

"To call in the statistician after the experiment is done may be no more than asking him to perform a postmortem examination: he may be able to say what the experiment died of." --- Sir Ronald Fisher

Sociological Research Methods Part I

Sociology 406

Fall 2009

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Course Objectives

This is the first of a two-semester series in social research methodology. In Part I, we will examine the logic of social science research and concentrate on the fundamental principles underlying solid research. Topics include measurement of concepts and variables; bivariate and multivariate association; hypothesis testing; and causal inference. We will draw examples from published work, ongoing studies, and publicly available data. This class is applied in nature so there is substantial emphasis placed on students learning the fundamentals, applying the techniques, interpreting the results, and critically evaluating the findings.

Required Texts

Thorne, B. Michael & J. Martin Giesen. 2002. 4th ed. *Statistics for the Behavioral Sciences*. McGraw Hill. ISBN-13: 978-0-07-283251-8.

Kohler, Ulrich & Frauke Kreuter. 2008. 2nd ed. *Data Analysis Using Stata*. Stata Press. ISBN-13: 978-1597180467

Recommended Readings

Below, I have recommended several books that may be useful, although they are not required.

Vogt, W. Paul. 2005. *Dictionary of Statistics and Methodology: A Nontechnical Guide for the Social Sciences*. Thousand Oaks: Sage Publications.

Fox, John 2008. *A Mathematical Primer for Social Scientists*. Los Angeles, CA: Sage Series in Quantitative Applications in the Social Sciences.

Agresti, Alan and Barbara Finlay. 2005. *Statistical Methods for the Social Sciences*. 4th Edition. Prentice Hall.

Acock, Alan C. 2005. *A Gentle Introduction to Stata*. Stata Press.

Grade Distribution ^a

Item	Points	Due Date
Exam 1	100 pts	October 2
Exam 2	100 pts	November 4
Exam 3	100 pts	December 16; 12:30-3:30
CH1: Role of Statistics in Social Science	40 pts	September 5
AH2: Nominal and Interval Variables	40 pts	September 25
CH3: Probability Distribution	40 pts	September 30
AH4: Normal Distribution	40 pts	October 16
AH5: Hypothesis Testing; Means & Proportions	40 pts	October 23
CH6: Use of Significance Tests in Statistics	40 pts	October 30
AH7: T-test and Chi-Square	40 pts	November 14 [Friday]
AH8: Analysis of Variance (ANOVA) & Sum of Squares	40 pts	November 20
AH9: Correlation and Regression	40 pts	December 2
CH10: Assumptions of Linear Regression	40 pts	December 8 [Monday]
Total	700 pts	

^a CH = Conceptual homework assignment; AH = Analytic homework assignment

Attendance Policy

This course does not have a formal attendance policy. However, since the information in the course is cumulative and we move at a steady pace, it is highly recommended that you attend all classes. There is a high correlation between attendance and class performance.

Homework Assignments

There are two types of homework assignments: analytic and conceptual. The analytic assignments require statistical analysis, interpretation, and modeling. The conceptual homeworks are writing assignments that focus on articulation of concepts, comprehension, and application. Homework assignments will be posted on Blackboard, along with any associated documents (e.g., do-files in STATA, study descriptions, etc.).

All homework assignments should be typed in 12pt font. Results from the statistical analyses conducted in STATA should be cut and pasted into the final Homework and clearly

annotated. Each section of output should have a title, description, and appropriate labels. Submit paper only copies of the homework assignments by the date and time specified on the assignment.

As a note: STATA output will appear best in Word documents when you change the font to Courier New, Font Size 9. In some assignments, you will be asked to provide your syntax. This should also be labeled clearly.

Exams

All three exams will be in-class exams. Types of questions include short answers, interpreting output, comparing and contrasting techniques, etc. Questions will be drawn from lectures, assigned readings, and homework assignments.

Data

All of the examples and exercises for this class will be drawn from the study *Americans' Changing Lives*. This is a four-wave panel study of more than 3,600 adults ages 25 to 96. Focusing especially on differences between Black and White Americans in middle and late life, these data constitute the first, second, third, and fourth waves in a national longitudinal panel survey covering a wide range of sociological, psychological, mental, and physical health items. The description of the data and the codebooks are available on Blackboard.

The data are publicly available from ICPSR (University of Michigan) and qualify for IRB Exemption #4 because the data are de-identified.

Blackboard

This course requires the use of Blackboard, which is an online course management program. Blackboard will be my primary tool for announcements, changes in readings or due dates, web site links, online discussions, and posting grades. You are responsible for keeping up with the material on Blackboard. The ACL data, documentation, and help sheets will also be posted on Blackboard.

Academic Honesty

It is my hope that this is an unnecessary statement about academic honesty. You are responsible for producing original work in this course. Intellectual property includes the ideas, words, statements, and concepts that are produced by an individual. It is wrong to take any of these without giving credit where it is due.

