COGS 180: Final project

Final presentation dates will run from Jul 30 - Aug 1 (see below for your assigned date)

The final paper is due Saturday, August 3 at @ 11:59pm (anywhere in the world)

Please submit your final paper here

Please submit your final presentation slides here

Fill out the: Final paper rubric (for students) for your own paper!

In-class presentation evaluation form: https://forms.gle/e36xcEGdYQcHqnac7

Learning goals and assignment details

This final project offers you the opportunity to *dive deeper* into one aspect of decision making! You will become the decision scientist and conduct one of the following types of research studies:

(1) **design an original study** to investigate a specific aspect of decision making, OR
(2) **reproduce** the results of an existing study, but extending it in some novel way, OR
(3) **conduct a review or critique of the literature** in the subtopic of your choice.

Your project can involve…collecting and analyzing behavioral data to test a theory of decision making, applying the decision making models that we learned about in class to analyze behavioral or neural data, or summarizing and critiquing the findings of decision research. *Specific example project ideas can be found at the end of this document.*

To help you scaffold progress on the assignment, Homeworks 3 and 4 will have sections devoted to brainstorming and solidifying your project topic, so you can get feedback and approval from Prof. Lai and Janet before you begin!

The final project will consist of 2 parts: a **2-3 paged (single-spaced) paper** and a **5-min solo presentation.** Details for the paper and presentation are below.

*Note that you are allowed to do your final project with **up to 2 other classmates** if you wish, but the required length of your paper and presentation will be multiplied by the number of total team members (and your grades for the final project will also be shared). You will also have to detail the individual contributions of each team member. Please let me know if you are choosing to pursue this option! 🙂

Paper

You will write a 2-3 paged (single-spaced*) paper that introduces the question that you are interested in answering, how you went about answering it, a summary of the results obtained, and a discussion that includes an interpretation of the findings as well as limitations and future directions of the line of research. These elements will look different depending on the type of project you choose to pursue (see options in the first section), but each must in some way satisfy the requirements detailed in the rubric below.

Quick reminder about the AI policy: Because I am only asking for a 2-3 paged paper (instead of a 12-paged one, for example), I expect that you will not directly copy / paste large chunks of ChatGPT output and claim it as your own when writing your paper. Of course, using AI to synthesize and stimulate your thoughts can be a useful tool, but I can usually tell when you have put real thought and nuance into writing rather than relying on AI to do it for you. If you tend to be a verbose writer, AI can also help you "shorten" your paper to fit the required length (but again, please don't simply copy and paste the shortened output!).

*If your paper is just over 3 pages, that's okay, no need to stress about shortening it just to fit.

Paper grading

As mentioned in the first lecture of this class, your grade on the paper portion of the final project will be an agreement between you and us (Prof. Lai/Janet). You will tell us what grade you think you deserve and why (via the below rubric), and we will tell you the same. Then we discuss until we reach a consensus!

Please give yourself a grade on the paper by filling out this empty rubric (same as below, with a section for comments): Final paper rubric (for students) and attaching it to the end of your paper before you submit it on Canvas (along with your presentation).

***You are always welcome to ask for feedback on your paper at any time before it's due! Reminder that this is a great way to utilize office hours 🙂 ***

The paper will be worth 9 out of the final project's 15 points (60%).

Criteria	Points	Description
Introduction (1.5 points)		
Clarity of research question or objective	0.75	★ Clearly states the research question or objective of the study/review. Provides a concise overview of the topic and its relevance to decision making.
Background and rationale	0.75	★ Provides sufficient background information, including a brief summary of relevant literature. Justifies the importance of the research question or topic.
Methodology and approach (2 points)		
Study design or review methodology	1	★ *For original studies:* Clearly describes the study design, including participants, materials, procedures, and measures. ★ *For reproductions/extensions:* Clearly describes the original study, the methodology used for replication (and if there were any new methods applied), and the novel extension. ★ *For reviews/critiques:* Clearly outlines the review methodology, including criteria for literature selection.

Novelty and innovation	1	★ *For original studies and reproductions/extensions:* Clearly describes the novel aspect or innovation introduced. (This is extremely important to highlight if you choose to reproduce a study!) ★ *For reviews/critiques:* Provides original insights or critiques that add value to the existing literature.
Analysis and results (2 points)		
Well-motivated analyses	1	★ *For original studies and reproductions/extensions:* Clearly describes the data analysis procedures and techniques used. ★ *For reviews/critiques:* Thoroughly analyzes and synthesizes the literature, highlighting key findings and trends.
Presentation of results	1	★ *For original studies and reproductions/extensions:* Clearly presents the results, including appropriate use of tables and figures. ★ *For reviews/critiques:* Clearly presents the findings, including a discussion of the strengths and weaknesses of the reviewed studies.
Discussion (2 points)		
Interpretation of results	1	★ Provides a thoughtful interpretation of the results in the context of the research question/objective. Discusses the implications of the findings. ★ *For reproductions/extensions:* Details how your results are consistent with or deviate from those of the original study.
Limitations and future directions	1	★ Acknowledges some limitations of the study/review and suggests possible directions for future research.
Writing quality and presentation (1.5 points)		
Clarity and coherence	0.75	★ Writes in a clear, concise, and well-organized manner. Ensures the paper is easy to follow and free of jargon.
Grammar and style	0.75	★ Uses proper grammar, punctuation, and academic voice. Adheres to some kind of formatting guideline (e.g., APA style, but it is up to you what kind of citation style you use).

Presentation

Along with your paper, you will give a 5 minute presentation about your project (with 1 minute for audience questions). Unlike the longer group presentation, you should think of this presentation as an "elevator pitch" that gets people excited and curious about the particular research question that you are tackling. A brief overview of the results and future directions should also be mentioned.

