

Grad-level Memory 546

Fall 2023

Instructor: Qiong Zhang

Instructor Email: qiong.z@rutgers.edu

Course Modality: In person

Meeting Times: M/W 10:00am to 11:20am

Instructor Office Hour: M/W 11:20am to 11:50am

NOTE: Information contained in this syllabus is subject to change. Any changes will be announced in class and/or via email notification. Updates to the syllabus will also be posted on Canvas.

Course Description

Why do some things stick in our memories forever and other things seem to disappear seconds after we experience them? How do our brains organize and spontaneously retrieve memories? What mental processes are involved when sometimes we see someone familiar but cannot recall their names? The field of human memory also has practical applications. For example, how much should we trust eyewitness testimony? Or, should you cram for tomorrow's exam or get a good rest instead?

To answer all these questions, this seminar course will explore the scientific study of human memory. We will examine a range of classic and cutting-edge experimental results and theories that form the foundation of our current understanding of how we learn and remember. Topics we will cover include recognition memory, associative memory, memory search, memory applications, neural mechanisms of memory, as well as memory deficits in aging and clinical populations.

Each class will start with a student presentation of a reading. We will end with a discussion around the reading or debate around a few readings.

Learning Objectives

By the end of the course, students will

1. leave this course with a solid grounding in our current understanding of how we learn and remember
2. learn to critically evaluate theories that describe how memory works and learn to build their own theories
3. be able to characterize major brain mechanisms of human memory encoding and retrieval
4. develop appreciation of how memory theories are applied, and acquire practical knowledge for improving skill acquisition and retention of meaningful material
5. develop and practice academic skills in presentations and literature review

Textbook/Resources

There is no required textbook. There will be papers and book chapters for discussion, available as PDF files through the class website.

Coursework Requirements

Students are expected to actively participate in class discussions and sign up for paper presentations. There will be a reading assignment for every class, and you are expected to arrive in class with ideas and questions to discuss. To help you develop these ideas, you are required to write short commentaries before classes— one paragraph is typical.

A commentary might take one or several of the following forms: describe the part of the reading that you find most interesting or surprising; mention a claim that doesn't seem right to you; describe how the work could be usefully extended; draw a connection between the reading and something else that has been discussed previously. The one-paragraph commentary should be ended with a suggestion on what would be a good discussion question to have in class.

Commentaries are graded pass/fail. If you submit and pass all commentaries, you will receive full credit for this component of the course.

To assess the student's ability to put together the concepts and tools they have learned in the course, the class also consists of a mini literature review selected from a list of topics set by the instructor. Additionally, towards the end of the semester, students are expected to be able to synthesize ideas across papers and address a relatively novel question within the topic selected and produce a more in-depth full literature review. In short, this class will provide a low-risk environment to practice writing and presentation skills.

Grade Evaluation

Participation	10%
Commentaries	25%
Paper presentation	30%
Mini literature review (1 page)	15%
Full literature review (3 pages)	20%

Schedule of Classes/Readings

(9/6 Wed) Course introduction, Fundamentals of memory

Kahana, M. J. (2012). Foundations of human memory. Oxford University Press. Chapter 1. Introduction.

(9/11 Mon) Multiple memory systems

[amnesia] Squire LR. The legacy of patient H.M. for neuroscience. *Neuron*. 2009 Jan 15;61(1):6-9. doi: 10.1016/j.neuron.2008.12.023. PMID: 19146808; PMCID: PMC2649674.

(9/13 Wed) Eyewitness testimony I.

TED talk “How reliable is your memory?” by Elizabeth Loftus
Loftus, E. F., & Pickrell, J. E. (1995). The formation of false memories. *Psychiatric annals*, 25(12), 720-725.

(9/18 Mon) Eyewitness testimony II.

Anderson, R. C., & Pichert, J. W. (1978). Recall of previously unrecalable information following a shift in perspective. *Journal of verbal learning and verbal behavior*, 17(1), 1-12.

(9/20 Wed) Recognition memory I.

Wais, P. E., Mickes, L., & Wixted, J. T. (2008). Remember/know judgments probe degrees of recollection. *Journal of cognitive neuroscience*, 20(3), 400-405.

(9/25 Mon) Recognition memory II.

Jacoby, L. L., Kelley, C., Brown, J., & Jasechko, J. (1989). Becoming famous overnight: Limits on the ability to avoid unconscious influences of the past. *Journal of Personality and Social Psychology*, 56(3), 326–338.

(9/27 Wed) Associative memory I.

Popov, V., Zhang, Q., Koch, G.E. et al. Semantic knowledge influences whether novel episodic associations are represented symmetrically or asymmetrically. *Mem Cogn* 47, 1567–1581 (2019). <https://doi.org/10.3758/s13421-019-00950-4>

(10/2 Mon) Associative memory II.

Anderson, J. R. (1974). Retrieval of propositional information from long-term memory. *Cognitive Psychology*, 6(4), 451–474. [https://doi.org/10.1016/0010-0285\(74\)90021-8](https://doi.org/10.1016/0010-0285(74)90021-8)

(10/04 Wed) Associative memory III.

Anderson, M. C. , Bjork, R. A. & Bjork, E. L. (1994). Remembering Can Cause Forgetting. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20 (5), 1063-1087.

(10/9 Mon) Memory search I.

[aging] Golomb, J. D., Peelle, J. E., Addis, K. M., Kahana, M. J., & Wingfield, A. (2008). Effects of adult aging on utilization of temporal and semantic associations during free and serial recall. *Memory & Cognition*, 36, 947-956.

(10/11 Wed) Memory search II.

