

# DATASCI 385 - Experimental Methods

Danilo Freire\*

Fall 2025

## 1 Course Description

Experimental methods have become increasingly important in social and life sciences, offering reliable ways to test theories and produce generalisable findings. This course covers the essential principles of experimental design, with emphasis on testing causal relationships. Students will learn about causal inference, experimental design techniques, and methods for addressing common challenges in experimental research, such as non-compliance and participant attrition. The course also explores blocking and covariate adjustment, heterogeneous treatment effects, and proper interpretation of results. Special attention will be given to reproducible research practices and ethical considerations in experimental studies.

This course is designed to be both applied and interactive, featuring lectures and hands-on sessions. Students will learn how to design and implement experiments and critically evaluate existing experimental research in their areas of interest. Moreover, students will have the opportunity to develop their writing and presentation skills by drafting an experimental research project and presenting their findings.

---

\*Visiting Assistant Professor, Department of Quantitative Theory and Methods, Emory University, [danilo.freire@emory.edu](mailto:danilo.freire@emory.edu), <https://danilofreire.github.io>.

## 2 Course Information

We will meet on Mondays and Wednesdays from 5:30pm to 6:45pm in the [Psychology Building 220](#). The course will be a mix of lectures, discussions, and hands-on activities. Therefore, it is important that you read the assigned readings before class. Students are encouraged to participate and are most welcome to express their views openly and freely. I suggest you bring notes to class so we can discuss together the topics you find most interesting.

All information about the course will be available at <http://danilofreire.github.io/datasci385>. The syllabus will be updated periodically according to the progress of the class. Please remember to visit the website regularly.

## 3 Learning Objectives

By the end of this course, students will be able to:

1. Design rigorous experiments with proper randomisation procedures and sample sizing calculations
2. Create pre-analysis plans (PAP) and apply appropriate statistical methods for experimental analysis
3. Produce reproducible reports using [Quarto](#)
4. Evaluate experimental designs, identifying potential limitations
5. Manage unexpected data challenges, such as attrition and non-compliance
6. Understand ethical considerations in experimental design
7. Develop analytical skills through practical problem sets and discussion sessions

## 4 Prerequisites

This course is designed for students who have taken or are currently taking an introductory course in statistics. Some understanding of hypothesis testing, confidence intervals, and regression analysis is beneficial. However, if you have not taken such courses, that is also fine. The course is not maths-heavy, and all concepts will be explained in detail in class. Some familiarity with R or Python is required, as we

will use these tools for data analysis. We can adjust the course accordingly if you need assistance. If you are unsure whether you meet the prerequisites, please contact me to discuss your background.

## 5 Software

We will use R for all data analysis in this course. R is a free and open-source software environment for statistical computing and graphics. You can download R from the [Comprehensive R Archive Network \(CRAN\)](#). You are free to use any text editor to write your R code, but I recommend using [RStudio](#), [VS Code](#), or [Jupyter Notebooks](#) with the R kernel. If you are feeling brave or want to learn some new skills, you can also use [Neovim](#) with the [Nvim-R](#) plugin. That is, if [you can exit the editor](#). :)

We will also use [Quarto](#) to write the reports. Quarto is a new document format that combines the best features of [Markdown](#), [L<sup>A</sup>T<sub>E</sub>X](#), and [R Markdown](#). It is easy to use, very versatile, and allows you to write reports, slides, books, and even websites in a single document. You can install Quarto from the [Quarto website](#). We will have a hands-on session on how to use Quarto in the course, and I have prepared templates for your [pre-analysis plan](#) and [presentation](#). However, you are free to use any other template you prefer or even write your own.

## 6 Office Hours

I am very flexible with office hours, but it is easier to contact me via email. Feel free to send me a message any time at [daniло.freire@emory.edu](mailto:daniло.freire@emory.edu), and I will likely reply within a few hours. My office address is in the [Psychology and Interdisciplinary Sciences Building, 36 Eagle Row, 4th Floor, room 480](#). Please email me a couple of days in advance to ensure that no two students book the same time slot.

## 7 Academic Integrity

Upon every individual who is a part of Emory University falls the responsibility for maintaining in the life of Emory a standard of unimpeachable honour in all academic work. The [Honour Code of Emory College](#) is based on the fundamental assumption that every loyal person of the University not only

will conduct his or her own life according to the dictates of the highest honour, but will also refuse to tolerate in others action that would sully the good name of the institution. Academic misconduct is an offence generally defined as any action or inaction which is offensive to the integrity and honesty of the members of the academic community. The typical sanction for a violation of the Emory Honor Code is an F in the course. Any suspected case of academic misconduct will be referred to the Emory Honour Council.