This presentation is another opportunity for you to learn how to give a clear, yet succinct, presentation on a niche topic of your choice to a diverse audience. This time, the particular

challenge will be in condensing the main points of your work to under 5 minutes, akin to how some conferences conduct their "flash" talks. As always, the clarity and quality of delivery is highly valued.

Presentation grading

Your final project presentation is the second assignment in this course where you will be graded by your classmates, in addition to yourself and myself (just like the group presentation). The below rubric should help guide your presentation, and is also the rubric which your classmates, you, and I will fill out to evaluate the presentation. Your presentation grade will be determined by the mean value of everyone's evaluations (including your own). The in-class presentation evaluation form can be found here.

While there will be no formal opportunity to practice your presentation before you give it, you are always welcome to do a practice run with me and get my feedback during office hours! 🙂

The presentation will be worth 6 out of the final project's 15 points (40%)

Criteria	Points	Description
Clear question or objective	1	★ 1 point: Research question was clear and well-motivated ★ 0 points: Unclear what the research question was
Well-motivated methodological approach	1	★ 1 point: Well-motivated methods or approach ★ 0 points: Unclear why they used the methods or approach they did
Presentation of results or findings	1	★ 1 point: Clear, yet succinct, presentation of results or findings and how they answered the research question ★ 0 points: Insufficient results or findings, unclear how they answer the research question
Limitations or future directions	1	★ 1 point: Explained limitations of the project's approach and/or future directions (extensions, new questions) resulting from the project ★ 0 points: No limitations or future directions proposed
Clear delivery	1	★ 1 point: Presentation was well-prepared, well-paced, and delivered in an engaging, organized, and clear manner ★ 0 points: Disorganized, unclear, rushed pacing, unpolished, lacking engagement (monotonous, reading off the slides the whole time, etc.)
Presentation visual aids	1	★ 1 point: Slides were uncluttered and well-organized, figures or other media was used effectively to enhance presentation. ★ 0 points: Cluttered slides, figures / media did not support or enhance presentation.

Presentation dates

I have assigned presentation dates in the rough order that people did their group presentations (so that the earliest group presenters also do their final presentation first, and the last group presenters wouldn't be presenting 2 days in a row).

If for some reason, your presentation date does not work for you, please let me know ASAP. Remember that your participation during the final presentations (in grading and asking your classmates thoughtful questions) is still part of your attendance grade 🙂

Presentation date	Students presenting
Tuesday, Jul 30	Anne Pham Christine Kwon Keyi Yu Nikita Rao Enrique Aguilar Eugenia Winata Harvey Yang Fei He Benjamin Kim
Wednesday, Jul 31	Jennifer Del Rio Prem Patel Gabriela Freedland Darwin Yu Gael Hinojosa Jiasheng Zhou Nathan Keodara Natalie Repetti Guadalupe Cardenas Cruz Shuyang Yu Kaiwen Bian Emi Lee
Thursday, Aug 1	Andy Thong Qirui Zheng Tairan Liu Valeria Avila Aleck Wu Sharon Ni Alexandra Citra Roham Mehrabi Mohammad Jalaal *(Leaving time at the end for final discussion and thoughts)*

Deciding on a topic

If you have never conducted research of any kind, you might find choosing a research question to be a daunting task. Here, I will attempt to guide you by providing some suggestions and examples of good project proposals. Remember that you will have a chance to get feedback on your project topic in Homeworks 3 and 4, so fear not, you are not completely on your own!

If you're not sure where to begin, reflect on the following questions:

- What topic(s) did I find most interesting so far in the lectures? Is there one in particular I have the most questions about?
- What topic(s) in the course do I want to learn more about?
- Are there any connections between topic(s) in the course and my own personal interests that I want to explore in more depth?

Here, ChatGPT can also serve as your "research assistant," helping you brainstorm possible research questions and topics that you might want to pursue given your topical interests! Your research question does not have to be entirely novel (you don't need to scrape the literature making sure it has never been done before), as there are many other ways to introduce novelty into your study (by trying out different experimental conditions, for example).

Some example project ideas, to give you a flavor of what we are looking for:

1. Original study
    - Question: How does stress influence risky behavior in decision making?
        i. Method: I will develop a survey (or use an existing one) where I can quantify people's stress levels. Each participant will then answer a series of questions involving gambles (e.g., *would you rather have 100% of receiving X, or 50% of receiving Y?*). I will see if there is a relationship between stress inventory scores and risk seeking behavior as predicted by expected utility theory.
    - Question: Does visualization of the future work as an intervention to change delay discounting behavior?
        i. Method: I will develop a protocol to have half of my subjects think about the value of their money in the future, before testing all subjects on a delayed discounting task. I hypothesize that those who were told to visualize the future will decrease their discount rates compared to those who did not.
2. Replication and extension of an existing study
    - Original study: Kahneman and Tversky's anchoring and adjustment experiments
        i. Question: Does mathematical training influence the degree to which people are subject to the anchoring and adjustment heuristic?
        ii. Method: I will first reproduce many of the experiments described in Kahneman and Tversky's 1979 paper on cognitive heuristics, but I will also survey my subjects on their level of mathematical background and reasoning (through their

performance on a mathematics battery). I predict that people with more mathematical training and knowledge will be less susceptible to the heuristic.

3. Review or critique of literature
    - Question: What are the neural correlates of impulsivity in decision making, and how do they interact with the brain's cognitive control systems?
    - Question: What are the similarities and differences between the Drift Diffusion Model and Bayesian Decision Theory, and how have they been used to explain the same decision making behaviors?
    - Question: How do cognitive biases influence medical professionals' decision making processes, and what strategies can mitigate these biases?