

PMAP 8131 Applied Research Methods and Statistics 2
GEORGIA STATE UNIVERSITY
Andrew Young School of Policy Studies
Summer 2013

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Course time: Monday & Wednesday, 4:45-7:15
Course location: 300 Classroom South
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Course description:

Applied Research Methods and Statistics 2 develops practical skills for summarizing, describing, and analyzing data to enable public policy makers to make better decisions. The major statistical technique is **regression analysis**. We will use two types of data: a random sample of federal personnel records, with an interval-level dependent variable (annual salary), and one or more surveys of random samples of the U.S. population, with dummy dependent variables (e.g., approval of same-sex marriage, torture of suspected terrorists, abortion, stem-cell research, legalization of marijuana).

We begin with bivariate analyses (e.g., to see whether salaries rise with education, whether support for marijuana legalization rises with liberalism and falls with age, or whether women support same-sex marriage more than men do). We use scatterplots, correlation coefficients, and bivariate regression to answer these questions. We also start thinking about how to ask interesting questions, propose convincing hypotheses, measure variables, and assess the ethical implications of our research.

One key conclusion is that bivariate analyses rarely tell the full story, especially if we are interested in causal relationships. Multiple regression analysis allows us to address such questions as whether men earn more than equally educated and experienced women and whether evangelicals are more likely than equally conservative non-evangelicals to think torture can be justified. We begin multiple regression fairly mechanically, understanding how the size and meaning of the coefficient on X changes when we add Z to the regression. We learn a variety of techniques for assessing the strength of relationships. Next, we think about why coefficients change and which variables we need to include in our regression before we can feel even somewhat confident about drawing causal inferences. We learn why even the best cross-sectional multiple regressions lead to less convincing causal implications than do well-designed experiments.

The midterm tests the material up to this point, then we take up **inferential statistics** – ways to generalize from the sample to the population. **Hypothesis tests** frequently allow us to conclude the direction of relationships in the population (e.g., if men, on average, earn \$6,000 more than women of the same race, age, level of education, and length of federal service in a sample of 1,000 employees, can we be confident that men, on average, earn more than comparable women in the federal

service as a whole?). **Confidence intervals** allow us to draw conclusions about the direction and strength of relationships in the population (e.g., if men, on average, earn \$6,000 more than women of the same race, age, level of education, and length of federal service in a sample of 1,000 employees, how big is the average salary gap between comparable men and women in the whole federal service?). You will incorporate inferential statistics into your short research papers.

In the final weeks of the semester, we examine a variety of means for gathering data, including survey research, qualitative field studies, and unobtrusive measures. We finish with program evaluation as a practical means to apply the material from this course to assessing the effectiveness of public programs.

Learning Objectives for Regression Analysis

Students will learn to:

1. Run basic statistical analysis using SPSS software.
2. Use scatterplots and correlation coefficients to show the direction and strength of relationships between interval-level variables.
3. Interpret regression coefficients on interval-level and dummy independent variables in both bivariate and multiple regression.
4. Explain clearly what it means to hold a variable constant.
5. Discuss the strength of relationships using unstandardized regression coefficients, standardized regression coefficients (beta-weights), and the coefficient of determination (R^2).
6. Graph hypotheses about inter-relationships among variables.
7. Distinguish between antecedent and intervening variables, models of explanation and interpretation, and spurious and indirect effects.
8. Determine when (and to what extent) we can generalize a relationship from a sample to the population from which the sample was drawn, using both hypothesis tests and confidence intervals.

Learning Objectives for Research Design

Students will learn to:

1. Pose research questions.
2. Distinguish between idiographic and nomothetic explanations, deductive and inductive approaches, and quantitative and qualitative methods.
3. Develop hypotheses and operationalize variables.
4. Identify key ethical challenges likely to confront researchers and key ethical principles used to address them.
5. Identify the key advantages and disadvantages of experimental, survey, qualitative, and unobtrusive research.
6. Identify special problems faced by evaluation researchers in conducting policy-relevant research in real-world contexts.

