Experimental Methods

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Class Time: Monday, 9:10-12PM
Class Location: Stubbs 210
Office Hours: Tuesday 9AM-12PM (and by appointment)

Objective

Experimental methods have grown increasingly common in political science. This course is intended to provide students with an introduction to the theories and methods involved in experimentally based research. There are three objectives of this course: (1) To develop the skills to conduct your own experiment. (2) To develop the skills to analyze experimental data. And, (3) to be able to critically evaluate research that relies on experimental data. The class provides an overview of the theoretical advancements in research that can be attributed to experiments. The class also provides the steps in conducting and analyzing experiments. As one of the oldest methods of research, obtaining a thorough understanding of experimental methods requires extensive reading and a grasp of statistical methods. My primary intention is to help you produce a high-quality research report by the end of the semester, which can be presented at a conference and/or submitted for publication.

In particular, the course will focus on the development of the following skills:

1. Being able to evaluate research that relies on experimental data.
2. An understanding of the theoretical bases of experimentation. This includes a thorough understanding of developing experiments, staging and experiment, and understanding the costs and benefits associated with particular experimental designs. This also includes understanding the strengths and weaknesses of experimental methods relative to non-experimental research designs.
3. Develop an understanding of how experimentation advances knowledge pertaining to political science research.
4. Develop the ability to critically evaluate experimental design by understanding constructs important in social scientific research, such as internal, external, construct, convergent, divergent, and face-validity. Discerning an independent variable from a dependent variable, and determine whether appropriate statistical
models are used in extant research. Also, understand the importance of reliability, and how reliable scales influence conclusions drawn in experiments.

5. Competence in analyzing data from a variety of experimental designs.

6. Develop an understanding of natural experiments.

Required Readings:


There will also be a small number of additional readings. Many of the course readings may be located through PsychArticles and/or JSTOR. Several readings will be posted on Moodle.

Statistical Software
There are a number of statistical packages available. We will be using Stata. Stata (version 9, 10, 11, or 12 is fine). Stata may be purchased at a significantly discounted student rate on Tigerware. Students may purchase a one year license, Stata Intercooled, or the more expensive Stata Special Edition. Please avoid the Stata Student Edition. There are far too many restrictions and you will not be able to work through all the required assignments. While initially expensive, Stata is perhaps the most widely used and flexible statistical package in the social and basic sciences. Also, subsequent statistics classes in this department will require or encourage you to purchase Stata. We will periodically hold Stata workshops throughout the semester, and you should feel free to bring your laptops to class if you would like to work through examples.

There are other statistical programs that work well with experimental data (e.g., R, SPSS); however, I will not be providing syntax/support for these programs in this class.

Class Notes
I have class notes prepared for every week of this course. Please go on Moodle the day before class, download, and print the notes.

Methods of Evaluation
Grades will be determined by the following five factors:

Homework (4 pts/each): 20%
Midterm Project: 20%
Article Presentation: 10%
Final Project: 30%
Poster Presentation: 20%

Homework
To develop data analysis skills, there will be five homework assignments involving analysis and/or an assessment of experimentally based media research. If you receive a poor grade on these assignments, you will have one week to redo the assignment and hand it in for full credit.

Proposal to Conduct an Experiment (Midterm Project)
The midterm project involves writing a detailed proposal. The proposal should include a thorough literature review, hypotheses, research design, and brief explanation of how you would analyze the data, if they were available. Proposals should include the experimental protocol (i.e., how would the experiment be conducted) and all stimulus materials (i.e., survey questions and treatment stimuli). The proposal is due on Monday, March 19.

Class Presentation of Articles
Beyond learning about the mechanics of ANOVA designs, it is useful to see how researchers use the experimental method in their own work. During the course, we will read and discuss a number of substantive articles that employ experimental designs. Each student will be responsible for leading a discussion (approximately 15 minutes) on one article. Everyone should read all the articles and be prepared for discussion. The following questions should be considered: (1) What is the substantive question or set of questions? (2) What experimental design is used? (3) What are the findings? (4) Does the experiment possess adequate validity (internal, external, construct)? (5) Are there better, more viable ways to test the hypothesis or hypotheses being considered?