## **8 Artificial Intelligence**

Students have to submit a series of problem sets and complete two group projects. You are encouraged to use AI to assist with your assignments, as learning to use AI is a valuable and emerging skill. I am available to provide support and assistance with these tools during office hours or by appointment. However, please note that any errors or omissions resulting from the use of AI tools are your responsibility. Do not rely solely on AI to complete your assignments; you must always double-check your work. Remember to cite all sources used in your problem sets and projects, including AI tools. Please include a note at the end of any document indicating that AI was used in its development.

## **9 Special Needs and Accessibility Services**

I am fully committed to providing the necessary accommodations to ensure that all students have an equal opportunity to succeed in this course. Students with medical/health conditions that might impact academic success should visit the [Department of Accessibility Services \(DAS\)](#) to determine eligibility for appropriate accommodations. Students who receive accommodations should contact me with an Accommodation Letter from the DAS at the beginning of the semester, or as soon as the accommodation is granted. If you wish to do so, feel free to request an individual meeting to further discuss the specific accommodations.

## 10 English Language Learners

Emory University welcomes students from around the country and the world, and the unique perspectives international and multilingual students bring enrich the campus community. To empower multilingual learners, an array of support is available including language and culture workshops and individual appointments. For more information about English Language Learning support at Emory, please contact the ELLP Specialists at <https://writingcenter.emory.edu>. No student will be penalised for their command of the English language.

## 11 Assignments and Grading Policy

**Problem Sets: 50%.** There will be ten problem sets throughout the course, each focusing on different aspects of experimental design and analysis. These assignments are designed to reinforce concepts covered in lectures and readings, and to provide hands-on practice with experimental design techniques. Problem sets will include a mix of theoretical questions and practical applications. They will be assigned regularly and must be completed individually. You may discuss your work with other colleagues as long as you do not copy entire sentences, just changing a few words. If you worked with other students, please write down their names on your problem set. Please also acknowledge any sources you used in your work, including textbooks, articles, and AI resources.

**Pre-Analysis Plan (PAP): 20%.** Students will work in groups to develop a pre-analysis plan for an experimental study. The PAP should be written in Quarto and include the following components:

- Research question and hypotheses
- Experimental design and randomisation procedure
- Sample size and power calculations
- Primary and secondary outcome measures
- Detailed analysis plan, including statistical models and robustness checks
- Plan for handling issues such as missing data, non-compliance issues, and attrition

A guide for writing the PAP will be available in the course GitHub repository and webpage. This

assignment will help students develop skills in planning and pre-registering experiments, a crucial practice in modern experimental research.

**Final Project: 30%.** The final project will consist of a short presentation, created using Quarto, based on the pre-analysis plans developed earlier in the course. For this assignment, I will simulate data based on each group’s PAP, intentionally introducing challenges such as missing data on covariates and non-compliance. Students will need to analyse this simulated data as if they were the true results of their proposed experiments, addressing any issues that arise in light of their original PAP. The presentation should include:

- A brief overview of the experimental design.
- Results of the primary and secondary analyses.
- Discussion of how deviations from the PAP were handled.
- Interpretation of results and their implications.
- Reflections on the challenges encountered and lessons learned.

This project will assess students’ ability to apply their knowledge of experimental design in a realistic scenario, adapting to unexpected challenges that often arise in real-world research.

Please submit all assignments in PDF format via Canvas before class (include your code). Work submitted late will be penalised by one letter grade every 24 hours unless discussed with the instructor.

## 12 Grading Scale

Each student’s final grade will be based on the following after rounding up to the nearest point:

Grade	A	A-	B+	B	B-	C	D	F
Range	91%–100%	86%–90%	81%–85%	76%–80%	71%–75%	66%–70%	60%–65%	<60%

## 13 Materials

The main textbook for this course is:

- Gerber, Alan S., and Donald P. Green. 2012. *Field Experiments: Design, Analysis, and Interpretation*. New York: W.W. Norton. (Referred to as FEDAI in the syllabus)

Students should closely read the assigned chapters and papers prior to the course date for which they are assigned. FEDAI will serve as our primary reference throughout the course.

This book is available:

- On course reserves at [Robert W. Woodruff Library](#)
- For purchase at the [campus bookstore](#)
- Online through retailers like [Amazon](#)

Additional readings will be provided through the course website or the library's electronic resources.

Students are encouraged to make use of the library's resources, including its [research guides](#) and [citation tools](#), to support their work in this course.

## 14 Subject to Change Policy

While I will try to adhere to the course schedule as much as possible, I also want to adapt to your learning pace and style. The syllabus and course plan may change during the semester. Again, please visit [the course website](#) regularly to check for updates. I will also announce any changes in class and via email.

