FALL 2021 | Thur 10:15am-12:45pm | Levine Science Research Center Room A156

POLISCI 731: Research Design and Causal Inference

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Course Overview

This course is a graduate-level introduction to conducting research in political science. Given the enormity of the topic, the course focuses on question asking, theory building, and empirical research design for causal inference.

The theory component of the course has two goals: First and most importantly, this course will help you understand the role of theory in political science. The hope is that by doing so your ability to ask questions / form hypotheses / build on existing literatures will be enhanced. Second, we will go through a few of the most salient theoretical models in political science and develop your modeling skills. Crucially, this course has no prerequisites; so, we will go as slow as needed to so that everyone understands these models, becomes more familiar with notation, etc.

The empirical research design component of the course is centered on causal inference. Causal inference is the process of drawing (or trying to draw, as the case may be) causal conclusions from evidence. The course will provide you with a

logical overview of different approaches to drawing such causal conclusions, this as opposed to a course on the statistical implementation of designs. The emphasis will be on the assumptions that must be true in order for those approaches to produce valid causal inferences. Our course will not exhaust the set of research designs that are available to empirical scholars, but will provide you firm grounding in a few of the most frequently used. From this logical background, students should be well-positioned to seek out the relevant statistical models that allow them to implement those research designs when they are quantitative.

In addition to exposure to the theory of research and the research of others, this course is also designed to help students develop their own research projects early in their graduate career. By the end of the semester, students will have produced a short research proposal that outlines a question, a theory in answer to that question, a hypothesis (or *-ses*) to test that theory, a measurement strategy, a feasible research design to evaluate the hypothesis, a description of the assumptions necessary to interpret the design as causal, and a plan for providing the evidence necessary to support those assumptions. This is a short course where last three weeks are dedicated to student presentations of their research proposals.

These proposals may form the basis for a future paper, or end up in the bottom of a desk drawer never again to see the light of day; however, the *practice* developing these ideas, regardless of the outcome, will be the critical component. Scholars rarely hit on a good design their first go-round. It takes time and practice and lots of failure. But without trying, you cannot succeed.

Learning Goals

By the end of the course, you will be able to

1. Differentiate between *descriptive* research questions and *causal* research questions; and identify a related causal question to a given descriptive question (and vice versa).
2. Describe the types of knowledge provided by deductive approaches vs. inductive/empirical approaches and the ways in which these are related.
3. For a given puzzle/question, sketch a theoretical answer by identifying the actors, their actions, and their payoffs.

4. Articulate the fundamental problem of causal inference in terms of counterfactuals.
5. Articulate the difference between causal inference and statistical inference.
6. Describe the ideal (albeit potentially infeasible) experiment that would allow for the best causal answer to a given question.
7. For a standard causal empirical research design, be able to (a) identify the comparison being made, (b) describe how each design approximates the counterfactual condition, and (c) the assumptions that must be true for the comparison to allow for a causal inference to be made.
8. Compare the theoretical estimator derived from a given theory with the empirical estimate that can actually be obtained given the sample and research design.
9. Deliver orally and in writing a succinct research proposal covering the main components of research.

Assignments

A core goal of this course is to give you the opportunity at the very outset of your graduate career to design your own research to answer questions about the political world that are interesting to you.

The following assignments are designed to help you to achieve the above learning goals, thereby deepening your abstract understanding of the scientific method as it relates to politics, and developing your ability to apply that abstract understanding to your own research. More information about each will be provided in class.

In addition to the assignments, your grade is determined by participation (described later).

Three Research Questions (5%)
DUE: September 9 at class time (via Sakai 'Assignments')

The first assignment is a research question assignment. You will submit three distinct *causal* research questions. See Sakai for additional details.

One Theoretical Sketch (15%)
DUE: September 23 at class time (via Sakai 'Assignments')

The second assignment asks you to select one of your research questions from the assignment above (or a new question, or the revised version of a question post-in-class-workshop). You will then outline a theoretical sketch that explains—in terms of causal mechanisms—what you think the answer to that question is. The theoretical sketch will identify (a) the actors relevant to your particular political dynamic, (b) the actions that those actors can take, and (b) the payoffs that they receive from taking different actions.

To do so, you will draw inductively from what you know about the particular setting you're working in and from other findings in this area, and deductively from existing theory. To do so will require some engagement with the literature related to your research question. From that theoretical sketch, you will present, at a minimum, one observable implication of that theory that you can operationalize as an empirically testable hypothesis. More details will be provided.

Two Research Designs (15%)
DUE: October 28 at class time (via Sakai 'Assignments')

The third assignment asks you to build on the theoretical sketch from the previous assignment. First, you will articulate the naive comparison that one might use to evaluate some component of the theoretical answer that you sketched in the previous question. Then, you will explain why that naive comparison might lead to erroneous causal inferences. Third, you will articulate the ideal (albeit potentially infeasible) experiment you would use to evaluate the theoretical answer to your question that you previously sketched. Finally, you will present two *different* research designs that can potentially evaluate the theoretical answer that you previously sketched.

