

**THE POWER OF NUMBERS:  
INTRODUCTION TO QUANTITATIVE SOCIAL SCIENCE  
(SOCIOLOGY 7)  
FALL 2017**

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Class: MWF: 8-9am, Barrows 104  
Office hours: W 9:15-10:15am ([sign-up](#)), Barrows 360

### **Course Overview<sup>1</sup>**

Social statistics have become more widespread and visible in recent years, but these numbers are not always well understood. Some statistics seem so transparent that we pay them no heed. Others appear so opaque that we give up. Many numbers circulating as common knowledge are not even right. Yet, they have the appearance of precision and a certain social power, and so they endure. Wrong numbers can have important social consequences. A quantitatively literate populace can confront these and produce or demand better statistics.

This course will introduce you to the basic concepts central to quantitative sociology and equip you to become more savvy and critical consumers of social science research. It seeks to give you an intuitive, context-driven overview of quantitative tools employed by social scientists and many hands-on opportunities to use these tools to examine the world. It is intended specifically for social science majors, and focuses on social science questions. *You do NOT need a strong mathematical, statistical, or computing background to succeed in this course.* What you do need is curiosity about how society is organized, desire to try something new, and a collaborative and constructive attitude. Our aim is to show you that quantitative social science is useful, can be fun, and is something that you can do.

By the end of the semester, you will be able to understand, evaluate, use and produce quantitative data about the social world by:

- Critiquing and producing basic graphs
- Accessing relevant, high-quality data & relevant sociological research
- Manipulating and analyzing data in spreadsheets and on-line
- Calculating and explaining basic statistical measures of central tendency, variation, correlation
- Applying and explaining basic concepts of sampling and selection
- Thinking critically about reported statistics and quantitative social science more broadly

### **Required Readings & Resources**

*You must have a laptop with internet access to take this course.* If you want to take this course and do not have a laptop, see Professor Liu immediately. There are two textbooks for this course:

Silver, Nate. 2012. *The Signal and the Noise: Why so many predictions fail — but some don't*. Penguin Books.

Wheeler, Charles. 2013. *Naked Statistics: Stripping the dread from the data*. Norton.

Other readings will be posted on bcourses. A course reader (including Silver) is available at Copy Central. All texts are on 2-hour reserve at Moffitt. Finally, as we work through real applications, we will rely heavily on web-based resources and tools.

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<sup>1</sup> I am grateful to Sara Lopus for her original course design of Soc 7 and to Professor Daniel Schneider for sharing his Soc 5 syllabus. My syllabus builds on Lopus' and Michael Schultz's syllabi for Sociology 7, and borrows many of the course policies, general guidelines and general formatting from Schneider's Soc 5 syllabus.

## Course Assignments

Students will be evaluated and graded based on two examinations, ten problem sets, four projects, and class participation and attendance. The table at the end of this section notes the due dates for each assignment and the percentage of the final grade that each assignment is worth.

### Individual homework

There will be 9 individual homework assignments, due every Thursday by 6:00pm on bCourses. Your best 8 will be counted. Late homework will not be accepted. No homework is assigned for exam weeks or when other projects are due. My aim is to keep you on track with course material. Homework is open-book and can be done in discussion with a study group. BUT if I think someone is doing homework for you - for example, if your homework performance is very different from the rest of your performance - I will quiz you orally in my office.

### Exams

There will be two exams: a midterm and a final exam. These exams will be more conceptual than computational, and will focus on your understanding of the core concepts of the course.

### Projects

This semester, we are going to work to conduct a research project using the General Social Survey ([online](#) data analysis + write-up). There are three group assignments (projects #1, #3, #4) and one individual project (#2). First, in small groups, we will explore, describe the dataset and some descriptive statistics and identify some outcomes of interest. Second, individually, students will read a real sociology study of the phenomenon and write a short report. Third, each group will revise project 1, use prior research to develop testable hypotheses, test these hypotheses, and report and discuss these results. Fourth, groups will produce an effective, polished presentation to share their project with the entire class. All written work is due at 6pm on their due date. Late assignments lose one letter grade per day.