## 15 Course Outline and Readings

It is important to read the required materials before class. Please feel free to engage in critical discussions and express your views openly. Bringing notes to class is recommended so we can discuss the topics you find most interesting together. The weekly suggested readings are optional and recommended for those who want to deepen their understanding of the course topics. They are usually more theoretical and maths-intensive than the required readings, but do not feel intimidated by them. They are there to provide a broader perspective on the topics we will cover in class.

## 15.1 Course Schedule

Please find below the schedule of our lectures. Each lecture includes a brief description, required readings, and suggested readings for further exploration. The lecture slides and additional resources are available [on the course website](#) and [GitHub repository](#). Please remember that the schedule may change during the course. If you have any questions or need further assistance, please let me know!

## 15.2 Lecture 01: Introduction to Experimental Design (August 27, 2025)

Required readings:

- Syllabus and course website: <http://danilofreire.github.io/datasci385>.
- GitHub repository: <https://github.com/danilofreire/datasci385>.
- Lecture slides: [Welcome to DATASCI 385: Introduction / Why Experiments?](#)
- FEDAI: Chapter 01: Introduction.

Suggested readings:

- Humphreys, M. (2021). [I saw your RCT and I have some worries! FAQs](#). An informal collection of questions and answers about RCTs.
- Mize, T. D., & Manago, B. (2022). [The Past, Present, and Future of Experimental Methods in the Social Sciences](#). Social Science Research, 108, 1-24.
- Jackson, M., & Cox, D. R. (2013). [The Principles of Experimental Design and Their Application in Sociology](#). Annual Review of Sociology, 39(1), 27-49.
- Hernán, M. A. (2018). [The C-Word: Scientific Euphemisms Do Not Improve Causal Inference from Observational Data](#). American Journal of Public Health, 108(5), 616-619.
- Bothwell, L. E., Greene, J. A., Podolsky, S. H., & Jones, D. S. (2016). [Assessing the Gold Standard – Lessons from the History of RCTs](#). New England Journal of Medicine, 374(22), 2175-2181
- de Kadt, D. & Grzysmala-Busse, A. (2025). [Good Description](#). Working paper..
- Deaton, A., & Cartwright, N. (2018). [Understanding and Misunderstanding Randomized Controlled Trials](#). Social Science & Medicine 210, 2-21.



## 15.3 Lecture 02: Theories and Experiments (September 3, 2025)

Required readings:

- Lecture slides: [The Research Design Process: Testing Theories with Experiments](#).
- Card, D., DellaVigna, S., & Malmendier, U. (2011). [The Role of Theory in Field Experiments](#). Journal of Economic Perspectives, 25(3), 39-62.
- Blair, G., Cooper, J., Coppock, A., & Humphreys, M. (2019). [Declaring and Diagnosing Research Designs](#). American Political Science Review, 113(3), 838-859.
- [Problem Set 01 assigned](#).

Suggested readings:

- Brutger, R., Kertzer, J. D., Renshon, J., Tingley, D., & Weiss, C. M. (2023). [Abstraction and Detail in Experimental Design](#). American Journal of Political Science, 67(4), 979-995.
- Peterson, J. C., Bourgin, D. D., Agrawal, M., Reichman, D., & Griffiths, T. L. (2021). [Using Large-Scale Experiments and Machine Learning to Discover Theories of Human Decision-Making](#). Science, 372(6547), 1209-1214.
- Smith, V. L. (2010). [Theory and Experiment: What Are the Questions?](#). Journal of Economic Behavior & Organization, 73(1), 3-15.
- van Rooij, I., & Baggio, G. (2021). [Theory Before the Test: How to Build High-Verisimilitude Explanatory Theories in Psychological Science](#). Perspectives on Psychological Science, 16(4), 682-697.

## 15.4 Lecture 03: Causal Inference and Potential Outcomes (September 8, 2025)

Required readings:

- Lecture slides: [Potential Outcomes Framework](#).
- FEDAI: Chapter 02: Causal Inference and Experimentation.
- Rubin, D. B. (2005). [Causal Inference using Potential Outcomes: Design, Modeling, Decisions](#). Journal of the American Statistical Association, 100(469), 322-331.
- [Kahoot Quiz](#)

## 15.5 Lecture 04: Selection Bias and Randomisation (September 10, 2025)

Required readings:

- Lecture slides: [Potential Outcomes Continued and Regression Analysis](#).
- Angrist, J. D., & Pischke, J. S. (2014). [Mastering 'Metrics: The Path from Cause to Effect](#). Princeton University Press. Chapter 01: Randomized Trials. The appendix is also worth reading.
- [Kahoot Quiz](#)
- Problem Set 01 due.
- [Problem Set 02 assigned](#).

