

PSC 200: Applied Data Analysis

Spring 2014

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Harkness 303

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Course Description

How do we evaluate empirically the claims politicians make? How do we determine whether theories of political behavior are supported by evidence? What do reporters mean when they refer to a poll being accurate to $\pm 3\%$? In this course, students are introduced to data analysis, statistical inference, and research design relevant to political science research. Topics covered will include variable measurement, descriptive statistics, confidence intervals, hypothesis tests, correlation, and regression analysis.

Lectures: Mon & Wed, 11-11:50, Harkness 114

Lab: Fri, 11-11:50, Harkness 114

half-grade (e.g., B to B-) for each day they are late. Homeworks more than seven days late will receive a grade of zero. Finally, while you are encouraged to study together and to learn the software together, all assignments are to be completed individually.

Academic Honesty. Please be familiar with [the University's policies](#) on academic honesty. Students found to be copying from another student on HW's or exams will be given a grade of zero for that assignment or exam.

Readings

The following textbooks are **required**:

Alan Agresti and Barbara Finlay, *Statistical Methods for the Social Sciences*.

This is the main textbook for the course. The newest copy is [the fourth edition](#). However, [the third edition](#) (1997) | which sells used for substantially less | is perfectly acceptable for this class.

Larry Gonick and Woollcott Smith, *The Cartoon Guide to Statistics*.

Yes, this is a textbook for this course, and yes, it is required. It might be helpful to do each topic's reading from the *Cartoon Guide* before reading the equivalent sections in Agresti & Finlay.

John Verzani, *SimpleR: Using R for Introductory Statistics*.

This is a free PDF about R, the computer program we'll be using for statistical analysis.

Most of the "recommended reading" below consists of articles, with links to an online pdf version (e.g., via JSTOR). To access these, you must be on the UR network or have a VPN connection. Articles without a web link are available on the course blackboard page or in the library reserves. From time to time, these articles may become "required" reading for homework assignments.

Statistical Program: R

Students will be required to complete homeworks using the R program for statistical analysis. Labs will be held in Harkness 114. However, most academic computing labs on campus have R installed either on Macs or Windows PC's (see the [list of computing labs](#) for more information).

R is free, so you may want to install it on your own computer. To do so, you can download R from

[Comprehensive R Archive Network \(CRAN\)](#). This is the original and most up-to-date version of R. Towards the top of the page is a section titled "Download and Install R." Select your operating system (Mac, Windows, Linux) and follow the links.

[RStudio](#). This is an integrated environment for R. It contains an editor, console, help, and plot window all in one larger window. Many first-time R users prefer the RStudio environment. It is also free. Just click on the RStudio link at the beginning of this paragraph and follow the download instructions.

Course Outline

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1 Course Introduction

Topics: Arrrgh! Why do I have to take this.....E159mm159(.) -26.285 Td [(mm159tG /F(58(2.16159(.)-Re

- { Bernard Grofman, William Koetzle, and Anthony McGann. 2002. Congressional Leaders 1965-96: A New Look at the Extremism Versus Centrality Debate. *Legislative Studies Quarterly*. ([JSTOR](#))
- { Michael McDonald and Samuel Popkin. 2001. "The Myth of the Vanishing Voter." *American Political Science Review*, Vol. 95, Issue 4: 963-974. ([JSTOR](#))
- { John Woolley. 2000. "Using Media-Based Data in Studies of Politics." *American Journal of Political Science*, Vol. 44, Issue 1: 156-173. ([JSTOR](#))

HW 2: Variables & Measurement

HW 3: Descriptive Statistics

- { Agresti & Finlay, sections 4.4{4.7 (third edition: 4.4{4.6), 5.1{5.4, 5.6.
- { *Cartoon Guide*, chapters 6{7.

HW 5: Probability and Sampling Distributions

HW 6: Estimators and Confidence Intervals

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5 Midterm Review

Midterm reviews held during lecture and lab.

6 Midterm Exam

Covers all material to date.

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7 Hypothesis Tests

Topics: Hypothesis Tests, Type I and II Errors

Required Reading:

- { Agresti & Finlay, 6.1{6.5.
- { *Cartoon Guide*, chapters 8.

Lab will cover midterm answers and grades.

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8 Comparing Two Groups

Topics: Difference of Means, Difference of Proportions

Required Reading:

- { Agresti & Finlay, sections 7.1{7.4.
- { *Cartoon Guide*, chapter 9.

Recommended Readings:

- { James Payne. 1982. Career Intentions and Electoral Performance of Members of the U. S. House. *Legislative Studies Quarterly*. 7(1):93-99. ([JSTOR](#))

HW 7: Hypothesis Tests & Difference of Means/Proportions

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9 Research Design

Topics: Types of Research Design, Internal & External Threats to Validity, Experimental Data

Required Reading:

{ Cartoon Guide, chapter 10.

{ James McDavid & Laura Hawthorn. 2005. Research Designs for Program Evalu-

11 Correlation and Bivariate Regression

Topics: Linear relationships, Correlation, Bivariate Regression, Regression Assumptions

Required Reading:

- { Agresti & Finlay, chapter 9.
- { *Cartoon Guide*, chapter 11.

Recommended Readings:

- { W.S. Robinson. 1950. "Ecological Correlations and the Behavior of Individuals." *American Sociological Review*, Vol. 15, Issue 3: 351{357. ([JSTOR](#))
- { Edward Tufte. 1973. "The Relationship Between Seats and Votes in Two-Party Systems." *American Political Science Review*, Vol. 67, Issue 2: 540{554. ([JSTOR](#))

HW 10: Correlation & Bivariate Regression

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12 Multiple Regression

Topics: Multiple Regression, R^2 , F-Test, Dummy Variables, Interaction Terms, Quadratic Terms

Required Reading:

- { Agresti & Finlay, chapters 10, 11.1-11.6, 13.1-13.4, 14.1-14.3, 14.5 (third edition: 14.1-14.4)

Recommended Readings:

- { Mark Duggan. 2001. "More Guns, More Crime." *Journal of Political Economy*, Vol. 109, Issue 5: 1086{1114. ([JSTOR](#))
- { Steven Fish. 2002. "Islam and Authoritarianism." *World Politics*, Vol. 55, Issue 1: 4{37. ([JSTOR](#))
- { Bruce Russett. 1982. "Defense Expenditures and National Well-being." *American Political Science Review*, Vol. 76, Issue 4: 767{777. ([JSTOR](#))

HW 11: Bivariate & Multiple Regression

HW 12: Multiple Regression: Dummies, Interactions, & Quadratic Terms

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13 Logistic Regression (if time permits)

Topics: Regression with Binary Data, S-curve, Likelihood Ratio Test

Required Reading:

{ Agresti & Finlay, chapter 15.1-15.3

Recommended Readings:

{ John Oneal and Bruce Russett. 1997. "The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950-1985." *International Studies Quarterly*, Vol. 41, Issue 2: 267-294. ([JSTOR](#))

HW 13: Logistic Regression

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14 Final Exam Review

Final exam reviews held during lectures and lab the last week of class.

15 Final Exam (TBD: Finals Week)