These should be feasible designs. You'll explain the strengths and limitations of the designs both in terms of their relationship to your theory, and in terms of their ability to identify a causal relationship. See Sakai for additional details.

In-Class Presentation (15%)
DUE: To be determined

You will present your proposal in a five minute conference-style presentation with slides. This presentation will occur in the second half of the course. You will see a model presentation in the style we expect prior to undertaking your own presentation. See Sakai for additional details.

Final Research Proposal (25%)
DUE: December 3, by noon (via Sakai 'Assignments')

The final research proposal asks you to pull together information from your above assignments into one incredibly succinct three-page proposal. Given the very short length of the document, the goal with this proposal is to be concise and utilitarian.

Your draft proposal should present (1) your research question, present a (2) sketch of the theory and hypotheses you develop, explain the (3) problems of the naive comparison and ideal experiment to evaluate your hypotheses, the (4) feasible (if not ideal) research design you've chosen, a description of (5) the logical assumptions for making a causal inference from that design, and how you plan to substantiate those assumptions with evidence, and (6) the strengths and limitations of the empirical design with respect to the theory you sketch. The final research proposal incorporates the feedback that you've received on assignments up to this point, including on your presentation. See Sakai for additional details.

Course Structure

The course is structured as a seminar in which discussing readings, asking questions, and probing topics of interest will be the key components. Some portions of class will also be dedicated to short lectures. Student participation is a vital component of the course.

Participation (25%)

The success of the course will depend on the active engagement of all students in class. Your ability to participate effectively is a function of your preparation and your conduct in class.

We expect all students not only to have completed readings prior to class, but to have thought about them and reflected on them. Knowing the quantity of work you have for other classes, we are keeping the reading load relatively light for this class. But in unburdening you from a large quantity of reading, we nevertheless expect your engagement with the reading that is assigned to be of the highest quality.

While you will develop (or refine) your own strategies of being prepared to participate in class, two of the best strategies are to write a set of questions and thoughts about the reading that you are interested in sharing with the group. Your questions or comments for class may be anything from notational confusion to critiques, extensions, and possible generalizations. Although it can be hard to admit places where you didn't understand, we deeply encourage students to bring questions to class of the variety "I don't understand *this*" or "I thought *this*, but this reading confused it"—that is, questions that reveal uncertainty. These are typically the questions that allow *everyone* in class the opportunity to clarify and solidify their understanding.

In addition, please bring scratch paper to take notes and work through models in class. Putting pen to paper is shown to improve learning. We will not be creating or posting lecture slides, and much of what we do in class is not conducive to computer note taking.

Grading

We will grade on a standard A, B, C grade scale (with +/-). For doctoral students, our emphasis will be on giving you feedback to help you succeed— not only in this course—but in the program overall. Thus, the feedback is more important than your letter grade.

With that being said, we expect students to be able to achieve a B+ or better in the course. If you're receiving B grades or lower—or your assignment feedback indicates a failure to grasp core components of the course—please come talk to us so that we can figure out what is going on and address it while there is still time.

Resources

Appointments

Please reach out to make an appointment with us if we can be helpful with your research proposal or your understanding of the class material. If you have a brief question, you can ask over email as well. Please email both instructors when asking a new/general question. Please expect a response within 24 hours.

Your Fellow Students

Academic scientific is a highly collaborative process. Even when this is not evidenced in formal co-authorships, the way in which your peers can probe, push, and refine your ideas is one of the most valuable (and rewarding, I think) parts of our discipline. Thus, you are welcome to share your ideas widely with students in your cohort or beyond, incorporate their thoughts, and rely on their advice. This will undoubtedly make your final project better.

At the same time, for other small assignments or in approaching the readings, I encourage you to work independently *first*, before having discussions with your fellow students. This will give you an opportunity to practice applying the knowledge that we're developing in class, and gauge your own understanding of the material. However, once you've tried something on your own, seek out your fellow students to share. We're smarter together.

Mental Health

Graduate school is designed to stretch your intellectual abilities so that you can push the frontier of collective knowledge. Doing so necessitates criticism (though hopefully constructive). For many students who have aced school since day one, this is some of the very first true criticism that they've ever received, and it can be difficult to process.

In addition, graduate school also puts you in charge of your own scholarship in a way few students have previously experienced. That freedom can be powerful, but also overwhelming. Questions about productivity, time management, and progress become salient as never before. In addition, the sheer amount of work that you're asked to do in a doctoral program can leave you eating poorly, sleeping poorly, and neglecting yourself in other basic ways. Finally, for students whose specific backgrounds leave them questioning whether they belong, all of these challenges can be multiplied.

All of this stress means that taking care of your mental health is a critical component of graduate school. Learning skills to manage stress, anxiety, criticism and disappointment will make you happier in life overall and a more successful scholar. For some of you, taking care of your mental health will require only a few adjustments from before. For others of you, you may want to invest even more fully in mental health. The Duke Wellness Center is a great resource for this. They have staff counselors you can speak with easily, and convenient referrals to more routine counseling off-campus.