Suggested readings:

- Imbens, G. W., & Rubin, D. B. (2015). [Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction](#). Cambridge University Press. Part I - Introduction.
- Hernán, M. A., Hernández-Díaz, S., & Robins, J. M. (2004). [A Structural Approach to Selection Bias](#). *Epidemiology*, 15(5), 615-625.
- Hernán M.A. & Robins J.M. (2020). [Causal Inference: What If](#). Boca Raton: Chapman & Hall/CRC. Chapters 6-10. Maths-heavy but very insightful.
- Morgan, S. L., & Winship, C. (2015). [Counterfactuals and Causal Inference: Methods and Principles for Social Research](#). Cambridge University Press. Chapter 02: Counterfactuals and Potential Outcomes Model.

## 15.6 Lecture 05: Statistical Inference for Randomised Experiments (September 15, 2025)

- Lecture slides: [Sampling Distributions, Statistical Inference, and Hypothesis Testing](#).
- FEDAI: Chapter 03: Sampling Distributions, Statistical Inference, and Hypothesis Testing (up to section 3.5).
- EGAP Methods Guides: [Hypothesis Testing](#), [Randomisation Inference](#), and [Cluster Randomisation](#). These short guides provide a good overview of the topics we will cover in class, as well as example code in R.

- [Kahoot Quiz](#).

Suggested readings:

- Imbens, G. W., & Rubin, D. B. (2015). [Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction](#). Cambridge University Press. Part II - Randomised Experiments.
- Athey, S., & Imbens, G. W. (2017). [The Econometrics of Randomized Experiments](#). In Handbook of economic field experiments (Vol. 1, pp. 73-140). North-Holland. Read section 4, although the entire chapter is worth reading.
- Berry, C. R., & Fowler, A. (2021). [Leadership or Luck? Randomization Inference for Leader Effects in Politics, Business, and Sports](#). Science Advances, 7(4), eabe3404.
- Caughey, D., Dafoe, A., Li, X., & Miratrix, L. (2023). [Randomisation Inference Beyond the Sharp Null: Bounded Null Hypotheses and Quantiles of Individual Treatment Effects](#). Journal of the Royal Statistical Society Series B: Statistical Methodology, 85(5), 1471-1491.
- Ritzwoller, D. M., Romano, J. P., & Shaikh, A. M. (2025). [Randomization Inference: Theory and Applications](#). arXiv preprint arXiv:2406.09521. *Very technical*, recommended for maths or statistics enthusiasts.

### 15.6.1 Lecture 06: Texts for discussion (September 17, 2025)

- Lecture slides: [Texts for Discussion](#).
- Kalla, J. & D. Broockman. 2016. [Campaign Contributions Facilitate Access to Congressional Officials: A Randomized Field Experiment](#). American Journal of Political Science, 60(3): 545–558
- Bertrand, M., & Mullainathan, S. (2004). [Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination](#). American Economic Review, 94(4), 991-1013.
- Chattopadhyay, R., & Duflo, E. (2004). [Women as Policy Makers: Evidence from a Randomized Policy Experiment in India](#). Econometrica, 72(5), 1409-1443. (*if time allows*)
- Problem Set 02 due.
- [Problem Set 03 assigned](#).

## 15.7 Lecture 07: Blocking, Clustering, and Covariate Adjustment (September 22, 2025)

- Lecture slides: [Blocking and Clustering](#).
- FEDAI: Section 3.6: Sampling Distributions for Experiments That Use Block or Cluster Random Assignment.
- FEDAI: Chapter 04: Using Covariates in Experimental Design and Analysis.

## 15.8 Lecture 08: Blocking and Clustering (Cont.), Statistical Power, and Sample Calculations (September 24, 2025)

- Lecture slides: [Blocking and Clustering \(Cont.\), Statistical Power, and Sample Calculations](#).
- FEDAI Appendix 3.1 on Power
- [EGAP Methods Guide on Power Calculations](#).
- Problem Set 03 due.
- [Problem Set 04](#) assigned.

Suggested readings:

- Blair, G., Coppock, A., & Humphreys, M. (2023). [Research Design in the Social Sciences](#). Princeton University Press. Sections 18.2 and 18.3.
- Rainey, C. (2025). [Power Rules: Practical Advice for Computing Power \(and Automating with Pilot Data\)](#). OSF Preprints. Note: This is a useful guide for power calculations without the need for complex maths. Not peer-reviewed yet.
- Bowers, J. [10 Things to Know About Cluster Randomization](#).
- Kaltenbach, H-M. (2021). [Statistical Design and Analysis of Biological Experiments](#). Chapter 7: Improving Precision and Power: Blocked Designs.
- Imai, K., King, G., & Nall, C. (2009). [The Essential Role of Pair Matching in Cluster-Randomized Experiments, with Application to the Mexican Universal Health Insurance Evaluation](#). *Statistical Science*, 29-53.

