POLITICAL SCIENCE 406, SPRING 2024

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1. Basic Course Information

Prerequisites: Political Science 403 and 405 or equivalent.

Course Objectives: This course offers an introduction to quantitative approaches to causal inference in the social sciences.

The goal of the course is to prepare students for applied quantitative causal inference by acquainting them with techniques that wrestle with the challenges inherent to causal analysis. After all, the relationship between statistical results and causal relations — the true quantities of interest in most analysis — are obscure and anything but direct for most studies.

We will consider a series of methods for causal inference, looking at both strengths and weaknesses. These will include the causal analysis of experiments, regression for causal inference, instrumental variables, matching, mechanism and regression-discontinuity designs, and panel inference. The goal is to leave students with an appreciation of the challenges of quantitative causal inference, a familiarity with the variety of existing solutions, and technical skill permitting them to use such techniques in practice as appropriate.

Note: Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (accessiblenu@northwestern.edu; 847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.

Books:

Counterfactuals and Causal Inference: Methods and Principles for Social Research, by Stephen L. Morgan and Christopher Winship.

Causal Inference: The Mixtape by Scott Cunningham.

Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction by Guido W. Imbens and Donald B. Rubin.

The Effect: An Introduction to Research Design and Causality by Nick Huntington-Klein, available online in an extremely useful Markdown version at `https://theeffectbook.net/index.html`.

Statistical Software: Students in this course are invited but not required to learn, use, and enjoy the statistical package, **R**. Most (all?) projects in this course can also be completed using Stata or Python, but there may be advantages to R, including:

- R is free. Anyone can download the newest version of R from the internet (see, for example, `http://cran.r-project.org/`). To get R for Windows from that address, click "Windows." Then click "base." Finally, click "Download R ¡latest version¿ for Windows" and walk through the installation process.
- R is one of the most extensive statistical packages in the world because it is open-source, although Python is clearly a close competitor at this point. As a result, new econometric and statistical techniques are often implemented and available online within days of their invention.
- Many people feel that R has better support for statistical graphics.
- I am a lot more familiar with R than with Stata. I've used Stata a few times, and use Python when relevant, but I do much of my research in R. So classroom examples will be done in R, and I'm a lot more likely to be able to help you solve problems in R than in Stata, Python, or other statistical environments. That said, the TA and/or I can usually point you toward relevant resources for doing the course labs in Stata, Python, or something else if that's your preference.

Class Time: Mondays and Wednesdays, 11:00-12:20.

Class Room: University Hall 218

Office Hours: Tuesdays, 3:30-5:30

2. Labs and Course Paper

Grades for this course will be based on applied labs (1/2), as well as on a final paper, due June 7th at 8pm (1/2).

Lab assignments for the entire quarter are currently available on the course github site (`https://github.com/jnseawright/PS406`). The labs are intended to ensure that each student is reasonably comfortable with each topic and set of techniques we cover — even those that will not be used in her term paper. As such, the labs are an alternative to a final exam for the course.

Each lab will be due at 8pm on Friday. Labs should be turned in electronically through the course Canvas site.

The major assignment for the term is a complete research design for a quantitative causal inference using one or more of the methods from this course. While regression may be a part of the design, it is required that the paper also include at least one technique discussed in week 3 or later of the course. This paper will be due on the day scheduled for this course's final exam. Think of this final paper as the research design component of a grant application or a prospectus. Spend at most one page setting up the problem and invoking theory; then turn to discussing and defending in detail your data sources, causal inferential strategy, and proposed statistical analysis. The entire paper should not exceed 10 pages — a hard limit. I will be happy to discuss ideas for, or problems in the development of, your paper as the term progresses.

2.1. **Academic Honesty.** Your term paper must, of course, reflect your original work. Any quotations from other people's work must be fully cited and documented. The same is true for paraphrases or for statistics or facts that are not general knowledge. Please do not hesitate to ask for additional details if you are confused about this assignment. The WCAS policy on academic integrity reads:

> In a scholarly community like Northwestern, academic integrity is of the utmost importance. If you are guilty of dishonesty in academic work, you may receive a failing grade in the course and be suspended or permanently excluded from the University. The brochure "Academic Integrity at Northwestern: A Basic Guide" details the types of offenses that constitute academic dishonesty and contains a thorough discussion of the proper citation of sources. You can get this brochure at the Office of Undergraduate Studies and Advising. A document on how instances of alleged academic dishonesty are handled is available online. The Undergraduate Catalog contains a non-exhaustive list of behaviors that violate standards of academic integrity. These include: cheating, plagiarism, fabrication, obtaining an unfair advantage, aiding and abetting dishonesty, falsification of records and official documents, and unauthorized access to computerized academic or administrative records or systems. Each of these is described in more detail in the catalog. One important type of academic dishonesty is plagiarism. Plagiarism includes more than just copying someone else's work. Northwestern's "Principles Regarding Academic Integrity" defines plagiarism as "submitting material that in part or whole is not entirely one's own work without attributing those same portions to their correct source." A Northwestern web page provides links to additional information on academic integrity, including information on relevant policies and on how to recognize and avoid violations of academic integrity in your own work. More tips on avoiding

plagiarism are available from Northwestern's Writing Place. Sometimes students think that another student has acted in a way that is academically dishonest. In this situation you should consult with the Weinberg College Adviser.

