Experimental Methods

Michael Gaddis, Ph.D.

Experimental Methods

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Overview

During the past decade, experiments in the social and behavioral sciences have become more popular as the internet has made implementing experiments easier, cheaper, and faster. Although researchers may have a conceptual knowledge of how experiments work, the actual experience of implementing an experiment for the first time is often frustrating and time consuming. Researchers without prior experience often struggle with a number of issues such as navigating IRB, obtaining true random sampling and assignment, understanding blocking, and interpreting different types of treatment effects. The initial learning curve may be steep but the rewards are plentiful as experiments produce highly valued original data, lend themselves to causal analysis in ways that traditional survey data cannot, and become easier to implement as a researcher's experience level increases.

This workshop is a moderately-paced introduction to experimental methods that will leave researchers able to begin designing their own experiments and embarking on data collection. We begin by focusing on the what, when, and why of social sciences experiments with a comprehensive introduction to vocabulary, diagraming, and the theoretical basis of conducting experiments. We then walk through the specific steps required in experimental design from ethical issues to power analysis to the universe of validity concerns. We conclude with two sections on practical design issues of survey and field experiments, drawing on recent published cases and the instructor's own experiences. These sections incorporate hands-on experience using online resources to give students the confidence to begin their own experimental design at the conclusion of this workshop.

Goals

By the end of the workshop, participants should understand the basic terminology of experiments, when experiments can and should be implemented, the causal advantages of experiments, the major ethical issues surrounding experiments, the major aspects of randomization, blocking, matching, and sampling, and the major aspects of different types of validity with experiments. Participants will also gain practical knowledge of MTurk, Qualtrics, and SurveyMonkey for use with survey experiments and a variety of programming scripts and tools for use with field experiments. Overall, participants will gain the knowledge to immediately begin designing valid and robust experiments to address a variety of research questions.

Who Should Attend?

The target audience is researchers at any level who have an interest in conducting their own experiment or simply want to be able to better understand the methodological details of experiments conducted by others. Participants need only to have a basic understand of general research design to take this workshop.

Course Outline

1. Using experiments to establish causation
2. The ethics of experimental design
3. Major issues of design – randomization, blocking, matching, and sampling
4. Major issues of validity – internal, construct, external, and statistical conclusion
5. Statistical power and conducting a power analysis
6. Analyzing your results
7. Turning the theoretical into the practical: Hands-on with survey experiments
8. Turning the theoretical into the practical: Hands-on with field experiments

Texts

Articles to read before attending the workshop:

Besbris, Max, Jacob William Faber, Peter Rich, and Patrick Sharkey. 2015. "Effect of Neighborhood Stigma on Economic Transactions." *Proceedings of the National Academy of Sciences*, 112(16):4994-8.

Campbell, Colin, and S. Michael Gaddis. 2017. "'I Don't Agree with Giving Cash': A Survey Experiment Examining Support for Public Assistance." *Social Science Quarterly*.

Gaddis, S. Michael. 2015. "Discrimination in the Credential Society: An Audit Study of Race and College Selectivity in the Labor Market." *Social Forces*, 93(4):1451-79.

Sampson, Robert J. 2008. "Moving to Inequality: Neighborhood Effects and Experiments Meet Social Structure." *American Journal of Sociology*, 114(1):189-231.

Recommended reading:

Auspurg, Katrin, and Thomas Hinz. 2015. *Factorial Survey Experiments*. SAGE Series: Quantitative Applications in the Social Sciences (little green book).

Gaddis, S. Michael. 2018. *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*. Springer.

Gerber, Alan S., and Donald P. Green. 2012. *Field Experiments: Design, Analysis, and Interpretation*. W. W. Norton.
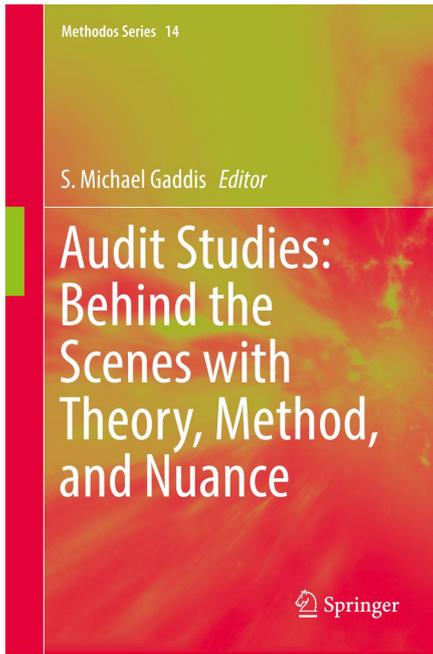
Gonzalez, Richard. 2009. *Data Analysis for Experimental Design*. The Guilford Press.

Shadish, William R., Thomas D. Cook, and Donald T. Campbell. 2002. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin.

<u>Instructor Bio</u>

Dr. S. Michael Gaddis is an Assistant Professor of Sociology at UCLA whose research focuses on racial discrimination, educational inequality, and mental health. He often uses experiments to examine levels of discrimination in employment and housing as well as the conditions under which racial discrimination occurs. He has led the data collection efforts on over a dozen field and survey experiments.

He recently published a book on the experimental method used to investigate discrimination titled *Audit Studies: Behind the Scenes with Theory, Method, and Nuance*. His research has been published in top journals such as the *American Journal of Sociology, Educational Evaluation and Policy Analysis, Social Forces, Social Science & Medicine,* and *Sociological Science* and has been funded by the National Academy of Education, the Robert Wood Johnson Foundation, the Russell Sage Foundation, and the Spencer Foundation. His work has been covered by *The Boston Globe, The Economist, Education Week, Inside Higher Ed, PBS NewsHour,* and *Times Higher Education*.