Final Project
The final project involves writing a research report, which will involve analyzing actual experimentally-based dataset. If you do not have the time and resources to collect your own data, there are many publicly available experimental datasets. The Time Sharing Experiments for the Social Sciences (TESS), is a federally funded organization that funds and archives experimental data [http://www.tessexperiments.org/]. The American National Election Studies (ANES) also relies on experimental methods, and provides data from nationally representative experiments [http://www.electionstudies.org/]. UC-Berkeley's Race and Politics survey also includes many experimentally manipulated variables [http://sda.berkeley.edu/cgi-bin/hsda?haresda+natrace]. Data may also be found through the ICPSR [http://www.icpsr.umich.edu/].
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ICPSR and the ICPSR Web site (http://icpsr.umich.edu). Many authors also archive their data for replication purposes through Dataverse (http://thedataverse.org). Finally, authors are often quite open when it comes to sharing their data for replication purposes. If there is a finding you would like to replicate and possibly extend, you should also consider getting in touch with an author directly for data.

If you have a dataset, or are in the process of collecting data, you are welcome to use this dataset for the project, with one important caveat: you must be able to provide me with the data you use in this report. Thus, if you or your advisor has proprietary data which I cannot access, you should not use this dataset. I must be able to verify that you did all the necessary calculations honestly and accurately, which requires me being able to access any data you use.

Your final report should be roughly 20 pages in length and include all the required sections of an American Psychological Association (APA) style or American Journal of Political Science (AJPS) style report: Title page, abstract, introduction, methods, results, discussion/conclusion, references, tables, figures, and appendix. Please follow APA or AJPS style for this report. The final paper is due no later than Monday, May 7.

**Poster Presentation**

The final class will be a “poster session.” You should create conference style posters explaining the data and analysis for the final project. I will invite faculty and students from the political science and mass communication departments to attend. They will have the opportunity to vote on the “best project.” Every poster will be graded.

**Grades**

Grades will be determined based on the following distribution:

- 90%-100% A
- 80%-89% B
- 70%-79% C
- 60%-69% D
- 50% and below F
Daily Schedule

Please read all assigned readings prior to the listed meeting times. Please note that the course schedule is subject to change at my discretion. You are responsible for making corrections to the syllabus in accordance with announced changes.

I. EXPERIMENTAL POLITICAL SCIENCE

JANUARY 23: WELCOME

Why are experimental methods important? What do you expect to get out of this class? What types of experiments are you interested in conducting?

JANUARY 30: EXPERIMENTS IN POLITICAL SCIENCE

This week we will explore the underlying logic of experiments in the social and basic sciences.

❖ Keppel and Wickens, Chapter 1
❖ Morton and Williams, Chapters 1 and 2.

FEBRUARY 6: BETWEEN-SUBJECT EXPERIMENTS EXPERIMENTS

This week we will establish the foundations of analysis of variance (ANOVA). Specifically, we will define the “between subjects” ANOVA.

❖ Keppel and Wickens, Chapters 2-3
❖ Morton and Williams, Chapter 3.

Presenter:

❖ ASSIGNMENT #1: COMPLETE THE BETWEEN SUBJECTS ANOVA ASSIGNMENT ON MOODLE. THE ASSIGNMENT IS DUE NEXT WEEK, FEBRUARY 13.

FEBRUARY 13: CONTRASTS AND PLANNED COMPARISONS

This week we explore post-hoc contrasts, t-tests, and the ANOVA relative to the general linear model.

❖ Keppel and Wickens, Chapters 4 and 6; Optional: Chapter 5 (Analysis of Trends)
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Morton and Williams, Chapter 3.


Presenter:

FEBRUARY 20: NO CLASSES. MARDI GRAS HOLIDAY

FEBRUARY 27: ANALYSIS OF COVARIANCE AND THE GENERAL LINEAR MODEL

Researchers often include “control variables” in their statistical models. Theoretically, controls are unnecessary when analyzing experimental data – due to random assignments – so, this week we will examine the conditions under which non-manipulated covariates should be included/excluded. We will specifically establish the “analysis of covariance,” or ANCOVA.