- R Psychology. (2023). [Understanding Statistical Power and Significance Testing](#). A comprehensive guide to power analysis in R.
- EGAP: [Power Calculator](#). An interactive tool to calculate power for your experiments.
- Pek, J., Hoisington-Shaw, K. J., & Wegener, D. T. (2024). [Uses of Uncertain Statistical Power: Designing Future Studies, Not Evaluating Completed Studies](#). Psychological Methods.
- Li, X., & Ding, P. (2020). [Rerandomization and Regression Adjustment](#). Journal of the Royal Statistical Society Series B: Statistical Methodology, 82(1), 241-268.

## 15.9 Lecture 09: Non-Compliance I (September 29, 2025)

- Lecture slides: [Non-Compliance I](#).
- FEDAI: Chapter 05: One-Sided Non-Compliance.
- [Kahoot Quiz](#)

## 15.10 Lecture 10: Non-Compliance II (October 1, 2025)

- Lecture slides: [Non-Compliance II](#).
- FEDAI: Chapter 06: Two-Sided Non-Compliance.
- [KaHoot Quiz](#)
- Problem Set 04 due.
- [Problem Set 05 assigned](#).
- Two paragraphs (maximum) summarising an experiment that you wish to develop in this course. At a minimum, your summary should include a research question, why the question is important, and a rough outline of how you plan to answer the question. Please send me an email by Wednesday with this information.

Suggested readings:

- Angrist, J. D., & Pischke, J. S. (2009). [Mostly Harmless Econometrics: An Empiricist's Companion](#). Princeton University Press. Chapter 4: Instrumental Variables Estimation.

- Baryakova, T.H., Pogostin, B.H., Langer, R. et al. [Overcoming Barriers to Patient Adherence: The Case for Developing Innovative Drug Delivery Systems](#). *Nature Reviews Drug Discovery* 22, 387–409 (2023).
- Kane, J. V. (2025). [More than Meets the ITT: A Guide for Anticipating and Investigating Nonsignificant Results in Survey Experiments](#). *Journal of Experimental Political Science*, 12(1), 110–125.
- Hartman, E., & Huang, M. (2024). [Improving Precision through Design and Analysis in Experiments with Noncompliance](#). *Political Science Research and Methods*, 12(3), 557-572.
- Gerber, A. S., Green, D. P., Kaplan, E. H., & Kern, H. L. (2010). [Baseline, Placebo, and Treatment: Efficient Estimation for Three-Group Experiments](#). *Political Analysis*, 18(3), 297-315.

## 15.11 Lecture 11: Attrition and Missing Outcomes (October 6, 2025)

- Lecture slides: [Attrition](#).
- FEDAI: Chapter 07: Attrition.
- Lo, A., Renshon, J., & Bassan-Nygate, L. (2024). [A Practical Guide to Dealing with Attrition in Political Science Experiments](#). *Journal of Experimental Political Science*, 11(2), 147-161.
- [Kahoot quiz](#)

Suggested readings:

- Zhou, H., & Fishbach, A. (2016). [The Pitfall of Experimenting on the Web: How Unattended Selective Attrition Leads to Surprising \(Yet False\) Research Conclusions](#). *Journal of Personality and Social Psychology*, 111(4), 493.
- Coppock, A., Gerber, A. S., Green, D. P., & Kern, H. L. (2017). [Combining Double Sampling and Bounds to Address Nonignorable Missing Outcomes in Randomized Experiments](#). *Political Analysis*, 25(2), 188-206.
- Ghanem, D., Hirshleifer, S., & Ortiz-Becerra, K. (2019). [Testing Attrition Bias in Field Experiments](#). UC Berkeley: Center for Effective Global Action.
- Pallmann, P., Bedding, A.W., Choodari-Oskoei, B. et al. (2018). [Adaptive Designs in Clinical Trials: Why Use Them, and How to Run and Report Them](#). *BMC Med* 16(29).

## 15.12 Lecture 12: Ethical Considerations in Experimental Research (October 8, 2025)

- Lecture slides: [Ethical Considerations in Experimental Research](#).
- Humphreys, M. (2015). [Reflections on the Ethics of Social Experimentation](#). Journal of Globalization and Development, 6(1), 87-112.
- Cronin-Furman, K., & Lake, M. (2018). [Ethics Abroad: Fieldwork in Fragile and Violent Contexts](#). PS: Political Science & Politics, 51(3), 607-614.
- Poverty Action Lab (2022). [Ethical Conduct of Randomized Evaluations](#). J-PAL.
- Problem Set 05 due.
- [Problem Set 06 assigned](#)

Suggested readings:

- Asiedu, E., Dean, E., Karlan, D., & Osei, R. (2021). [Ethics and Society Review: Ethics Reflection as a Precondition to Research Funding](#). Proceedings of the National Academy of Sciences, 118(52), e2117261118.
- ASAB Ethical Committee/ABS Animal Care Committee. (2024). [Guidelines for the Ethical Treatment of Nonhuman Animals in Behavioural Research and Teaching](#). Animal Behaviour, 207, I-XI.