Most work in the 'real world' and in much of sociology is team-based. Negotiating group dynamics and work can be truly difficult. Learning to resolve these issues is a very valuable skill. For group projects, each student should keep notes on their progress, contributions and difficulties and submit these too. You will be graded on both the individual and group components. Students in well-functioning groups are likely to receive the same grade. Please notify me as early as possible as problems arise that you and your team are unable to handle. I will step in when necessary.

### Key Assignments, Weights, and Due Dates

Assignment	% of Grade	Due Date
Homework and Exams		
Homework, best 8 of 9	20%	Submit online
Mid-Term Exam	15%	In-class Exam Oct 6 <sup>th</sup>
Final Exam	15%	In-Class Exam Dec 11 <sup>th</sup>
Projects		
Project 1: Exploring & Describing Data	8%	Sept 22 <sup>nd</sup>
Project 2: Diving into the Literature	5%	Oct 27 <sup>th</sup>
Project 3: Hypotheses & Beyond	11%	Nov 17 <sup>th</sup>
Project 4: Presentation	11%	Nov 29 <sup>th</sup> & Dec 1 <sup>st</sup>
Participation	15%	Semester-basis

## Course Policies

### *Readings and Lecture*

Students are responsible for materials covered in class and in readings. I will post lecture slides on the bCourses site. The slides are aids for learning and are not a complete account of class activity. Please do all of the readings in a timely fashion. Each day usually has one or two readings associated with it. You will get the most out of lecture if you do these readings before the class for which they are assigned.

### *Accommodation*

I will provide accommodation to any student who provides me with a written letter from a DSP Specialist. If you require accommodation, the first step is to have DSP send me an official written accommodation letter. Once I receive this letter and if I have any questions, I will contact you by email. Please arrange for me to receive the letter as early in the semester as possible. I will also provide accommodation for observation of religious rituals. University policy is that such requests should be made by the second week of the semester. Please submit them by email.

### *Late Work*

There are several written assignments for this course. The precise due dates and where the assignments should be handed in are noted above. Assignments turned in late will be penalized one letter grade for every day late (e.g. one day late makes a B a C). If an emergency arises, email Professor Liu about it at least 24 hours before the deadline. Exams will be given on the posted dates (Oct 6th and Dec 11th). If you know now that you will have a conflict with the scheduled exam times, either do not take this course or speak with me as soon as possible so that we can work out an accommodation. If you have a true unforeseen emergency that prevents you from attending the exam, contact Professor Liu as soon as possible to discuss an accommodation.

### *Grading Policy*

If you wish to contest a grade, please outline in writing (1) what assignment you are contesting, (2) the grade you received on the assignment, and (3) the reason(s) why you believe the grade you received is unfair. I will consider your appeal and may decide to re-grade your assignment. Please note: a re-grade likely involves closer scrutiny of the work and so may result in an increase or a decrease in your grade. Whatever the outcome, the score from the re-grade will be final. The grade appeals process should be initiated within seven days of receiving the grade in question.

### *Academic Honesty*

The UC Berkeley Honor Code states that "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." (<http://asuc.org/honorcode/index.php>). I expect you will follow these principles. You may not copy specific text or ideas from others, whether from fellow students, from authors of our readings or other material you find, without specific attribution. To do otherwise is to plagiarize. You may not cheat on any of the exams by bringing in illicit outside material, copying from fellow students, or engaging in other dishonest practices. You may of course discuss the lectures and readings with your fellow students. Violation of these rules will result in a failing grade on the assignment and possibly on the course and may result in you being reported to University authorities. There will be a significant amount of collaborative work in this course. While working in groups is a pedagogical tool and helps us prepare for work beyond this class, knowing what is acceptable collaboration and what is taking unfair advantage of others can be difficult. If at any point you have any questions about how the honor code applies, or how best to fulfill your obligations as a member of the UC Berkeley community, please ask Professor Liu.

### *Email*

Email should not be used for substantive questions about the reading or course materials. Please ask such questions in class or sign-up for office hours. I will endeavor to respond to other email messages within 24 hours.

### *Office Hours*

I highly encourage you to sign-up for office hours. You may also just stop-by my office during office hours and if I don't have another student scheduled, I will be happy to talk with you. Office hours are a good time to introduce yourself, talk about ideas you are thinking about, and discuss problems you may have with class. I may decide to hold obligatory office hours for groups. My office hours are held on Wednesdays from 9:15-10:15am. You may sign up [here](#).

