University of Waterloo
Department of Psychology
PSYCH 398
Research in Memory
Winter 2018
11:30-1:00 MW, PAS 4032

Instructor and T.A. Information

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The course uses LEARN both for materials and class announcements. Please check LEARN regularly. Also, please check the uWaterloo Home Page for important announcements should an emergency arise (e.g., snow storm).

Please contact the instructor and TA using the email address provided above. If we need to contact you, then we will do so using your official uWaterloo address. Students are responsible for all e-mail that is sent to the official uWaterloo email address. Check e-mail regularly for important and time sensitive messages. See Statement on official student e-mail address for further details e.g., procedures and warnings regarding forwarding e-mail to other accounts

Course Description

The goal of the course is to introduce students to the theoretical and practical aspects of memory research. Readings will focus on important topics in memory research with an emphasis on the wide variety of methods being applied in the search for a deeper understanding of human memory and on learning how to critically evaluate research.

Course Objectives

Upon completion of this course, students should be able to:

A. Demonstrate knowledge of major concepts, theories, and empirical findings in memory research
B. Demonstrate the ability to comprehend primary source articles in memory research. This will involve the ability to understand research methods, interpret basic statistics, and understand experimental logic
C. Demonstrate the ability to understand basic and applied research and how research in memory contributes to both of these scientific enterprises

D. Demonstrate the ability to think critically and communicate effectively about research in memory

Required Text

There is no textbook for this course.

Readings Available on LEARN

Readings for the course will consist of primary source material (i.e., journal articles). While the number of pages of text required each week may not be high, reading primary source material is typically much more challenging than textbooks so you should be prepared to read papers more than once. All readings are available on LEARN.

Course Requirements and Assessment (see below for due dates)

Assessment	Weighting
Quizzes	50%
Article Presentation	12.5%
Written Assignment	12.5%
Poster Presentations	12.5%
Participation	12.5%
Total	100%

Quizzes (50%)

There will be 9 quizzes in the course. These quizzes will correspond to the topics for the previous 2 weeks (except Quiz 1 which will be based on only the first week). This includes readings and material presented in student presentations. Each quiz is worth an equal portion of your grade. Your worst quiz will not contribute to your grade. Quizzes will be multiple-choice and short answer. The quizzes are timed, with only 15 minutes available for each. The quizzes will be taken in class and tentative quiz dates are listed below. When completing multiple-choice questions you must choose the best answer for each question, even though the other answers may have some qualities of a correct answer. The quiz dates are tentative:

Quiz 1: 15-Jan
Quiz 2: 22-Jan
Quiz 3: 29-Jan
Quiz 4: 12-Feb
Quiz 5: 26-Feb
Quiz 6: 5- Mar
Quiz 7: 12-Mar
Quiz 8: 21-Mar
Quiz 9: 2-Apr

Article Presentation (12.5%)

The article presentation component of the course will consist of an approximately 25 minute PowerPoint presentation of a research paper in class. The course centers on student presentations of articles and associated discussion thus it is critical that you prepare your presentation with great care.

There should be enough detail that your audience can understand:
(1) the motivation for the investigation described in the article (i.e., why did they do it?)
(2) the nature of the experiments discussed/reported and their relation to the motivation for the research presented in the article (i.e., why did they do it the way they did it?)
(3) the predictions (if available)
(4) the results, including relevant information about the statistics provided (if available please SHOW us the data in the presentation; what did they find?)
(5) how the authors interpreted their results and the general conclusions that they drew

Furthermore, students will be expected to go beyond the paper in some meaningful respect in order to aid students in understanding their article (e.g., showing data from a related study, showing a video to help illustrate a concept or tool etc.). Think of your presentation as "teaching" the class about you're the topic of your article (not just the article). The student presenter will be considered the "expert" on the article and as such should be able to answer questions from other students and the instructor during their presentation. If you are unclear on any aspect of the article you have been assigned, then you need to discuss it with the TA or instructor BEFORE class. Your presentation slides are due 1 week before your presentation for review by the instructor. Please hand in slides via the instructor's email. Provided the latter, you will be given feedback about your presentation and expected to integrate that feedback prior to your presentation. Handing in your presentation on time and integrating feedback will be a part of your grade. A copy of your slides will be provided to other students. Please be sure to hand in the final, presented version of your slides to the instructor via email before or on the day of the presentation.

Written Assignment (12.5%) – Due April 2nd

Research in memory is motivated by both applied and theoretical goals. One applied area of memory research that has particularly important implications for students is research investigating the best way to study in order to maximize long term retention. This is an area of research that takes the basic goal of understanding memory and applies it to a particular context (i.e., studying). In your research paper you will summarize recent research (specific articles below) on this issue and propose a novel experiment, using your own ideas, that meangingfully extends this research. The papers you will draw from are included below (i.e., under the Target Articles heading).

