PLSC 309: Quantitative Political Analysis

Spring 2023
Monday-Wednesday-Friday: 10:10 AM - 11:00 AM
Chambers 104

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Office Hours: Monday and Wednesday 11:30 AM - 12:30 PM

Course Description

Why do people vote? Why do some countries experience civil wars but not others? Does trade increase inequality? What kinds of countries are more likely to go to war against each other? These are the questions you may ask when studying politics. To answer and evaluate these questions, data and statistics have become invaluable tools for social scientists.

This course introduces you to the empirical research process used in political science and other disciplines that use data to answer questions. You will learn how to construct theories and hypotheses, and how to test theories using a variety of statistical techniques, including descriptive analysis, hypothesis testing, correlation, and regression analysis. The course will empower you with the skills and confidence needed to produce your own quantitative analyses. In addition, you will learn critical thinking skills to evaluate claims and assertions by using data. These skills will improve your performance in other classes, strengthen applications to graduate school, and make you valuable to potential employers.

In addition to learning how to perform analyses by hand, you will learn how to employ programming and software to perform these tasks. We will use the R programming language and RStudio software. These are powerful tools to manipulate, analyze, and visualize data. Both are free, so you can easily download them to your personal computers. No prior experience is required.

Objectives

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

1. Explain how political scientists use statistical methods to test theories about the political world,
2. Analyze and critically evaluate the use of inferential statistics in applied settings,
3. Think probabilistically about evidence for or against a proposition,
4. Use data visualization and statistical techniques–including measures of central tendency and dispersion, hypothesis testing, linear regression, and logistic regression–to analyze data and answer questions about the world, both by hand and using R,

5. Interpret the results of statistical analyses to lay audiences, both orally and in writing,
6. Apply these techniques as part of an original study that tests a theory about some political phenomenon.

Readings and Course Materials

Readings

The readings are crucial to understanding the concepts and how they are applied.

1. (Required) Kellstedt, Paul M. and Guy D. Whitten. The Fundamentals of Political Science Research, 3rd Edition. Hereafter referred to as "KW".
2. (Recommended) Wheelan, Charles. Naked Statistics: Stripping the Dread from the Data. (This is a ridiculously casual and accessible way to learn about statistics, so it will be a useful supplement if the required chapter reading is too technical.)
3. In addition to these books, there are also journal articles in political science. We will be discussing the research design and methodological approaches of these articles. I will provide the page numbers that you should focus on, so there is no need to read all of the contents. These readings are available on Canvas.

Technology and Software

The course relies heavily on using the computer and software. I will provide tutorials to install and run the programs.

1. Computer/Laptop. We will use computers almost every day during class. You are welcome to bring your own laptop or rent one from the Penn State library.
2. R is the programming language we will use for our analyses. You can download it from: https://cloud.r-project.org/
3. RStudio is the software that provides the interface to look at code, output, and visualization. *You must install R before Rstudio.* You can download it from: https://posit.co/download/rstudio-desktop/
4. GitHub is the platform I use to host the code and data used for assignments, which can be accessed via https://github.com/hknd23/PLSC-309-SP23.

Other Resources

1. Google is your friend. If you are stuck with an error or question, try googling first to find a guide online.
2. If you google an issue, you may find questions for similar issues on Stack Overflow. This is a community for R users to help each other and provide guides to resolve issues.
3. There are many free online tools to help you familiarize yourself with R and statistics. They can help you as a reference tool. Here are some examples:
    - https://ourcodingclub.github.io/tutorials.html
    - https://www.statmethods.net/r-tutorial/index.html

Prerequisite

This class does not assume any prior statistical or programming experiences. Some background in Algebra should be enough for you to get comfortable with the concepts.

Requirements

- ***Lab Reports*** (25%): There are 5 lab reports for you to practice with real data. Some of these labs we will work on during class. They are meant to assess your understanding of the material and allow you to ask questions and seek help from me or your peers before doing similar problems in exam settings. You will submit each lab assignment on CANVAS.
- ***Project and Presentation*** (40%): As we learn about how to do quantitative political science through this semester, you will do your own piece of original research. You can choose any topic in political science that interests you, and I will be happy to point you to resources to help you along the way. Doing research is extremely time-intensive, and projects develop and evolve as you work on them. To help you structure your time, you will complete three preliminary assignments, which you will submit to me by the designated due dates: 1) your topic/hypothesis; 2) a codebook and data description; and 3) a preliminary analysis. The final project will take the form of a poster, which you will present in class. More details about each of the three checkpoint assignments as well as a rubric for your final poster will be made available on CANVAS and in class.
- ***Exams*** (25%): There will be two exams (10% and 15% respectively). I will provide further details later, but for now, they will involve the use of R. The exams will have multiple choice and open answer questions, and the second exam will not be cumulative.
- ***Participation*** (10%): Active participation is one way to help you master the materials more quickly. Participation can take many forms, including but not limited to asking and answering questions in class, engaging with material during class discussion periods, coming to office hours, etc. Participation is important because you will be more likely to learn, understand, and retain material with which you are actively engaged. **Importantly**, we will be doing regular in-class activities in addition to labs. These activities will count toward your participation grade.

