

PSYC 494-02: Research in Behavioral Neuroscience

Fall 2026

Contact Information

Instructor: Jean-Marie N. Maddux, Ph.D. (pronouns: she/her/hers)

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Note: Cell number is to be used **only** in the case of an urgent animal health and welfare concern.

Office Hours (student drop-in hours): Monday, 4:00 – 5:00 PM

Thursday, 11:00 AM – 12:00 PM

or by appointment (e-mail me to set up an appointment)

Course Time and Location

We meet on Monday, Wednesday, and Friday from 10:50 – 11:50 AM in the Humanities Building room 228. Our research lab space is in Olin-Rice room 371 (behind ID key card access).

Course Description

Research in Behavioral Neuroscience is a hands-on, lab-based experience that entails research with rodent (rat) subjects in a faculty member's lab. Students in this course will learn how to handle and care for rats, and how to collect behavioral data within the context of an experiment designed to assess Pavlovian conditioned approach behavior. Students will also gain ample experience in reading and analyzing the literature of the field, experimental design, data analysis, and effective communication of their findings. Class meeting times will be for training, progress reports, and journal club purposes; students will need to dedicate time outside of class hours for data collection. Students must be willing to work independently with rats and engage in mildly invasive procedures. Responsibility and attention to detail are critical characteristics for successful completion of this work. This course fulfills the research experience requirement of the Neuroscience major. Prerequisites: PSYC 248; STAT 155 or PSYC 201 and PSYC 301; and permission of the instructor.

Note: This is not a "course" in the traditional sense. Think of it as a research experience.

Course Structure

As noted above, although this experience is listed as a "course" in the Macalester College course catalog, it is not a course in the conventional sense. It is a training experience in how to conduct behavioral neuroscience research, which does not fit neatly into three, one-hour blocks of time per week. Rather, class meetings times will be used for training, progress reports and check-ins, and journal club presentations. Data collection, which is a key aspect of this research experience, must be done outside of class hours. It may help to think of it as a type of "homework" assignment (but more fun than usual homework). This structure requires all

students to identify and adhere to a consistent daily time for data collection, during which they know they will be available. Rats become used to being worked with at the time of day that you establish; drastic changes to this time can have deleterious effects on their behavior. Hence, we will need to keep the time of day for outside data collection relatively consistent (plus or minus one hour). Please be aware that the rats are housed on a 12-hour light-dark cycle, with lights turning on at 8:00 AM and turning off at 8:00 PM. All work with the rats must take place during this 12-hour time range. As you will work in small teams, scheduling will require you to communicate and collaborate with other student researchers in the lab. This is an essential skill in scientific endeavors, and indeed, in any future workplace.

Due to both practical and ethical limitations associated with animal research, it is not possible for each student to devise their own separate research project. Rather, we will all contribute to an overarching project designed to examine Pavlovian conditioned approach behavior. With that said, I am always interested to hear your ideas for future projects that you may decide to conduct in other contexts and I am happy to offer my thoughts and feedback on your ideas.

IACUC Information

All work with live rats in this course has been approved by the Macalester College Institutional Animal Care and Use Committee (IACUC). The Macalester College IACUC acts to review and ensure that animal welfare standards and ethical principles are applied at the highest possible level in any animal use or research conducted at or in association with the college. The goal of each IACUC is to ensure the humane care and use of any animals used in research, and compliance with guidelines and regulations, while maintaining flexibility to best meet the unique needs of the institution. Active participation by research scientists allows for the scientific needs of research investigators to be considered; participation by nonaffiliated members incorporates a public conscience; and the involvement of veterinarians ensures appropriate medical care and animal well-being. A program of continuing education for IACUC members and researchers ensures that animal care and use standards and ethical principles continue to align with best practices. As at other educational and research institutions, the Macalester College IACUC derives its authority from the law. IACUCs are mandated by the Health Research Extension Act (HREA) of 1985 and the Animal Welfare Act.

Photography and Videography Policy

We will work with live rats during this lab-based course. Although the rats are adorable, and I appreciate your enthusiasm in working with them, I ask that you please refrain from taking photographs and/or videos of our rat subjects. Your cooperation in this matter is greatly appreciated.

