



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


# 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](#)

[Module](#) [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!

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

# 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  $\alpha$  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<sup>a1</sup>, Astrid Kraal<sup>b1</sup>

Show more

+ Add to Mendeley Share Cite

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

[Get rights and content](#)

Under a Creative Commons license

[open access](#)

### 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.

[paper](#)

### TECHNOLOGY

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

By Brennan Klein

May 27, 2014

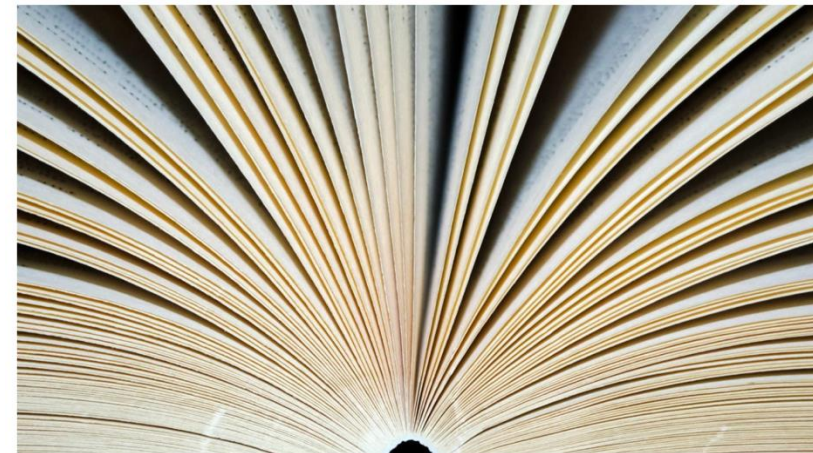


Image: [George Hodan/Public Domain Pictures](#)

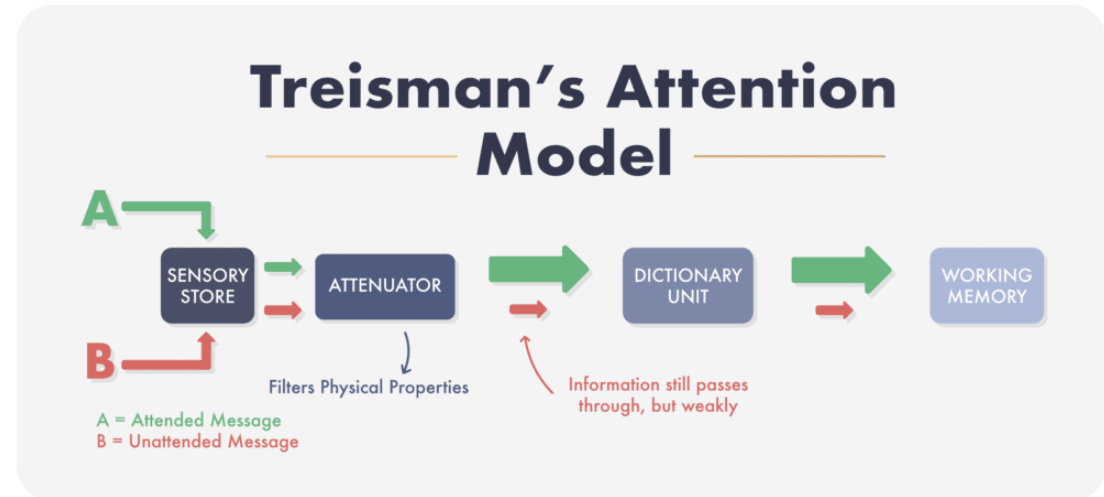
[story](#)

For readers with language-based learning disabilities (LBD), 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 LBD. 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 LBD and visual-attention span are discussed.

[thesis](#)

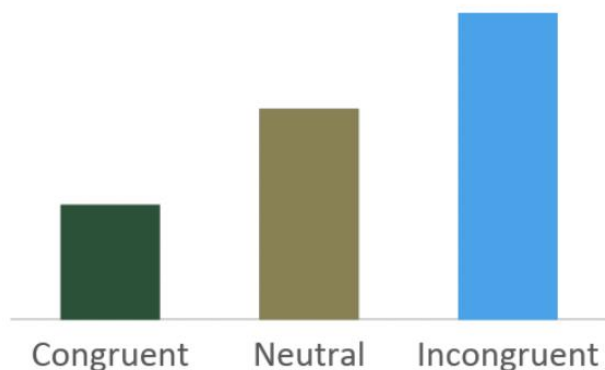
# lingering question

- 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](#)

[Read this a](#)

