q 17: Did another car pass the blue Datsun while it was stopped at the...
 - STOP sign (**Consistent**)
 - YIELD sign (**Inconsistent**)
 - Intersection (**Neutral**)
- test: pairs of slides shown, forced choice [stop/yield]



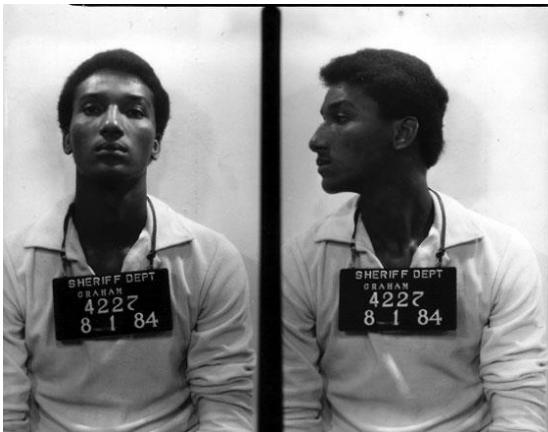
misinformation paradigm

- longer retention intervals led to worse performance
- providing inconsistent or misleading information produced the least accuracy overall, but the impact was worse when the questionnaire was delayed
- the weaker the original trace, the easier it is to alter



why is this important?

- The curious case of Ronald Cotton



eyewitness testimony

- several factors affect eyewitness testimony
- at the time of crime: race, exposure duration, lighting, retention interval, stress, weapon focus
- during initial identification: nature of lineup, suggestive questions, similarity, memory strength
- after initial identification: reinforcing memories, repeated exposure



cognition and legal system

- admissibility of evidence in cases is governed by the Federal Rules of Evidence, which have **largely remained unchanged since 1975** (Yilmaz, Shen, & Wixted, 2023)
- eyewitness testimony played a role in almost **70% of 375 wrongful convictions** overturned by DNA evidence since 1989 (Innocence Project, 2023)
- even without suggestibility, the act of testing a witness' testimony creates a memory trace that can be later reinforced
- **the first identification** is therefore the purest and most indicative of innocence (or guilt)
- there is a systematic predictive relationship between confidence and accuracy during early lineups (Wixted, Mickes, et al., 2016)

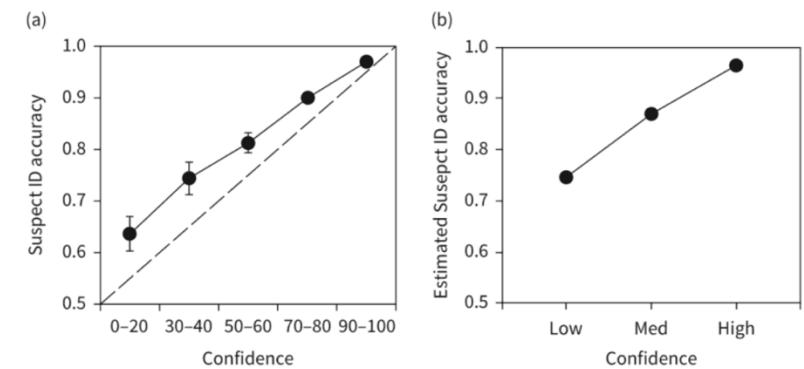
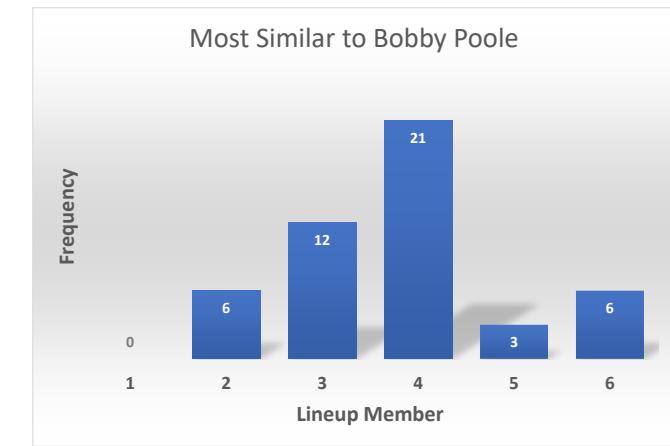
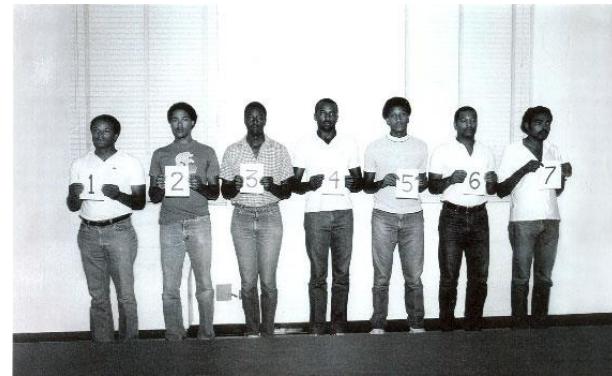


Figure 4.7 (a) CAC plot showing suspect identification accuracy (proportion correct) averaged across 15 studies with comparable scaling on the confidence (x-) axis (Wixted & Wells, 2017). (b) Estimated suspect identification accuracy (proportion correct) as a function of confidence for the data from the Houston Police Department field study assuming equal base rates (Wixted, Mickes, et al., 2016).