Learning Outcomes

The primary goal of this experience is to gain the knowledge and skills necessary to independently carry out behavioral neuroscience research. This involves several sub-goals:

1. Learn how to handle and care for rats in a research setting.
2. Learn how to use lab equipment to collect behavioral data.
3. Learn how to design appropriately controlled experiments.
4. Learn how to use inferential statistics to analyze and interpret collected data.
5. Learn how to effectively communicate your research findings to an audience, both orally and in writing.
6. Learn how to engage effectively with the primary source literature of the field.

Required Course Materials

- (1) A laptop computer that you bring to all class meetings. Please let me know if this will be challenging for you; we will find a solution.
- (2) MS Office installed and running on your laptop computer. You may install MS Office for free from Macalester's Information Technology Services (ITS), if you do not have it already.
- (3) SPSS installed and running on your laptop computer. You may install SPSS for free from Macalester's ITS, if you do not have it already.
- (4) Primary source literature (i.e., published journal articles). The instructor may provide you with some articles to help get you started, but part of your work in this course is to identify, find, read, understand, analyze, synthesize, and present relevant primary source literature. If the Macalester Library does not have a subscription to a specific journal that you want/need, please do not let that stop you! Interlibrary loan (ILL) is a wondrous service that you can use for free to get any journal article you may desire!

Assessment/Evaluation

The following components will be used to assess your progress in this course, and determine the final grade that you earn at the end of the semester:

- Group Journal Club Presentation: 10%
- Individual Journal Club Presentation: 10%
- Critical Review Commentaries: 10%
- Public Poster Session Presentation (and associated poster preparation): 25%
- Scientific Writing: 10%
- Independent Collection of Data: 25%
- Reflection Paper on the Research Experience: 10%

Incomplete Policy

Macalester College strongly discourages assignment of incomplete grades, and incomplete grades will not be given except under dire circumstances and after consultation with the Dean of Academic Programs. In addition, given the nature and structure of this lab-based research experience, it would be especially challenging for a student to navigate an incomplete grade (e.g., much of the course work needs to be done in person in the laboratory at specific times).

Practices for Success in this “Course”

As addressed repeatedly throughout this syllabus, a research-based lab experience is quite different from a classroom-based course. This unique opportunity comes with its own set of challenges and joys. To help you navigate these processes and have a successful experience, please attend to the following practices:

1. Show up to all class meetings on time and be prepared to contribute productively.
Note: If you are sick, do not come to class, but please e-mail me in advance to let me know and we will make appropriate arrangements.
2. Show up to lab at your agreed upon data collection time, consistently and reliably, ready to work. If you cannot attend a session because of illness, you must notify all of your team members and the instructor; communicate with your team members so that they can continue to effectively collect data even in your absence. Be prepared to return the favor for your lab team mates (that is, you will need to cover for them, if one of them gets sick).
3. Treat your research subjects ethically and with care. Please discuss any ethical concerns you may have about working with research animals with me at the very start of the semester.
4. Follow guidelines and instructions carefully. If you do not understand some aspect of what needs to be done, please ask me for more information/further explanation/further clarification before proceeding.
5. Complete all tasks and assignments by their due dates. Certain aspects of research, such as data collection with animal subjects, cannot be delayed. Other aspects, such as written assignments, are less time-sensitive, but require adherence to a schedule nonetheless, as timely completion of the work is what will allow enough time for me to provide you with feedback and for you to incorporate this feedback in your future work (see point #8).
6. Practice good communication skills. Science is a team effort, and you need to communicate effectively and in a timely manner with both your lab team mates and your instructor. Exchange phone numbers and e-mail addresses at the start of the semester, and be committed to help each other.
7. Attend to detail. Science is methodical and small details can matter greatly. Please do your best to stay focused, reduce distractions, and avoid running on “autopilot” when working in the lab. Similarly, attention to detail in your assignments will be critical for success.
8. Be responsive to feedback, and incorporate feedback into your future work. Feedback exists to help you continually improve your work. Effectively incorporating this feedback into your future work is a key step in producing high quality final products. Please note that my feedback may be given to you in writing or verbally or a mix of both modalities. During verbal exchanges, be sure to take notes to which you can later refer when revising your work.
9. Be willing and able to work both independently, at times, and collaboratively, at other times.

10. Practice good time management. Much of the work in this course will take place outside of our scheduled class meeting times. You will need to create and adhere to a schedule for yourself to accomplish these various duties.
11. Take good notes. This applies not only during our class meeting times, but also when you are working independently in the lab. Replicability is a hallmark of good science, and in order to be able to replicate, there must be a detailed written record of what was done.
12. Keep the lab spaces and lab equipment clean. Working with animals can get dirty; budget time for thorough cleaning at the end of each experimental session.

