

## **Experimental Research: Design, Analysis, and Interpretation**

W4368

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Course overview: In this course, we will discuss the logic of experimentation, its strengths and weaknesses compared to other methodologies, and the ways in which experimentation has been -- and could be -- used to investigate social phenomena. Students will learn how to interpret, design, and execute experiments. Special attention will be devoted to field experiments, or randomized trials conducted in real-world settings.

Prerequisites: Students should have taken at least one or two semesters of statistics. Some understanding of probability, hypothesis testing, and regression are assumed. Familiarity with statistical software (Stata and R) is helpful but not required. We will be working with data in class throughout the term.

Readings: Students are expected to keep up with each week's reading. The primary text for the course, available at the nearby bookstore Book Culture, is

Gerber, Alan S., and Donald P. Green. 2012. *Field Experiments: Design, Analysis, and Interpretation*. New York: W.W. Norton.

The abbreviation for the book is FEDAI.

Supplementary articles and unpublished papers are available on-line on the Courseworks site. These works are designed to illustrate the design and implementation of field, lab, and survey experiments.

Assignments: Students are expected to complete weekly problem sets based on exercises from the FEDAI textbook. In addition, students are required to complete the following projects. Early in the term, students will be asked to design and conduct a small experiment *not* involving human subjects and to describe the design and results in a 750 word essay. Toward the end of the term, students will be asked to compose a 1,500 word essay describing an attempt to reproduce and extend the analysis of an existing field experiment. (Each student will sign up to analyze a different study.) We will have a take-home midterm after Chapter 6 and an in-class final exam during exam period. The final grade is based on the problem sets (30%), practicum experiment (10%), midterm (20%), replication project (20%), and final exam (20%).

The planned schedule of the course is as follows. Adjustments may be made based on

student interest and discussion.

Week 1. What are experiments? Why conduct experimental research?

FEDAI: Chapter 1.

My prejudices are stated more explicitly here:

Gerber, Alan S., Donald P. Green, and Edward H. Kaplan. 2004. The Illusion of Learning from Observational Research. In Ian Shapiro, Rogers Smith, and Tarek Massoud, eds., *Problems and Methods in the Study of Politics*. New York: Cambridge University Press, pp. 251-73.

Week 2. Experiments and Models of Potential Outcomes

FEDAI: Chapter 2. In addition, read these brief research articles that highlight the three core assumptions that underlie experiment-based inference.

Page, Stewart. 1998. Accepting the Gay Person: Rental Accommodation in the Community, *Journal of Homosexuality*, 36 (2): 31-39

Sherman, Lawrence W., and Dennis P. Rogan. 1995. Deterrent Effects of Police Raids on Crack Houses: A Randomized, Controlled Experiment. *Justice Quarterly* 12(4): 755-781.

Week 3. Sampling distributions and Randomization Inference

FEDAI: Chapter 3. In addition, read the following article, which we will use in class to illustrate sampling distributions, as it comprises 10,000 small-scale experiments:

Gerber, Alan S., Green, Donald P. and Chris W. Larimer. 2008. Social Pressure and Voter Turnout: Evidence From a Large Scale Field Experiment. *American Political Science Review* 102(1): 33-48.

Week 4. Blocking and Covariate Adjustment

FEDAI: Chapter 4. In addition, read the following article, which we will use in class to illustrate the analysis of blocked experiments.

Bertrand, Marianne and Sendhil Mullanathan. 2004. Are Emily and Greg More Employable than Lakisha and Jamil? A Field Experiment on Labor Market Discrimination. *American Economic Review* 94(4): 991-1013.

#### Week 5. Field Experiments with One-sided Noncompliance (Failure-to-Treat)

FEDAI: Chapter 5. In addition, read the following article, which we will use in class to illustrate the analysis of experiments with one-sided noncompliance.

Gerber, Alan S., and Donald P. Green. 2000. The Effects of Canvassing, Direct Mail, and Telephone Contact on Voter Turnout: A Field Experiment. *American Political Science Review* 94:653-63.

#### Week 6. Field Experiments with Two-sided Noncompliance (Encouragement Designs)

FEDAI: Chapter 6. In addition, read the following article, which we will use in class to illustrate the analysis of experiments with two-sided noncompliance.

Clingingsmith, David, Asim Ijaz Khwaja, and Michael Kremer. 2009. “Estimating the Impact of the Hajj: Religion and Tolerance in Islam’s Global Gathering.” *Quarterly Journal of Economics* 124: 1133-70.

#### Week 7. Sample Attrition

FEDAI: Chapter 7. In addition, read the following article, which illustrates the uncertainty that attrition introduces and some potential modeling and bounding approaches.

Angrist, Joshua, Eric Bettinger, and Michael Kremer. 2006. “Long-Term Educational Consequences of Secondary School Vouchers: Evidence from Administrative Records in Colombia.” *American Economic Review* 96:847-862.

#### Week 8. Interference between Experimental Units

FEDAI: Chapter 8. In addition, read the Sinclair et al. article, which illustrates a design and modeling approach to household and neighborhood spillover.

Sinclair, Betsy, Margaret McConnell, and Donald Green. 2012. “Detecting Social Networks: Design and Analysis of Multi-level Experiments.” *American Journal of Political Science* 56: 1055-1069.

#### Week 9. Heterogeneous Treatment Effects

FEDAI: Chapter 9. In addition, read the following article, which discusses how machine learning techniques can be used to automate the search for interactions.

Green, Donald, and Holger Kern. 2012. "Modeling Heterogeneous Treatment Effects in Large-Scale Experiments Using Bayesian Additive Regression Trees." *Public Opinion Quarterly* 76: 491-511.

#### Week 10. Mediation and Causal Mechanisms

FEDAI: Chapter 10. In addition, read the Ludwig et al. article, which suggests ways of assessing causal mechanisms short of full-blown social experiments; for an alternative perspective on mediation, see the Imai et al. article:

Ludwig, Jens, Jeffrey R. Kling, and Sendhil Mullainathan. 2011. Mechanism Experiments and Policy Evaluations. *Journal of Economic Perspectives* 25(3): 17-38.

#### Week 11. Models and Meta-Analysis

FEDAI: Chapter 11. In addition, read the following articles that suggest that caution is warranted when assessing conclusions reported in print.

Hill, Russell A., and Robert A. Barton. 2005. Red Enhances Human Performance in Contests. *Nature* 435 (19 May): 293.

Gerber, Alan S. and Neil Malhotra. 2008. Do Statistical Reporting Standards Affect What is Published? Publication Bias in Two Leading Political Science Journals. *Quarterly Journal of Political Science* (3): 313-326.

#### Week 12. Conducting an Experiment and Reporting the Results

FEDAI: Chapter 12, 13, and Appendix A and B

Weeks 13 and 14. These weeks allow us a bit of cushion in the likely event that we need extra time on topics above.