

# Introduction to Learning & Memory

## PSYCH 45 – Spring 2024

**Location:** Building 420, Room 040

**Class Meetings:** Tuesdays and Thursdays, 9:00 - 10:20 am

## Course Description

Everything we know is derived from and reflects memory for our past. Memories, be they of the recent or more distant past, inform current thinking and action, and enable planning for the future. This course provides an introductory survey of the science on learning and memory, including consideration of the cognitive and neural organization of memory, mechanisms of remembering and forgetting, and the nature of false memories. Theory and behavioral evidence will be integrated with data from patient studies and functional brain imaging.

Satisfies UG Requirement: WAYS-Social Inquiry (SI)

## Teaching Team

Instructor	E-mail (@stanford)	Office Hours (+by appointment)	Office Location
Anthony Wagner (he/him)	<a href="mailto:awagner@stanford.edu">awagner</a>	Wed 2:30-3:30pm	Bldg 420, Rm 402
<b>Teaching Assistants</b>			
Shawn Schwartz (he/him)*	<a href="mailto:stschwartz@stanford.edu">stschwartz</a>	Thur 1:30-2:30pm	Bldg 420, Rm 470
Alice Xue (she/her)	<a href="mailto:alicexue@stanford.edu">alicexue</a>	Mon 1:30-2:30pm	Bldg 420, Rm 470
Anna Xu (she/they)	<a href="mailto:xua@stanford.edu">xua</a>	Tues 10:25-11:25am	Bldg 420, Rm 432
Douglas Miller (he/him)	<a href="mailto:dsmiller@stanford.edu">dsmiller</a>	Fri 10:00-11:00am	Bldg 420, Rm 470
Huan Wang (he/him)	<a href="mailto:huanhw@stanford.edu">huanhw</a>	Wed 1:30-2:30pm	Bldg 420, Rm 474
*Head TA – Please send all course-related emails to <a href="mailto:stschwartz@stanford.edu">stschwartz@stanford.edu</a>			



Alice



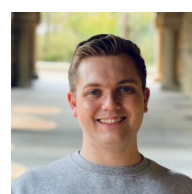
Anna



Douglas



Huan



Shawn

We acknowledge that Stanford University sits on the ancestral and unceded land of the Muwekma Ohlone Tribe. This land was, and continues to be, of great importance to the Ohlone people. Consistent with our values of community and diversity, we have a responsibility to honor and make visible the university's relationship to Native peoples. You can learn more about the Muwekma Ohlone Tribe here: <http://www.muwekma.org/>

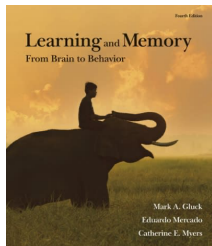
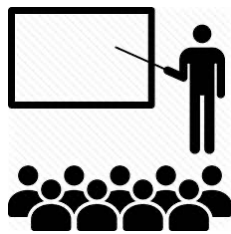
# How The Course Works

## Prepare for Class

Learning is enhanced when new information can be related to already acquired knowledge. For this reason, we encourage you to complete the assigned readings prior to lecture as that will support lecture comprehension, learning, and retention.

## Participate in Class

We invite you to engage during lectures, posing questions you may have. If you have a question – be it a point of clarification or an idea about how the lecture relates to other points discussed – chances are other students would benefit from your question / comment!



## Lectures, Readings, OHs, Piazza, & Reviews

We will rely on a variety of learning materials and formats.

**Lectures:** The lectures are constructed to present our overview of the field of learning and memory. While some of the content covered in lecture can be found in the readings, **much** of the content will be unique (i.e., only presented in lecture). The teaching team will post slides of the lecture prior to class.

**Readings:** Readings will come from the textbook along with two additional primary papers. We encourage you to do the readings prior to the corresponding lectures, as that will provide a knowledge scaffold that will support comprehension, learning, and memory for lecture content and will reinforce overlapping points with the readings.

**Office Hours:** The teaching team is here to support you. Come to an office hour to have questions of clarification addressed and/or to discuss your thoughts and ideas about the lecture and reading content.

**Piazza:** We will use Piazza for online discussion of class content. We encourage you to post and answer questions on Piazza. We will be responsive to queries posted to Piazza within 24 hrs. <https://piazza.com/stanford/spring2024/psych45>

**Reviews:** Prior to each exam, we will distribute a review guide to assist you in identifying core content that you should know. The teaching team will also run review sessions (times TBD) during which we will field your exam-related questions.