## 15.13 Lecture 13: Introduction to Quarto and DeclareDesign (October 15, 2025)

- Lecture slides: [Introduction to Quarto and DeclareDesign](#).
- Quarto official website: <https://quarto.org/>.
- DeclareDesign official website: <https://declaredesign.org/>.
- Problem Set 06 due.

Suggested readings:

- [Quarto official website](#).

- Awesome Quarto: <https://github.com/mcanouil/awesome-quarto>. Note: this repository contains dozens of tutorials, examples, and resources.
- Çetinkaya-Rundel, M. & Lowndes, J. S. (2022) [Keynote talk: Hello Quarto: Share • Collaborate • Teach • Reimagine](#). [Slides](#) and [source code](#). This is one of the nicest Quarto presentations I have seen.
- [Getting Started with Quarto \(YouTube\)](#). Note: Posit (formerly RStudio) has a series of tutorials on Quarto on their YouTube channel. You can find their playlist [here](#).
- Blair, G., Coppock, A., & Humphreys, M. (2023). [Introduction to Design Declaration with DeclareDesign](#). A series of presentation slides on DeclareDesign by the authors of the book. Strongly recommended.
- [DeclareDesign official website](#).
- Nosek, B.A., Alter, G., Banks, G.C., Borsboom, D., Bowman, S.D., Breckler, S.J., Buck, S., Chambers, C.D., Chin, G., Christensen, G. and Contestabile, M., 2015. [Promoting an Open Research Culture](#). *Science*, 348(6242), pp.1422-1425.
- [A Gentle Introduction to DeclareDesign \(YouTube\)](#). Video tutorial by the authors of the book.

## 15.14 Lecture 14: Writing Pre-Analysis Plans (October 20, 2025)

- Lecture slides: [How to Write a Pre-Analysis Plan](#).
- EGAP: [Pre-Analysis Plans](#).
- Olken, B. A. (2015). [Promises and perils of pre-analysis plans](#). *Journal of Economic Perspectives*, 29(3), 61-80.
- [Kahoot Quiz](#)

Suggested readings:

- Ofosu, G. K., & Posner, D. N. (2023). [Pre-Analysis Plans: An Early Stocktaking](#). *Perspectives on Politics*, 21(1), 174-190.
- Rubenson, D. (2021). [Tie My Hands Loosely: Pre-Analysis Plans in Political Science](#). *Politics and the Life Sciences*, 40(2), 142-151.



- Coffman, L. C., & Niederle, M. (2015). [Pre-Analysis Plans Have Limited Upside, Especially where Replications Are Feasible](#). *Journal of Economic Perspectives*, 29(3), 81-98.
- Even-Tov, Omri and Valentine, K. (2025). [The Research Paper Playbook: A PhD Student's Guide to Writing and Presenting](#).

### 15.15 Lecture 15: When Experiments are Not Possible (October 22, 2025)

- Lecture slides: [Natural and Quasi-Experiments](#).
- [Kahoot Quiz](#).
- Dunning, T. (2012). [Natural Experiments in the Social Sciences: A Design-Based Approach](#). Cambridge University Press. Chapter 01: Introduction.
- [Problem Set 07 assigned](#).

Suggested readings:

- Diener, E., Northcott, R., Zyphur, M. J., & West, S. G. (2022). [Beyond Experiments](#). *Perspectives on Psychological Science*, 17(4), 1101-1119.
- Dunning, T. (2016). [Transparency, Replication, and Cumulative Learning: What Experiments Alone Cannot Achieve](#). *Annual Review of Political Science*, 19(1), 541-563.
- Petticrew, M., Cummins, S., Ferrell, C., Findlay, A., Higgins, C., Hoy, C., ... & Sparks, L. (2005). [Natural Experiments: An Underused Tool for Public Health?](#). *Public Health*, 119(9), 751-757.
- Grosz, M. P., Ayaita, A., Arslan, R. C., Buecker, S., Ebert, T., Hünermund, P., ... & Rohrer, J. M. (2024). [Natural Experiments: Missed Opportunities for Causal Inference in Psychology](#). *Advances in Methods and Practices in Psychological Science*, 7(1), 25152459231218610.

