

**University of Waterloo
Department of Psychology
PSYCH 398: Research in Memory
Winter 2017**

Fridays 8:30-11:20 PAS 4032. Lab Days 11:30-12:50 PAS 1237.

Updated Jan 6th

Instructor and T.A. Information

Instructor: Tim Dunn

Office: PAS 4038

Office Hours: Thursdays 12pm – 130pm

Email: t2dunn@uwaterloo.ca

T.A.: Syaheed Jabar

Email: s2jabar@uwaterloo.ca

Office: PAS 2261 (in research area)

Office Hours: Mondays 11am – 12pm

Please contact the instructor and TA using the email addresses provided above. If we need to contact you, then we will do so using your official UWaterloo address. Students are responsible for all email sent to their official UWaterloo address.

Please check email and the class site on LEARN regularly for important and time sensitive messages.

Course Description

The goal of the course is to introduce students to the theoretical and methodological 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. In addition to readings, students will participate in lab sessions designed to provide practical experience with experimental design and deployment, and basic data analysis.

Course Goals and Learning Outcomes

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

1. Demonstrate knowledge of major concepts, theories, and empirical findings in memory research
2. 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
3. Demonstrate the ability to understand basic and applied research and how research in memory contributes to both of these scientific enterprises
4. Demonstrate the ability to think critically and communicate effectively about research in memory
5. Demonstrate the ability to design and program an experiment

- Demonstrate the ability to perform basic statistical analyses on experimental data and present results.

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 or chapters). The average length of the papers assigned for the class is approximately 10 pages. However, 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 the class LEARN site and are numbered corresponding to the detailed class scheduled below.

Software used in the Course

This course will use PsychoPy (<http://psychopy.org/installation.html>) for experiment building, and the R statistical language (<https://cran.r-project.org/mirrors.html>) for data management, analyses, and visualization. The R language also has a corresponding integrated development environment (IDE), R Studio (www.rstudio.com/products/rstudio/download3/), which will be used as well. R Studio provides a more user-friendly work environment for doing data management and analyses relative to the stand-alone R software. ***Critically, all of this software is FREE and available for PCs and Macs.*** Though all of the software will be available on the lab computers, I highly recommend that everyone download the programs to their personal machines in addition. That way you are not constrained with having to work in the computer lab to practice/work on projects.

Course Requirements and Assessment

Assessment	Quantity	Points	Total
Reaction Papers	5	6	30
In-Class Presentation	1	10	10
In-Lab Assignments	5	6	30
Data Analysis & Presentation Project	1	30	30
BONUS Research Participation		4	
			100

Reaction Papers – 6pts each

For each of the six weeks we will have readings/presentations, you will be required to submit a short “reaction” paper to LEARN *prior* to the presentations of the papers in class. The cut-off date for drop-box submissions will be 8:30am on the Friday of the class. Your lowest mark out of the six total papers will be dropped. The goal of these assignments is to facilitate in-class discussions of the papers being presented by your peers. Specifically, the paper will consist of two components:

- 3pts** - An APA (6th edition) formatted citation of the paper you have chosen.
There are large amounts of resources available online pertaining to APA

formatting (e.g., <https://owl.english.purdue.edu/owl/resource/560/05/>). A used version of the official APA manual is fairly cheap online and is a good resource to have on-hand, but not a requirement for the course. This part of your reaction paper will be marked strictly, so do not simply rely on citation websites or software because they often incorrectly format citations or miss specific details of a correct citation. Also, do not rely on specific journal's reference lists as some journals have specific formatting that does not necessarily follow APA. The citation should be the first part of your paper.

2. **3pts** – Your “reaction” to *one* of the papers assigned for the week. Here, “reaction” is a fairly broad term for your thoughts, questions, critiques, and elaborations pertaining to the paper you have chosen to write about. Please do not attempt to summarize the paper, but rather, provide a few critical thoughts on some aspects of the paper (e.g., the hypothesis, design, claims made from the data, etc.). Generally, we will be looking for whether you critically evaluated the paper in some way. Furthermore, it is expected that you will share your thoughts when the specific paper is presented in class. This portion should be no less than a half of a page (approximately 175 words) and no more than a full page double-spaced (approximately 250 words). Be clear and concise in your thoughts.