Here are a few guidelines for you:

1. If you take 3 or more words in a row from any source, it must be in quotation marks and followed by the author's last name, year of publication, and page number. **THIS INCLUDES CONTENT FROM THE WEB.** Web content should be cited with the web page, author, and date retrieved.
2. If you take ideas or facts from a source but use your own words, you still must use a citation (author's last name and year of publication) to give credit to the source of the work.
3. You **MAY NOT** take the words, statements, or ideas of other students who are currently or previously in this class. This includes borrowing the work of another student and simply rephrasing it.
4. The work you produce in this class must be original. You cannot use a paper that you have previously or simultaneously submitted to another class.
5. Do not give copies of your work to other students. If someone copies your work, both of you will be considered guilty and will receive equal discipline for the action.

Consequences for breaches of academic honesty such as those mentioned above will result in failure for the assignment. A second instance will result in failure for the course.

Class Schedule

August 25 – Class Introduction: Statistics are a Tool, Not a Blunt Instrument

August 27 – The Construction of Science: What Is It? How Do We Get It?

Kuhn, Thomas. 1969. *Structure of Scientific Revolutions*. Chapter 1.

<http://www.marxists.org/reference/subject/philosophy/works/us/kuhn.htm>

Goldthorpe, John H. 2001. "Causation, Statistics, and Sociology." *European Sociological Review* 17: 1-20.

September 1 – Science as Systematic Observation: Theory, Hypotheses, and Measurement

Miller, Delbert C. "Theory and Hypotheses." Chapter 2 in *Research Design and Methodology*. Sage Publications.

Univariate & Descriptive Statistics

September 3 – Nominal Variables

Thorne & Giesen. Chapter 2. "Definitions and Scaling."

September 4 – CREC IRB Certificate: Copy Due to Me by 4pm.

<http://ora.ra.cwru.edu/research/orc/crec/index.cfm>

September 8 – Ordinal Variables

Thorne & Giesen. Chapter 3. "The Frequency Distribution."

Homework 1 Due.

September 10 – Summary Statistics for Nominal Variables [Computer Lab]

Kohler & Kreuter. Chapter 1. "The First Time."

And Chapter 7, Pages 141 – 153 "Describing and Comparing Distributions."

September 15 – Interval Variables: Measures of Central Tendency

Thorne & Giesen. Chapter 4. "Graphing Data."

Thorne & Giesen. Chapter 5. "Measures of Central Tendency."

September 17 – Interval Variables: Measures of Dispersion [Computer Lab]

Kohler & Kreuter. Chapter 7 Pages 154 – 180.

And Chapter 2 "Working with Do Files."

September 22 – Characterizing Dispersion: What's a z score anyway?

Homework 2 Due.

Thorne & Giesen. Chapter 6. "Measures of Dispersion and Standard Scores."

September 24 – Review of Descriptive Statistics

September 29 – Exam 1

Inferential Statistics

October 1 – Playing the Odds: An Introduction to Probability

Thorne & Giesen. Chapter 7. “Probability.”

October 6 – Heads or Tails? The Binomial Probability Distribution

October 8 – Normal Probability Distribution

Thorne and Giesen. Chapter 8. “The Normal Distribution.”

October 13 – The Standard Deviation

Homework 3 Due.

October 15 – Confidence Intervals

Thorne and Giesen. Chapter 9. “Confidence Intervals and Hypothesis Testing.”

October 20 – NO CLASS: Fall Break

October 22 – Hypothesis Testing, Type I and Type II Error

Homework 4 Due

October 27 – This Class is Awesome ($p < .05$).

Cohen, Jacob. 1994. “The Earth is Round ($p < .05$).” *American Psychologist* 49: 997-1003.

Ziliak, S. T. and D. N. McCloskey. 2008. “Dieting ‘Significance’ and the Case of Vioxx.” Pages 23-33 in *The Cult of Statistical Significance*. Ann Arbor: University of Michigan Press.

Same book: “Better Practice: Beta-Importance versus Alpha Significance.”

October 29 – Review

Homework 5 Due

November 3 – Exam 2

Measures of Association

November 5 – T-Test (Difference of Means and Proportions)

Thorne & Giesen. Chapter 10. "Significance of the Difference Between Two Sample Means."

November 10 – Single-Sample Tests for Means and Proportions [Computer Lab]

Homework 6 Due.

November 12 – Measures of Association for Nominal Variables

Reynolds, H. T. 1977. *Analysis of Nominal Data*. Sage University Paper. Chapters 1 & 2.

November 17 – Tests for Relationship Between Nominal Variables (Chi-Square) [Computer Lab]

Homework 7 Due.

November 18 – Sum of Squares – Calculating and Understanding the F Test

No Class Meeting; See Blackboard for Self-Guided Exercise

November 24 – Analysis of Variance (a.k.a. ANOVA)

Thorne & Giesen. Chapter 11 Pages 237 – 259. "One-Way Analysis of Variance with Post-Hoc Comparisons."

December 1 – Correlation and Regression

Thorne & Giesen. Chapter 12. "Correlation and Regression."

Homework 8 Due.

December 3 – Principles and Assumptions of Linear Regression [Computer Lab]

Kohler & Kreuter. Chapter 8. "Introduction to Linear Regression."

Kachigan, Sam. 1991. "Regression." *Multivariate Statistics*. MIT Press.

December 7 – Homework 9 Due [NOTE: Monday]

Final Exam: December 15, 12:30 – 3:30pm; Room TBA