Methodos Series 14

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S. Michael Gaddis (Ed.)

Audit Studies: Behind the Scenes with Theory, Method, and Nuance

Series: Methodos Series

- Examines methodological problems various social sciences are facing when using audit studies
- Provides an in-depth overview of the theory, history, method, innovations and challenges of audit studies
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This book offers practical instruction on the use of audit studies in the social sciences. It features essays from sociologists, economists, and other experts who have employed this powerful and flexible tool. Readers will learn how to implement an audit study to examine a variety of questions in their own research. The essays first discuss situations where audit studies are the most effective. These tools allow researchers to make strong causal claims and explore questions that are often difficult to answer with observational data. Audit studies also stand as the single best way to conduct research on discrimination. The authors highlight what these studies have uncovered about labor market processes in the past decade. The next section gives some guidance on how to design an audit study. The essays cover the difficult task of getting a study through an institutional review board, the technical setup of matching procedures, and statistical power and analysis techniques. The last part focuses on more advanced aspects. Coverage includes understanding context, what variables may signal, and the use of technology. The book concludes with a discussion of challenges and limitations with an eye towards the future of audit studies. "Field experiments studying and testing for housing and labor market discrimination have, rightly, become the dominant mode of discrimination-related research in economics and sociology. This book brings together a number of interesting and useful perspectives on these field experiments.

Part of **SPRINGER NATURE**

Understanding Design Issues of Survey Experiments

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Purpose and Setup of Survey Experiments

- Experimental manipulation *within* a survey
  - could be any regular means of survey administration
- Usually does not include pretest measurement
  - conduct survey experiments with regularity?
  - create your own MTurk sampling frame with pretests
- Survey experiments can be methodological or substantive tests (or both!)
  - Survey experiment example of both: https://www.surveymonkey.com/r/NC3SM6R

- Methodological survey experiments might work to decrease:
  - item non-response
    - required response
    - instructions
    - page layout
  - measurement error
    - question wording
    - question sequence
    - option availability (e.g. "I don't know," "not applicable," "choose not to respond")
    - question format
    - scales (numbers, labels)

- Outcomes from methodological survey experiments:
  - response rate
    - individual item
    - total completion
  - individual question responses
  - other data quality measures
  - Another example:
    - https://www.surveymonkey.com/r/XBDB66D
    - https://www.surveymonkey.com/r/9TFNBW9

- The basics of substantive survey experiments:
  - can cross (probably) any subfield and questions you can imagine
  - common manipulations: demographic characteristics (race, gender, age, etc.)
  - can be done easily and cheaply with MTurk and SurveyMonkey/Qualtrics
  - can apply to TESS for free nationally representative sample
    - http://www.tessexperiments.org/
  - often use factorial vignette style

Specific Ethical Issues with Survey Experiments

- Fewer issues with IRB for survey than field experiments
- Deception
  - survey: most likely just the nature of the experimental manipulation
- Intrusion and harm
  - survey: likely minimal, maybe some harm depending on what you do and how they respond (debriefing)
- Voluntary participation and informed consent
  - survey: absolutely
- Debriefing subjects
  - survey: maybe
- Anonymity and confidentiality
  - survey: absolutely

The Experimental Unit in Survey Experiments

- Unit of analysis is individual* (survey participant)
- Split-sample (between-subject) design is common
  - probably: random assignment, no prettest, 1 treatment & 1 control group
  - basic analysis: 2 sample (independent) t-test
- Within-subjects is possible
  - particularly with methodological survey experiments
  - e.g. one type of question early, one type of question late, counterbalance order
  - basic analysis: paired t-test
- Factorial vignette may combine designs
  - multiple vignettes, but only one condition for each

Randomization in Survey Experiments

- Randomization likely done electronically/automatically
- Multiple ways to do so with MTurk / SurveyMonkey combination:
  - within question (enable question text A/B test)
  - within page (question randomization – ONLY for methodological experiments)
  - between pages (page randomization + skip logic)
  - between surveys (random URL redirect)
    - http://www.dynamicdrive.com/forums/showthread.php?41004-random-url-redirect
- Note: this does not ensure completely random assignment
  - selection into treatment/control still possible (internal validity threat)

- Blocking and matching
  - can be done if you maintain your own MTurk sampling frame with pretests
  - difficult, time-consuming, more expensive
  - restricting sample size

Sampling in Survey Experiments

- Random sample != MTurk
  - individuals have selected into using MTurk
  - individuals select into taking your survey
- Still, better than undergrads and not as bad as most think
  - can restrict to US only (very valid)
  - similar to US population but more women, younger, more educated, more liberal
  - racially: under-represents blacks and Hispanics, over-represents Asians
  - *Berinsky, Huber, and Lenz, 2012; Buhrmester, Kwang, and Gosling, 2011; Chandler, Mueller, and Paolacci, 2014; Ipeirotis, 2010; Paolacci, Chandler, and Ipeirotis, 2010*
- If you absolutely need a random sample, try TESS, GfK, or others ($$$)
- SurveyMonkey, Qualtrics, GfK can also get you targeted samples ($$$)

- Types of validity
  - internal validity - is the relationship between A and B causal?
  - construct validity - does the construct capture what we assume it does?
  - external validity - do results apply to other units, treatments, outcomes, and contexts?
  - statistical conclusion validity - did we reject/fail to reject null hypothesis appropriately? (no Type I or Type II error)