



Quantitative Research Techniques

Sociology 549

Autumn 2006

<http://www.sociology.ohio-state.edu/classes/soc549/vonhippel/index.php>

Instructor & GTAs	Paul von Hippel	Irinia Tomescu
Lecture & lab	MW 5 ³⁰ -6 ⁴⁸ PM Psychology 14	TTh 5 ³⁰ -6 ¹⁸ PM Derby Hall 70 (SIL)
Office hours	MW 6:48-7:30 PM (after lecture, in lecture hall)	TTh 6:30-8:30 PM (after lab in the SIL)
Phone	688-3768	292-2115 during office hours only
Mailbox	Bricker 301	Bricker 301
Email	von-hippel.1@osu.edu	tomescu.1@sociology.osu.edu

Alternative formats

Students requiring course materials in alternative formats—for example, blind or dyslexic students needing sound recordings—should immediately contact Karyl Shirkey, 304 Bricker Hall, 292-2056.

Goals

Statistics may be the most marketable skills that you acquire as a sociology major. As we will demonstrate throughout the quarter, statistics are used in police work, fraud investigations, marketing and social research. The software you use in this course—Excel and SPSS—is often mentioned in job ads on monster.com and elsewhere.

Statistics are also essential for following current events. The news is full of good and bad uses of statistical evidence, and full of stories where statistics aren't used but would be relevant. We'll teach you to read the news critically, by learning sharp ways to ask the following questions:

1. What's typical?
2. How much variety is there?
3. Who exactly are we talking about?
4. How certain are we?
5. Compared to what?

At the end of this class you'll be a better citizen with brighter job prospects.

Course materials

- Frankfort-Nachmias and Leon-Guerrero. (2002 or 2005). *Social Statistics for a Diverse Society (SSDS)* 3rd or 4th edition. Thousand Oaks, CA: Pine Forge Press. ISBN 0761987436 (3rd ed.) or 1412915171 (4th ed.)
- Dretzke, B. (2004). *Statistics with Microsoft Excel (SME)*, 3rd edition). Upper Saddle River, NJ: Prentice-Hall. ISBN 0-13-147111-2.
- Hand calculator, especially one with built-in statistical functions.
(Look for keys labeled \bar{x} or σ).
One very good statistics calculator is the TI-83, which retails for about \$80.

- Photocopied course packet in 3-ring binder.
Contains supplemental readings, a formula sheet, and lecture notes. Order for delivery or pickup from Zip Publishing:
www.zippublishing.com
info@ZipPublishing.com

The textbooks, but not the course packet, are available from campus and online bookstores.

Software and data sets

This class uses Excel and SPSS software. Excel is available on almost any Windows computer. SPSS is available in the Sociology Instruction Lab (SIL), 70 Derby, where your lab sections meet; however, the SIL is often crowded. The following list of sites with SPSS may be out of date; a current list is available at <http://www.oit.ohio-state.edu/sccsoft/sites/softsearch.html> :

209 W. 18th	285-295	PC
Agricultural Admin	5	PC
Baker Systems	590	PC
Brown Hall	145	PC
Campbell Hall	119	PC
Hagerty Hall	171	PC
Hagerty Hall	171	MAC
Howlett Hall	272	PC
Journalism Building	216-224	PC
Main Library	105	PC
Ohio Union	6	PC
Page Hall	40	MAC
Stillman	235	PC

For site locations and hours, see <http://www.oit.ohio-state.edu/sccsoft/sites/map.html>

As an OSU student, you can download a free personal copy of SPSS; for details see <http://softwareto.go.osu.edu/>.

Finally, the class uses data from the 1998 General Social Survey (GSS). This is accessible in the SIL, and available for download from the course website.

Grading

Course grades are based on the usual cutoffs:

90/93%	A-/A
80/83/87%	B-/B/B+
70/73/77%	C-/C/C+
60/67%	D/D+

Points scored on assignments and tests will be weighted as follows:

Midterm	30%
Final	30%
Assignments	40%

There are 5 short assignments, so each counts for 8% of your grade.

There are two opportunities for extra credit:

1. 3% for completing and turning in the math review by the due date.

2. Up to 3% for attendance. Your rate of attendance in lectures and labs will be multiplied by 3%. For example, if you attend 90% of all lectures and labs, you will receive 2.7% extra credit. We do not distinguish between “excused” and “unexcused” absences since one absence more or less has only a trivial effect on your extra credit score.