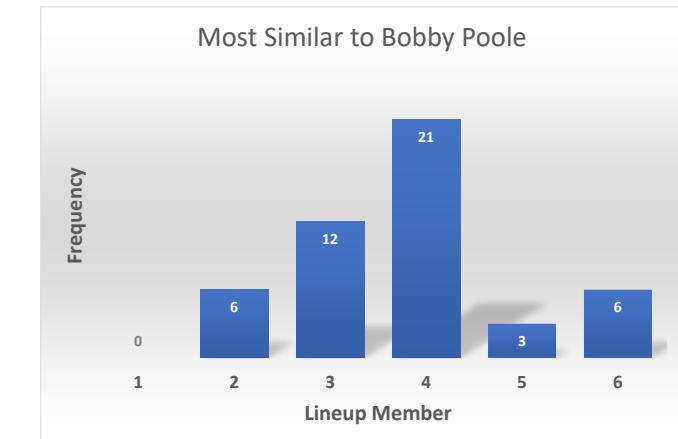
recollection vs. familiarity

- in a face-recognition test (a lineup), the witness is not being asked to actively generate information about the perpetrator but instead may be relying on their **recollection** of or **familiarity** with the suspects
 - **familiarity** is driven by a matching process (the same neural circuits and regions are activated upon seeing the face again)
 - **recollection** is driven by probabilistic search, i.e., you might be able to retrieve the memory trace (or not)
- key point: **recollection** may be initially unsuccessful but eventually successful (hypermnesia) but **familiarity** should not show such gains
- if the key suspect is in the line-up, they should be identified with high confidence initially (in ideal situations)



“pristine” eyewitness identification

- only one suspect per lineup
- suspect should not stand out in the lineup
- caution that the offender might not be in the lineup
- use double-blind testing (administrator of lineup should not know who the suspect is)
- collect a confidence statement at the time of the identification



flashbulb memories

- *autobiographical* memories for **salient, emotionally charged** events
- feel **very vivid** and are reported with **high confidence**, but typically show **memory declines** and **lack specific details over time**
- factors that affect flashbulb memories
 - retroactive interference: new information presented from multiple sources
 - rehearsal and spacing: makes them more vivid and strengthened

flashbulb memories: age differences

Age-Related Differences in Flashbulb Memories: A Meta-Analysis

Sarah J. Kopp, Laura E. Sockol, and Kristi S. Multhaup
Davidson College

Recent meta-analyses reveal age-related declines in short-term memory (STM), working memory, associative memory, prospective memory, face memory, recognition, and recall. The present meta-analyses extend this work beyond predominantly laboratory-based tasks to a naturalistic phenomenon. *Flashbulb memories* are vivid autobiographical recollections for the circumstances in which one learns of a distinct event that may be surprising, emotional, or personally important (the *reception event*). The existing literature on aging and flashbulb memories includes inconsistent findings. The present meta-analyses included 16 studies ($N = 1898$) that examined flashbulb memory in nonclinical samples of younger adults (below age 40 years) and older adults (above age 60 years). Findings, after exclusion of an outlier, suggest a small-to-moderate age-related impairment in flashbulb memory scores ($k = 14$, Hedges' $g = -0.30$, 95% CI $[-0.45, -0.15]$, $p < .001$) that was not moderated by study characteristics. After exclusion of an outlier, older adults' flashbulb memories were also significantly less consistent across time than younger adults' ($k = 7$, Hedges' $g = -0.29$, 95% CI $[-0.47, -0.11]$, $p = .002$). Secondary analyses investigated age-related differences in the presence and consistency of canonical categories of flashbulb memories and encoding and rehearsal variables associated with flashbulb memory formation and retention. Age-related differences were found only for consistency of memory for ongoing activity at the time of the reception event, favoring younger adults ($k = 3$, Hedges' $g = -0.40$, 95% CI $[-0.65, -0.15]$, $p = .002$). Overall, these findings are consistent with age-related impairment in flashbulb memory formation and retention.