### 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

Pe

Col  
adu

B. U  
Jou  
Put

Col  
Per

# 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

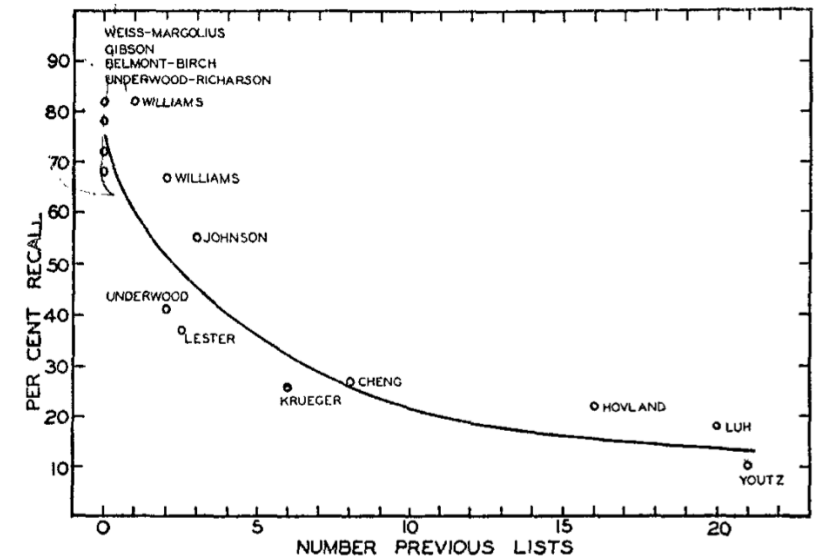


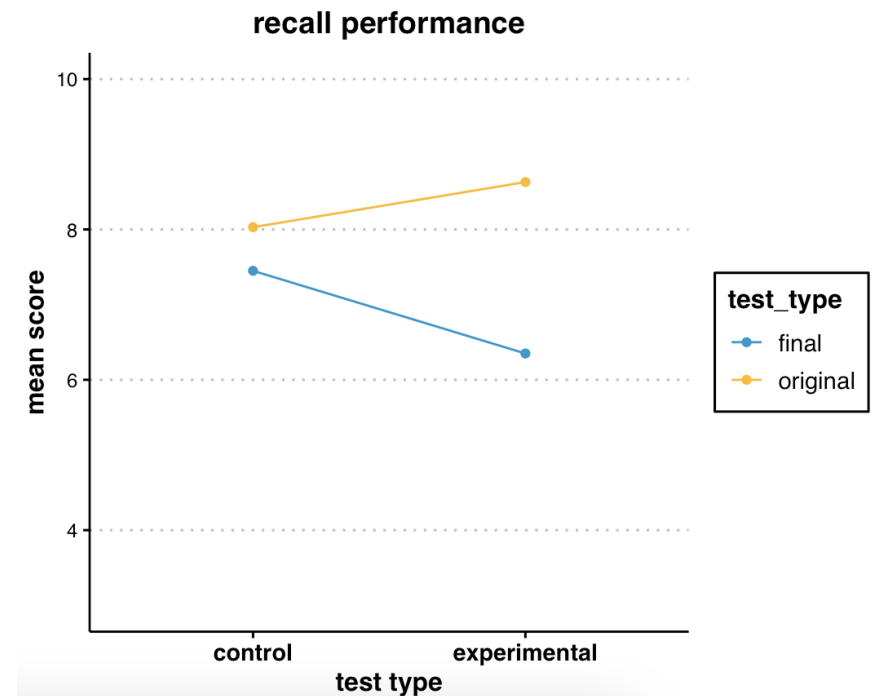
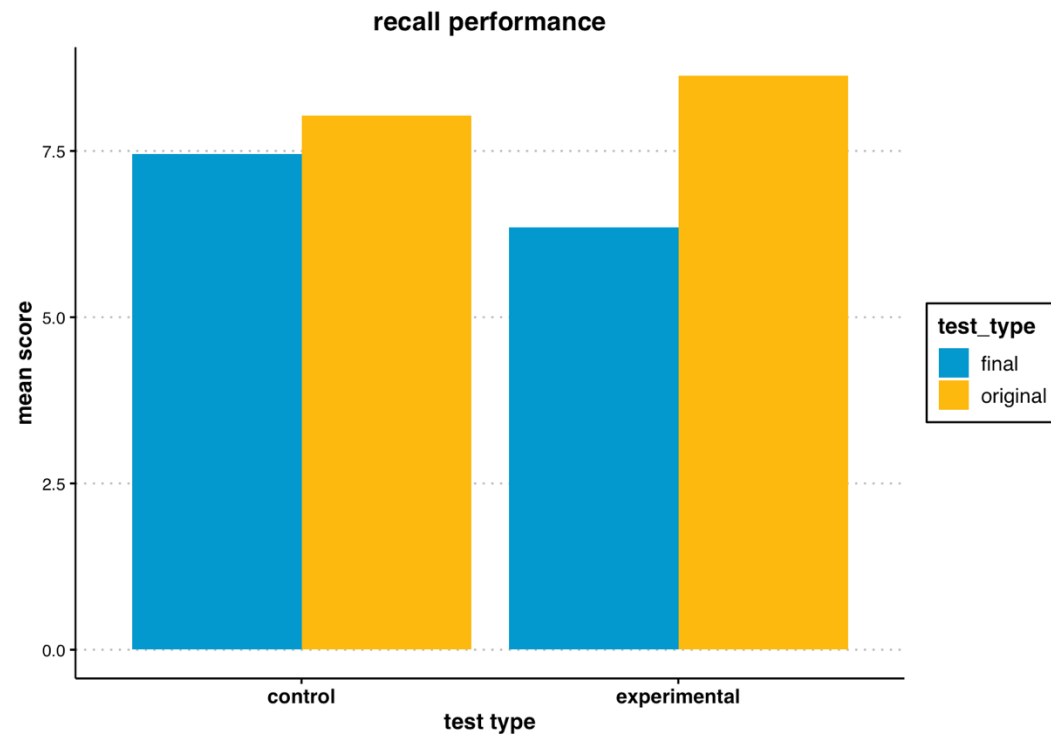
FIG. 3. Recall as a function of number of previous lists learned as determined from a number of studies. From left to right: Weiss and Margolius (35), Gibson (9), Belmont and Birch (3), Underwood and Richardson (33), Williams (36), Underwood (27, 28, 29, 30), Lester (17), Johnson (14), Krueger (16),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