Smith, T. A., Hasinski, A. E., & Sederberg, P. B. (2013). The context repetition effect: Predicted events are remembered better, even when they don't happen. *Journal of Experimental Psychology: General*, 142(4), 1298.

(10/16 Mon) Memory search III.

Shiffrin, R. M. (1970). Forgetting: Trace erosion or retrieval failure?. *Science*, 168(3939), 1601-1603.

(10/18 Wed) Naturalistic stimuli I.

[fMRI recordings] Baldassano, C., Chen, J., Zadbood, A., Pillow, J. W., Hasson, U., & Norman, K. A. (2017). Discovering event structure in continuous narrative perception and memory. *Neuron*, 95(3), 709-721.

(10/23 Mon) Naturalistic stimuli II.

Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2008). Visual long-term memory has a massive storage capacity for object details. *Proceedings of the National Academy of Sciences*, 105(38), 14325-14329.

(10/25 Wed) Memory span and chunking I.

Miller, G. A. (1956). The magical number seven, plus or minus two. *Psychological Review*, 63(2), 81-97.

(10/30 Mon) Memory span and chunking II.

Chase, W. G., & Simon, H. A. (1973). Perception in chess. *Cognitive psychology*, 4(1), 55-81.

(11/1 Wed) Semantic/episodic memory interaction I.

Tompson, A., & Thompson-Schill, S. L. (2021). Semantic influences on episodic memory distortions. *Journal of Experimental Psychology: General*, 150(9), 1800.

(11/6 Mon) Semantic/episodic memory interaction II.

Langlois, T. A., Jacoby, N., Suchow, J. W., & Griffiths, T. L. (2021). Serial reproduction reveals the geometry of visuospatial representations. *Proceedings of the National Academy of Sciences*, 118(13), e2012938118.

(11/8 Wed) Sleep I.

[single-neuron recordings] Louie K, Wilson MA. Temporally structured replay of awake hippocampal ensemble activity during rapid eye movement sleep. *Neuron*. 2001 Jan;29(1):145-56. doi: 10.1016/s0896-6273(01)00186-6. PMID: 11182087.

(11/13 Mon) Sleep II.

Whitmore, N. W., Harris, J. C., Kovach, T., & Paller, K. A. (2022). Improving memory via automated targeted memory reactivation during sleep. *Journal of Sleep Research*, 31(6), e13731.

(11/15 Wed, 11/20 Mon) Canceled due to conference traveling.

(11/22 Wed) Metamemory I.

Reder, L. M. & Ritter, F. E. (1992). What Determines Initial Feeling of Knowing? Familiarity With Question Terms, Not With the Answer. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 18 (3), 435-451.

(11/27 Mon) Metamemory II.

Markant, D., DuBrow, S., Davachi, L., & Gureckis, T. M. (2014). Deconstructing the effect of self-directed study on episodic memory. *Memory & cognition*, 42, 1211-1224.

(11/29 Wed) Beyond memory of individuals I.

Kalnikaitė, V., & Whittaker, S. (2007, April). Software or wetware? Discovering when and why people use digital prosthetic memory. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 71-80).

(12/4 Mon) Beyond memory of individuals II.

Abel, M., & Bäuml, K. H. T. (2017). Collaborative remembering revisited: Study context access modulates collaborative inhibition and later benefits for individual memory. *Memory & cognition*, 45, 1319-1334.

(12/6 Wed) Relation to other subfields of cognition I.

[EEG recordings] Linde-Domingo, J., Treder, M. S., Kerrén, C., & Wimber, M. (2019). Evidence that neural information flow is reversed between object perception and object reconstruction from memory. *Nature communications*, 10(1), 179.

(12.11 Mon) Relation to other subfields of cognition II.

Hornsby, A. N., & Love, B. C. (2022). Sequential consumer choice as multi-cued retrieval. *Science Advances*, 8(8), eab19754.

(12/13 Wed) Discussions & Wrap-up

Academic Integrity Policies

Rutgers University regards acts of dishonesty (e.g. plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. Violations of academic integrity will be treated in accordance with university policy, and sanctions for violations may range from no credit for the assignment, to a failing course grade to (for the most severe violations) dismissal from the university. Details policies can be found here: <http://academicintegrity.rutgers.edu>

These principles forbid plagiarism and require that every Rutgers University student:

- properly acknowledge and cite all use of the ideas, results, or words of others
- properly acknowledge all contributors to a given piece of work
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of unsanctioned materials or unsanctioned collaboration
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress (reproduced from: <http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers/>).

Students with Disabilities

Our community values diversity and seeks to promote meaningful access to educational opportunities for all students. If you believe that you need accommodations for a disability, please follow these procedures outlined at <http://disabilityservices.rutgers.edu/request.html> Since accommodations may require early planning and are not provided retroactively, please initiate this process as soon as possible.

Diversity and Inclusion Statement

The Department is committed to creating a consciously anti-racist, inclusive community that welcomes diversity in various dimensions (e.g., race, national origin, gender, sexuality, disability status, class, or religious beliefs). We will not tolerate micro-aggressions and discrimination that creates a hostile atmosphere in the class and/or threatens the well-being of our students. We will continuously strive to create a safe learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Our goal is to maintain an environment where students, staff, and faculty can contribute without the fear of ridicule or intolerant or offensive language. If you witness or experience racism, discrimination micro-aggressions, or other offensive behavior, you are encouraged to bring it to the attention to the undergraduate program director, the graduate program director, or the department chair. You can also report it to the Bias Incident Reporting System <http://inclusion.rutgers.edu/report-bias-incident/>

Student-Wellness Services

Just In Case Web App

<http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at:

<https://ods.rutgers.edu/students/registration-form>.