# PHDBA 297B: Research and Theory in Behavioral Science, Spring 2023

## I. Time and Location
Time: Thursdays 12-3 pm
Location: All class will be on Zoom, https://berkeley.zoom.us/my/julianaschroeder/

## II. Professor
Juliana Schroeder, jschroeder@haas.berkeley.edu. Office hours are available by appointment.

## III. Materials
Syllabus Link: https://tinyurl.com/BehavioralScienceMethods2023
Course Website Link: https://bcourses.berkeley.edu/courses/1520375
Suggested Textbook: Reis, H. T., & Judd, C. M. (2014). *Handbook of research methods in social and personality psychology* (2nd ed.). Cambridge University Press.

## IV. Course Outline

| Week | Date | Topic |
|------|------|-------|
| 1 | Jan 19 | Introduction and Philosophy of Science – Juliana Schroeder |
| 2 | Jan 26 | Ethics in Research – Suzanne Stone |
| 3 | Feb 2 | Open Science – Don Moore |
| 4 | Feb 9 | Replication – Leif Nelson [1 – 3pm class] |
| 5 | Feb 16 | Experimental Design and Research Tools – Juliana Schroeder [1 – 3pm class] |
| 6 | Feb 23 | No Class - SPSP |
| 7 | March 2 | Regression, Mediation, and Moderation – Michael Slepian |
| 8 | March 9 | Structural Equation Modeling – Aaron Fisher |
| 9 | March 16 | Online Experiments and Modeling – Doug Guilbeault |
| 10 | March 23 | Field Methods – Jenny Chatman |
| 11 | March 30 | No Class - Spring Break |
| 12 | April 6 | Data Fraud – Ellen Evers |
| 13 | April 13 | Factor Analysis – Oliver John |
| 14 | April 20 | Neuroscience Methods – Ming Hsu |
| 15 | April 27 | Workshop - Analyze Each Other's Data |

## V. Course Overview/Description

The purpose of this class is for you to: 1) learn good research practices in the behavioral sciences and 2) expose yourself to, and give yourself some practice with, a variety of research methods that you are likely to encounter across different subfields within behavioral science.

Weeks 1-5 will cover the fundamentals of good research practices, including topics such as philosophy of science, ethics in research, open science and replicability, experimental design (e.g., random assignment, identifying confounds, internal/external validity, power analysis), and research tools (Prolific, Turk Prime, Qualtrics, content coding, and reference management). We will discuss various study designs, overviewing the pitfalls and advantages of different types of designs.

Weeks 7-14 will cover more nuanced methodological topics. We will have guest lectures almost every week from experts in the field on different topics, including regression, structural equation modeling, field methods, physio methods, factor analysis, and neuroscience.

In the final week (Week 15), you will have the opportunity to analyze a peer's data and get advice from the professor and your class peers on your own data that you collected for your research project for the class.

To enroll in this course, you should either be a Ph.D. student in a field of Behavioral Science (Management of Organizations, Behavioral Marketing, Psychology, etc) or have taken an advanced seminar in social psychology or sociology and be familiar with theory and research. This is not an applied course and is not recommended for students interested in applied issues.

## VI. Course Requirements and Grading

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| A. Class Participation | 20% |
| B. Weekly Assignments | 40% |
| C. Research Project and Related Assignments | 40% |

***A. Class participation is worth 20% of your grade, based on: (1) active engagement in classroom discussions and (2) appropriate building and give-and-take with colleagues and professors/guest lecturers.***

It is important for you to be **actively** engaged in class discussions and to immerse yourself into the methodology of behavioral science research. Thus, vigorous seminar participation, including developing and articulating informed views on topics and constructively contributing to others' thinking and work in the seminar, are central requirements of the course.