## **Course Outline and Weekly Readings**

### **Aug 23 - Overview of the Course and Reading Graphs**

1. Huff, Darryl. 1954. chapters 5 (the gee-whiz graph) and 6 (the one-dimensional figure)

### **Aug 25 - Units of Analysis**

2. Wheelan, Charles. 2013. chapter 1 (What's the Point?)

#### *Unit 1 - Basic Properties of Data*

### **Aug 28 - Scales**

3. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 2

### **Aug 30 & Sept 1 - Measure of Centrality**

4. Wheelan, Charles. 2013. chapter 2 (Descriptive Statistics)
5. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 3 - centrality

### **Sept 4: No Class- Labor Day**

### **Sept 6 - Measure of Variability**

6. Wheelan, Charles. 2013. chapter 3 (Descriptive Description)
7. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 3 - variability

### **Sept 8 & 11 – Association** *Association does not imply causation*

8. Wheelan, Charles. 2013. chapter 4 (correlation)
9. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 3 bivariate descriptive statistics

### **Sept 13 & 15 - Probability & Histograms**

10. Wheelan, Charles. 2013. chapters 5 (basic probability) and 5 ½ (the Monty Hall problem)
11. Wheelan, Charles. 2013. chapter 6 (problems with probability)
12. Silver, Nate. 2015. chapters 1 (a catastrophic failure of prediction) and 2 (Are You Smarter than a Television Pundit?) – accuracy vs precision

### **Sept 18 & 20 - Distributions & Central Limit Theorem**

13. Wheelan, Charles. 2013. chapter 8 (the central limit theorem: the lebron james of statistics)
14. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 4

## Unit 2 - Statistical Inference

### Sept 22- Project 1 due

#### Sept 22, 25 & 27 - Samples, Populations & Hard-to-survey populations

15. Wheelan, Charles. 2013. chapter 7 (The importance of data: 'Garbage in, garbage out')
16. Silver, Nate. 2015. Chapters 4 (for years you've been telling us that rain is green) and 7 (role models)
17. Beauchemin, Cris & Amparo González-Ferrer. 2011. Sampling international migrants with origin-based snowballing method: New evidence on biases and limitations. *Demographic Research*, 25, 103-134.

#### Sept 29 & Oct 2- Modes of Inference (Bayesian / Frequentist)

18. Wheelan Chapter 9 (Inference)
19. Silver, Nate. 2015. chapter 8 (less and less wrong)

#### Oct 4 - Mid-Term Review

### Oct 6 - In Class Mid-Term

#### Oct 9, 11 & 13- Hypothesis Testing & Uncertainty

20. Revisit Wheelan Chapter 9 (Inference)
21. Wheelan Chapter 10 (Polling)
22. Agresti, Alan & Barbara Findley. 2009. Excerpt from chapter 6

#### Oct 15 & 18- Regression

23. Wheelan, Charles. 2013. chapter 11 (regression analysis)
24. Wheelan, Charles. 2013. chapter 12 (common regression mistakes)

## Unit 3 - Interpreting and Representing Data

#### Oct 20, 23 & 25 - Data sources

25. Liu, Mao-Mei, Mathew J. Creighton, Fernando Riosmena, & Pau Baizán. 2016. Prospects for the comparative study of international migration using quasi-longitudinal micro-data. *Demographic Research*, 35, 745-782.
26. Huff Chapter 10 ("How to Talk Back to a Statistic")
27. Additional reading tba

### Oct 27 - Project 2 due

#### Oct 27 – No Class

#### Oct 30, Nov 1 & 3 Representing & Visualizing Data

28. Tufte *The Visual Display of Quantitative Information* (tba)
29. Review blogs

## Unit 4 - Social Issues with Data

### **Nov 6, 8 & 13- Sampling as a social process & selection bias**

30. Berk, Richard. 1983. An introduction to sample selection bias in sociological data. *American Sociological Review*, 386-398.
31. Revisit Wheelan Chapter 10