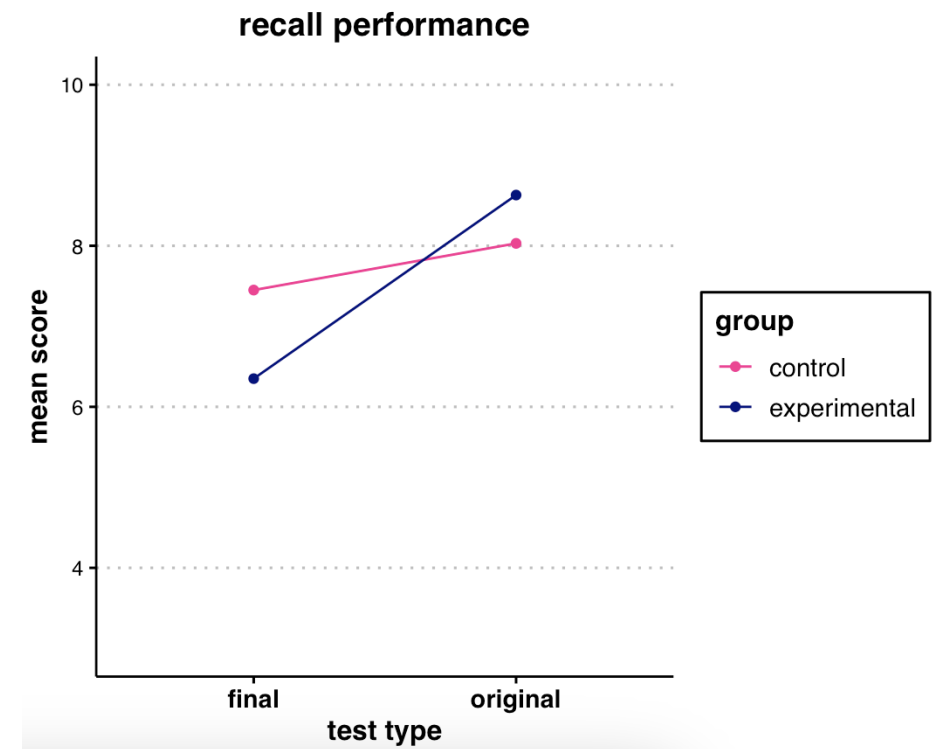
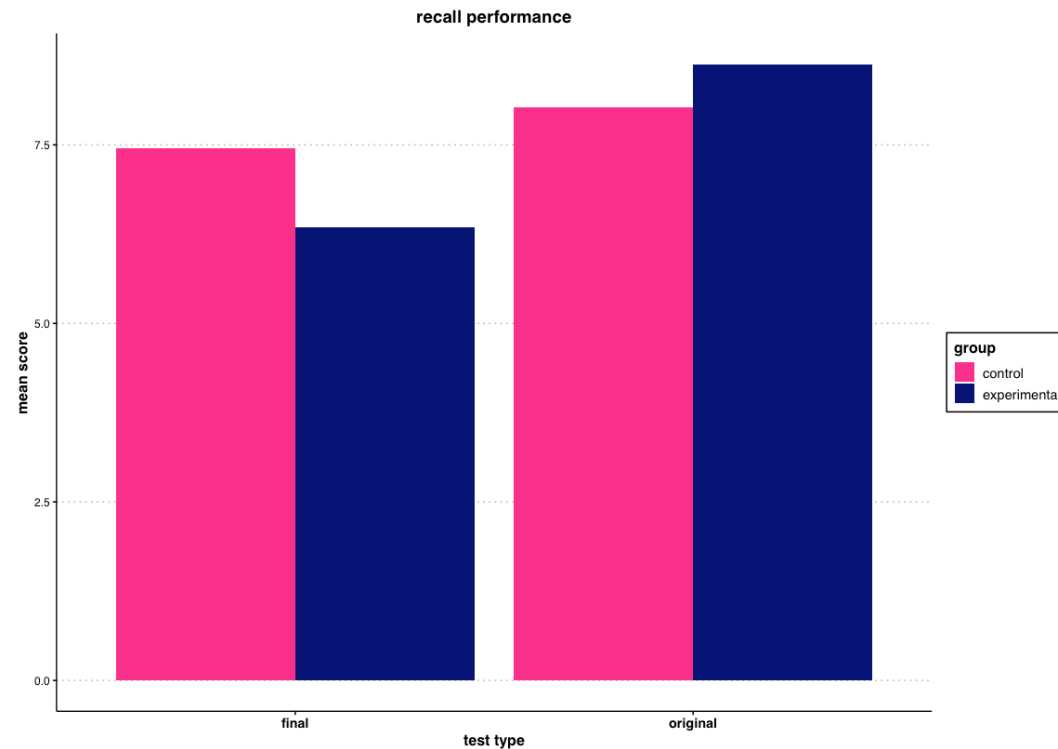
# retroactive interference: bar vs line plot 1

- newer events influence prior learning



# retroactive interference: bar vs line plot 2

- newer events influence prior learning





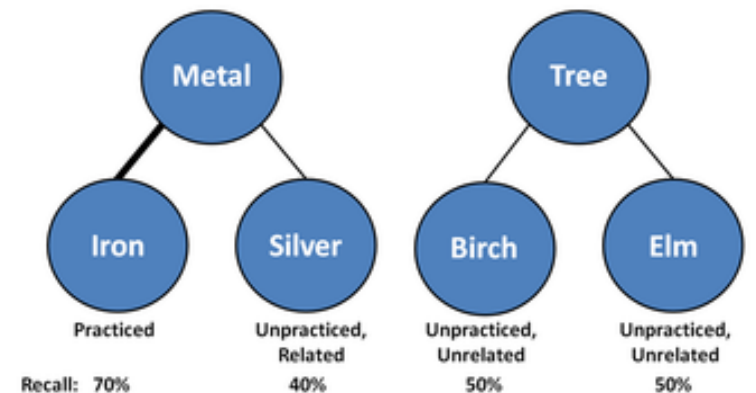
# retrieval-induced forgetting

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

METAL-ir????