In-class Presentation – 10pts

Every student will be required to sign-up to present *one* paper in class. Public speaking is an important skill to develop. Given we are restricted to one class a week there are five assigned papers for the “In Class” weeks (please see the detailed schedule below). Thus, five students will present each one of those weeks. As you can imagine fitting five presentations into one class will put constraints on time. Therefore, each *presentation portion* will shoot for **15 minutes**. In addition, **10 minutes** will be saved for class discussion at the completion of the presentation. This gives **25 minutes** total for every presenter and should give us enough time to fit in all presentations + breaks. Marking will be based on overall quality of the presentation. This will include things such as what information from the paper the presenter decided to convey and whether this information was presented succinctly. Think of your presentation as “teaching” the class about your article. The student presenter will be considered the “expert” on that 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 well **BEFORE** the class you are scheduled to present. The marking of the presentation will roughly breakdown the presenter's ability to address the following:

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 hypothesis or hypotheses (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/or the general conclusions that they drew

In-lab Assignments – 5pts each

Roughly every other week we will be in the PAS computer lab (1237) to focus on the methodological portion of this course. We will begin with basic experimental programming in PsychoPy and then move to basic statistical programming in R. ***This course does not presume students have prior experience with programming; we will start slow and work together.*** As mentioned above, both of these programs are free for download and I highly recommend that everyone download the programs to their personal machines in addition to using the lab computers (if needed) for more flexibility. Both programs have large online communities for asking questions and looking for answers (chance is someone has probably already asked your question online). Some examples of useful websites are:

- PsychoPy forum: <http://discourse.psychopy.org/>
- Stack Overflow R: <http://stackoverflow.com/questions/tagged/r>
- Cross Validate R: <http://stats.stackexchange.com/questions/tagged/r>
- Google: literally type your question in, chances are it is online somewhere

All R-based assignments will be pulled from examples in the **FREE** online R textbook provided by Dr. Nathaniel Phillips. I recommend everyone download a free copy here: <https://ndphillips.github.io/piratesguide.html>

The specific assignments will be handed out in lab. Please see the detailed course schedule below for when the lab dates fall, and the topics for the tutorials and assignments.

Data Analysis & Presentation Project – 30pts

This is a methods course. So a major component of the course will be getting hands-on experience with the lab assignments and integrating the knowledge you gain into a project where you will analyze and present data to your peers. You will be given simulated data based one of the three papers below:

1. The Generation Effect (paper #3)
2. The Production Effect (paper #4)
3. The Drawing Effect (paper #5)

Every individual will receive slightly different data so results will vary for each hypothetical experiment across individuals. Given I will know what everyone's data looks like prior to analysis, I will know the expected results for each student. Specifically, you will analyze the data assigned to you and present the results in the form of a poster on the assigned final's day for the course. ***A detailed rubric will be uploaded to LEARN when data sets are assigned (see detailed course scheduled below).***

Detailed Course Schedule

(Note: page numbers for articles do not include references)

Week	Itinerary
1. Jan 6th	In Class: <p style="text-align: center;"><i>“Introduction to Research in Memory”</i></p>
2. Jan 13th	In Class: <p style="text-align: center;"><i>“Memory Systems & the Brain”</i></p> 1. Tulving. “How many memory systems are there?” Pages: 12 Presented by: 2. Corkin. “Lasting consequences of bilateral medial temporal lobectomy: Clinical course and experimental findings in HM.” Pages: 10 Presented by: 3. Martin & Chao. “Semantic memory and the brain: Structure and processes.” Pages: 6 Presented by: 4. Tulving: “Episodic memory: From mind to brain.” Pages: 18 Presented by: 5. Yamadori et al.: “Neurological basis of skill learning.” Pages: 6 Presented by: Due: Reaction Paper #1
3. Jan 20th	In Class: <p style="text-align: center;"><i>“Working Memory”</i></p> 1. Kane et al.: “A controlled-attention view of working memory capacity.” Pages: 13 Presented by:

	<p>2. Luck & Vogel: “Visual working memory capacity: from psychophysics and neurobiology to individual differences.” Pages: 9 Presented by:</p> <p>3. Markovits et al.: “Individual differences in working memory and conditional reasoning with concrete and abstract content.” Pages: 10 Presented by:</p> <p>4. Jaeggi et al.: “Improving fluid intelligence with training on working memory.” Pages: 5 Presented by:</p> <p>5. Morrison & Chein: “Does working memory training work? The promise and challenges of enhancing cognition by training working memory.” Pages: 13 Presented by:</p> <p>Due: Reaction Paper #2</p>
4. Jan 27th	<p>In Lab:</p> <p style="text-align: center;"><i>“Programming an experiment in PsychoPy pt.1”</i></p> <p>Due: Lab Assignment #1 – Basic Programming in PsychoPy</p>
5. Feb 3rd	<p>In Class:</p> <p style="text-align: center;"><i>“Levels of Processing and Memory Strategies”</i></p> <p>1. Craik & Lockhart: “Levels of processing: a framework for memory research.” Pages: 11 Presented by:</p> <p>2. Olofsson: “The effect of enactment on memory for order.” Pages: 5 Presented by:</p>

	<p>3. Marsh et al.: “Demonstrations of a generation effect in context memory.” Pages: 7 Presented by:</p> <p>4. Forrin et al.: “Widening the boundaries of the production effect.” Pages: 9 Presented by:</p> <p>5: Wammes et al.: “The drawing effect: Evidence for reliable and robust memory benefits in free recall.” *Exps 1a, 1b, 3 Pages: ~23 Presented by:</p> <p>Due: Reaction Paper #3</p>
<p>6. Feb 10th</p>	<p>In Lab: <i>“Programming an experiment in PsychoPy pt. 2”</i></p> <p>Due: Lab Assignment #2 – Programming a Memory Experiment</p>
<p>7. Feb 17th</p>	<p>In Class: <i>“False Memory”</i></p> <p>1. Roediger & McDermott: “Creating false memories: Remembering words not presented in lists.” Pages: 10 Presented by:</p> <p>2. Loftus & Pickrell: “The formation of false memories.” Pages: 6 Presented by:</p> <p>3. Wade et al.: “A picture is worth a thousand lies: Using false photographs to create false childhood memories.” Pages: 7 Presented by:</p>

	<p>4. Garry & Wade: “Actually, a picture is less than 45 words: Narratives produce more false memories than photographs do.” Pages: 7 Presented by:</p> <p>5. Frenda et al.: “False memories of fabricated political events.” Pages: 7 Presented by:</p> <p>Due: Reaction Paper #4</p>
	<i>Reading Week</i>
8. Mar 3rd	<p>In Lab: <i>“Introduction to the R statistical programming language”</i></p> <p>Due: Lab Assignment #3 – Basic Operations and Data Manipulation in R.</p>
9. Mar 10th	<p>In Class: <i>“Metamemory”</i></p> <p>1. Metcalfe: “Metameory: Theory and data.” Pages: 11 Presented by:</p> <p>2. Benjamin et al.: “The mismeasure of memory: When retrieval fluency is a misleading as a metamnemonic index.” Pages: 12 Presented by:</p> <p>3. Metcalfe & Finn: “Evidence that judgments of learning are causally related to study choice.” Pages: 5 Presented by:</p> <p>4. Perfect & Hollins: “Predictive feeling of knowing judgments and postdictive confidence judgments in eyewitness memory and general knowledge.”</p>

	<p>Pages: 10 Presented by:</p> <p>5. Rhodes & Castel: “Metacognitive illusions for auditory information: Effects on monitoring and control.” Pages: 5 Presented by:</p> <p>Due: Reaction Paper #5</p>
10. Mar 17th	<p>In Lab: <i>“Data Manipulation and Statistical Analyses in R”</i></p> <p>Due: Lab Assignment #4 – Conducting an Analysis in R *Data for final assignment released</p>
11. Mar 24th	<p>In Class: <i>“Distributed Memory”</i></p> <p>1. Wegner et al.: “Transactive memory in close relationships.” Pages: 7 Presented by:</p> <p>2. Basden et al.: “Costs and benefits of collaborative remembering.” Pages: 10 Presented by:</p> <p>3. Sparrow et al.: Google effects on memory: Cognitive consequences of having information at our fingertips. Pages: 4 Presented by:</p> <p>4. Storm & Stone: “Saving-enhanced memory: the benefits of saving on the learning and remembering of new information.” Pages: 7 Presented by:</p> <p>5. Gilbert: “Strategic use of reminders: Influence of both domain-general and task specific metacognitive confidence, independent of objective memory ability.” Pages: 13 Presented by:</p> <p>Due: Reaction Paper #6</p>

12. Mar 31st	In Lab: <i>“Data Visualization and Graphing in R”</i> Due: Lab Assignment #5 – Graphing Data in R
Final Apr 7 th -Apr 25th	<i>Poster Session (date TBD)</i>

*Please note that these dates may be subject to change. All potential changes will be posted to the course LEARN site.