The top two reasons for low grades in Sociology 549 are: (1) rusty math skills, and (2) neglect of homework. We know this because we’ve done statistics on old gradebooks.

To see a spreadsheet that shows how your grade is calculated, click the “Grading” link on the course homepage.

Late assignments. Because learning depends on regular effort and timely feedback, late assignments are strongly discouraged. Assignments are due at the *beginning* of lab. We appreciate that emergencies do arise, and so will accept late assignments with a 10% reduction for each day late. Assignments turned in at the end of lab, rather than the beginning, will be considered one day late. Absolutely *no* work can be accepted after other students’ assignments have been graded and returned.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct. <http://oaa.osu.edu/procedures/>

Disability Statement: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

Unpaid Fees: Faculty rules specify that students are to have their fees paid by the first day of enrollment for the quarter. [Faculty Rule 3335-9-12]. If you have not paid your fees, you will not be allowed to continue attending class until:

1. your fees are paid, OR
2. you have a signed letter from Financial Aid stating that you are working with them to get your fees paid.

GEC Goals

Sociology 549 is a *Data Analysis* course, meaning that it fulfills the Data Analysis sub-requirement under the “*Quantitative and Logical Skills*” category of the General Educational Curriculum (GEC).

This course provides a basic introduction to the logic, application and interpretation of statistical analysis in the social sciences. The course introduces descriptive statistics, exploratory data analysis, probability theory, and inferential statistics. It aims to provide a solid foundation for studying advanced statistics and conducting data analysis. Students also learn how to use one of the computer programs (SPSS) that is widely used to perform statistical analysis.

GEC Learning Objective

Students understand statistics and probability, comprehend mathematical methods needed to analyze statistical arguments, and recognize the importance of statistical ideas.

The course goals will be met through the study of descriptive statistics, exploratory data analysis, probability theory, and inferential statistics. Through hands-on practice, students learn to use statistics to simplify information, compare group differences, and make inferences about populations based on sample data. Students also learn how to use one of the computer programs that is widely used to perform statistical analysis.

In order to meet the course goals and objectives students must demonstrate (in homework assignments, exams, and class discussion) the ability to: (1) calculate statistics and conduct statistical tests by hand and using the computer and (2) describe, interpret, and critically evaluate quantitative research findings.

Schedule

Week 1.

W 9/20 Lecture 0. Logging in, syllabus, course binders, course overview.

- Course reader: “Thinking About Social Statistics: The Critical Approach.” In Joel Best (2001), *Damned Lies and Statistics*. Berkeley, CA: University of California Press.

**After this lecture, start the extra credit math review.
(See the last page of this syllabus.)**

Th 9/21 Lab 0. Logging in, Excel.

- *SME*, chapter 2, first half of chapter 3
(Stop at “Using Formulas in Statistics”)

Week 2.

M 9/25: Lecture 1. Variables.

Reading:

- *SSDS* chapter 1. Stop before the SPSS demonstration.

After this lecture, start Assignment #1 (in the course binder).

T 9/26: Lab 1. SPSS and the general social survey (GSS).

Reading:

- *SSDS*: SPSS demonstration at the end of chapter 1.
- Course reader: “SPSS Appendix: How to Use a Statistical Package”
(This is also available on the CD in the back of *SSDS*.)

W 9/27: Lecture 2. Frequency tables.

Reading:

- *SSDS* chapter 2. Stop before the SPSS demonstration.
Note. In tables 2.1 and 2.2, the three categories are mutually exclusive (despite the confusing labels).

Th 9/28: Lab 2. Frequency tables.

Reading:

- *SSDS*: SPSS demonstration at the end of chapter 1.
- *SME*, first half of chapter 4 (“Frequency Distributions Using Pivot Table...”), skipping the sections on histograms and bar graphs.

Extra credit math review due.

Week 3.

M 10/2 (Yom Kippur): Lecture 3. Graphs.

Reading:

- *SSDS* chapter 3.
- The section on “Shape” from *SSDS* chapter 4 (pp. 130-135 in the 3rd edition, 116-121 in the 4th).
- (optional) Tufte, *The visual display of quantitative information*. Permanent reserve, Science and Engineering Library (SEL).

T 10/3: Lab 3. Graphs.

