PS 200E: Experimental Design for Social Science

Graeme Blair

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Contact information

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Schedule

• Class sessions: Tues. and Thurs. 12:15-1:55 p.m. (Bunche 4357)

Course description

This course covers the design, implementation, and analysis of experiments in the social sciences. In class, there will be a lecture component and a practicum in which you will work in small groups to analyze experiments or explore their properties through simulation. The aim is to explore each topic conceptually (verbally and graphically), analytically (in mathematical proofs), through simulation, and through data analysis of a real experiment. You will get three bites at each topic: in lecture, group-work during class, and problem sets.

Course objectives

• Learn about important design concerns for experiments, and how to address them by design
• Learn how to implement key components of experimental designs in code
• Learn how to assess design choices in your own experiments through simulation
• Gain experience replicating the design and analysis of prominent experiments

Prerequisites

This course assumes familiarity with the statistics at the level of Political Science 200B (Regression for Social Science), which may be met through courses in some other disciplines. Students who did not take the methods sequence in political science can contact me before enrolling in the course to discuss their preparation.
Computation

The course assumes intermediate familiarity with the 
R statistical environment. The problem sets must be completed using R and RMarkdown. If you have not used R in a course before, please contact me before enrolling in the course. There will be an R review session in the first course meeting (it will not be a sufficient introduction if you have not used R in a course before).

Each session of the course will include a practical session in small groups. Bring your laptop with RStudio and the tidyverse family of packages installed and be ready to code.

Course requirements

1. **Problem sets.** 40% of grade. There will be a short problem set most weeks, largely drawing on problems from the Gerber and Green textbook (note this should be a good encouragement to read the text each week!).
   - Work in groups is permitted, but you must note the name of each person you collaborated with for each question. Failure to do so will be treated as a violation of the plagiarism policy. You may not collaborate with students not enrolled in the course.
   - You can (and should!) Google, read Stack Overflow, and seek out online resources for help. You can copy-paste code from these resources, just remember to comment your code with the URL where you got it from (this is good practice too, in order to remember where you got it!). Grabbing code from these resources is a key part of how social scientists do data analysis.
   - Problem sets should be submitted to the Moodle before the beginning of the Thursday class of the due date. A printout of the PDF created by RMarkdown should be submitted in person in class.
   - Problem sets submitted after the deadline will not be accepted. However, during the busy quarter, something always comes up for each of us. You can select one freebie problem set and have its grade dropped.

2. **Attendance and participation in groupwork.** 10% of grade (based on completion of groupwork). Students are expected to attend each class session and participate in group work during the class. The group will upload their completed RMarkdown document at the end of class (it will not be graded besides noting it was completed).

3. **Mini-experiment.** 10% of grade. You will design, conduct, and analyze a small experiment that does not use human subjects in the middle of the course. Further details will be provided in Week 1.

4. **Takehome midterm exam.** 20% of grade. Covers all material up to this point. Due October 31 before class (12:15pm). No problem set will be due that week.

5. **Final exam.** 20% of grade. Covers all material in the course. Due the last day of finals week, Friday Dec. 13, at 12 p.m.

**Auditing:** in my experience, auditing a class like this without completing the assignments will not be productive for you, so auditors will not be permitted. I encourage you to take the course for credit!
Getting help

This course is a lot of work! The group-work and problem sets are motivated by the idea that the most effective way to learn this material is to do it yourselves. This means if you get behind, it will be hard to catch up. We encourage you to take advantage early and often three resources: Graeme’s office hours, Caleb’s office hours, and the Moodle discussion board. We are here to help, and want everyone to succeed in the course.

The Moodle allows all students to benefit from the discussion and to help each other understand the materials. Both students and instructors are encouraged to participate in discussions and answer any questions that are posted. You should operate on the principle “if I have a question, everyone else is unsure too.”

Books

Primary texts for the course:


Additional references available for free online:

- R 4 Data Science book
- Evidence in Governance and Politics methods guides
- DeclareDesign software primer

Tentative lecture topics and readings schedule

I will assume you have read all of the assigned readings before class each week. You will find the group work difficult or impossible if you have not first read the experiment paper assigned (one is assigned most weeks). I encourage you to read it more than once before you come to class.

Papers without links below will be posted on Moodle.

0. Data analysis in R review session
   - Review R 4 Data Science book https://r4ds.had.co.nz

1. Why experiment?
   - RRE ch. 2; FEDAI chs. 1-2

2. Random assignment procedures
   - RRE ch. 4; FEDAI ch. 3
3. Ethics in experimentation

- Draft American Political Science Ethics Guidelines. Also read a short background.
- McClendon, Gwyneth. 2012. “Ethics of using public officials as field experiment subjects.” *Newsletter of the APSA Experimental Section*.
- Kramer, Adam, David Guillory, and Jeffrey Hancock. “Experimental evidence of massive-scale emotional contagion through social networks.” *Proceedings of the National Academy of Sciences*.

4. Analyzing experimental data

- FEDAI ch. 4
- Lauren Young. “The psychology of state repression: Fear and dissent decisions in Zimbabwe.” *American Political Science Review*.
- Coppock, Alexander. “Visualize as You Randomize: Design-Based Statistical Graphs for Randomized Experiments.” In *Cambridge Handbook of Experimental Political Science* (Druckman and Green, eds.). Available on Moodle

5. Diagnosing research designs

- DeclareDesign software primer

6. Outcome measurement

- RRE ch. 5
- Experiments for studying sensitive questions:
- Audit experiments:
  - Marianne Bertrand and Sendhil Mullainathan. “Are Emily and Greg More Em-


- Conjoint experiments:
  - Kirk Bansak, Jens Hainmueller, Daniel J. Hopkins, and Teppei Yamamoto. “Conjoint Survey Experiments.” In *Cambridge Handbook of Advances in Experimental Political Science* (Druckman and Green, eds.).

- Behavioral measures:

7. Heterogeneous effects

- FEDAI ch. 9
- Experiment reading TBD

8. Sampling units and generalizability

- Thompson ch. 2, 6, and 11-13.
- Experiment reading TBD

9. Noncompliance

- FEDAI chs. 5-6
- Experiment reading TBD

10. Attrition

- FEDAI ch. 7
- Experiment reading TBD
- Coppock, Alexander, Alan Gerber, Donald Green, and Holger Kern. “Combining Double Sampling and Bounds to Address Non-Ignorable Missing Outcomes in Randomized Experiments.” *Political Analysis*.

11. Interference

- FEDAI ch. 8