This course's final term paper will be submitted electronically, via the course's Canvas page, rather than in printed form. As per university policy, all student work may by analyzed electronically for violations of the university's academic integrity policy and may also be included in a database for the purpose of testing for plagiarized content.

3. Course Schedule and Readings

This schedule is subject to changes (minor or major) depending on how long each topic actually takes us to cover, as well as on the needs of the class. Slides and code for in-class discussion and examples are available on the course github site (`https://github.com/jnseawright/PS406`).

Week 1: *Experiments.*

- Cunningham, Chapters 1, 3-4.
- Morgan and Winship, Chapters 1-3.
- Imbens and Rubin, Chapters 1, 3-6.
- Huntington-Klein, Chapters 1-11.

Examples:

- Bush, Sarah Sunn and Lauren Prather. 2021. "Islam, gender segregation, and political engagement: Evidence from an experiment in Tunisia." *Political Science Research and Methods* 9(4): 728-744. `https://doi.org/10.1017/psrm.2020.37`
- Krishnarajan, Suthan. 2023. "Rationalizing Democracy: The Perceptual Bias and (Un)Democratic Behavior." American Political Science Review 117(2): 474–96. `https://doi.org/10.1017/S0003055422000806`
- Cheema, Ali, Sarah khan, Asad Liaqat, and Shandana Khan Mohmand. 2023. "Canvassing the Gatekeepers: A Field Experiment to Increase Women Voters' Turnout in Pakistan." American Political Science Review 117(1): 1–21. doi: 10.1017/S0003055422000375. `https://doi.org/10.1017/S0003055422000375`

Week 2: *Regression.*

- Cunningham, Chapter 2.
- Morgan and Winship, Chapters 4, 6, 7.
- Imbens and Rubin, Chapters 7, 8, 11.
- Huntington-Klein, Chapters 12-13.

- Keele, Luke, Randolph T. Stevenson, and Felix Elwert. 2020. "The Causal Interpretation of Estimated Associations in Regression Models." *Political Science Research and Methods* 8(1): 1–13. doi: 10.1017/psrm.2019.31.

Examples:

- Noam Lupu and Leonid Peisakhin, 2017, "The Legacy of Political Violence across Generations." *American Journal of Political Science* 61 (Oct.): 836-51.
- Sergi Pardos-Prado, 2015, "How Can Mainstream Parties Prevent Niche Party Success? Center-Right Parties and the Immigration Issue." *Journal of Politics* 77 (Feb.): 352-67.
- Rambotti, S., and Breiger, R. L. 2020. "Extreme and Inconsistent: A Case-Oriented Regression Analysis of Health, Inequality, and Poverty." *Socius*. `https://doi.org/10.1177/2378023120906064`

Week 3: *Matching.*

- Cunningham, Chapter 5.
- Morgan and Winship, Chapter 5.
- Imbens and Rubin, Chapters 12-15, 18-19.
- Huntington-Klein, Chapter 14.
- King, Gary, and Richard Nielsen. 2019. "Why Propensity Scores Should Not Be Used for Matching." *Political Analysis* 27(4): 435–54. doi: 10.1017/pan.2019.11.

Examples:

- Andrea Ruggeri, Han Dorussen, and Theodora-Ismene Gizelis, 2017, "Winning the Peace Locally: UN Peacekeeping and Local Conflict." *International Organization* 71 (Winter): 163-85.
- Lilliana Mason, 2015, "'I Disrespectfully Agree': The Differential Effects of Partisan Sorting on Social and Issue Polarization." *American Journal of Political Science* 59 (Jan.): 128-45.
- Mark Hill. 2020. "Traditional and Non-traditional Forms of Political Participation in Multigenerational Households." Working paper. `https://osf.io/2nsbh/download`

Week 4: *Natural Experiments I.*

- Morgan and Winship, Chapter 9.
- Imbens and Rubin, Chapters 23-25.

Examples:

- Allison Carnegie and Nikolay Marinov, 2017, "Foreign Aid, Human Rights, and Democracy Promotion: Evidence from a Natural Experiment." *American Journal of Political Science* 61 (July): 671-83.
- Silva, Bruno Castanho, and Sven-Oliver Proksch. 2021. "Fake It 'Til You Make It: A Natural Experiment to Identify European Politicians' Benefit from Twitter Bots." American Political Science Review 115(1): 316–22. `https://doi.org/10.1017/S0003055420000817`
- Umair Khalil, Sulagna Mookerjee, and Ryan Tierney. 2019. "Social interactions in voting behavior: Evidence from India." *Journal of Economic Behavior & Organization* 163: 158-171.

Week 5: *Natural Experiments II.*

- Cunningham, Chapter 5.
- Dunning, *Natural Experiments in the Social Sciences*, Chapters 5, 6, 8-10.
- Huntington-Klein, Chapters 19-20.