Grading Scale

A = 94 to 100%
A- = 90 to 93.99%
B+ = 87 to 89.99%
B = 83 to 86.99%
B- = 80 to 82.99%
C+ = 77 to 79.99%
C = 70 to 76.99%
D = 60 to 69.99%
F = below 59.99%

How do I succeed?

This may be the first course you take in Political Science that makes you do statistics and work on the computer more than reading. I will do my best to make the materials more

approachable and provide you with the skills that can help you in the long run. There are some things you can do to be successful:

- Read before class and ask as many questions as you can. I welcome all questions as they not only clear up confusion but also help you engage with the materials.
- Practice (practice practice). Practicing is essential for this class. Statistics and R are not something you can do well on the first try, but you will be amazed by your progress if you practice frequently.
- Come to office hours. If my office hours do not work for you, let me know and we can work out a meeting time.

Expectations and Procedures

Office Hours: If you need help with the material, come to my office hours as much as you can. Students who come to office hours are, in addition to doing the best in class, those that *improve* the most.

Working together is encouraged. You should definitely collaborate on your assignments because working on problems together benefits everyone. However, when submitting the assignments, **the final work must be your own**. This means that you must type in and produce your own results in R; you must write the written assignments yourself; and you must complete your own final projects. You may not collaborate on exams.

Assignment Submissions: Written assignments are to be submitted in person. For R assignments, you must submit on Canvas both the code file (.R format) and the output file with the results produced and neatly presented. Points are deducted if you are missing the required files.

Late Assignments: Assignments not submitted by the designated due date/time are late. Late submissions will be accepted, but with a one-half grade (5%) per day (including weekends) penalty. All assignments must be completed to pass the course.

Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Disability Accommodation

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus (http://equity.psu.edu/sdr/disability-coordinator). For further information, please visit the Student Disability Resources website (http://equity.psu.edu/sdr/).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. See documentation guidelines (http://equity.psu.edu/sdr/guidelines). If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity, and sexual orientation.

Counseling and Psychological Services at University Park (CAPS) (http://studentaffairs.psu.edu/counseling/): 814-863-0395

Counseling and Psychological Services at Commonwealth Campuses (https://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400 Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

Reporting Bias

Penn State University has adopted a "Protocol for Responding to Bias Motivated Incidents (http://equity.psu.edu/reportbias/reports/protocol-for-responding-to-bias-motivated-incidents)" that is grounded in the policy that the "University is committed to creating an educational environment which is free from intolerance directed toward individuals or groups and strives to create and maintain an environment that fosters respect for others." That policy is embedded within an institution traditionally committed to academic freedom (https://guru.psu.edu/policies/OHR/hr64.html). Bias motivated incidents include conduct that is defined in University Policy AD 91: Discrimination and Harassment, and Related Inappropriate Conduct (https://guru.psu.edu/policies/ad91.html). Students, faculty, or staff who experience or witness a possible bias motivated incident are urged to report the incident immediately by doing one of the following:

* Submit a report via the Report Bias webpage (http://equity.psu.edu/reportbias/)

* Contact one of the following offices:

University Police Services, University Park: 814-863-1111

Multicultural Resource Center, Diversity Advocate for Students: 814-865-1773

Office of the Vice Provost for Educational Equity: 814-865-5906

Office of the Vice President for Student Affairs: 814-865-0909

Affirmative Action Office: 814-863-0471

* Dialing 911 in cases where physical injury has occurred or is imminent.

COVID 19

While COVID-19 cases have decreased substantially since the fall of 2021, COVID-19 remains a pandemic. I will strictly follow Penn State's official guidelines related to COVID-19. As of currently, masking is not required, but anyone who wishes to wear a mask is welcome to do so. I will make announcements if there are any changes to the guidelines.

Schedule

Below is the list of class meetings, topics, and assignments. The schedule is tentative and subject to change. I will inform you if there is any change to the schedule.

January 9: Introduction

January 11: Political "Science"

- KW Chapter 1

January 13: Research Design

- KW Chapter 4

January 16: No Class - Martin Luther King Day

January 18: Measurement

- KW 5.1-5.3 (pages 104-115)
- Eck, Kristine, and Christopher J. Fariss. 2018. "Ill Treatment and Torture in Sweden." Journal of Human Rights 40: 591-604.

January 20: Introduction to R

- Notes on R. Available on CANVAS
- Using the slides on CANVAS, install the following two programs on your computer: (1) R and (2) RStudio (in that order). Bring your computer to class!