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

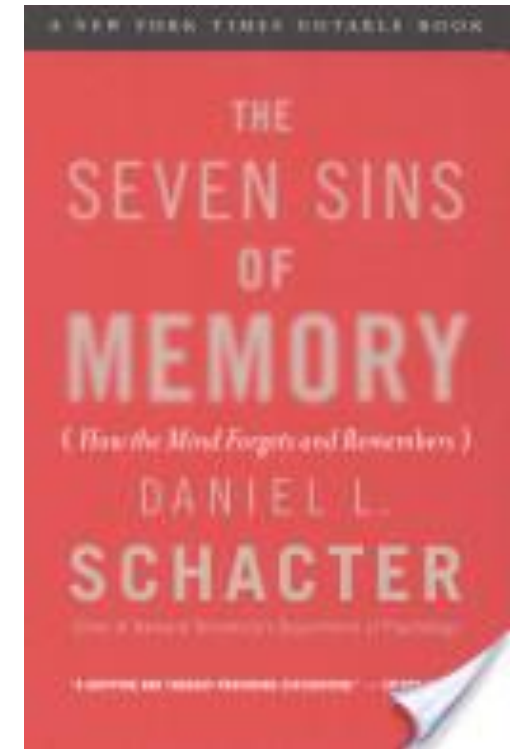




**RIF: explain it to each other!**

# seven “sins” of memory

- transience
- absent-mindedness
- blocking
- misattribution
- suggestibility
- bias
- persistence
- how do we fill the gaps??

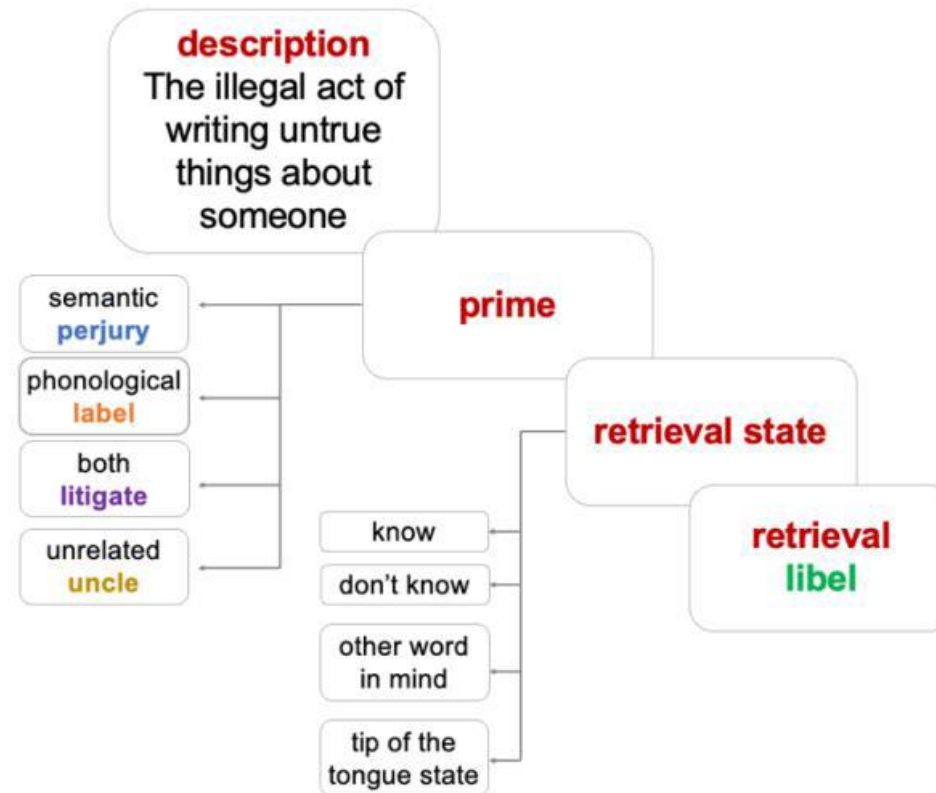




# class activity debrief

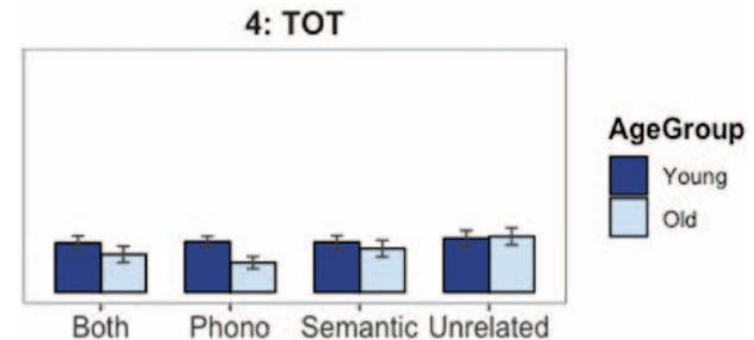
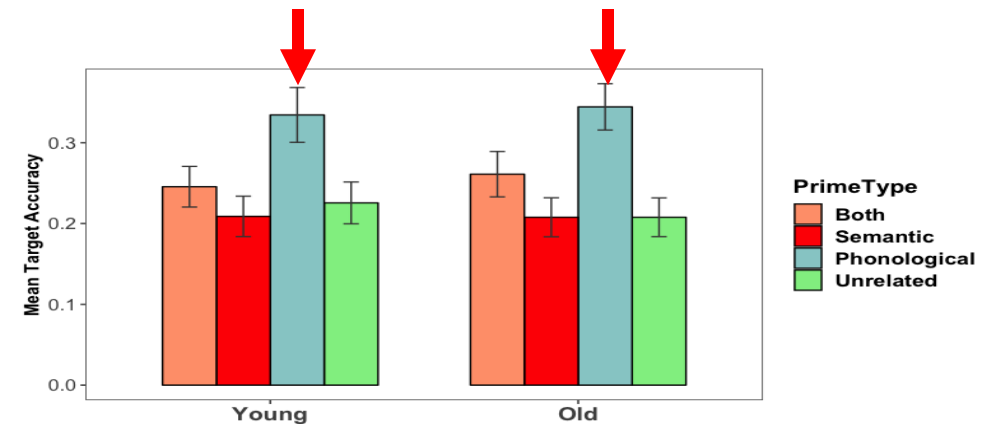
- discuss your experience
- what did you think of the questions?
- what did you feel when you didn't know the answer?

