

Final Research Project

For your final project for this lab class, you will work in small groups (4 students) to conduct a novel research project that explores some facet of memory. Your group will pick a topic to study, do a small literature review, design a project, program the experiment, collect data, and analyze the results. At the end of the term your group will present your findings in a research symposium on the last day of class. Your final paper for the class will be an **individually written** APA-style report.

Part of the fun of this project is that some of you will have the opportunity to collect data online! Although we can do many interesting research projects on campus, it can sometimes be difficult to recruit enough subjects to see significant results. Collecting data online not only allows us to quickly gather a larger amount of data, but it also allows us to recruit a much more diverse group of subjects (i.e., not just college students from Carleton). With a larger sample size, some of your group projects have the chance to be pilot projects or experiments in a real publication! (We can work together to find an outlet for your work if things turn out well). One downside to collecting data online is certain experiments are tricky or impossible. Thus, depending on your project, it may be easier for your group to collect data on campus instead.

For the rest of the term, the majority of lab time will be devoted to working on these projects. You can see a brief outline of what we will be doing each week below. There will be more details at the start of each lab.

Sarah and I are both here to help you with this project. Please contact us if you want to talk through an idea, get feedback on something, or want suggestions about any step of the process.

WEEK 4 – PROJECT IDEAS

In Lab

In this lab, you will work with partners to research and develop a research topic for your own investigation. The last page of this handout contains a brief list of some experiment ideas. A .zip file on Moodle contains additional questions and key readings for each of these topics.

- 1) Read through the text files describing the different areas. Take some notes on the projects that seem interesting to you. Add a list of memory questions/ topics that you thought about to this list.
- 2) Discuss your notes and your lists with your group. Use a white board to help facilitate your thinking. See the yellow Group Info sheet for more details. Settle on a general topic or area that your group would like to explore and list some potential research questions.
- 3) Use PsycInfo to identify a list of potential readings that can help shape the theory and methodology of your project. Start a shared Google doc to list articles as you are searching.
- 4) Determine how you want to distribute reading for next week (see the Annotated Bibliography assignment below).
- 5) Turn in one copy of the yellow Group Project form for the group. (Be sure to come up with a creative team name. Memory- or Psychology-related puns are encouraged, especially if it is related to your topic. Otherwise, a team name will be assigned to you by a random name generating website and it probably won't be flattering.)

Assignment (due before lab, week 5) – Annotated Bibliography

Each **person** should upload to their group's Moodle forum an Annotated Bibliography with at least 3 relevant articles to discuss with the group. You'll each want to read different articles to cover more ground, but you may also want to read some central articles in common. The annotated bibliography should list the articles in APA reference style and provide a brief (3-4 sentences) description of the relevance of each article to your proposed topic.

WEEK 5 – PLAN GROUP PROJECTS (+IRB)**In Lab**

In today's lab session you will refine your research question. You will start by discussing the articles you read last week, how they relate to the theoretical question(s) that you want to answer and how you will approach answering that question.

During lab, each group will write and turn in a brief (~ 2 page) description of their experiment. The first page will describe the theory, background, and hypothesis. The second page will describe the experimental method, materials, and procedure (an outline and bullet points are fine – see example posted on Moodle).

You do not have to have every single detail of the experiment clearly identified, but the design and foundation should be there. You should know the independent and dependent variables, have an operational definition for each variable (e.g., saying that you'll "measure speed" isn't clear enough – you need to say "measure response time in milliseconds), have an example of the stimuli you will be using, describe how you will present stimuli (Qualtrics, Superlab, or PowerPoint, etc.), and know which population you will be recruiting participants from. Talk to Adam about which software will be best for your experiment and how you can find materials.

We will also discuss research ethics and working with Institutional Review Boards (IRB). Researchers must submit a full report of their planned studies to be reviewed by the IRB of their college or university. This ensures that the research is ethically sound. Because we are conducting research, potentially with people outside of Carleton (and that is potentially publishable), you will complete an IRB application and submit it to the Carleton IRB. **Data collection cannot begin until the Carleton IRB has approved your project.**

Assignment (due by Friday 4/29 by 5:00 pm) – IRB Form

Your IRB application will have 3 parts, templates of which are available on Carleton's IRB website.