Finally, if the burdens of graduate study ever become too much, reach out to someone, anyone. The circumstances of the pandemic further augment these challenges and underline the importance of taking care of yourself.

SCHEDULE

Weeks labeled SD will be primarily taught by Scott. Weeks labeled AF will be primarily taught by Adriane.

Week 1 — August 26 — The Scientific Enterprise in Politics

Readings to be completed before class:

1. Varian, Hal. "How to Build an Economic Model in Your Spare Time." http://people.ischool.berkeley.edu/~hal/Papers/how.pdf
2. de Marchi, Scott. *Computational Modeling in the Social Sciences.* Chapter 1. To be emailed to class.

Week 2 — September 2 — Example Theoretical Model 1: Spatial Theory

Readings to be completed before class:

1. If you can, find a cheap copy of Downs' *An Economic Theory of Democracy*. But, I'll present the core model in class.
2. Munger & Munger, Choosing in Groups chapters 3 and 4. To be emailed to class.

Week 3 — September 9 — Strategic Actors and Game Theory

DUE: Three research questions assignment Readings to be completed

before class:

1. Brief Introduction to Game Theory (Matthew Jackson) https:// papers.ssrn.com/sol3/papers.cfm?abstract_id=1968579.

2. Also consult chapters 1 and 2 of Osborne at https://www.economics.utoronto.ca/osborne/igt/.
3. Robert Gibbons. 1997. "An Introduction to Applicable Game Theory," *Journal of Economic Perspectives* 11:127-149. https://www.jstor.org/stable/2138255?seq=1#metadata_info_tab_contents
4. Rubinstein. 1991. "Comments on the Interpretation of Game Theory," *Econometrica* 59:909-24. https://www.jstor.org/stable/2938166?seq=1#metadata_info_tab_contents
5. Rubinstein. "Dilemmas of an Economic Theorist." http:// arielrubinstein.tau.ac.il/papers/74.pdf

Week 4 — September 16 — Example Theoretical Model 2: Bargaining Theory

Readings to be completed before class:

1. Baron and Ferejohn. "Bargaining in Legislatures." APSR, 1989. https://www.jstor.org/stable/1961664?seq=1#metadata_info_tab_contents
2. Cox, Gary. "Nonunitary Parties, Government Formation, and Gamson's Law." APSR, 2021. https://www.cambridge.org/ core/journals/american-political-science-review/article/ nonunitary-parties-government-formation-and-gamsons-law/ F1141F85A250739AB75F63E0773B94E5

Week 5 — September 23 — Counterfactuals, Potential Outcomes & The Experimental Ideal

DUE: Theoretical sketch assignment

Readings to be completed before class:

1. Morgan and Winship: Chapter 2. Available on Sakai.
2. Angrist and Pishke: Chapters 1 and 2. Available on Sakai.

3. Dunning, Thad (2008). Improving Causal Inference: Strengths and Limitations of Natural Experiments. *Political Research Quarterly.* Vol. 61. No. 2. Available on Sakai.

Week 6 — September 30th

NO CLASS (APSA)

Week 7 — October 7 — Directed Acyclic Graphs

Readings to be completed before class:

1. Morgan and Winship. Selections to be emailed to class.

Week 8 — October 14 — Natural Experiments 1: Regression Discontinuity Designs

Readings to be completed before class:

1. Morgan and Winship: Pages 354-363.
2. Ferwerda, Jeremy and Nicholas L. Miller (2014). "Political Devolution and Resistance to Foreign Rule: A Natural Experiment." *American Political Science Review*. Available on Sakai.
3. Kocher, Matthew A. and Nuno P. Monteiro. "Lines of Demarcation: Causation, Design-Based Inference, and Historical Research." *Perspectives on Politics*. Available on Sakai.

Week 9 — October 21 — Natural Experiments 2: Difference-in-Differences Designs

Readings to be completed before class:

1. Cascio, Elizabeth and Ebonya Washington (2014). "Valuing the Vote: The Redistribution of Voting Rights and State Funds following the Voting

Rights Act of 1965" *The Quarterly Journal of Economics* Vol 129, No 1. Available on Sakai.

2. Angrist and Pishke: Chapter 5. Available on Sakai.

Week 10 — October 28 — Connecting Theory and Empirics

DUE: Two research designs assignment

Readings to be completed before class:

1. de Marchi and Stewart. "Wrestling with Complexity." To be emailed to class.
2. Gailmard, Sean. "Theory, History, and Political Economy." https://www.nowpublishers.com/article/Details/HPE-0003
3. Ward, Michael. 2017. "Do We Have Too Much Theory in International Relations or Do We Need Less? Waltz Was Wrong, Tetlock Was Right." https://oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-301
4. Przeworski, Adam. 2006. "Is the Science of Comparative Politics Possible?" https://www.researchgate.net/publication/287514283_Is_the_Science_of_Comparative_Politics_Possible

Week 11 — November 4

Final Student Presentations (Day 1)

Week 12 — November 11

Final Student Presentations (Day 2)

Week 13 — November 17

Final Student Presentations (Day 3)