# class activity debrief

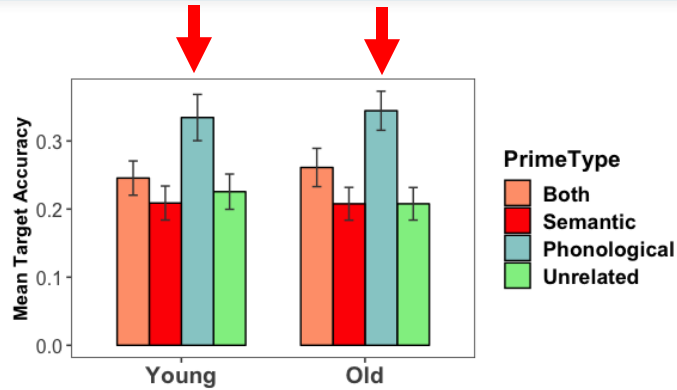


# lexical retrieval: key findings

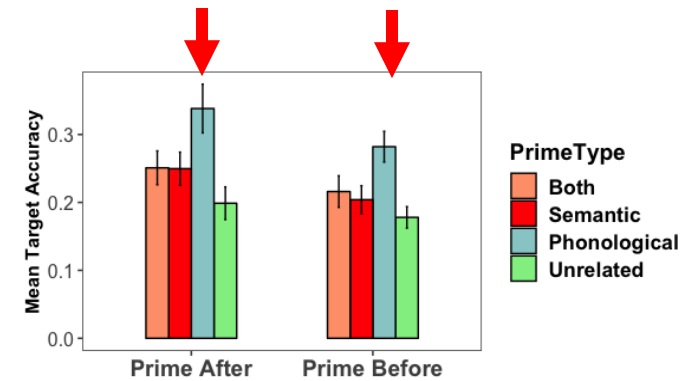
- phonological facilitation
- more TOTs in unrelated & semantic conditions compared to both/phonological conditions