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 Richard Eibach, the Associate Chair for Undergraduate Affairs who will provide further assistance; reibach@uwaterloo.ca.

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](#).

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.

Sona and Research Experience Marks Information and Guidelines

Experiential learning is considered an integral part of the undergraduate program in Psychology. Research participation is one example of this, article review is another. A number of undergraduate courses have been expanded to include opportunities for Psychology students to earn grades while gaining research experience.

Since experiential learning is highly valued in the Department of Psychology, students may earn a **"bonus" grade of up to 4%** in this course through research experience. Course work will make up 100% of the final mark and a "bonus" of up to 4% may be earned and will be added to the final grade if/as needed to bring your final grade up to 100%.

The two options for earning research experience grades (participation in research and article review) are described below. Students may complete any combination of these options to earn research experience grades.

Option 1: Participation in Psychology Research

Research participation is coordinated by the Research Experiences Group (REG). Psychology students may volunteer as research participants in lab and/or online (web-based) studies conducted by students and faculty in the Department of Psychology. Participation enables students to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience. Please be assured that all Psychology studies have been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee.

How to earn extra marks for your Psychology course(s) this term by participating in studies ...

- You will earn "credits" which will be converted to "marks" (1 credit = 1%)
- You can schedule your LAB and/or ONLINE studies using the "Sona" website.

Educational focus of participation in research

To maximize the educational benefits of participating in research, students will receive feedback information following their participation in each study detailing the following elements:

- Purpose or objectives of the study
- Dependent and independent variables
- Expected results
- References for at least two related research articles
- Provisions to ensure confidentiality of data
- Contact information of the researcher should the student have further questions about the study
- Contact information for the Chief Ethics Officer of the Office of Research Ethics should the student wish to learn more about the general ethical issues surrounding research with human participants, or specific questions or concerns about the study in which s/he participated.

Participation in LAB studies has increment values of 0.5 participation credits (grade percentage points) for each 30-minutes of participation. Participation in ONLINE studies has increment values of .25 credits for each 15-minutes of participation. Researchers will record student's participation, and at the end of the term the REG Coordinator will provide the course instructor with a credit report of the total credits earned by each student.

How to participate?

Study scheduling, participation and grade assignment is managed using the SONA online system. All students enrolled in this course have been set up with a SONA account. You must get started early in the term.

[Participating/SONA information: How to log in to Sona and sign up for studies](#)

**** Please do not ask the Course Instructor or REG Coordinator for information unless you have first thoroughly read the information provided on this website.****

More information about the REG program is available at:
[REG Participants' Homepage](#)

Option 2: Article Review as an alternative to participation in research

Students are not required to participate in research, and not all students wish to do so. As an alternative, students may opt to gain research experience by writing short reviews (1½ to 2 pages) of research articles relevant to the course. The course instructor will specify a suitable source of articles for this course (i.e., scientific journals, newspapers, magazines, other printed media). *You must contact your TA to get approval for the article you have chosen before writing the review.* Each review article counts as one percentage point. To receive credit, you must follow specific guidelines. The article review must:

- **Be submitted before the [last day of lectures](#). Late submissions will NOT be accepted under ANY circumstances.**
- Be typed
- Fully identify the title, author(s), source and date of the article. A copy of the article must be attached.
- Identify the psychological concepts in the article and indicate the pages in the textbook that are applicable. Critically evaluate the application or treatment of those concepts in the article. If inappropriate or incorrect, identify the error and its implications for the validity of the article. You may find, for example, misleading headings, faulty research procedures, alternative explanations that are ignored, failures to distinguish factual findings from opinions, faulty statements of cause-effect relations, errors in reasoning, etc. Provide examples whenever possible.
- Clearly evaluate the application or treatment of those concepts in the article.
- Keep a copy of your review in the unlikely event we misplace the original.