Reading:

- *SSDS*: SPSS demonstration from the end of chapter 3.
- *SME*, chapter 4, sections titled “Histogram of a quantitative variable” and “Bar graph of a qualitative variable”

W 10/4: Lecture 4. Measures of center.

Reading:

- *SSDS* chapter 4.
- von Hippel, “Mean, median, and skew.” Course binder or course website.
 - Skip section 2.2, which is meant for a more mathematical course.

After this lecture, start Assignment #2 (in the course binder).

Th 10/5: Lab 4. Measures of center.

Reading:

- *SSDS*: SPSS demonstration from the end of chapter 4.
- *SME*, chapter 3, section titled “Mean”.

Extra credit math review returned.

Assignment #1 due.

Week 4.

M 10/9: Lecture 5. Measures of variation.

Reading:

- *SSDS* chapter 5.
Skip the section on the index of qualitative variation (pp. 151-162 in the 3rd edition, pp. 138-155 in the 4th).

T 10/10: Lab 5. Measures of variation.

Reading:

- *SSDS*: SPSS demonstration at the end of chapter 5.
- *SME* chapter 3, from “Deviation scores” through “Standard Deviation” chapter 5, section titled “Functions: Descriptive statistics”

Assignment #1 returned.

W 10/11: Lecture 6. Sampling and the sampling distribution.

Reading:

- *SSDS* chapter on “Sampling” (chapter 11 in the 3rd edition, chapter 10 in the 4th).

After this lecture, start Assignment #3 (in the course binder).

Th 10/12: Lab 6. Sampling and the sampling distribution.

Reading:

- *SSDS*: SPSS demonstration from the end of the chapter on “Sampling”.

Assignment #2 due.

Week 5.

M 10/16: Lecture 7. The sampling distribution is normal.

Reading:

- *SSDS* chapter on “The Normal Distribution” (chapter 10 in the 3rd edition, chapter 9 in the 4th).

T 10/17: Lab 7. The sampling distribution is normal.

Reading:

- *SSDS*: SPSS demonstration from the end of the chapter on “The Normal Distribution”.
- *SME*, chapter 6, section titled “Normal distribution”

Assignment #2 returned.

W 10/18: Lecture 8. Confidence intervals for means.

Reading:

- *SSDS* first part of chapter on “Estimation”:
 - 3rd edition: chapter 12, stop after p. 446.
 - 4th edition: chapter 11, stop after p. 389.

Th 10/19: Lab 8. Confidence intervals for means.

- *SSDS*: SPSS demonstration from the end of chapter on “Estimation”.
- *SME* chapters 7, sections titled “Confidence interval for the one-sample Z-test” and “Interpreting the confidence interval,” as well as the corresponding sections for the “*t* test.”

Week 6.

M 10/23: Lecture 9. Sampling distribution and confidence intervals for proportions.

Reading:

- *SSDS* last part of chapter on “Estimation”:
 - 3rd edition: chapter 12, p. 446 to the end.
 - 4th edition: chapter 11, p. 389 to the end.
- Waldman, “A polling primer.” Course binder or course website.

After this lecture, start the pre-midterm extra problem (in the course binder).

T 10/24: Lab 9. Sampling distribution and confidence intervals for proportions.

Assignment #3 due.

W 10/25: Midterm review lecture

Th 10/26: Midterm review lab

Assignment #3 returned. Pre-midterm extra problem due.

Week 7.

M 10/30: MIDTERM in regular LECTURE hall, at regular time.

Coverage: through Assignment #3 and the Extra problem.

Allowed materials: formula sheet, tables, pencil, calculator. (No book.)

The midterm cannot be given early or late. Students who cannot attend the scheduled midterm should not enroll in the course.

T 10/31: LAB canceled.

W 11/1: Lecture 10. Hypothesis test for a single mean.

Reading:

- *SSDS*: first part of chapter on “Testing Hypotheses”:
 - 3rd edition: chapter 13, stop in the middle of page 477.
 - 4th edition: chapter 13, stop at the bottom of page 417.

After this lecture, start Assignment #4 (in the course binder).

Th 11/2: **Midterm returned in Lab**

F 11/3: Deadline to drop the course without petitioning.

Week 8.

M 11/6: Lecture 11. Hypothesis test for a single proportion.

Reading:

- *SSDS* last part of chapter on “Estimation” (review):
 - 3rd edition: chapter 12, p. 446 to the end.
 - 4th edition: chapter 11, p. 389 to the end.