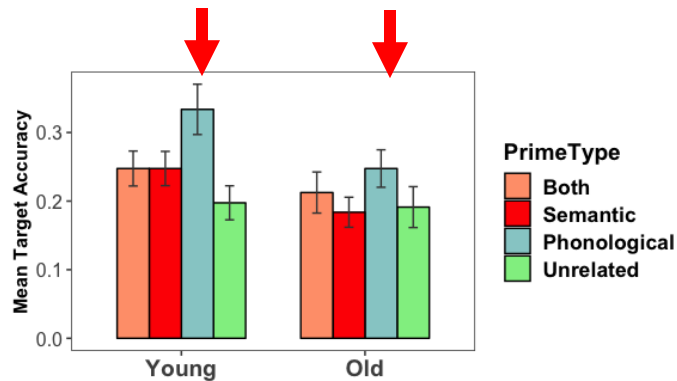
# robust phonological facilitation



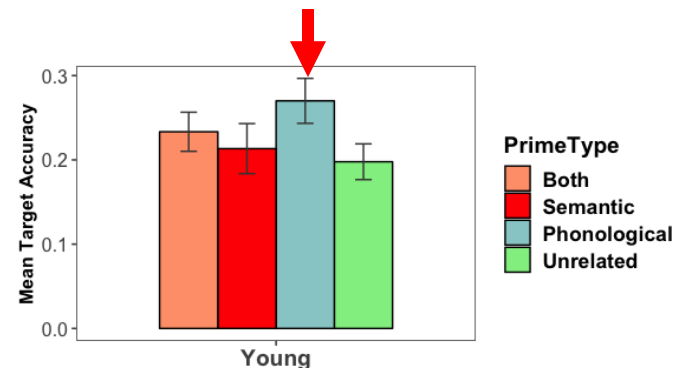
No Instructions about the Prime



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

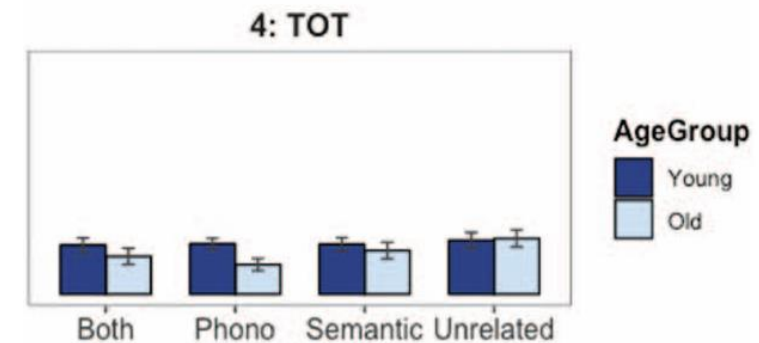
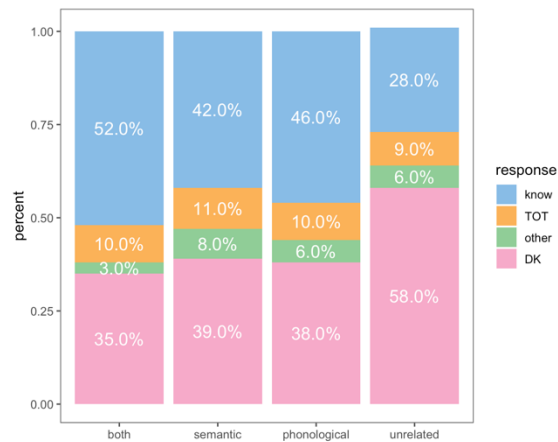
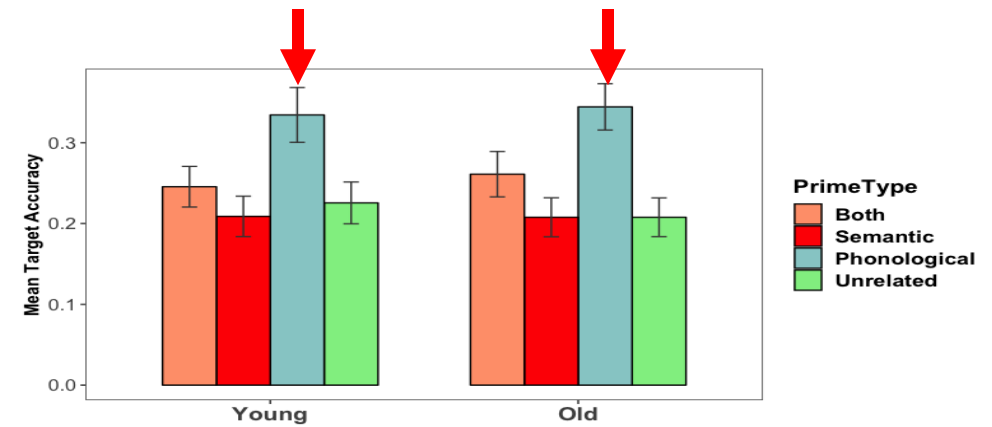
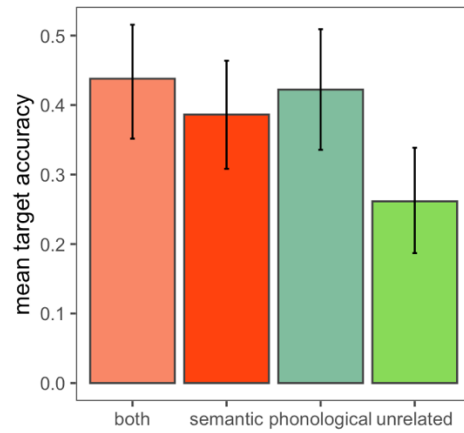


With Instructions that the Prime is not the answer



Threshold Priming (48 ms)

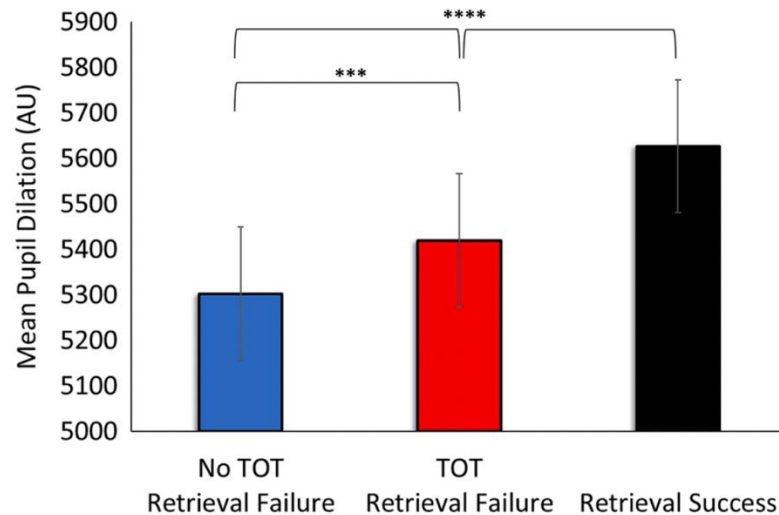
# lexical retrieval: your data





# TOT features

- partial recollection
- affective glow hypothesis



[paper](#)

## Likelihood of Reporting a TOT Across Conditions

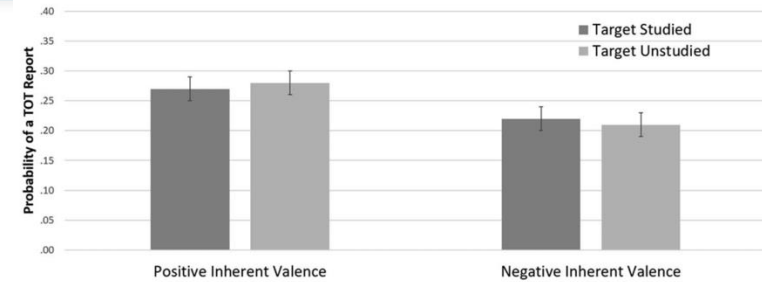


Figure 1. The probability of reporting a tip-of-the-tongue (TOT) state as a function of inherent target valence. Participants were more likely to report experiencing a TOT state among more positively valenced targets than among more negatively valenced targets.