### 15.16 Lecture 16: Interference in Experiments (October 27, 2025)

- Lecture slides: [Interference in Experiments](#).
- FEDAI: Chapter 08: Interference between Experimental Units.
- EGAP: [Spillovers](#).
- [Kahoot Quiz](#).

Suggested readings:

- Aronow, P. M., Eckles, D., Samii, C., & Zonszein, S. (2020). [Spillover Effects in Experimental Data](#). arXiv preprint arXiv:2001.05444. *Quite technical too*.
- Baird, S., Bohren, J. A., McIntosh, C., & Ozler, B. (2014). [Designing Experiments to Measure Spillover Effects](#).
- Benjamin-Chung, J., Arnold, B. F., Berger, D., Luby, S. P., Miguel, E., Colford Jr, J. M., & Hubbard, A. E. (2018). [Spillover Effects in Epidemiology: Parameters, Study Designs and Methodological Considerations](#). *International Journal of Epidemiology*, 47(1), 332-347.
- Imbens, G. (2024). [Interference and Spillovers in Randomized Experiments](#) (Video). A short lecture on recent advances and new designs to deal with interference in experiments. A little technical.

### 15.17 Lecture 17: Texts for Discussion (October 29, 2025)

- Lecture slides: [Texts for Discussion](#).
- [Kahoot Quiz](#).
- Centola, D. (2010). [The spread of behavior in an online social network experiment](#). *Science*, 329(5996), 1194-1197.
- Paluck, B. L., Shepherd, H., and Aronow, P. 2016. [Changing climates of conflict: A social network experiment in 56 schools](#). *Proceedings of the National Academy of Sciences*, 113(3): 566-571
- Gerber, A. S., & Green, D. P. (2000). [The effects of canvassing, telephone calls, and direct mail on voter turnout: A field experiment](#). *American Political Science Review*, 94(3), 653-663.
- Problem Set 07 due.
- [Problem Set 08 assigned](#).

### 15.18 Lecture 18: Heterogeneous Treatment Effects (November 3, 2025)

- Lecture slides: [Heterogeneous Treatment Effects](#).
- FEDAI: Chapter 09: Heterogeneous Treatment Effects.

Suggested readings:

- Holzmeister, F., Johannesson, M., Böhm, R., Dreber, A., Huber, J., & Kirchler, M. (2024). [Heterogeneity in Effect Size Estimates](#). Proceedings of the National Academy of Sciences, 121(32), e2403490121.
- Ding, P., Feller, A., & Miratrix, L. (2016). [Randomization Inference for Treatment Effect Variation](#). Journal of the Royal Statistical Society Series B: Statistical Methodology, 78(3), 655-671.
- Wager, S., & Athey, S. (2018). [Estimation and Inference of Heterogeneous Treatment Effects using Random Forests](#). Journal of the American Statistical Association, 113(523), 1228-1242.
- Susan Athey and Stefan Wager: [Estimating Heterogeneous Treatment Effects in R](#). A one-hour video on how to use the grf package in R to estimate heterogeneous treatment effects.
- [Generalised Random Forests](#) (R package).
- Coppock, A. (2015). [10 Things to Know about Multiple Comparisons](#). EGAP Methods Guide.
- Frandsen, B. (2025). [Machine Learning and Heterogeneous Treatment Effects](#). Slides and coding labs from a workshop on this topic. Available on GitHub.

### 15.19 Lecture 19: Texts for Discussion (November 5, 2025)

- Lecture slides: [Texts for Discussion](#).
- Munshi, K. (2003). [Networks in the modern economy: Mexican migrants in the US labor market](#). The Quarterly Journal of Economics, 118(2), 549-599.
- Miguel, E., & Kremer, M. (2004). [Worms: identifying impacts on education and health in the presence of treatment externalities](#). Econometrica, 72(1), 159-217.
- Pre-Analysis Plan due.
- Problem Set 08 due.
- [Problem Set 09 assigned..](#)

### 15.20 Lecture 20: Mediation Analysis (November 10, 2025)

- Lecture slides: [Mediation Analysis](#).
- FEDAI: Chapter 10: Mediation.
- [KaHoot Quiz](#)

Suggested readings:

- Bullock, J. G., & Green, D. P. (2021). [The Failings of Conventional Mediation Analysis and a Design-Based Alternative](#). *Advances in Methods and Practices in Psychological Science*, 4(4), 25152459211047227.
- VanderWeele, T. J. (2016). [Mediation Analysis: A Practitioner's Guide](#). *Annual Review of Public Health*, 37(1), 17-32.
- Acharya, A., Blackwell, M., & Sen, M. (2018). [Analyzing Causal Mechanisms in Survey Experiments](#). *Political Analysis*, 26(4), 357–378.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). [Mediation Analysis](#). *Annual Review of Psychology*, 58(1), 593-614.

