LAIS 564: Quantitative Methods for the Social Sciences

Fall 2010   Prof. Sylvia Gaylord
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                                                                              Office Hrs: by appt.

Course Description:
This course introduces the graduate student to basic methods of quantitative empirical research in the social sciences. The course begins with a short introduction to the nature and role of explanation, theory, observation, and hypothesis in the natural and social sciences with the purpose of placing social science research in the broader context of scientific inquiry. Throughout the course we will be paying close attention to questions of research design, internal validity, and reliability. In terms of methodology, the course will focus on group comparisons and linear regression. The main topics include analyses of variance, simple and multiple regressions, hypothesis testing, and the challenges of real world data. Some background in statistics is desirable, though the primary focus of the course is not on the mathematical aspects of the methodology.

Learning Objectives
The learning objectives of this course are:
- To introduce students to scientific inquiry in the social sciences.
- To enable students to identify the types of questions that lend themselves to quantitative analysis and to formulate hypotheses that can be tested quantitatively.
- To acquire basic techniques for data description and presentation and the use of statistical computer software.
- To develop skills in the use of linear regression and cross-tab techniques to analyze data and interpret the meaning of the results.
- To learn to evaluate the results of research carried out by others.
- To emphasize the importance of concept formation and theorization prior to the collection of data and the testing of hypotheses.

Assignments and Grading:
- Mid-term: 30%
- Homework: will be checked but not graded. Assignments will be distributed at least one week before the due date. You may work in groups, but make sure you can do the work yourself, since the mid-term exam and final term paper require individual work.
- Research Paper: 70%
    o One-page summary: 20%

Timely completion of homework, class attendance and participation, while not graded explicitly, are nonetheless mandatory.

Readings
Required:
King, Gary, Keohane, Robert, and Sidney Verba. 1994. *Designing Social Inquiry*. Princeton U. Press. (hereafter **KKV**).
Agresti, Alan, and Barbara Finlay. 2009. *Statistical Methods for the Social Sciences*. 4th edition. Pearson. (hereafter Agresti).

Both books are available at the campus bookstore (or you can buy them online, if you prefer). Other required readings will be posted on Blackboard. Please enroll in the class on Blackboard (enrollment code "stats").

Recommended:
Garner, Roberta. *The Joy of Stats*, for an introduction to statistics.
Kuhn, Thomas. *The Structure of Scientific Revolutions*.

Software
We will be using STATA to carry out statistical computations. The software has been installed in the computers in the TA computer lab in Stratton. You may also purchase, if you wish, a six-month license of Stata/IC 11 for your personal computer for $65. Contact STATA for details.

Class Schedule: Topics and Readings

Week 1, 8/27: Introduction to the class; the role observation, inference, and the "science" in Social Science.
Do we really know what makes us healthy? Gary Taubes, *The NYT Magazine*, 9/16/07.
Karl Popper, "Science: Conjectures and Refutations."

Week 2, 9/3: Review of probability concepts.
Agresti: ch. 1, 3-4
STATA assignment #1

Week 3, 9/10: Measures of association; correlation and covariance.
Agresti: ch. 2, 8
Sartori, Giovanni. 1970. Concept Misformation in Comparative Politics. *APSR* 64, 4: 1033-1053.
Collier, David and Steven Levitsky. 2009. *Concepts and Methods in Social Science*, ch. 10, "Democracy: Conceptual hierarchies in comparative research."

Week 4, 9/17: Bivariate regression; properties of estimators
Agresti: ch. 9
KKV: ch. 1-2
STATA assignment #2

Week 5, 9/24: Goodness of fit; hypothesis testing; confidence intervals
Agresti: ch. 6
Gerring, John. 2007. Is There a (Viable) Crucial-Case Method? *Comparative Political Studies*, 40, 3: 231-253.
Rogowski, Ronald. 1995. The Role of Theory and Anomaly in Social-Scientific Inference. *APSR*, 89, 2: 467-470.

Week 6, 10/1: Multiple regression
Agresti: ch. 10-11
KKV: ch. 3
Homework #1 due

Week 7, 10/8: Dummy variables
Agresti: ch. 13
Adam Przeworski. Democracy and Economic Development. Mimeo.

Week 8, 10/15: Review
       Homework #2 due
       Gallagher, Patrick. Do Taxes Really Affect the Consumption of Cigarettes? Mimeo.
       Chris Moore. Unraveling the Size Effect. Mimeo.

Week 9, 10/22: MID-TERM

Week 10, 10/29: First class discussion of projects.
       One-page summary due.

Week 11, 11/5: Model specification; omitted/irrelevant variables
       Agresti: ch. 14.1
       KKV: pp. 168-185.
       Young, Cristobal. 2009. Model Uncertainty in Sociological Research: An Application to
       Religion and Economic Growth. *American Sociological Review*, 74: 380–397.

Week 12, 11/12: Collinearity; Heteroskedasticity; Outliers; Selection Bias
       Agresti: ch. 14.2-14.3
       KKV: ch. 4
       Geddes, Barbara. 1990. How the cases you choose affect the answers you get: selection bias in
       comparative politics. *Political Analysis,* 2, 1: 131-150.

Week 13, 11/19: Measurement error; reliability and validity
       Carmines and Zeller, *Reliability and Validity Assessment*.
       KKV: pp. 150-168.
       Landau, Milich, and Whitten, "A Comparison of Teacher and Peer Assessment of Social Status,"
       Journal of Clinical Child Psychology 13, 1 (1984): 44-49.

Week 14, 11/26: NO CLASS. THANKSGIVING HOLIDAY.

Week 15: CLASS MEETS TO PRESENT AND DISCUSS PROJECTS.

TERM PAPER

During the second half of the semester you will be carrying out your own research for a term paper. The paper must involve the use of quantitative data and methods to learn something about the "social/political" world (elections; poverty; crime; education; health; etc.). The topic is of your own choosing. The paper should include the following:

1. An introduction to the topic explaining the question(s) you wish to answer, and why we should care.

2. A presentation of hypotheses about the patterns you wish to explain and the relationship(s) you will test, and a justification for these hypotheses: have they been tested before? are they plausible? are you challenging existing wisdom? The discussion should include a literature review (i.e. what is already known about your topic and the particular relationships you wish to explore).

3. A discussion of the indicators you will use to measure the concepts in your hypotheses and the appropriateness and flaws of these measures, as well as the selection, sources and quality of your data. Is measurement problematic? What are the known flaws? Are you making compromises? Of what kind? Are there data limitations? How do you think they might affect your results? Give some assurances as to the validity and reliability of your data.

4. The results. Compose tables with relevant results. Present visual graphs (scatter plots; bar charts; two-by-two tables; etc.) of the data and results if you think they will help the reader follow your arguments. Emphasis should be placed on interpreting and communicating results clearly.

5. A discussion of your results and an evaluation of the explanatory power of your model. Does your research support your hypotheses? Are there alternative explanations that compete with yours? Can you demolish them with your results? Alternatively, if your results do not give statistical support to your hypotheses, are there alternative explanations that would? What contribution(s) are you making to our understanding of the world? This section is central to your paper.

The paper is not graded based on the strength of the results; if it turns out the data do not support your hypotheses, then so be it. How you set up your research and explain your method and results is what counts. Excessive complexity is not desirable either. Choose a question that interests you in the field of politics/sociology/IPE that can be empirically tested by you, given time and resources available.