These papers will consist of two components:
a) Summary. Summarize the research in the 5 target articles and articulate what each means with respect to how students should study in order to maximize learning and long term retention. This summary should demonstrate clearly that you understand the material presented.

b) Proposed Experiment. Using your summary as a starting point, generate a novel experiment that extends this research in a meaningful way. Describe your experiment with sufficient methodological and theoretical detail for a good understanding of the experiment you propose, how it relates to the research you have summarized, and what new knowledge your experiment would create. You are encouraged to discsuss your idea with the instructor or TA.

Requirements
The paper must be at least 8 pages and no longer than 9 pages including references
The description of the proposed experiment should be at least 2 pages
You must use 12 point Times New Roman font, double spaced, 2.5 cm margins
Use APA. You must cite the 5 articles below correctly and any other source you draw from
Please submit to the electronic drop box on LEARN on or before midnight on the due date.
You are responsible for keeping a copy of the final version of your paper.

Target Articles for the Written Assignment (all must be cited and summarized in your paper)
(1) Rohrer, D. & Pashler, H. (2010). Recent research on human learning challenges conventional instructional strategies. Educational Researcher , 39, 406-412.
(2) Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17, 249-255.
(3) Seabrook, R., Brown, G. D. A., & Solity, J. E. (2005). Distributed and massed practice: From laboratory to classroom. Applied Cognitive Psychology, 19, 107-122.
(4) Rohrer, D., & Taylor, K. (2007). The shuffling of mathematics practice problems boosts learning. Instructional Science, 35, 481-498.
(5) Rohrer, D., Taylor, K., Pashler, H., Wixted, J., & Cepeda, N. J. (2005). The effect of overlearning on long-term retention. Applied Cognitive Psychology, 19, 361-374.

Poster Presentations (12.5%) – Due Jan 29th

The poster presentation component of the course will consist of the presentation of a research paper in the form of a poster. Poster presentations constitute an important avenue for the communication of research. You may choose the paper you wish to present with the requirment that your paper address an issue in memory research that deals with basic and/or applied issues regarding the malleability of human memory (e.g., misinformation effects, false memory, eyewitness memory). Please email the instructor the paper you want to present before Jan 24th so that it can be approved. You will be marked both on the content and your presentation. If you are not presenting, then you are expected to attend the poster session and to visit your classmates' posters (this will be part of your participation grade). All posters are due Jan 29th and should be submitted to the appropriate Learn dropbox. Students will present their posters in one of three poster sessions (Jan. 31st, Feb. 5th, Feb 7th). Your presentation date will be assigned to you. Further information about how to prepare a poster will be provided in class.

Participation and Class Activities (12.5%)

This class is based on an open exchange of ideas. It is absolutely essential that you come prepared to discuss the readings. Your participation mark will be determined by the quantity and quality of your contributions to the class. This will include, but is not limited to, asking questions, answering questions, participating in discussion, attending class, attending poster sessions, and paying attention to your classmate's presentations. This mark will also include completion of in class activities (e.g., as part of the programming and data analysis sections).

General Overview of Topics to be Covered:

Week - Date	Topic	Readings Due
Week 0 - 03-Jan	Organizational Meeting	None
Week 1 - 08-Jan - Mon	Memory Loss/Memory Systems	Tulving, E., Schachter, D. L., McLachlan, D. R., & Moscovitch, M. (1988). Priming of semantic autobiographical knowledge: A case study of retrograde amnesia. Brain & Cognition, 8, 3-20. Presented by: Evan Corkin, S. (1984). Lasting consequences of bilateral medial temporal lobectomy: Clinical course and experimental findings in HM. Seminars in Neurology, 4, 249-259. Presented by: Evan
Week 1 - 10-Jan - Wed	Memory Loss/Memory Systems	Mackinnon, D. F., & Squire, L. R. (1989). Autobiographical memory and amnesia. Psychobiology, 17, 247-256. Presented by: Zola-Morgan, S. M., & Squire, L. R. (1990). The primate hippocampal formation: Evidence for a time-limited role in memory storage. Science, 250, 288-290. Presented by:
Week 2 - 15-Jan- Mon	Exceptional Memory	Parker, E., Cahill, L., & McGaugh, J. L. (2006). A case of unusual autobiographical remembering. Neurocase, 12, 35-49. Presented by: Ericsson, K. A., Cheng, X., Pan, Y., Ku, Y., Ge, Y., & Hu, Y. (2017). Memory skills mediating superior memory in a world-class memorist. 9, 1294-1302. Presented by:
Week 2 - 17-Jan - Wed	Encoding & Retrieval – Encoding Operations	Roediger, H. L. (1980). The effectiveness of four mnemonics in ordering recall. Journal of Experimental Psychology: Human Learning and Memory, 6, 558. Presented by: Nairne, J. S., Pandeirada, J. N., & Thompson, S. R. (2008). Adaptive memory: The comparative value of survival processing. Psychological Science, 19, 176-180. Presented by:

Week - Date	Topic	Readings Due
Week 3 - 22-Jan - Mon	Encoding & Retrieval – Testing Effect	Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17, 249-255. Presented by: Karpicke, J. D., & Blunt, J. R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. Science, 331, 772-775. Presented by:
Week 3 - 24-Jan - Wed	Encoding & Retrieval - Attention	Castel, A. D., Vendetti, M., & Holyoak, K. J. (2012). Fire drill: Inattentional blindness and amnesia for the location of fire extinguishers. Attention, Perception, & Psychophysics, 74, 1391-1396. Presented by: Smallwood, J., McSpadden, M., & Schooler, J. W. (2008). When attention matters: The curious incident of the wandering mind. Memory & Cognition, 36, 1144-1150. Presented by:
Week 4 - 29-Jan - Mon	Malleability of Human Memory	Loftus, E. F., & Pickrell, J. E. (1995). The formation of false memories. Psychiatric Annals, 25, 720-725. Presented by:
Week 4 - 31-Jan - Wed	Poster Presentations	No Reading
Week 5 - 05-Feb- Mon	Poster Presentations	No Reading
Week 5 -07-Feb - Wed	Poster Presentations	No Reading

Week - Date	Topic	Readings Due
Week 6- 12-Feb - Mon	Metamemory	Patihis, L., Ho, L. Y., Tingen, I. W., Lilienfeld, S. O., & Loftus, E. F. (2014). Are the "memory wars" over? A scientist-practitioner gap in beliefs about repressed memory. Psychological science, 25, 519-530. Presented by: Talarico, J.M. & Rubin, D.C. (2003). Confidence, not consistency, characterizes flashbulb memories. Psychological Science, 14, 455–461. Presented by:
Week 6 -14-Feb-Wed	Metamemory	Shimamura, A. P., & Squire, L. R. (1986). Memory and metamemory: A study of the feeling-of-knowing phenomenon in amnesic patients. Journal of Experimental Psychology: Learning, Memory, and Cognition, *12*(3). Presented by: Castel, A. D., McCabe, D. P., & Roediger, H. L. (2007). Illusions of competence and overestimation of associative memory for identical items: Evidence from judgments of learning. Psychonomic Bulletin & Review, 14, 107-111. Presented by:
Reading Week 19-Feb - Mon	Reading Week [No Class]	No Reading
Reading Week - 21-Feb - Wed	Reading Week [No Class]	No Reading
Week 7 -26-Feb - Mon	Working Memory	Kane, M. J., Bleckley, M. K., Conway, A. R., & Engle, R. W. (2001). A controlled-attention view of working-memory capacity. Journal of Experimental Psychology: General, 130, 169. Presented by: Kleider, H. M., Parrott, D. J., & King, T. Z. (2010). Shooting behaviour: How working memory and negative emotionality influence police officer shoot decisions. Applied cognitive psychology, 24(5), 707-717.

Week - Date	Topic	Readings Due
Week 7 -28- Feb- Wed	Improving Memory	Jaeggi, S. M., Buschkuehl, M., Jonides, J., & Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. Proceedings of the National Academy of Sciences, 105, 6829-6833. Presented by: Harrison, T. L., Shipstead, Z., Hicks, K. L., Hambrick, D. Z., Redick, T. S., & Engle, R. W. (2013). Working memory training may increase working memory capacity but not fluid intelligence. Psychological Science, 24, 2409-2419. Presented by:
Week 8- 5- Mar-Mon	Improving Memory	Moreau, D., Morrison, A. B., & Conway, A. R. (2015). An ecological approach to cognitive enhancement: Complex motor training. Acta psychologica, 157, 44-55. Presented by: Fregni, F., Boggio, P. S., Nitsche, M., Bermpohl, F., Antal, A., Feredoes, E., ... & Pascual-Leone, A. (2005). Anodal transcranial direct current stimulation of prefrontal cortex enhances working memory. Experimental brain research, 166, 23-30. Presented by:
Week 8- 7-Mar - Wed	Improving Memory	Schiller, D., Monfils, M. H., Raio, C. M., Johnson, D. C., LeDoux, J. E., & Phelps, E. A. (2009). Preventing the return of fear in humans using reconsolidation update mechanisms. Nature, 463, 49-53. Presented by: Lonergan, M. H., Olivera-Figueroa, L. A., Pitman, R. K., & Brunet, A. (2013). Propranolol's effects on the consolidation and reconsolidation of long-term emotional memory in healthy participants: a meta-analysis. Journal of psychiatry & neuroscience: JPN, 38(4), 222. Presented by:

Week - Date	**Topic**	**Readings Due**
Week 9- 12-Mar- Mon	Experiment Programming	No Reading [in computer lab]
Week 9 -14 -Mar-Wed	Experiment Programming	No Reading [in computer lab]
Week 10- 19-Mar-Mon	Experiment Programming	No Reading [in computer lab]
Week 10-21-Mar-Wed	Technology and Memory	Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. Science, 333, 776-778. Presented by: Storm, B. C., & Stone, S. M. (2015). Saving-enhanced memory the benefits of saving on the learning and remembering of new information. Psychological Science, 26, 182-188. Presented by:
Week 11-26-Mar-Mon	Technology and Memory	Henkel, L. A. (2014). Point-and-shoot memories: The influence of taking photos on memory for a museum tour. Psychological Science, 25, 396–402. Presented by: Gardony, A. L., Brunyé, T. T., & Taylor, H. A. (2015). Navigational aids and spatial memory impairment: the role of divided attention. Spatial Cognition & Computation, 15(4), 246-284. Presented by:
Week 11-28-Mar-Wed	Data Analysis [in computer lab]	No Reading [in computer lab]
Week 12-2-Apr-Mon	Data Analysis [in computer lab]	No Reading [in computer lab]

Electronic Device Policy
Please limit the use of electronic devices in class to course related activities (e.g., taking notes).

Attendance Policy
You are expected to attend all classes.

Intellectual Property
Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:
•Lecture content, spoken and written (and any audio/video recording thereof);
•Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
•Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
•Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Academic Integrity

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the UWaterloo Academic Integrity webpage and the Arts Academic Integrity webpage for more information.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean.

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline. For typical penalties check Guidelines for the Assessment of Penalties.

Concerns About a Course Policy or Decision

Informal Stage. We in the Psychology Department take great pride in the high quality of our program and our instructors. Though infrequent, we know that students occasionally find themselves in situations of conflict with their instructors over course policies or grade assessments. If such a conflict arises, the Associate Chair for Undergraduate Affairs (Richard Eibach) is available for consultation and to mediate a resolution between the student and instructor: Email: reibach@uwaterloo.ca; Ph 519-888-4567 ext. 38790

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 - Student Appeals

Accommodation for Students with Disabilities

Note for students with disabilities: The AccessAbility Services office, located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

Accommodation for course requirements

- Students requesting accommodation for course requirements (assignments, midterm tests, final exams, etc.) due to illness should do the following:
  - seek medical treatment as soon as possible and obtain a completed uWaterloo Verification of Illness Form
  - submit that form to the instructor within 48 hours.
  - (if possible) inform the instructor by the due date for the course requirement that you will be unable to meet the deadline and that documentation will be forthcoming.
- In the case of a missed final exam, the instructor and student will negotiate an extension for the final exam, which will typically be written as soon as possible, but no later than the next offering of the course.
- In the case of a missed assignment deadline, midterm test, or quiz, the instructor will either:

    - waive the course component and re-weight remaining term work as he/she deems fit according to circumstances and the goals of the course, or
    - provide an extension.
- In the case of bereavement, the instructor will provide similar accommodations to those for illness. Appropriate documentation to support the request will be required.
- Students who are experiencing extenuating circumstances should also inform their academic advisors regarding their personal difficulties.
- Elective arrangements such as travel plans are not acceptable grounds for granting accommodations to course requirements per the uWaterloo Examination Regulations and Related Matters.

Late Assignments/Missed Quizzes not due to illness/bereavement/extenuating circumstances

- A late penalty of 5% per day late (24 hours) will be levied against late assignments
- Missed quizzes will not be rescheduled (note that you can drop your worst quiz grade)

Official version of the course outline

If there is a discrepancy between the hard copy outline (i.e., if students were provided with a hard copy at the first class) and the outline posted on LEARN, the outline on LEARN will be deemed the official version. Outlines on LEARN may change as instructors develop a course, but they become final as of the first class meeting for the term.

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSYCH cross-list will count in the Philosophy major average, even if the course was taken under the Psychology rubric.

Mental Health Support

On Campus

- Counselling Services: counselling.services@uwaterloo.ca / 519-888-4567 xt 32655
- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services
- Health Services Emergency service: located across the creek form Student Life Centre

Off campus, 24/7

- Good2Talk: Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-433 ext. 6880
- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online at the Faculty of ARTS website
Download UWaterloo and regional mental health resources (PDF)
Download the WatSafe app to your phone to quickly access mental health support information

Territorial Acknowledgement

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometres on each side of the Grand River.

Unclaimed graded assignments, essays, and midterm tests for this course will be kept in storage in the Psychology Department for a maximum of 16 months after the final grades have been submitted to the Registrar's Office. After that time, these documents will be destroyed in compliance with UW's confidential shredding procedures.