## Mean Ratings of the Likelihood that the Pictured Celebrity was Ethical

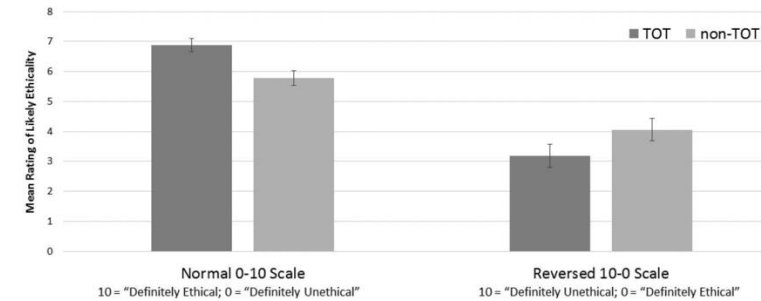
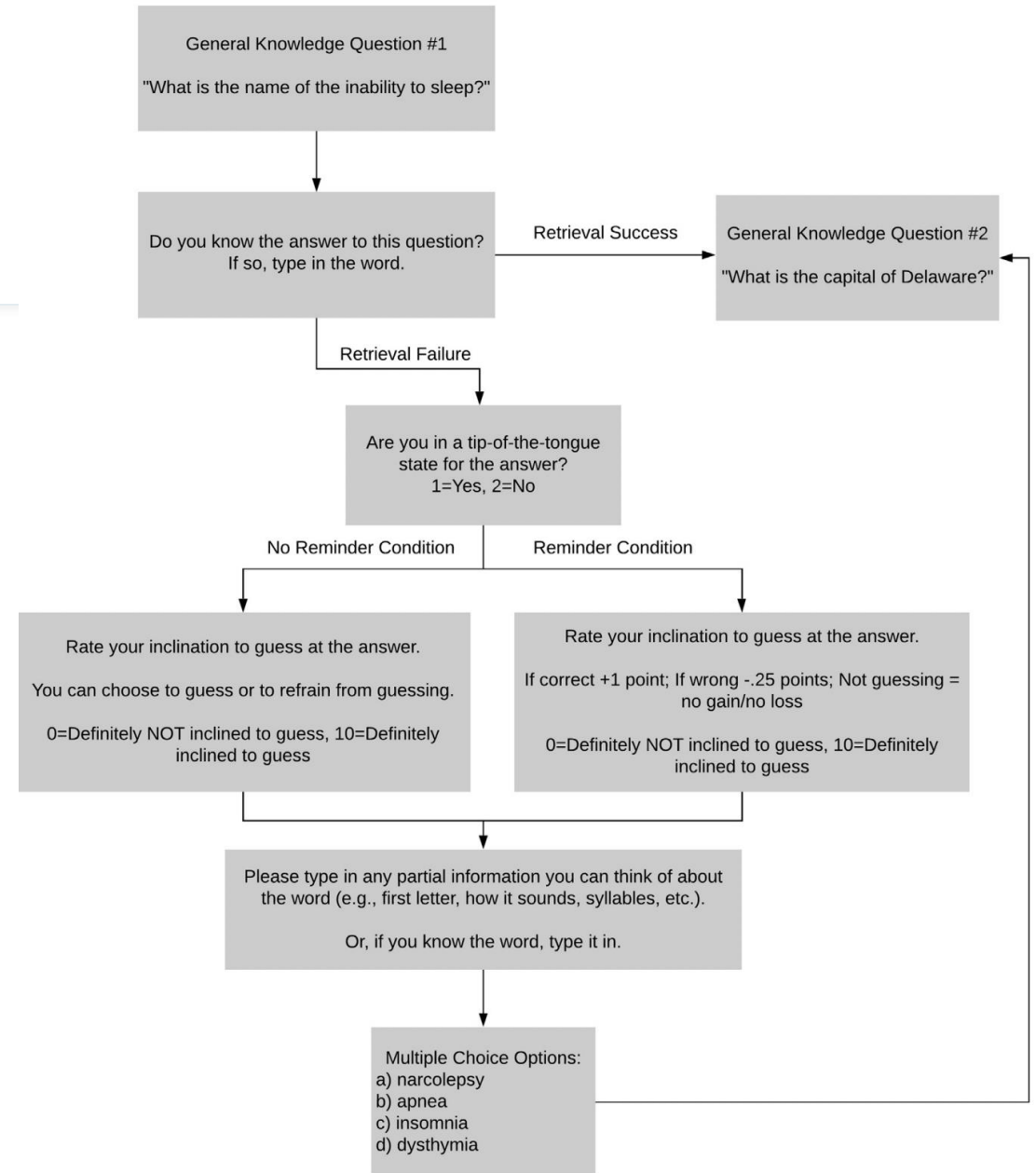
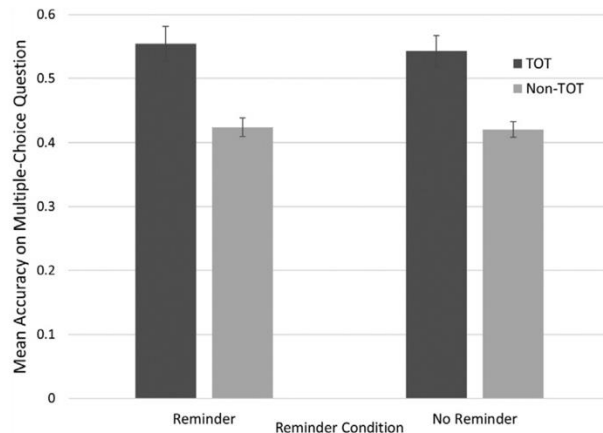
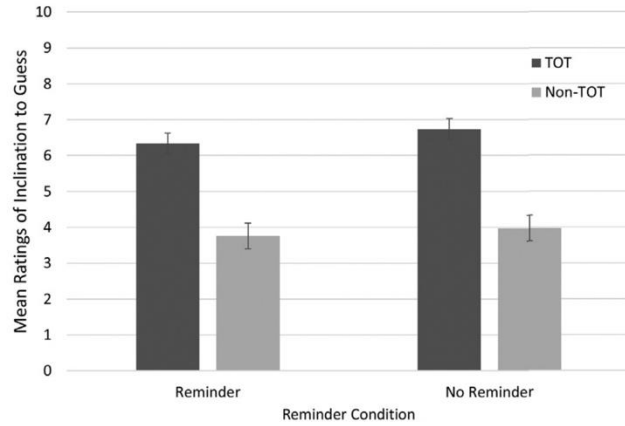


Figure 4. Mean ratings of the likely ethicality of the pictured celebrity as a function of reported tip-of-the-tongue (TOT) state for the person's name for Experiment 3a (normal 0–10 scale) and Experiment 3b (reversed 10–0 scale). Regardless of the nature of the scale used, participants exhibited a TOT 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