A Note on Communication

E-mail is the primary form of communication outside of the classroom. If you are not already doing so, please get in the habit of checking your Macalester College e-mail daily.

I try my best to respond to e-mails as soon as I can, but please be patient. I will respond to e-mails within 36 business hours. I do not check e-mail from my phone, and I do not always check e-mail on weekends and evenings. Hence, please plan accordingly when you need to communicate with me.

If there is an urgent health issue involving one or more of our rat subjects, please call or text me at (312) 774-2151. Please do not use this number for reasons unrelated to animal welfare, animal care, and animal health.

Assignments are to be submitted via Moodle. Critical review summaries may be shared with me as a Google doc or e-mailed to me. You also need to monitor our Moodle course page frequently, as that is where readings will be posted as we move through the semester.

Academic Integrity Policy

Students are expected to maintain the highest standards of honesty in their college work; violations of academic integrity are serious offenses. Students found guilty of any form of academic dishonesty — including, for instance, forgery, cheating, and plagiarism — are subject to disciplinary action. Examples of behavior that violates this policy, as well as the process and sanctions involved, can be found on the Academic Programs website:

<https://www.macalester.edu/academicprograms/academicpolicies/academicintegrity/>.

Artificial Intelligence (AI) Use Policy

Relying on Gen AI to generate ideas or language can interfere with the learning goals this course is designed to cultivate. To support your growth toward these goals, the use of generative AI tools is not permitted for assignments in this class unless explicitly authorized by the instructor. As is the case for all courses at Macalester College, work submitted by you for this class should reflect both your own ideas and your own language and you should properly cite any resources you have consulted. If you have any questions about citation or about what constitutes academic honesty in this course or at Macalester College in general, please feel free to raise these questions in class and/or contact me to discuss your concerns.

Disability Accommodation

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act, Macalester College works hard to ensure that all facilities and programs are accessible to all students. Accommodations are based on individual need substantiated by the appropriate process. What is reasonable is also determined by what is essential to this course. Any students who believe that they may need accommodations due to disability impacts should contact the Center for Disability Resources by emailing disabilityresources@macalester.edu, or by calling 651-696-6748 to schedule an appointment to discuss your individual needs. Students should then follow up with me directly to discuss accommodations for this course.

Religious Observance

In an effort to respect religious diversity, I request that students who plan to observe a religious holiday during scheduled class meetings/class requirements talk to me about reasonable consideration by the end of the second week of the course.

Health and Wellness Statement

Here at Macalester, we encourage you to make your well-being a priority throughout this semester and your time here. Investing time into taking care of yourself will help you engage more fully in your academic and holistic experience. Sleeping, moving your body, and connecting with others can be strategies to help you navigate your time at Macalester. Remember that beyond being a student, you are a human being carrying your own experiences, thoughts, emotions, and identities with you. Acknowledging any stressors you may be facing, which can be mental, emotional, physical, financial, etc., and how they can have an academic impact may be helpful and Macalester offers an array of resources to help you navigate these challenges. If you are having difficulties maintaining your well-being, please reach out to me and/or find support from other resources, including those offered by the [Hamre Center](https://www.macalester.edu/health-and-wellness/counseling/): <https://www.macalester.edu/health-and-wellness/counseling/>.

Sexual Misconduct/Title IX Statement

Macalester is committed to providing a safe and open learning and living environment for all students, staff, and faculty. Any community member experiencing sexual harassment, sexual violence, relationship violence, or stalking, is encouraged to seek help and support.

Please be aware that as a faculty member, it is my responsibility to report disclosure about sexual harassment, sexual misconduct, relationship violence, and stalking to the Title IX Office. The purpose of this report is to ensure that anyone experiencing harm receives the resources and support they need. I will keep this information *private* and it will not be shared beyond this required report.

You may also contact Macalester's Title IX Coordinator directly (phone: 651-696-6258 ; e-mail: titleixcoordinator@macalester.edu); she will provide you with supportive measures, resources, and referrals. Additional information about how to file a report (including anonymously) is available on the [Title IX website](#).