## 15.21 Lecture 21: Survey Experiments (November 12, 2025)

- Lecture slides: [Survey Experiments](#).
- EGAP: [Survey Experiments](#).
- Stantcheva, S. (2023). [How to run surveys: A guide to creating your own identifying variation and revealing the invisible](#). *Annual Review of Economics*, 15(1), 205-234.
- Problem Set 09 due.
- [Problem Set 10](#) assigned.

Suggested readings:

- Sniderman, P. M. (2018). [Some Advances in the Design of Survey Experiments](#). *Annual Review of Political Science*, 21(1), 259-275.
- Schneider, D., & Harknett, K. (2022). [What's to Like? Facebook as a Tool for Survey Data Collection](#). *Sociological Methods & Research*, 51(1), 108-140.
- Clifford, S., Sheagley, G., & Piston, S. (2021). [Increasing Precision Without Altering Treatment Effects: Repeated Measures Designs in Survey Experiments](#). *American Political Science Review*, 115(3), 1048-1065.
- Kane, J. V. (2024). [More Than Meets the ITT: A Guide for Anticipating and Investigating Nonsignificant Results in Survey Experiments](#). *Journal of Experimental Political Science*, 1-16.

## 15.22 Lecture 22: Survey Methods for Sensitive Topics (November 17, 2025)

- Lecture slides: [Survey Methods for Sensitive Topics](#).
- Bursztyn, L., Haaland, I. K., Röver, N., & Roth, C. (2025). [The Social Desirability Atlas](#). NBER Working Paper No. 33920.

Suggested readings:

- Blair, G., Imai, K., & Zhou, Y. Y. (2015). [Design and Analysis of the Randomized Response Technique](#). Journal of the American Statistical Association, 110(511), 1304-1319.
- Blair, G., & Imai, K. (2012). [Statistical Analysis of List Experiments](#). Political Analysis, 20(1), 47-77.
- Riambau, G., & Ostwald, K. (2021). [Placebo Statements in List Experiments: Evidence from a Face-to-Face Survey in Singapore](#). Political Science Research and Methods, 9(1), 172-179.
- Gosciak, J., Molitor, D., & Lundberg, I. (2025). [Adaptive Randomization in Conjoint Survey Experiments](#). Retrieved from <osf.io/preprints/socarxiv/69y2j.v1>.

## 15.23 Lecture 23: Texts for Discussion (Related to Survey Experiments) (November 19, 2025)

- Lecture slides: [Texts for Discussion](#).
- Druckman, J. N., Gilli, M., Klar, S., & Robison, J. (2015). [Measuring drug and alcohol use among college student-athletes](#). Social Science Quarterly, 96(2), 369-380.
- Blair, G., Imai, K., & Lyall, J. (2014). [Comparing and Combining List and Endorsement Experiments: Evidence from Afghanistan](#). American Journal of Political Science, Vol. 58, No. 4 (October), pp. 1043-1063.
- Rosenfeld, B., Imai, K., & Shapiro, J. (2016). [An Empirical Validation Study of Popular Survey Methodologies for Sensitive Questions](#). American Journal of Political Science, 60(3), 783-802.
- Freire, D., & Skarbek, D. (2023). [Vigilantism and Institutions: Understanding Attitudes Toward Lynching in Brazil](#). Research & Politics, 10(1), 1-8.
- Problem Set 10 due.

## **15.24 Lecture 24: Meta-Analysis and Integration of Research Findings (November 24, 2025)**

- Lecture slides: [Meta-Analysis and Integration of Research Findings](#).
- FEDAI: Chapter 11: Integration of Research Findings.

Suggested readings:

- Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2011). [Introduction to Meta-analysis](#). John Wiley & Sons. A whole book dedicated to the topic. A bit technical but very good.
- Harrer, M., Cuijpers, P., Furukawa, T., & Ebert, D. (2021). [Doing Meta-Analysis with R: A Hands-On Guide](#). Chapman and Hall/CRC.
- Hansen, C., Steinmetz, H., & Block, J. (2022). [How to Conduct a Meta-Analysis in Eight Steps: A Practical Guide](#). Management Review Quarterly, 1-19.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). [The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews](#). BMJ, 372.

## **15.25 Lecture 25: Course Revision (December 1, 2025)**

- Lecture slides: [Course Revision](#).
- Final report due.

## **15.26 Lecture 26: Presentations (December 3, 2025)**

- Presentations of final projects.

## **15.27 Lecture 27: Presentations (December 8, 2025)**

- Presentations of final projects.