- 1) a completed IRB form
- 2) a consent form
- 3) a copy of your advertising materials

The IRB form will be completed in an online form and then you will upload a copy of the consent form and a copy of your advertising materials. Be sure to list Adam as the Faculty Adviser.

This is also a good time to start writing your Method section. The lab reports must be written individually, so be careful not to just copy and paste from your experimental summary or the IRB. If you begin writing the Method section now, you'll be very glad during week 9. Having a written Method section will also provide clarity next week when you are designing the experiment.

WEEK 6 – EXPERIMENT BUILDING DAY**In Lab**

Today you will assemble and/or create your materials, write your instructions, and begin programming your experiment. On Moodle you will find links to a tutorial on using Qualtrics and a link to the SuperLab programming manual. In both cases, working through the tutorials should teach you most of what you need to know. Running an experiment with PowerPoint is another option. This will require less work up front (little to no programming) but will require more work towards the end of the project when coding responses. By the end of lab you should have your experiment largely ready to go.

Assignment (due Monday 5/9 at 5:00 pm)

Submit your experiment program to Adam. The experiment should be 100% ready to go – all conditions are included, the materials are complete, and it has been pilot-tested more than once.

There should be no spelling or grammar mistakes in the instructions or materials, and the data output should look as expected.

If the program is a SuperLab program, please send Adam a link to download the .zip package containing all elements of the experiment. If the program is in PowerPoint (with paper recall) please email Adam all of the program elements, along with a text file describing the experimental protocol. Finally, if it is a Qualtrics program, simply email Adam with the name of the final survey.

You'll also want to start writing the introduction for your individual final report.

WEEK 7 – DATA COLLECTION AND WRITING

In Lab

The goal this week is to collect data! Assuming the IRB has approved your project, you are ready to begin. If you are doing an online project we will post the experiments during the lab session. If you are conducting a lab study, then your group will need to recruit subjects and collect data. You can run experiments during the lab time (3 – 5). Additionally, if you wish to schedule data collection periods at other times (it is often very effective to run multiple subjects at the same time) then Sarah can work with you to open the lab in the evenings or during common time.

Assignment (due at start of Week 8 lab)

Data collection should be complete before the start of the Week 8 lab. If you conducted an online study your group may need to meet with Adam to work on restructuring the data output.

WEEK 8 – DATA VISUALIZATION, POSTER DESIGN, AND WRITING

In Lab

There are several goals for this week's lab: 1) work on scrubbing, organizing, visualizing, and analyzing your data 2) begin to work on your poster design, 3) write your results and discussion sections for the final report. Bring your completed data to lab.

Groups will meet with Adam to discuss any questions about the data analysis.

Assignments

- **Posters due 5/20, Friday, by 5:00 pm.** Email to Adam as PDF.

- **Lab Report Draft due 5/23, Monday, by 5 pm** (note: this is a weird deadline so I have time to make groups for the peer review and print copies before lab). Submit a full APA-style draft of your report to Moodle. Although the word "draft" is here, this should be a polished paper – including a title page, reference section, figure, etc. You'll get much more out of the peer review this way.

WEEK 9 – PEER REVIEW OF LAB REPORT

In Lab

In lab we will break into small groups and do a peer review of the Lab Report. This is a chance to help others in your class and to improve the quality of your own report.

If there is extra time in lab, you may want to meet with your group to plan and practice your poster presentation.

Assignments

- Revise your lab report in light of the feedback you received during the peer review (final draft due June 6th).
- Prepare for the poster session (as a group) on June 1st.

WEEK 10 AND BEYOND

- No lab this week!!!
- Memory Research Poster Symposium (in Olin 102 on June 1st from 11:10 – 12:30 (The last day of class). Each group of researchers will present their study in a poster session open to the Carleton community. Invite your friends!
- Final Lab Report due via Moodle at 5:00 pm on June 6th (the end of the exam period).
- Fill out the group evaluation form that Adam sends you to comment on the contributions that you and the other members of your group made to your project.