# answers

- how many words did you recall?

butter  
food  
eat  
sandwich  
rye  
jam  
milk  
flour  
jelly  
dough  
crust  
slice  
wine  
loaf  
toast

# 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!**



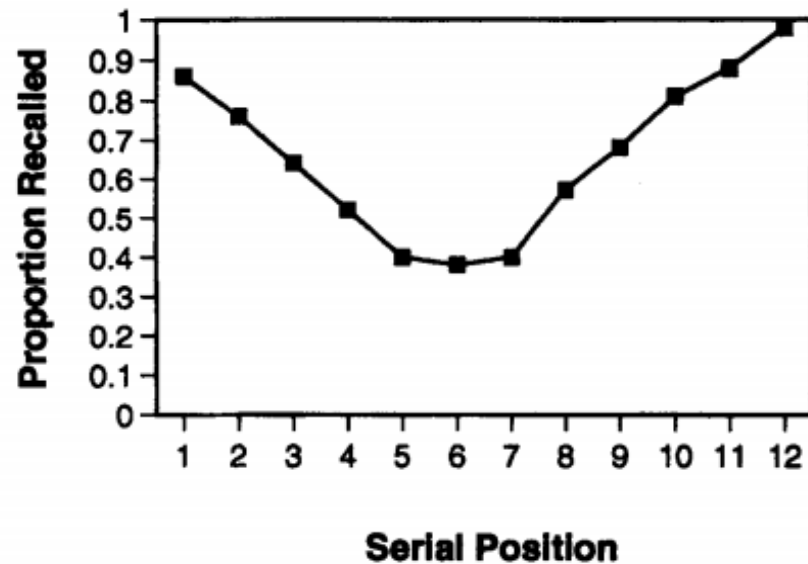
Roddy Roediger



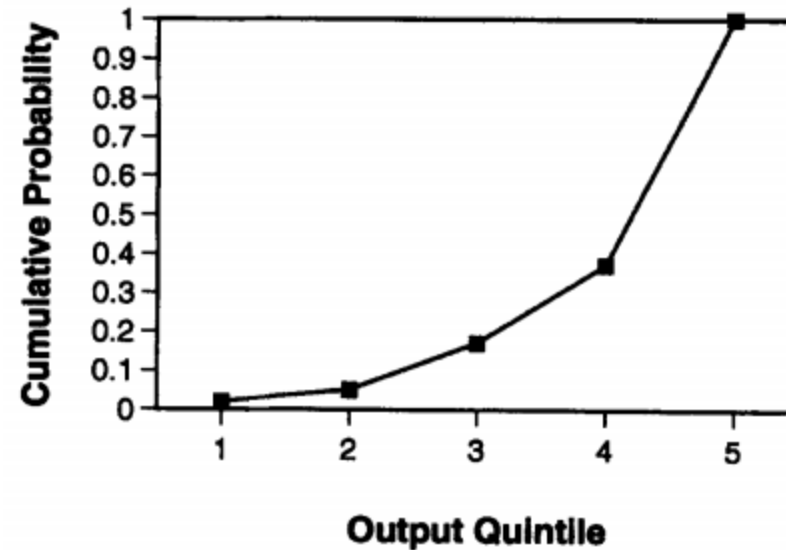
Kathleen McDermott

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



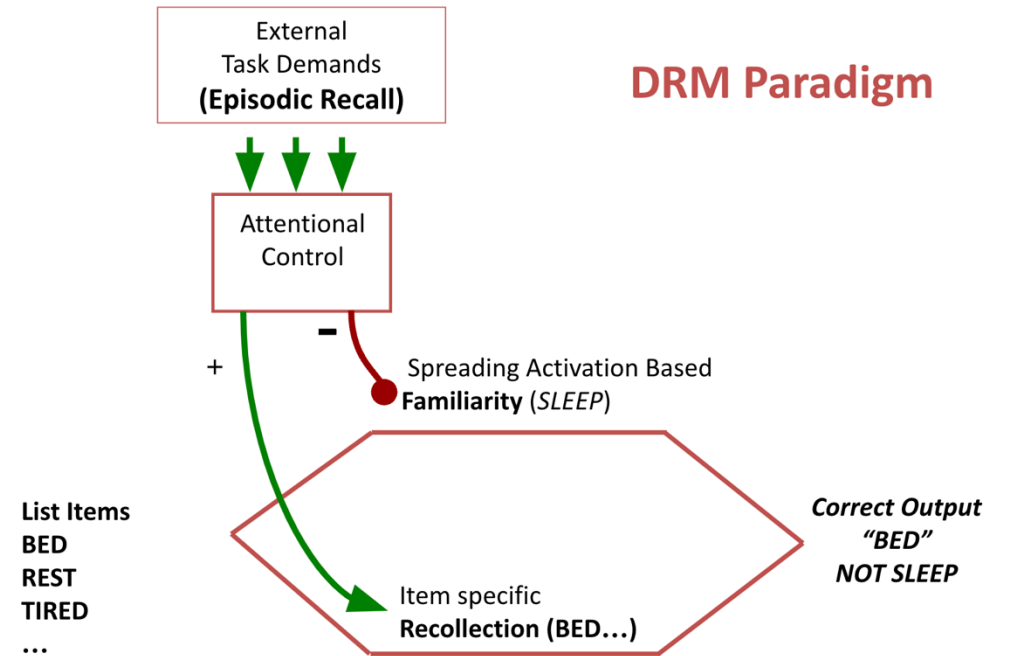
*Figure 1.* Probability of correct recall in Experiment 1 as a function of serial position. Probability of recall of the studied words was .65, and probability of recall of the critical nonpresented item was .40.



*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)



# 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 [Extra Credit Questions](#) (1 point for 8 submissions)
  - Submit [Optional Meme Submission](#) (1 point for winners!)