In certain class weeks, you will have assigned papers to help you prepare for the lessons during that week. You should complete and be prepared to discuss all readings for each class session. The essence of this seminar is contained in the quality of the classroom discussion.
As you read each paper you might want to consider the following issues:

- What is the basic formulation of the theory (constructs and relationships among them), and what drives the theory?
- What are the underlying assumptions?
- What is the main contribution of this paper? What are the interesting ideas?
- What did the author(s) do well and do poorly?
- Do you believe his or her arguments? What would it take to convince you?
- What are the boundary conditions of the argument, in other words, under what circumstances does the argument apply and not apply?
- What are the critical differences between this author's argument and others you have read? Can these differences be resolved through an empirical test? What would that study look like?
- Does the research design make sense given the research question?
- Does the research design allow you to rule out alternative hypotheses?
- How are the variables operationalized, and is this consistent with the theory?
- Are the data analyzed and interpreted effectively?

Each class will also involve an assignment. You should give serious thought to the assignment prior to each class. If you will be absent from class, please still plan to complete your assignment for the week.

If you are participating inadequately or insufficiently, the faculty member for the week will reach out to you after class to give you feedback. Each of these reach-outs will reduce your participation grade by 2 percentage points.

**An unexcused absence from the class will reduce your participation grade by 3 percentage points.**

*B. Weekly Assignments, themed to fit with the lecture topic (40% of your grade).*

Each week, you will have an interactive assignment to complete. Below is an example list of the types of assignments that you're likely to encounter for each topic in this class. Note that this list is only of *examples* and that assignments may change as the date approach:

- Ethics – complete a CITI profile, write your own IRB or review others' IRBs
- Open Science, Replication – write and post a preregistration, make a profile on OSF, post a dataset and/or survey, code
- Experimental Design, Research Tools – make a survey on Qualtrics and post it on Prolific/MTurk, post a study on SONA, familiarize yourself with the Xlab and Blab
- Regression, SEM – analyze pre-existing data
- Field Methods – design a field study
- Data Fraud – review several datasets and determine which ones are fraudulent and why
- Physio – analyze a saliva sample or do behavioral coding
- Factor Analysis – analyze the validity and reliability of scale, identify the stable factors

Each weekly assignment will be **worth 2 points**. 2 points = full credit, good quality submission. 1 point = inadequate or poor quality submission. 0 points = no submission or such poor quality that it was not deemed worth a point. For every 24 hours that an assignment is late, you will lose 1 point from the assignment (out of the 2 possible points).

Weekly assignments are always due on **Wednesday at 5 pm prior to class**.

Grades for each weekly assignment will be posted within 2 weeks on bCourses. If you would like extra feedback about your analysis or grade, please reach out directly to the relevant faculty member.

## C. Research project, worth 40% of your grade.

You will engage in a course-long research project as part of this class.

**Overview of project**. In this project, you will propose one or more studies to test a research idea. The proposal should concern a piece of research that interests you but for which no paper yet exists (to your knowledge). Although you can replace the topic during the semester, it will be to your advantage to focus on a single topic throughout the semester. Therefore, please try to make the initial choice carefully. ***You are encouraged to use a research project that you are currently conducting or plan to conduct in the future.***

Throughout the semester, you will go through many steps in the research process, such as devising a set of predictions, operationalizing and defending your constructs, proposing a set of studies, writing an IRB protocol, workshopping your studies with faculty and peers, running one of your studies, and writing a final paper.

I hope to be able to give you each a **budget of up to $100** to actually collect data on at least one experiment in your project. You will design the experiment, collect data, analyze the data, and write and present the results.

Research Project Assignment 1: Research Question (due week 2)

**Determine your research question**. What is/are your research question(s)? Your question needs to be broad enough to be psychologically interesting and rich, but narrow and specific enough to be able to form a set of testable hypotheses that could fit into a single paper. For example, asking, "How do people make judgments about other people?" or "How do relationships form?" would be overly broad (as much of social psychology incorporates some aspect of these questions) but asking, "Do people infer that averting one's eye gaze signals lying?" might be overly narrow. Your research question should allow you to focus on a particular set of prior research literature to test a series of predictions.

For full credit, submit a Word document with your research question and any relevant information about why you selected that question and feedback you would like about it.