Course Work

You will complete two in-class, open-book examinations, a short research paper, twice-weekly homework assignments that require time on the computer, and occasional quizzes. The homework assignments using the SPSS computer package prepare you for the quizzes, paper, and examinations. Quizzes check your understanding of the concepts you've learned. A short paper assignment allows you to demonstrate that you have learned how to use statistics in reports: how to choose appropriate statistics to answer particular questions, how to interpret them, and how to write about statistics. The midterm and final examinations require both calculation and interpretation of statistics, while the paper emphasizes interpretation.

The class makes few expectations about your math background and existing computer skills and begins from a fairly elementary level. However, you are expected to put in the necessary hours to complete the **homework** and keep up with the pace of the class. Though the homework counts for only a small percentage of the final grade and will take **several hours each week**, it is essential for understanding the material and doing well on the quizzes, paper and examinations. Remember that a summer class moves twice as quickly as a regular semester class, so you need to spend twice as much time per week on homework. As a concession to summer semester, you can turn in all homework on Mondays, so that you have the weekend to work on it, but you still need to do two homework assignments most weeks. You do not need to do much reading in this class — the homework largely takes the place of the reading you do in most of your courses. Homework is graded merely as completed or not completed. Late homework receives half credit.

Class **attendance** is not required, but it too is essential. This class builds steadily on material learned in previous class sessions. If you fall behind, by missing classes or not doing the homework, you will have difficulty catching up. As an incentive to show up for class (and on time), I sometimes give **quizzes** during the first 10 minutes of class. Homework and quizzes combined count for 10% of the course grade. I also review material by asking you questions. If you have reviewed your and my notes shortly before class, you will be much more likely to impress me with your brilliance. Be sure to read through the new material before each class even if you don't understand it.

If you have trouble in the class, please take advantage of help that I, my teaching assistant, or your fellow students can provide. I will be available for **office hours** every week, at times convenient for most members of the class. **Group work** is strongly encouraged, particularly for the computer problems.

You may work together on the homework and in thinking through and doing the computer work for the paper assignments, but all written work must be your own. Standards of academic conduct are set forth in the University's **Student Handbook: Conduct and Policies: Academic Honesty**. See the webpage <http://www.gsu.edu/~wwwcam/book.html> for more details. By registering for this course, you acknowledge your awareness of the Academic Honesty code, and you are obliged to become familiar with your rights and responsibilities as defined by the code.

Violations of the code will not be treated lightly, and disciplinary action will be taken should such violations occur. Please see me if you have any questions about the academic violations described in the academic honesty code, especially as they relate to particular requirements for this course.

Note: Over the years I have had to bring several students up on academic honesty charges. It is a very painful process for everyone involved, including me, but I do it when necessary. It is now possible to search the web easily for material copied without proper citation. I am a suspicious reader, and I will search the web if I read a passage that sounds too good to be true.

Course Resources:

My lecture notes are available on the course Desire2Learn site.

Earl Babbie. *The Practice of Social Research*. New York: Wadsworth Publishing Co. (This book is currently in its 12th edition, but it has not changed much since the 8th edition or earlier. Used copies of older editions should be perfectly acceptable.)

These are the only required texts. Those interested in more technical and rigorous explanations of concepts should consider buying a text required in similar courses or checking an appropriate book out from the library. All texts cover fairly similar material, but vary in their rigor, examples, applications, etc. The main problem you will run into is that different books use somewhat different words and symbols to represent the same concepts.

Norusis, *SPSS 17.0 Guide to Data Analysis*, is on sale for several classes at the campus store. It provides a more detailed explanation of SPSS (complete with pictures) and of some statistics. While my instructions on how to perform SPSS are reasonably detailed and clear, this book can provide a more general context for those who are interested.

Any edition of W. Laurence Neuman, *Social Research Methods* is a good substitute or enrichment to Babbie. Any addition of Elizabethann O'Sullivan and Gary R. Russell, *Research Methods for Public Administrators* can help you see how the methods apply to public administration jobs.