## Learning Goals

- Build knowledge about the psychological and brain processes that underly human learning and memory.
- Build knowledge about how to enhance learning and memory, with practical implications for structured learning environments (e.g., courses) and for everyday life.
- Learn about how memory is core to many aspects of the human experience and acquire knowledge about the ways in which memory is impacted by clinical conditions.
- Build science literacy and analytic skills that enable comprehension, synthesis, and evaluation of scientific evidence. Strengthen understanding of the scientific method and your ability to reason about data.

# Course Components

**Midterms and Final Exam:** Exams will focus on **key concepts and experimental findings** presented in the readings and lecture. In addition to demonstrating mastery of key concepts and findings, exams will ask you to discuss **how experimental findings/data provide evidence for key concepts and theories**. Exams will not test you on dates, the names of scientists, or other trivial content. To assist you in preparing for exams, we will distribute a review guide and will run a review session prior to each test. The review guide will include example exam questions. Midterms (24% each); Final (30%)

**Academic Accommodation:** For students who require an accommodation, we will coordinate an alternative testing environment. **Please email your academic accommodation letter to Shawn Schwartz (stschwartz@stanford.edu) by no later than the end of Week 2 (April 12<sup>th</sup>).**

**Alternative Final Exam:** Because some students require departure from campus early in June, we will offer an alternative final exam during Week 10 (date and time TBD). Any student can decide to take the exam early or at the set time on June 10<sup>th</sup>.

**Participation Prompts:** During lecture, we will pose questions that aim to prompt reflection on the material. Your brief written response will be handed in at the end of the class. Over the term, there will be 7 such prompts, and you will be asked to turn in 5. **There will be no opportunities for make-ups.** (10% of grade; 2% per prompt)

**Memory-in-Action Demos:** We have assembled a series of online memory demos. Each demo illustrates a fundamental phenomenon or task; demos may also generate data from the class that will be discussed during lecture. For each demo, we will also pose up to two questions to which we ask that you provide brief responses (uploading your responses via Canvas). **MiA Demos should be completed 24hrs prior to the date/lecture specified on the syllabus. Late submissions will not receive credit.** MIA Demos are available on the course website: <https://wagnerlab.github.io/psych-45/mia> (12% of grade)

**Extra Credit – Peer Assistance on Piazza:** We will use Piazza for online discussion of class content. **We encourage students to field questions, providing answers to posts from classmates.** There are two benefits for students who consistently provide accurate, thoughtful responses to posts — the potential for up to 3 bonus points added to your grade, as well as the benefits of engaging in retrieval practice and “learning through teaching”, which will serve to foster your comprehension, learning, and retention. <https://piazza.com/stanford/spring2024/psych45> (up to 3% added to grade)

## Grading

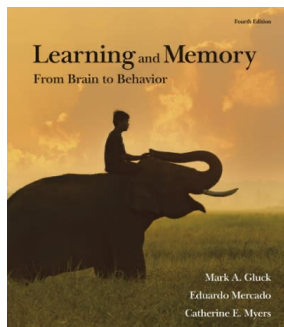
This course is worth 3 units of credit, which translates to up to 9 hours of work per week, including class time. Beyond attending class, this leaves approximately 6 hours for work outside of class (for reading, completion of Memory-in-Action demos, and reviewing the material for mastery).

Assessment	Percentage of Grade	Notes
Midterm I	24%	
Midterm II	24%	
Final Exam	30%	
Participation Prompts	10%	<ul style="list-style-type: none"> <li>Complete 5 of 7 prompts</li> </ul>
Memory-in-Action (MiA)	12%	<ul style="list-style-type: none"> <li>Complete ALL 6 MiAs &amp; submit by deadline</li> </ul>
Extra Credit: Piazza Responses	Up to 3%	

# Readings

If you master the content in the lectures along with the assigned readings, you will learn much about the psychological and neural mechanisms that enable us to learn and remember; you will acquire valuable analytic skills; and you will strengthen your understanding of the scientific method and your ability to reason about data.

## Textbook



Gluck, M., Mercado, E., & Myers, C. (**4<sup>th</sup> Edition**) *Learning and Memory: From Brain to Behavior*. NY: Worth Publishers.

Much of the course content will be presented through lectures, which will provide our overview of how people learn and remember. Your knowledge building will be supplemented by reading the textbook — **assigned chapters relevant for each week's lectures are listed to the right on the Course Schedule**. The textbook complements the lecture content and will allow you to go deeper on some topics and to learn about other topics not covered in lecture.