Research Project Assignment 2: Hypotheses and Literature Review (due week 3)

**Formalize your predictions**. What are your predictions related to your research question(s)? Please formalize your predictions (H1, H2, etc.). In order to do this, you must operationalize and define your constructs of interest (i.e., at a minimum, your independent and dependent variables). You may choose, for instance, to design and validate a scale that can capture your construct of interest. Or you may rely on previously validated scales. Regardless, you must determine a way to reliably and validly measure your constructs. You must be able to know what set of phenomena would fit in the definition of your construct, and what set of phenomena would not fit in your definition.

**Write a short literature review.** As part of determining your predictions, you will need to do a cursory literature review. Please identify and carefully read at least 5-10 papers that are relevant to your hypotheses, ideally in top journals. Then, write a short summary of their findings, explaining how your hypotheses fit in the pre-existing literature and why you think that your hypotheses are novel and theoretically valuable in light of the literature.

For full credit, submit a Word document with your hypotheses and literature review.

Research Project Assignment 3: Title and Anticipated Significance Statement (due week 4)

*Note: These tasks are adapted from Greenwald's 1994 Psychology 508 course syllabus:*

**Create a title for your paper.** Consider these suggestions in composing your title: Try to make it: a) short (preferably no more than 10 words), b) understandable *without* the reader having to read anything else (such as an accompanying abstract), c) communicate or suggest either a major likely conclusion of the research or a question that will be answered by the research, and d) capture what is important about the research. Consider also that the title is necessarily the first (and perhaps the only) part of a report that will be noticed and read. Its function therefore resembles that of a newspaper article. Like a headline, it should capture attention, draw interest, and communicate a major point.

**Create an anticipated statement of significance, assuming that you get exactly your hypothesized set of results.** (Length limit: 300 words). As you will be able to see by examining journal articles, researchers often assume (rather than explain) the importance of their research problem. At the same time, a major reason for editorial rejections of manuscripts submitted to journals is that they do not seem important enough to warrant the journal space they would require.

Several journals now require Significance Statements or Statements of Relevance, such as *PNAS* and *Psychological Science*. For example, the Statement of Relevance at Psychological Science states: "The aim of the Statement of Relevance is to broaden the impact of the science reported in the journal and make it easier for interested readers to appreciate and understand our efforts. It should make clear why the questions that motivated the study and the findings that bear on them matter beyond psychology laboratories and college and university campuses. What is requested is a description of the sort that might open a conversation with a journalist, explain the work to a friend or family member, or introduce a student to the field of inquiry. In other words, a

Statement of Relevance is not a technical abstract but instead, a description that makes the work accessible beyond the professional academe."

For full credit, submit a Word document with your title and significance statement.

<u>Research Project Assignment 4: Study Design (due week 6)</u>

**Design your studies, with the intention to test at least one experiment**.

I hope to be able to provide you with a budget of up to $100 to test a research question of your choosing. Please design at least one experiment that you believe could plausibly test your key predictions using this budget. You may want to use an online sample or RPP pool to keep your budget manageable. Your goal is to make the experiment as methodologically rigorous as you possibly can, given your (significant) time and budget constraints.

Your experiment should seek to identify the relationship that you are predicting. It will likely include just a single manipulated factor, with two+ conditions using a within-subjects or between-subjects design. If possible, it should examine consequences of the predicted effect and/or the mechanism of the effect via moderation and/or mediation. Ideally your experiment will have a behavioral outcome (i.e., where you would plan to collect behavioral data or at least behavioral intentions).

You should also consider how many participants you plan to collect for the experiment. You should defend your sample size decision, for example by conducting a statistical power analysis or in some other way (e.g., "using standard norms in the field").

In addition to your primary experiment that you plan to run, please propose a complementary set of follow-up studies that you would like to run. You are encouraged whenever possible to draw from real research projects that you're currently working on. For your follow-up studies, you may want to consider drawing from different methods that you've learned about in class including archival data, correlational studies, field studies, and so on.

When designing your experiment (and follow-up studies), please explicitly consider the following:
A.  How will you minimize potential confounds?
B.  How will you ensure your manipulation is effective?
C.  How will you minimize experimenter demand effects?
D.  How will you address alternative explanations for your effects?
E.  How will you handle selection bias?
F.  How will you try to maximize both internal and external validity?
G.  How will you achieve appropriate statistical power?
H.  How will you know if your constructs/effects are reliable and consistent?