If you prefer to speak with someone confidentially, or need 24/7 support, there are resources available on- and off-campus to assist you:

- [Counseling Services](#) at the Hamre Center – on-campus counseling resource for students **Free, Urgent, Phone Counseling (Press 2) is available to Macalester students anywhere in the world, 24/7/365.** Speak to a licensed mental health counselor 24 hours a day by calling Hamre Center at 651-696-6275, then press or say option 2 when prompted.
- [Center for Religious and Spiritual Life](#) – chaplains may be reached via 651-696-6298 or email religiouslife@macalester.edu
- [SOS Sexual Violence Services of Ramsey County](#) 651-266-1000 (24-Hour Crisis Hotline staffed by trained advocates)
- [Rape, Assault, and Incest National Network \(RAINN\)](#) 1-800-656-4673 (24-Hour Hotline and Live Chat)
- Additional local and national resources can be found at <https://www.macalester.edu/title-ix/find-support/>

Tutoring @ Mac

Macalester has many resources to support students academically. For example, the Writing Center (WC) provides one-on-one peer tutoring for writing at any stage of a project or paper; the Science and Quantitative Center (SciQ) supports group tutoring for many math, science, and economics courses; and Academic Coaching provides one-on-one support for study skills, time management, reading, note taking, and effective learning strategies. Seeking help is a sign of strength and maturity, and everyone is encouraged to take advantage of the (free) resources available. Check out the [Academic Success page](#) for more information about our services.

Library Resources

Working to integrate neuroscientific literature into your research can be a complex process. Consulting with the research and instruction librarians for psychology and neuroscience will save you time and help you discover better, more scholarly sources. You can make an appointment using the Ask Us page on the library website, which can be accessed at <https://www.macalester.edu/library/askus/>, or email your librarian(s) directly.

Course Schedule

Please note: The course schedule is subject to change based on class progress and the instructor's discretion.

Note: For required readings, please check Moodle and keep an eye/ear out for class announcements.

Day and Date	Topic/Activity	Required Reading	Assignment Due
W September 9	Welcome and Lab Tour		
F September 11	Journal Club Intro and Organizational Planning		Form research teams and synchronize schedules
M September 14	Journal Club Group Discussion	Morrison et al. 2015	Critical Review Commentary
W September 16	Journal Club Group Discussion	Nasser et al. 2015	Critical Review Commentary
F September 18	Journal Club Group Discussion	Keefer et al. 2020	Critical Review Commentary
M September 21	Rat Handling	APA Guidelines for Ethical Conduct in the Care and Use of Nonhuman Animals in Research	
W September 23	Rat Handling		
F September 25	Experiment Planning and Design		
M September 28	Equipment Training		
W September 30	Journal Club Group Discussion	Amaya et al. 2020	Critical Review Commentary
F October 2	Journal Club Group Discussion	Derman et al. 2018	Critical Review Commentary
M October 5	Journal Club Group Discussion	Bien & Smith 2023	Critical Review Commentary
W October 7	Journal Club Student Presentation - Pairs	Presenters' choice of journal article	Critical Review Commentary
F October 9	Journal Club Student Presentation - Pairs	Presenters' choice of journal article	Critical Review Commentary
M October 12	Journal Club Student Presentation - Pairs	Presenters' choice of journal article	Critical Review Commentary

Day and Date	Topic/Activity	Required Reading	Assignment Due
W October 14	Journal Club Student Presentation - Pairs	Presenters' choice of journal article	Critical Review Commentary
F October 16	Fall Break – No class		
M October 19	Progress Reports/Troubleshooting		
W October 21	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
F October 23	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
M October 26	Scientific Writing	Turbek et al. (2016)	
W October 28	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
F October 30	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
M November 2	Scientific Writing		Draft Introduction
W November 4	Progress Reports/Troubleshooting		
F November 6	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
M November 9	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
W November 11	Progress Reports/Troubleshooting		
F November 13	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
M November 16	Scientific Writing		
W November 18	Journal Club Student Presentation - Individual	Presenter's choice of journal article	Critical Review Commentary
F November 20	Data Analysis		Revised Introduction
M November 23	Data Analysis		
W November 25	Thanksgiving Break – No class		
F November 27	Thanksgiving Break – No class		

Day and Date	Topic/Activity	Required Reading	Assignment Due
M November 30	Scientific Communication - Posters		
W December 2	Scientific Communication - Posters		
F December 4	Progress Reports/Troubleshooting		Poster Draft
M December 7	Poster Preparation		
W December 9	Poster Preparation		
F December 11	Poster Preparation		Practice your poster presentation
M December 14	Reflection on the Research Experience and Poster Presentation		Reflection Paper Public Poster Session takes place from 4:45 – 6:15 PM in Art Commons