### **Nov 10 - No Class, University Holiday**

### **Nov 15 & 17- Non-sampling sources of bias & Remedies**

32. Creighton, Mathew & Amaney Jamal (2015). Does Islam play a role in anti-immigrant sentiment? An experimental approach. *Social science research*, 53, 89-103.
33. Reading tba

### **Nov 17 - Project 3 due**

### **Nov 20 – Quantitative social science in the real world**

34. Readings tba

### **Nov 22 & 24 – No Class, University holiday**

### **Nov 27 - TBA**

### **Nov 29 & Dec 1 - Presentations**

### **Dec 4 – Review for Final Exam**

### **Dec 11 - Final Exam**

8:00am – 11:00am, location tbd

## **Projects**

### **Project 1: Exploring & Describing Data**

Due Friday Sept 22. 8% of Final Grade. Group project.

This semester, we are going to work in small groups to conduct a research project using the General Social Survey ([on-line](#) data analysis + write-up). The group project has three parts. First, we will explore and describe the dataset and some descriptive statistics. Second, we will revise the first part and include hypothesis tests, regressions, and more elaborate discussion. All decisions should be justified in writing. For example, why did you choose to use (mean, median, mode) instead of the other options? Why did you use a cross-tabulation table rather than a scatter-plot, or vice-versa? The primary content of the report should be your narrative. Figures and tables are necessary, but are not sufficient on their own.

Working with the other members of your group, combine your notes and write a 3-5 page report (5 pages maximum) explaining the following:

- Introduce data and variables. Describe the dataset. How was the data collected? Which population does it represent? Which outcomes (name at least 2) are you most interested in examining and understanding? Which variables best capture these? Choose 2-5 other variables of interest. What do these variables measure? How were they collected?

- Provide descriptive statistics of variables and relationships. Provide appropriate descriptive statistics (centrality and dispersion) for each variable. Which variables do you predict to be related to one another? For at least three pairs of variables, describe their association.
- Discuss. Explain what the data and your analyses suggest. What are the take-aways? What can we learn about this phenomenon using this data?

### **Project 2: Diving into the Literature**

Due Friday Oct 27. 5% of Final Grade. Individual Project

Start by identifying the outcome you want to explore this semester. Find 1 influential sociology article that examines this. Describe the data using language we learned about in class. Then, identify 1 dependent variable and 1 independent variable. Make sure that these variables are predicted to be related to each other. Justify your choices of variables by copying and pasting (or typing) one or more short excerpts. Explain in your own words: (1) why the author expects that the independent and dependent variables are related and (2) how the independent variable is actually related to the dependent variable. This project should be 2 pages maximum.

### **Project 3: Hypotheses & Beyond**

Due Friday Nov 17. 11% of Final Grade. Group project.

In this second part of the group project, revise project 1 based on feedback received. Then, use prior research to develop testable hypotheses, test these hypotheses, report and discuss these results. All decisions should be justified in writing. A significant portion of the grade for this part of the project is choosing and developing the best representation for your results, both in table and chart form. Your tables and charts will be judged on informativeness, accuracy, clarity, and readability. Working with the other members of your group, combine your notes and write a 10-12 page report (12 pages maximum):

- Introduce data and variables. (same instructions as in Project 1, albeit with only one outcome now)
- Provide descriptive statistics of variables and relationships. (same instructions as in Project 1 + For each point estimate, provide a confidence interval)
- Based on existing studies, develop at least three hypotheses. Explain fully and justify why they are interesting hypotheses. Relate to existing sociology studies (be sure to reference!). Test each hypothesis with data and the appropriate test (i.e. regression models or categorical tables, not point estimate tests). Provide a full write-up, including statistics and confidence intervals (where necessary). Determine whether you should reject the hypothesis or not. Explain the reasoning and conclusion in words.
- Discuss. (same instructions as in Project 1 + What are alternative explanations?)

### **Project 4: Presentations**

Wednesday Nov 29 & Friday Dec 1. 11% of Final Grade. Group project.

Using powerpoint or a short movie, present a 5-8 minute interesting, informative and effective audio-visual overview of your group project (Intro data and variables; Descriptive Statistics; Hypotheses & Inference). Include a reflection of the problems and difficulties encountered and how the group solved them.