For full credit, submit a Word document with all of the design details for your primary experiment and planned follow-up studies. If possible when relevant, please also address the list in points A through H above.

Research Project Assignment 5: IRB (due week 7)

**Write an IRB Protocol**. Please write and ideally also submit a CPHS IRB protocol based on the study you designed in Week 6. You should draw upon what you learned in Week 2 to write an effective IRB protocol.

For full credit, print the IRB protocol in a PDF and submit it.

Research Project Assignment 6: Workshopping (due week 8)

**Workshop your studies to improve them**. By Week 8, please make sure to **receive feedback** by "workshopping" your proposed studies with at least one other student in the class. You will want to schedule at least a 30-minute meeting to discuss your studies and get feedback on each of them. You will learn how to incorporate feedback into your research. You are not required to implement everyone's suggestions; just those that you think really improve your research. You must provide evidence that you workshopped your studies, by making a list of the changes you implemented and why. In addition, please make sure to **provide feedback** to at least one other student in class.  Please also submit the feedback you provided to your classmate(s).

For full credit, submit a summary of the feedback you received and gave, as well as how you incorporated it.

Research Project Assignment 7: Preregistration (due week 9)

**Write a preregistration**. Complete and ideally submit a preregistration (on AsPredicted, OSF, or another platform) for the study that you plan to run.

For full credit, submit a PDF of your preregistration. You can also make the link publicly available (but please keep it anonymous for peer review) and just submit the link.

Research Project Assignment 8: Online Survey (due week 10)

**Build your survey in Qualtrics.** Use the prior work you did on your experiment design (from Week 6), any feedback from IRB (from Week 7), and any feedback from your peers (Week 8) to bring your study to "life" by creating it in Qualtrics.

For full credit, submit a cleaned (i.e., readable) Word document of your survey and the live survey link.

Research Project Assignment 9: Peer Feedback On Your Survey (due week 11)

**Take a peer's survey and have a peer take your survey.** Exchange surveys with another student in the class using the Qualtrics links generated in Week 10. Then please provide detailed feedback on your peer's survey and incorporate your peer's feedback on your survey.

For full credit, submit a summary of the feedback you received and gave, as well as how you incorporated it.

Research Project Assignment 10: Run Your Online Survey, Initial Data Analysis (due week 12)

**Post your survey to a participant pool.** You can choose to use any participant pool within your budget (e.g., RPP, Prolific, Mturk, etc). Once you have collected data, download them from Qualtrics and start analyzing them. Write a data variable key (see example from Professor) so others will be able to easily understand your data.

Write a one-paragraph summary of the data results. Although not required, you may want to try writing a short (150-word) abstract for your paper.

For full credit, submit your cleaned data and data key along with a short summary of initial data results and/or your paper abstract.

Research Project Assignment 11: Methods and Results (due week 13)

**Write a Methods and Results section for your final paper.** Now that you have completed your study, you can write your methods and results sections in your paper. Try to model your Methods and Results from one of the papers that you read during class.

At a minimum, your Methods section should have the following subsections:
- Participants: describe your sample size and sample size determination, participant demographics (age, gender, race, other relevant characteristics), and any attrition or data exclusions if relevant
- Open Science: describe how you utilized open science principles including data transparency (open data, code, methods), preregistration, etc. For example, see the required disclosures for Open Science Badges: https://osf.io/tvyxz/wiki/2.%20Awarding%20Badges/
- Design: describe your experimental design
- Procedure: describe the exact procedure that participants followed
- Materials: describe your survey materials

At a minimum, your Results section should have the following information:
- General description of data including any reasons for not including everyone in analyses
- Key hypothesis tests
- Robustness analyses if relevant

You may want to consider the following resources as you write:
- https://pubmed.ncbi.nlm.nih.gov/15447808/#
- https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writing-a-journal-manuscript/introduction-methods-and-results/10285524
- https://amj.amegroups.com/article/view/5131/html

For full credit, submit a Word document containing your Methods and Results sections.