Examples:

- Jeremy Ferwerda and Nicholas L. Miller, 2014, "Political Devolution and Resistance to Foreign Rule: A Natural Experiment." *American Political Science Review* 108 (Aug.): 642-60.
- Matthew A. Kocher and Nuno P. Monteiro, 2016, "Lines of Demarcation: Causation, Design-Based Inference, and Historical Research." *Perspectives on Politics* 14 (Dec.): 952-75.
- Fernanda Brollo and Tommaso Nannicini, 2012, "Tying Your Enemy's Hands in Close Races: The Politics of Federal Transfers in Brazil." *American Political Science Review* 106 (Nov.): 742-61.

Week 6: *Selection and Missing Data.*

- Morgan and Winship, Chapter 8.
- Christopher Winship and Robert D. Mare, 1992, "Models for Sample Selection Bias," *Annual Review of Sociology.*
- Arel-Bundock, Vincent, and Krzysztof J. Pelc. 2018. "When Can Multiple Imputation Improve Regression Estimates?" *Political Analysis* 26 (2): 240–45. doi: 10.1017/pan.2017.43.
- Pepinsky, Thomas B. 2018. "A Note on Listwise Deletion versus Multiple Imputation." *Political Analysis* 26(4): 480–88. doi: 10.1017/pan.2018.18.

Examples:

- Vladimir Gimpelson and Daniel Treisman, 2018, "Misperceiving Inequality." *Economics & Politics* 30 (March): 27-54.

- Ranjit Lall, 2017, "The Missing Dimension of the Political Resource Curse Debate." *Comparative Political Studies* 50 (10): 1291-1324.
- Zimran, Ariell. 2019. "Sample-Selection Bias and Height Trends in the Nineteenth-Century United States." *The Journal of Economic History* 79(1): 99–138. doi: 10.1017/S0022050718000694.

Week 7: *Synthetic Controls, Sensitivity Analysis and Bounds.*

- Morgan and Winship, Chapters 10 and 12.
- Imbens and Rubin, Chapter 22.
- Cunningham, Chapter 10.
- Huntington-Klein, Chapter 15.

Examples:

- Luke Keele and William Minozzi, 2013, "How Much Is Minnesota Like Wisconsin? Assumptions and Counterfactuals in Causal Inference with Observational Data." *Political Analysis* 21 (Spring): 193-216.
- Mourtgos, SM, Adams, IT, Nix, J. (2022). "Elevated police turnover following the summer of George Floyd protests: A synthetic control study." *Criminology and Public Policy* 21: 9-33. `https://doi.org/10.1111/1745-9133.12556`

Week 8: *Panels.*

- Cunningham, Chapters 8-9.
- Morgan and Winship, Chapter 11.
- Huntington-Klein, Chapters 16-18.

Examples:

- Kevin B. Smith, John R. Alford, John R. Hibbing, Nicholas G. Martin, and Peter K. Hatemi, 2017, "Intuitive Ethics and Political Orientations: Testing Moral Foundations as a Theory of Political Ideology." *American Journal of Political Science* 61 (April): 424-37.
- Andy Baker, Barry Ames, Anand E. Sokhey, Lucio R. Renno, 2015, "The Dynamics of Partisan Identification When Party Brands Change: The Case of the Workers Party in Brazil." *Journal of Politics* 78 (Oct.): 197-213.
- Edmund J. Malesky, Cuong Viet Nguyen, and Anh Tran, 2014, "The Impact of Recentralization on Public Services: A Difference-in-Differences Analysis of the Abolition of Elected Councils in Vietnam." *American Political Science Review* 108 (Feb.): 144-68.

Week 9: *Machine Learning and Big Data Methods.*

- Mario Molina and Filiz Garip. 2019. "Machine Learning for Sociology." *Annual Review of Sociology* 45 (1): 27-45.
- Stefan Wager and Susan Athey, 2017 "Estimation and Inference of Heterogeneous Treatment Effects using Random Forests." Journal of the American Statistical Association `https://www.tandfonline.com/doi/full/10.1080/01621459.2017.1319839`
- Naoki Egami, Christian J. Fong, Justin Grimmer, Margaret E. Roberts, and Brandon M. Stewart, 2018. "How to Make Causal Inferences Using Texts." `https://arxiv.org/abs/1802.02163`
- Huntington-Klein, Chapter 19.

Examples:

- Robert A Blair, Christopher Blattman, and Alexandra Hartman, 2017, "Predicting Local Violence: Evidence from a Panel Survey in Liberia." *Journal of Peace Research* 54 (2): 298-312.
- In Song Kim, 2017, "Political Cleavages within Industry: Firm-level Lobbying for Trade Liberalization." *American Political Science Review* 111 (1): 1-20.
- ANASTASOPOULOS, L. JASON, and ANTHONY M. BERTELLI. 2020. "Understanding Delegation Through Machine Learning: A Method and Application to the European Union." *American Political Science Review* 114(1): 291–301. doi: 10.1017/S0003055419000522.

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