The textbook is available through the following routes: (a) purchase a hardcopy from the bookstore; (b) purchase an e-book version from the publisher or Amazon.com; and (c) multiple copies are on Reserve at Green Library. **For the latter, if you find that you are unable to access a copy on Reserve (because other students have copies checked out), please let us know and we will increase the number of copies available on Reserve.**

## Papers

Putnam A.L., Sungkhasettee V.W., Roediger HL III (2016). Optimizing learning in college: Tips from cognitive psychology. *Perspectives on Psychological Science*, 11: 652-660.

Schacter DL. (1999). The seven sins of memory: Insights from psychology and cognitive neuroscience. *American Psychologist*, 54:182-203.

In addition to the textbook, the above two assigned papers cover content that is not in the textbook.

**How to download a paper:** Go to PubMed (<https://pubmed.ncbi.nlm.nih.gov/>) and enter the author and paper title. On the PubMed listing for a given article, there will be a link to the journal typically in the **upper right corner** for direct pdf download. Click the link and follow through to download. If you run into difficulties accessing a paper, please reach out to the teaching team.

# Course Schedule

Week		Date	Topic	Reading and Memory-in-Action
1	T	4/2	Course overview	Chapter 1
	TH	4/4	Science of learning	Putnam et al. (2016)
2	T	4/9	Experimental approaches	Chapter 2
	TH	4/11	Transient memory	
3	T	4/16	Working memory	Chapter 9 & <b>MiA #1: N-back</b>
	TH	4/18	Cognitive control and memory	<b>MiA #2: Stroop</b>
4	T	4/23	<b>Midterm I</b>	
	TH	4/25	Episodic memory: Encoding I • How do we learn?	Chapter 7
5	T	4/30	Episodic memory: Encoding II • Brain mechanisms	<b>MiA #3: Event Segmentation</b>
	TH	5/2	Episodic memory: Retrieval I • How do we remember?	Chapter 3, pp 86-95 & 106-110
6	T	5/7	Episodic memory: Retrieval II • What do we remember?	
	TH	5/9	Semantic memory and statistical learning [Guest Lecture by Alice Xue]	Chapter 6, pp 249-255 & Chapter 7, pp 277-284, 301-304 <b>MiA #4: Semantic Memory</b>
7	T	5/14	<b>Midterm II</b>	
	TH	5/16	Skills and habits	Chapter 8
8	T	5/21	Priming and conditioning	Chapters 4 & 5
	TH	5/23	Emotion and memory	Chapter 10 & <b>MiA #5: Emotion &amp; Memory</b>
9	T	5/28	Forgetting	
	TH	5/30	False memories [Guest Lecture by Douglas Miller]	Schacter (1999) & <b>MiA #6: False Memory</b>
10	T	6/4	Aging and memory [Guest Lecture by Shawn Schwartz]	Chapter 12
	TH	6/6	<b>Final Exam Review Session</b>	Location TBA
<b>Final</b>	M	6/10 8:30-11:30a	<b>Final Exam</b>	Location TBA

# Expectations

**What you can expect from us:** We are here to guide your learning and challenge you to actively engage in the learning process through lectures, office hours, assignments, and exams. We will strive for an inclusive and collaborative environment and welcome any suggestions for improvement. We will do our best to give you the tools, feedback, and support to succeed, so please let us know if we can do anything more. Learning is a never-ending process, so we hope to motivate students to seek out more information on topics we do not have time to cover (e.g., unassigned sections of the textbook). We also are here to support you in one-on-one interactions; the best way to seek our input is to swing by a teaching team member's office hours. We also welcome your posts to the course Piazza discussion board; you can expect us to respond to posts within 24 hours.

**What we expect from you:** With laptops and phones open, it can be easy to get distracted during lecture or to distract another student sitting nearby. For this reason, we ask that you put your phone away and only have your laptop open when viewing a copy of the lecture slides. That said, you are likely to learn and retain lecture content better if you take notes during lecture with your laptop closed. We expect you to take an active role in your learning, raising questions in lecture to address points of clarification and to explore ideas and connections between different aspects of the course content. We believe that each member of the course is likely to have different ideas and perspectives that will enrich the experience for us all. We expect all of us to speak and listen with compassion and not make assumptions about others.