Research Project Assignment 12: General Discussion (due week 14)

**Write a General Discussion section for your final paper.** Your discussion should include the following:
- Summary of your study and what you learned (and/or didn't learn) from it
- The key theoretical contributions (ideally list at least three)
- Limitations of the study (and potentially the broader idea)
- Future directions, including at least three specific ideas for future research
- A short conclusion paragraph with the key takeaways

For another resource, see: https://www.apa.org/gradpsych/2006/01/findings

For full credit, submit a Word document containing your General Discussion.

Research Project Assignment 13: Analyze Another Student's Data (due week 15)

Exchange your current paper along with all of your materials and data with another student in class. Take some time to review their materials and write notes. Then, try to analyze their data yourself to see if you get the same results that they got. Do you see anything that they missed?

In class on Week 15, you will meet with the other student to take turns sharing insights and going through the materials and data together. If there is time, we will also have short "data blitzes" in which everyone shares their findings with the entire class.

For full credit, submit a summary of the feedback you gave and received. (Unlike the other assignments, this assignment is due the day *after* class so you have time to write about the feedback you received.)

Research Project Assignment 14: Final Paper (due week 16)

**Final paper**. Your final paper will be the combination of all of the sections you've been working on throughout the semester: title, abstract, significance statement, literature review, methods, results, general discussion, and references. Put everything together into a cohesive final paper. You are welcome to also include Supplemental Materials and proposed future studies.

For full credit, submit your full paper.

Grading for each of the research project assignments

Just like the weekly assignments, each of the research project assignments will be worth 2 points. 2 points = full credit, good quality submission. 1 point = inadequate or poor quality submission. 0 points = no submission or such poor quality that it was not deemed worth a point. For every 24 hours that an assignment is late, you will lose 1 point from the assignment (out of the 2 possible points).

Research project assignments are always due on **Thursday at noon prior to class**.

Grades for each research project assignment will be posted within 2 weeks on bCourses. If you would like extra feedback about your analysis or grade, please reach out to Professor Schroeder directly.

Your final paper will be worth 10 points and due on May 4th (exam week).

## IV.  Other Class Considerations

**Honor Code:** Consistent with UC Berkeley's honor code, cheating in any form will be met with the fullest sanctions permitted by the University.

**Grade Appeals:** To appeal a grade, submit a written request via email to me explaining your position (along with the original assignment) within 7 days of receiving your grade. Document your points with the appropriate course material. After reviewing your explanation, I may schedule a meeting with you to discuss the disputed issue(s). I reserve the right to re-grade the entire assignment when an appeal is submitted. This can result in a lower grade.

**Code of Conduct for Class:**

1. Be present and punctual. It enhances the value of the class not only for you but for everyone when you are present and attentive.
    a. We start class on Berkeley time.
    b. Please keep your camera on and your face fully visible, insofar as you are able.
    c. Feel free to use a virtual background, but avoid one that could be distracting.

2. Step up/step back to be inclusive. If you are usually quiet in class, raise your hand and share your wisdom. If you tend to raise your hand a lot, try to do so a little less to open the opportunity for others to contribute.
    a. You can choose to leave yourself unmuted if you'd like.
    b. Use the "hand-raise" function when you'd like to speak, or raise a physical hand.
    c. Listen to one another and build on others' contributions.
    d. Strive to create a safe and welcoming learning community.

3. Be low-tech to help your focus. Try to avoid electronic distractions.
    a. Keep the class window active in your browser.
    b. Use only programs related to class.
    c. Refrain from sending messages unrelated to class.
    d. Put your phone away.
    e. Stay focused on class work.

4. Be present and professional during class.
    a. Arrive punctually and stay to the end.
    b. Limit distracting behavior and food consumption.
    c. Treat the virtual classroom as a professional space.

5. Use the chat as a tool to enrich class content.

a. Be respectful and inclusive of one another both verbally and in chat.
b. Be aware of strong language, all caps, and exclamation points.
c. Remember sarcasm doesn't translate well via chat.
d. Know that the host can read a transcript of the chat, both private and public, after class.