January 23: Data Collection and Operationalization

- KW 6.1-6.2.3 (pages 125-129)
- Wheelan Chapter 7. Available on CANVAS

January 25: Central Tendency

- Burden, et al. 2017. "Reassessing Public Support for a Female President." Journal of Politics 79: 1073-1078. Available on CANVAS

January 27: Dispersion

- KW 6.2.4-6.6 (pages 130 - 140)

January 30: Data Visualization

- Due: Project Topic and Hypothesis

February 1: Data Visualization II February 3: Intro. to Probability and Inference

- KW Chapter 7
- Carl Zimmer. 2014. "Why We Can't Rule Out Bigfoot" https://nautil.us/why-we-cant-rule-out-bigfoot-2269/

February 6: Confidence Intervals and One-sample Tests

- KW 8.3 (pages 163-166) and 8.4.2 (pages 173-178)
- "Central Limit Theorem" https://seeing-theory.brown.edu/probability-distributions/index.html#section3
- "Confidence Intervals" https://seeing-theory.brown.edu/frequentist-inference/index.html#section2
- Due: Data Visualization Lab

February 8: Bivariate Hypothesis Testing and Statistical Significance

- KW 8.4.1 (pages 163-178)
- Licklider, Roy. 1995. "The Consequences of Negotiated Settlements in Civil Wars." American Political Science Review 89(3): 681-690.

February 13: Bivariate Hypothesis Testing and Statistical Significance II

February 15: Hypothesis Testing Lab/Midterm Review

- Due: Project Codebook and Data Description

February 17: **Midterm Exam I**

February 20: Manipulating Data Lab

- Due: Hypothesis Testing Lab

February 22: Correlation

- KW 8.4.3 (pages 178-184)
- Inglehart, Ronald. 2003. "How Solid is Mass Support for Democracy–And How Can We Measure It?" PS: Political Science and Politics 36: 51-57

February 24: Regression I

- Wheelan Chapter 11. Available on Canvas

February 27: Regression II

- KW Chapter 9 (pages 188-212)
- Lyall, Jason. 2009. "Does Indiscriminate Violence Incite Insurgent Attacks?" Journal of Conflict Resolution 53(3): 331-332.

March 1: Multivariate Regression

- KW 10.1-10.6 (pages 215-228) and 10.8 (pages 233-236)
- Canelo, et al. 2018. "The Paradoxical Effect of Speech-Suppressing Appeals to the First Amendment." Journal of Politics 80: 309-313.

March 3: Multivariate Regression II

March 6-10: No Class- Spring Break

March 13: Model Specification and Statistical Control

- KW 10.7 (pages 228-233) and 11.1-11.3 (pages 246-258)
- Enders, et al. 2022. "Who Supports QAnon?" Journal of Politics 84(3): 1845-1849.

March 15 - March 17: No Class

March 20: Predicting and Graphing Linear Regression

- TBA

March 22: Challenges: Multicollinearity and Outliers

- KW 11.4-11.5 (pages 258-270)
- Crabtree, Charles, and Matt Golder. 2016. "Party System Volatility in Post-Communist Europe." British Journal of Political Science 47(1): 229-234.

March 24: Logistic Regression

- KW 12.2 (pages 274-282)
- Fearon, James D., and David Laitin. 2003. "Ethnicity, Insurgency, and Civil War." American Political Science Review 108: 588-604.

March 27: Logistic Regression II

March 29: Predicting and Graphing Logistic Regression

- TBA

March 31: R Lab: How to Present Analyses + Exam II Review

- KW 10.9 (pages 236-242)

April 3: **Midterm Exam II**

April 5: Saving your Research and Reproducibility: GitHub Basics

- Create a free GitHub account: https://github.com/
- https://resources.github.com/github-and-rstudio/
- Dafoe, Allan. "Science deserves better: the imperative to share complete replication files." PS: Political Science & Politics 47, no. 1 (2014): 60-66. Read only BENEFITS OF SHARING COMPLETE REPLICATION FILES https://www.cambridge.org/core/journals/ps-political-science-and-politics/article/science-deserves-better-the-imperative-to-share-complete-replication-files/C19AE087642810DD9C0C83BF8D0908A9

April 7: Regression Lab

April 10: Regression Lab II

- Due: Project Preliminary Analysis

April 12: Logit Lab

- Due: Regression Lab

April 14: No Class

April 17: Logit Lab II

April 19: Some more models

- TBA

April 21: Research Ethics

- LaCour, Michael J. and Donald P. Green. 2014. "When Contact Changes Minds: An Experiment on Transmission of Support for Gay Equality." Science 346(6215): 1366-1369.
- Due: Logit Lab

April 24: Poster Presentations

April 26: Poster Presentations

April 28: Poster Presentations

By **11:59 PM April 30th**, the following files must be uploaded on Canvas:

1. Poster file
2. Replication data
3. .R code file (clean and well documented)