EVALUATION

As a reminder, here is the breakdown of the different components of the memory project. The project is worth 60% of your grade in the lab.

Annotated Bibliography (individual)	5%
IRB/Project Proposal (group)	5%
Poster Presentation (group)	15%
Team Participation (individual)	10%
Final Lab Report (individual)	25%

TOPICS

For each of these projects I've written a brief summary, identified a few key readings, and proposed a few questions:

- Metacognition – Judgments of Learning and Confidence ratings
- Perceptual Fluency in Encoding
- The Picture Superiority Effect
- The Serial Position Curve
- Testing and Proactive Interference
- The Google Effect
- The Production Effect

Here are a few other topics that might be interesting. However, you'll have to research these topics on your own:

- Does using abbreviations in PowerPoint presentations lead to better recall?
- Survival Processing
- The Drawing Effect
- Where did you learn that? Testing source memories.

Finally, feel free to pick something else that we've talked about in class! You'll want to have a conversation with Adam to see if the topic lends itself to a class project in the short timeline that we have.

Final Lab Report

First draft due for peer review May 23rd at 5:00 pm

Final draft due June 6th at 5:00 pm.

For your final lab report you will **individually write** a full APA-style report based on your group project.

Title Page

Include an APA Style formatted title page. Make sure that you have a clear and informative title that describes your project.

Abstract

The abstract is a short summary that describes the take-home message of the paper: what is the research question, what method did you use to address the question, what was the outcome, and why was it important. The abstract is easier to write *after* you have written the rest of the paper.

Introduction

Your introduction section should introduce the topic at a broad level, specify the research question, briefly review previous research, and outline your hypotheses for the experiment. In your literature review you will want to **reference at least 5 other sources** (start with the annotated bibliographies from earlier in the term). Some of your references may be in passing, but if you are doing a direct follow up to a project you will want to describe the original study in detail. A good introduction will introduce the reader to a topic and motivate the research question.

Method and Results

See the previous lab assignments for details about the Method and Results sections. Include a table or figure that displays your results. You do not need to report all of the means in the main text (as was required in earlier assignments), but do include means if it helps tell a clearer story.

Feel free to consult with your group members on running the actual statistics and analyses; just be sure that your written results section is your own work. Talk to Adam or Sarah if you need help with writing your results section.

Discussion

Address the following questions in your discussion: What is the meaning of the results we found in class? Did they support the hypotheses made in the introduction? Were the results similar or different from what was found in the original experiment? If different, offer some suggestions about why the results may have differed. Discuss any other limitations of the experiment and provide suggestions for future research. Be sure to finish with a strong conclusion.

Format

There is no strict page limit for the lab report, but you should assume that your introduction will be around 3-5 pages and your discussion around 2-3 pages. The method and result should be as short as possible while still covering the critical details. As always, use 1-inch margins on all sides, 12-pt Times New Roman Font, and put page numbers in the upper right-hand corner. Be sure to include a separate title page, a references section (formatted in APA style), and the figures in the appropriate location (**aka on their own page at the back of the manuscript**).

Rubric for Final Lab Report

Title Page Title page formatted correctly; includes running head & page number; title is descriptive	/5
Abstract One-paragraph summary of whole paper (problem, method, findings, contribution)	/10
Introduction Explains problem and its importance; lit review of previous work and theory is appropriate depth; research question is clearly articulated; hypotheses are explicit and theoretically motivated; at least 5 references.	/20
Method Participants, materials, and design sub-sections are present; procedure is appropriate level of detail; measures described accurately.	/15
Results Findings clearly described, figure or table displays data; statistics are used appropriately; written and visual info is integrated.	/15
Discussion Recap of results; provides analysis of results in context of previous lit; shows practical applications, short-coming and future directions identified.	/20
APA Style Formatting double-spaced, Times New Roman, 12-pt font, 1-inch margins, page numbers included on upper right hand corner, headers and sub-headers are appropriately formatted, references are formatted appropriately, figure and tables are included in the correct location of the manuscript.	/5
APA Style Style writing is clear, uncluttered, and graceful; tone is appropriate for scientific writing; free of errors in grammar, spelling, punctuation, and usage.	/10
Total	/100