Table 1
Characteristics of Included Studies

Study	Country	Study design	Event
Bohn and Berntsen (2007)	Germany	CS	Fall of Berlin Wall
Cohen, Conway, and Maylor (1994)	United Kingdom	CQ	Resignation of Margaret Thatcher
Davidson, Cook, and Glisky (2006)	United States	CQ	September 11, 2001 terrorist attacks
Davidson and Glisky (2002) Study 2	United States	CQ	Death of Mother Theresa
Denver, Lane, and Cherry (2010)	United States	CS	September 11, 2001 terrorist attacks
Gerdy, Multhaup, and Ivey (2007)	United States	CQ	September 11, 2001 terrorist attacks
Greene, Loftus, Grady, and Levine (2018)	Ireland	CQ	May 2018 abortion referendum
Kensinger, Krendl, and Corkin (2006)	United States	CQ	Explosion of Columbia Shuttle
Kvavilashvili, Mirani, Schlagman, Wellsted, and Kornbrot (2009), Study 1	United Kingdom	CS	Death of Princess Diana
Kvavilashvili et al. (2009) Study 2	United Kingdom	CS	Death of Princess Diana
Kvavilashvili et al. (2009) Study 3	United Kingdom	CQ	September 11, 2001 terrorist attacks
Otani et al. (2005)	Japan	CQ	Nuclear accident in Ibaraki
Tekcan et al. (in press), Study 1	Turkey	NR	Challenger shuttle explosion
Tekcan and Peynircioğlu (2002)	Turkey	CS	Death of President Ozal
Wolters and Goudsmit (2005)	Netherlands	CS	September 11, 2001 terrorist attacks
Yarmey and Bull (1978)	United States and Canada	CS	Assassination of John Fitzgerald Kennedy

Note. CS = cross-sectional; CQ = cross-sequential; NR = not reported.

- moderate age impairment in a recent meta-analysis (Kopp et al., 2020)

flashbulb memories: recent work

Flashbulb Memories and Memories for Personal Events: Their Role in Social Categorization and Identification

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Does the act of remembering or not remembering convey socially relevant information? The present work explored this question by examining the role flashbulb memories (FBMs) and memories for personal (MPEs) events play in social categorization and social identification. Study 1 investigated the extent to which Americans believe FBMs of both domestic and international public events and memories for life-script events should be remembered by an American or a Briton. Study 2 built on Study 1 and examined whether these normative expectations serve as a basis for identifying someone as "American," "American immigrant," "Black American," "female," "religious," or "politically conservative." Results indicate that FBMs and MPEs affect social categorization and identification in distinctive ways. The role of FBMs as markers of social identity is discussed.

A day that America will remember: flashbulb memory, collective memory, and future thinking for the capitol riots

Nawéï Cheriet, Meymune Topçu, William Hirst, Christine Bastin & Adrien Folville

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ABSTRACT

This study explores the topics of flashbulb memory, collective identity, future thinking, and shared representations for a public event. We assessed the memories of the Capitol Riots, which happened in Washington DC, on 6 January 2021. Seventy Belgian and seventy-nine American citizens participated in an online study, in which they freely recalled the unfolding of Capitol Riots and answered questions regarding their memory. Inter-subjects similarity of recalled details was analysed using a schematic narrative template (i.e., the event, the causes and the consequences). Results revealed that representations of the event, and its causes were more similar among Belgians compared to Americans, whereas Americans' representations of the consequences showed more similarity than Belgians'. Also, as expected, Americans reported more flashbulb memories (FBMs) than Belgians. The analysis underlined the importance of rehearsal through media and communication in FBM formation. This research revealed a novel relation between FBM and future representations. Regardless of national identity, participants who formed an FBM were more likely to think that the event would be remembered in the future, that the government should memorialise the event, and that a similar attack on the Capitol could happen in the future compared to participants who did not form FBM.

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next class

- how do we learn ?
- how do we learn better?

Before/On Tuesday

Note that February 11th's class is canceled! Here are the assignments you need to work on in lieu of the in-person class:

- Read and annotate this [chapter on association and conditioning](#)
- [Complete W4 Activity 1](#)
- Work on and submit [Project Milestone 1b: Group Contract](#)

Before Thursday

- Work on and submit [Project Milestone 1b: Group Contract](#)
- [Complete W4 Activity 2](#)

Here are the to-do's for the week:

- [Week 3 Exit Ticket \(due Thursday\)](#).
- [Week 3 Quiz \(due Sunday\)](#).
- Post any lingering questions [here](#)
- [Project Milestone 1b: Group Contract](#)
- Extra credit opportunities:
 - Submit [Exra Credit Questions](#) (1 point for 8 submissions)
 - Submit [Optional Meme Submission](#) (1 point for winners!)