T 11/7: Labs 10-11. Hypothesis test for a single mean or a single proportion.

Reading:

- *SSDS* pp. 493-494 (3rd edition), or p. 433 (4th edition).
- *SME* chapter 7, skipping the sections on confidence intervals.

W 11/8: Lecture 12. Comparing two means.

Reading:

- *SSDS* from chapter on “Testing Hypotheses”:
 - 3rd edition: chapter 13, pp. 477-487 and 490-end.
 - 4th edition: chapter 12, pp. 419-427 and pp. 430-end.

After this lecture, start Assignment #5 (in the course binder).

Th 11/9: Lab 12. Comparing two means.

Reading:

- *SSDS*: SPSS demonstration from end of chapter on “Testing Hypotheses”.
- *SME* chapter 8, stop before the section titled “Z-test for two independent samples”.

Assignment #4 due.

Week 9.

M 11/13: Lecture 13. Comparing two proportions.

Readings from *SSDS*:

- 3rd edition:
 - most of *SSDS* chapter 6 (pp. 198-217; stop before “Elaboration”).
 - end of *SSDS* chapter 13 (pp. 487-490 only).
- 4th edition:
 - most of *SSDS* chapter 6 (pp. 177-195; stop before “Elaboration”).
 - end of *SSDS* chapter 12 (pp. 427-430 only).

T 11/14: Lab 13. Comparing two proportions.

Reading:

- *SME* chapter 12, stop before “Cross Tabulation of a Qualitative and a Quantitative Variable.”

Assignment #4 returned.

W 11/15: Lecture 15. Comparing several means.

Reading from *SSDS*:

- 4th ed.: chapter 14, “Analysis of Variance”.
- 3rd ed: electronic chapter, “Analysis of variance”, on the CD in the back of the book.
 - (This chapter is also reproduced in the course binder.)

Th 11/16: Lab 15. Comparing several means.

Reading:

- *SSDS*: SPSS demonstration from the end of the chapter on “Analysis of Variance”
- *SME* chapter 9, section titled “One-Way Between-Groups ANOVA.”

Week 10.

M 11/20: Lecture 14. Comparing several proportions.

Reading:

- *SSDS*: Chapter on “The Chi-Square Test”
(chapter 14 in 3rd ed, chapter 13 in 4th ed.)

After this lecture, start the Pre-final extra problem (in the course binder).

T 11/21: Lab 14.

Reading:

- *SSDS*: SPSS demonstration from the end of the chapter on “The Chi-Square Test”.

Pre-final extra problem discussed.

Assignment #5 due.

W 11/22: **Thanksgiving Eve: Class canceled.**

Week 11.

M 11/27: Review lecture.

Reading: SSDS review chapter (Chapter 15 in the 3rd edition)

T 11/28: Review lab.

Assignment #5 returned.

W 11/28: **No lecture.**

Th 11/29: **Optional lab.**

Finals week

M 12/4: Final exam, lecture room, LECTURE TIME.

Coverage: Comprehensive, but emphasizing second half of course.

Allowed materials: formula sheet, tables, pencil, calculator. (No book.)

The final cannot be given early or late. Students who cannot attend the scheduled final should not enroll in the course.

Th 12/7, midnight: Grades submitted.

NAME _____

**Extra credit instructions (optional; adds 3% to your final grade)
due Th 9/28 at the *beginning* of lab**

This extra credit will help you polish rusty math skills. You should benefit especially if you miss more than 2 problems on the initial math assessment.

In the “Readings” section of your course reader is a Basic Mathematics Review from a textbook by Gravetter & Wallnau. Please follow these instructions carefully:

1. Take the skills assessment preview exam on the second page of the review. Then check your answers, using the answer key on page 688-689. Mark any wrong answers clearly, in a contrasting color such as red ink.
2. If you miss more than 2 questions in any section of the test, turn to the section of the appendix that corresponds to your problem area. Read that section, do the “learning check,” and do the appropriate section of the final exam at the end of the Review. Mark the learning check and the final exam in a contrasting color.
3. Repeat step 2 for all sections where you got more than 2 problems wrong.
4. Staple the Review, write your name on the first page, and bring it to lab on the due date.

Note. The textbook authors suggest that “if you miss more than *three* questions in any section of the test, you probably need help in that area.” In our experience, missing more than 2 questions is a more accurate threshold.