SPSS is available at most computer labs on campus, and using the labs may work during the summer. Many of you will find that it is much more convenient to buy the student version of SPSS, which costs about \$70. Since the course packet is cheap and you may already own a copy of Babbie, your cost should still be under \$100.

The class **Desire2Learn** page contains back-up copies of the syllabus and lecture notes, the SPSS data sets for the homework and paper assignment, old midterm and final exams, and a gradebook. I prefer that you contact me through my regular e-mail address (glewis@gsu.edu) rather than through Desire2Learn.

Grading:

Midterm examination	35%
Research paper	25%
Final examination	30%
Homework and Quizzes	10%

A	92.0-100
A-	90.0-91.9
B+	88.0-89.9
B	82.0-87.9
B-	80.0-81.9

Tentative Course Schedule:

Note: I have substantially re-structured the course, so the class schedule is even more tentative than usual. I am likely to fall behind schedule, and assignments may be pushed back. If you have any questions about how deadlines and assignments have changed, ask me in class or email me.

June 10 **Asking research questions. Using social science methods. Using scatterplots and correlation coefficients to study bivariate relationships between variables.**

Read Lecture 1 and Babbie chapters 1 (Human Inquiry and Science) and 4 (Research Design). Do assignment 1 at the end of Lecture 1. Start Babbie assignment 1 (you only need to think about the essay questions; you don't need to write them up).

June 12 **Using bivariate regression analysis to study relationships between variables. Using social science methods. Developing hypotheses.**

Read lecture 2 and re-read Babbie chapter 4. Do computer assignment 2. Finish Babbie assignment 1.

June 17 **The Ethics of Policy Research. Conceptualization, operationalization, and measurement: How should we measure our variables?**

Read Babbie chapters 3 (The Ethics and Politics of Social Research) and 5 (Conceptualization, Operationalization, and Measurement). Complete Citi Training. Do Babbie hw 4. **Computer assignments 1 and 2 and Babbie assignment 1 due.**

June 19	<p>Using multiple regression analysis to study relationships among variables.</p> <p>Read lecture 3. Do computer assignment 3.</p>
June 24	<p>Measuring the strength of relationships in regression analysis: Standardized coefficients and the coefficient of determination.</p> <p>Read lecture 4. Read Babbie chapter 5. Do computer assignment 4.</p>
June 26 - July 1	<p>Experiments. Causal modeling.</p> <p>Read chapters 8 (Experiments) in Babbie. Read lecture 5. Do Babbie experiments homework. Do computer assignment 5.</p> <p><i>Computer assignment 3 and Babbie hw 4 due June 26.</i></p> <p><i>Computer assignments 4 and 5 and Babbie experiments due July 1.</i></p>
July 2	<p>Voluntary review session.</p>
July 3	<p>MIDTERM EXAMINATION.</p>
July 8-15	<p>Inference in regression analysis: The logic of sampling, Hypothesis tests, and Confidence intervals.</p> <p>Read lectures 6 and 7. Do computer assignment 6. Read chapter 7 (The Logic of Sampling) in Babbie.</p> <p><i>Brief description of paper due July 8: data set, research question, hypotheses.</i></p> <p><i>Computer assignment 6 due July 15.</i></p>
July 17	<p>Survey research.</p> <p>Read chapter 9 (Survey Reserch) in Babbie. Do Babbie survey research assignment.</p>
July 22	<p>Qualitative Field Research and Unobtrusive Research.</p> <p>Read chapters 10 (Qualitative Field Research) and 11 (Unobtrusive Research) in Babbie.</p> <p><i>Computer assignment 7 and Babbie survey research due.</i></p> <p><i>First draft of paper due if you want feedback.</i></p>

July 24

Evaluation research.

Read chapter 12 (Evaluation Research) in Babbie.
Do ***Babbie evaluation before class.***

July 29

Catch-up and review.

PAPER DUE.

July 31

FINAL EXAMINATION 4:15-6:45

[note the time difference – we will discuss in class whether to
change this]