Social Experiments: Design and Generalization
PPHA 44900
University of Chicago
Winter 2022
Monday Wednesday 9:10-10:30am

Instructor
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[Office Hours: to be arranged]

Course description

Increasingly, policy makers demand some form of evidence to justify the implementation of a new policy or the modification of an existing policy. In many fields (notably medicine, health research, and education) the pressure to provide evidence-based results has increased the importance of the design and analysis of social investigations. We will consider the complementary strengths of experiments, quasi-experiments, and surveys in producing and assessing evidence for generalization in policy areas; randomized clinical trials in medicine, field experiments in economics and psychology, and the use of scientific evidence in policy formulation will be among the examples. The course will comprise three broad streams: the design and analysis of social experiments and quasi-experiments; the design and analysis of sample surveys; and how the interrelationships between the two approaches can strengthen causal claims from social data.

There are two major challenges in providing evidence [generalizing findings] from social research: (i) determining causation and (ii) generalizing results from a sample of observed cases to the rest of the (unobserved) population. Statistics has provided the fundamental approaches to addressing these two challenges: (randomized) field experiments and (random) sample surveys.

The course will tackle the issues of generalization from these two perspectives: (i) the classical statistical design of experiments (developed by statisticians between the 1910s and the 1950s) that can be found in texts by Fisher, Cox, Snedecor and Cochran, and others); this approach relates closely to the design of quasi-experiments and experiments in the social sciences, as described by Campbell and Stanley in the 1950s, and extended by Cook, Shadish, and others; (ii) the design and analysis of sample surveys, originating in the 1890s, in particular multi-stage clustered designs, and experiments embedded in them, as presented by Cochran, Kish, and others.

Course Materials:

The following three books provide background reading:

A S Gerber and D P Green: *Field Experiments: Design, Analysis, and Interpretation*. W W Norton and Co. 2012

W R Shadish, T D Cook, and D T Campbell: *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin Co. 2002
G Kalton: *Introduction to Survey Sampling* (Quantitative Applications in the Social Sciences). A Sage University Paper. 1983

Topic-specific materials will be posted on the Canvas site each week.

Class materials

A draft version of the slides to be presented in class will be posted on Canvas a week in advance of each class.

Each assignment will be posted on Canvas a week ahead of the due date.

Homework Assignments

There will be 7 or 8 homework assignments, mostly short. The assignments will account for 30% of the class grade.

One late assignment will be forgiven without justification; no other exemptions. The homework grade will exclude the two weakest scores (late homework assignments will receive a zero score).

Grading

The grade will be based on three components: class attendance and participation (20%), homework assignments (30%) and a final (50%). Attendance at office hours and written questions will count towards participation.

Syllabus: Modules 1 - 4

MODULE 1: INTRODUCTION [JANUARY 3 AND 5]

1.1 Introduction to generalization: experiments, surveys, and observational studies
1.2 Two early experiments: Fisher (1936); Jellinek (1946)
1.3 History of experimental design

Assignment 1 (due January 9, midnight CST): Inference from an early experiment; Darwin, Galton, and you.

MODULE 2 DESIGN OF EXPERIMENTS [DE] [JANUARY 10 AND 12]

2.1 DE I: Causation; Average treatment effect [ATE]
2.2 DE II: Control through matching and blocking
2.3 DE IIII: Stable Unit Treatment Value Assumption [SUTVA]
2.4 DE IV: Terminology

Discussion of assignment 1

Assignment 2 (due January 16): Evaluate NYT Editorial opinion on COVID clinical trials;

MODULE3: EXAMPLES OF EXPERIMENTS [JANUARY 19 AND 24]

3.1 Example: Current Population Survey redesign [applied test of new processes];
3.2 Example; The Very Study [cross-disciplinary context for results
3.3 DE V: Three basic designs: completely randomized; randomized blocks; hierarchical
3.2 DE VI: Use of covariates in analysis

Discussion of assignment 2

Assignment 3 (due January 23): Generalizing the results of an experiment examining racial bias in medicine

MODULE 4: MORE COMPLEX EXPERIMENTS [JANUARY 26 AND 31]

4.1 Precision in clustered models
4.2 Relationships in hierarchical systems
4.3 IES guidelines for evidence in education studies

Discussion of Assignment 3
Assignment 4 (due February 7):

MODULE 5: QUASI-EXPERIMENTS [FEBRUARY 2 AND 7]

Definitions of evidence: IES guidelines
Quasi-experiments I:
Observational studies
Experiments in surveys

Discussion of Assignment 4
Assignment 5 (due February 14?): Practice exam questions part 1

MODULE 6: QUASI-EXPERIMENTS CONTINUED [FEBRUARY 9 AND 14]

Quasi-experiments II:
More complex designs; threats to generalization
Arguments against experiments

Discussion of Assignment 5
Assignment 6 (due February 21): Practice exam questions part 2

MODULE 7: SURVEY DESIGN 1 [FEBRUARY 16 AND 21]

Design of Surveys I:
Sampling, noncoverage, nonresponse
Design of surveys II:
Design-based inference; random sampling, stratification, clustering
Design effect, effective sample size, precision

Discussion of Assignment 6
Assignment 7 (due February 28): Computation of design effect and effective sample size

MODULE 8: COMBINING SURVEYS AND EXPERIMENTS [FEBRUARY 23 AND 28]

Raudenbush: Evaluating charter schools
Population inference and experiments
Strategic design [O'Muircheartaigh and Hedges, 2014]

Assignment 8 (due March 2) Final practice question

MODULE 9: MARCH 2

Generalization without sampling
Meta-analysis
Review (including discussion of Assignment 8)