Keppel and Wickens, Chapters 7

Morton and Williams, Chapter 4


Presenter:

ASSIGNMENT #2: COMPLETE THE CONTRAST/ANCOVA ASSIGNMENT ON MOODLE. THE ASSIGNMENT IS DUE NEXT WEEK, MARCH 5.

MARCH 5: MEDIATION, CONTROL, AND TREATMENT EFFECTS

Often, we are interested in “processes,” where A predicts B because of some intervening variable, C. This is called “mediation,” which isn’t to be confused with “moderation.” Several methods and issues may arise in mediation analysis, which are explored this week.

Keppel and Wickens, Chapter 15


Bullock, John, Donald Green, and Shang E. Ha. 2010. “Yes, But What’s the Mechanism?


Presenter:

ASSIGNMENT #3: COMPLETE THE MEDIATION ASSIGNMENT ON MOODLE. THE ASSIGNMENT IS DUE IN TWO WEEKS, MARCH 19.

II. DESIGN CONSIDERATIONS

MARCH 12: ERROR AND VALIDITY

Most methods courses spend time explaining Type I error, or alpha. Reducing Type I error has the consequence of increasing Type II error, beta. The “power” of a treatment effect is 1-beta. This week we will establish and review the two major sources of error and how experiments can be conducted to effectively balance Type I and Type II error rates. We also discuss validity in experimental research.

Keppel & Wickens, Chapter 8

Morton and Williams, Chapters 7 and 8


Presenter:

MARCH 19: EXTERNAL VALIDITY

Experiments are often challenged on external validity grounds. After all, many researchers rely on student samples and artificial lab environments to understand human behavior. This week we explore this old debate and we will discuss the trade-offs between external and internal validity.

Morton and Williams, Chapter 9


Presenter: __________________________

MIDTERM PAPER IS DUE

MARCH 26: ETHICS AND TWO-WAY DESIGNS

Ethical issues, including deception, informed consent, and “minimal risks” are explored, along with an introduction to more complex factorial designs.

Keppel & Wickens, Chapter 10

Morton and Williams, Chapter 11


Presenter: __________________________


III. INCREASING COMPLEXITY

APRIL 2: TWO AND THREE WAY FACTORIAL DESIGNS
Many experiments manipulate more than one variable, and these variables often interact. This week, we further explore the two-way analysis of variance, with close attention paid to interpreting interactive effects. In other words, we explore “moderation,” which should not be confused with “mediation.”

- Keppel & Wickens, Chapters 11-12


Presenter:

APRIL 9: NO CLASS. SPRING BREAK

APRIL 16: MODERATED EXPERIMENTS: INTERACTIONS BETWEEN MANIPULATED AND NON-MANIPULATED VARIABLES

This week we will extend the models established on April 2 to circumstances where observed covariates interact with treatment variables. This is an extension of the ANCOVA, but to circumstances where the observed covariate interacts with a manipulated variable or set of variables.

- Keppel & Wickens, Review Chapters 15 and 16.


Assigner: ________________________________

ASSIGNMENT #5: COMPLETE THE MODERATED EFFECTS ASSIGNMENT ON MOODLE. THE ASSIGNMENT IS DUE IN TWO WEEKS, APRIL 30.

APRIL 23: LONGITUDINAL AND PANEL BASED EXPERIMENTS

In this final lecture week, we explore the often encountered empirical situation where respondent attitudes/behaviors are observed on more than one occasion. Up to this point, we have assumed “between subjects” manipulations; in many circumstances, researchers encounter “within subjects” manipulations, where a participant is exposed to all levels of a stimulus. The “within subjects” ANOVA is explored, as well as “mixed effects” ANOVA, where between and within subjects manipulations interact. As we will see, the “mixed effects” ANOVA is simply a variant of the general linear model where observations are nested within subjects.

Keppel & Wickens, Chapters 17 and 19


Assigner: ________________________________

APRIL 30: CLASS POSTER PRESENTATIONS

MAY 7: FINAL PAPERS DUE.

Please upload your final paper to the Moodle dropbox no later than 5PM on Monday, May 7.