**Mindful about learning:** The class should challenge you, but we believe everyone has the ability to succeed with some effort. We adopt a growth model, wherein we (a) recognize that course participants will enter the class with differing levels of background in psychological and brain sciences and in the science of learning and memory, and (b) are confident that with a commitment to knowledge building and the allocation of effort, all participants have the ability to excel. We aim to be attentive to a student's performance trajectory across the term and are here to support positive trajectories. Our teaching philosophy embraces student-instructor interactions to support knowledge building. If you are having any difficulty that might prevent you from excelling or completing the coursework, please contact the teaching team to alert us right away. We look forward to helping you reach your learning goals this term.

## Attendance, Late Work & Incompletes

Personal emergencies and illness that preclude attendance at lecture are understandable. However, your learning and performance will likely suffer from frequent absences from lecture. We strongly encourage you to attend and engage during lectures.

In fairness to students who submit MiAs in a timely manner, we **will not accept late submissions** (unless there is a medical emergency). Similarly, make-ups for Participation Prompts during lecture **are not possible**. Serious health or other issues that interfere with your ability to remain on top of assignments can be discussed with Prof. Wagner.

If a student requires an extended absence after at least 60% of coursework is completed at a passing grade or higher, the student may request an Incomplete. Incompletes do not award any credit and can drop you below the University's minimum required unit load. This could negatively impact academic progress, graduation, NCAA and Veteran's certifications, and financial aid. Students in this situation should talk to the instructor.

**Academic Accommodations** Stanford is committed to providing equal educational opportunities for students with a disability. Students who require accommodations are a valued and essential part of the Stanford community and our class. If you require an accommodation, please register with the Office of Accessible Education (OAE). Professional staff will evaluate your needs, support appropriate and reasonable accommodations, and prepare an Academic Accommodation Letter for faculty. To get started, or to re-initiate services, please visit: <https://oae.stanford.edu/>. If you already have an Academic Accommodation Letter, we invite you to share your letter with us. Academic Accommodation Letters should be shared with **Shawn Schwartz** ([stschwartz@stanford.edu](mailto:stschwartz@stanford.edu)) at the earliest possible opportunity and **by no later than the end of Week 2 (April 12<sup>th</sup>)** so we can partner with you and OAE to identify any barriers to access and inclusion that might be encountered in your experience of this course.

**Course Privacy Statement** As noted in the University's [recording and broadcasting courses policy](#), students may not audio or video record class meetings without permission from the instructor (and guest speaker, when applicable). If the instructor grants permission, students may keep recordings only for personal use and may not post recordings on the Internet, or otherwise distribute them. These policies protect the privacy rights of instructors and students, and the intellectual property and other rights of the university. Students who need class sessions recorded for the purposes of an academic accommodation should contact the [Office of Accessible Education](#).

**Academic Dishonesty** To the extent that it fits with your approach to learning, we encourage students to collaborate in their thinking about the ideas and data discussed in lecture and in studying the course material and preparing for exams. However, you will be evaluated in this course as an individual and are expected to independently complete all course components. Failure to do so is a violation of Stanford's Honor Code and is a serious offense, even when the violation is unintentional. Conduct prohibited by the Honor Code includes all forms of academic dishonesty, among them unpermitted collaboration and representing others' work as one's own. Please review [Stanford's Honor Code](#) and [documentation and citation resources](#) from the Hume Center for Writing and Speaking. When in doubt, contact a member of the teaching team.

**Respect for Diversity** It is our intent that students from all backgrounds, perspectives, and situations be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to the course be viewed as a resource, strength and benefit. It is our intent to present materials and activities that are respectful of diversity.

We strive to affirm the rights and responsibilities of all students, including typically underrepresented and marginalized individuals and groups. Diversity includes many unique human characteristics, including (but not limited to) physical or mental ability, age, color, ethnicity, gender, national origin, religion, sexual orientation, socioeconomic background, and veteran status. We believe diversity is honored and developed when educational environments foster and sponsor connection, acceptance, and mutual learning through the interaction of the many dimensions of human characteristics.

We acknowledge that there is likely to be a diversity of access to resources among students and plan to support all of you as best we can. Please let us know ways to improve the effectiveness of the course for you personally or for other students. In addition, if any of our class sessions conflict with your religious events, please let us know so that we can make arrangements for you.

All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. We will do our best to address and refer to all students accordingly and support classmates in doing so as well.

**Support Services** The COVID-19 pandemic remains a stressful time for us all. In addition, you may experience a range of other challenges that can cause barriers to learning, such as strained relationships, increased anxiety, economic challenges for you or your family, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily life. Stanford is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. You can learn more about the broad range of confidential mental health services available on campus here: <https://vaden.stanford.edu/caps>