USC Dornsife College of Letters, Arts and Science

Graduate Seminars in Sociology

SOCI 621 61625D: Quantitative Methods and Statistics II

Units: 4.0

Fall 2015—MW—12:30-1:50pm

Location: **Kaplrielian Hall (KAP) 305 Lab**

Instructor: **Tim Biblarz**

Office: Hazel Stanley Hall (HSH) 210

Office Hours: Friday mornings
Ground Zero or Marks Hall 101

Contact Info: biblarz@usc.edu

Course Site: https://blackboard.usc.edu

Course Description

This is the second course in a two-semester sequence on statistics in sociology and the social sciences. Its purpose is to learn and apply some of the central multivariate models social scientists use to explore (and test theory about) interrelationships among a set of independent variables and a dependent variable. All of the models covered help us unpack spurious relationships from those we can have more confidence in.

By now you've had some grounding in the basic (least-squares) regression model of a quantitative outcome using cross-sectional data. In this course, we want to expand that set of tools by investigating statistical models especially appropriate for three kinds of data: 1) categorical and count data; 2) nested data (for example, children within families, students within schools, schools within districts, or individuals within countries); and 3) longitudinal (or panel) data.

Our aim is that you gain a strong understanding of one or two of the models listed within each of these categories:

Categorical and count data

- Loglinear, Logistic, multinomial logistic, Poisson, negative binomial

Nested data

- HLM/multilevel models for quantitative and categorical outcomes

Longitudinal data

- Difference in differences models
- Fixed and random effects regression models for panel data analysis
- Event history analysis (discrete time)
- Cox proportional hazards model (continuous time)
- Growth curve models (multilevel regression approach)

For ALL models, we will pay special attention to the important issues of:

- Model building
- Selecting from competing models
- Interactions (or moderators)
- Nonlinearities or transformations for better fit to the data
- Mixing quantitative and categorical independent variables
- Assumptions, diagnostics, handling violations of assumptions

On the first day of class, we will have a conversation about which of these methods you would like to learn. In my experience, the most successful classes have occurred when I've allowed for a little tailoring of these decisions to the needs and composition of the cohort in my class in that particular year.

Stata will be the main statistical software used. Dornsife IT makes Stata available to all students enrolled in SOCI graduate statistics courses, regardless of whether your machine is USC-formatted or not. To install Stata, visit:

http://uscdornsife.usc.edu/secure/stata/

Installing the software should be straightforward and won't prompt for license keys or other information. If you have any issues, please contact Jeremy Wiemer at wiemer@dornsife.usc.edu.

At every step, we want to generate answers to these questions: 1) what do the statistics allow us to do? 2) How are they calculated and what's the theory behind them? 3) How can they be applied to data using the software? 4) What do they mean? How can they be interpreted? What stories do they tell about the way the world works? And 5) What can't they tell us? This knowledge should allow you to 1) conduct publishable research based on quantitative data; 2) make good decisions about which methods best fit the question and data; 3) understand the strengths and limitations of various statistical applications; and 4) understand and read critically quantitative social science research published in contemporary journals.

All classes take place in KAP's Soc/Econ computer lab (305). At the beginning of each class session you will open an Excel file that I've posted on Blackboard that contains the day's lecture outline, and an accompanying dataset in Stata format. You'll populate the excel file in the appropriate places, taking notes on my lecture materials, run group exercises on the data, and save the files on your memory stick, laptop or email them to yourself at the end of class. Each session will also always include interactive class exercises analyzing data in Stata to exemplify the lecture points.

Learning Objectives

Upon completion of the course, our hope is that you are able to:

- Estimate and interpret core statistical models for categorical data
- Estimate and interpret core statistical models for nested data
- Estimate and interpret core statistical models for longitudinal data
- Communicate them clearly and persuasively tabularly, graphically, and in writing
- Read, understand, and evaluate research based in these models
- Apply these to your own research, culminating in a fully realized research paper that you can use for degree requirements and journal submission

Required Readings and Supplementary Materials

I'll post articles and chapters that present and apply the methods we're covering each week. These constitute the required readings. In addition, here's a list of some good recommended books:

OpenIntro: Statistics (David Diez, Christopher Barr and Mine Cetinkaya-Rundel)
Multiple Regression (Paul Allison)
Econometrics (Jeffrey Wooldridge)
Statistical Methods for the Social Sciences (Alan Agresti and Barbara Finlay)
Multiple Regression and Causal Analysis (McKee J. McLendon)
Regression Models for Categorical Dependent Variables Using Stata (Scott Long)
Logistic Regression: A Primer (Fred Pampel)
The Elements of Statistical Learning (Trevor Hastie)
The Workflow of Data Analysis Using Stata (Scott Long)
Basic Econometrics (Damodar Gujarati)

Description and Assessment of Assignments

1. Research Paper

A 20 page paper (excluding title page, abstract, all tables, and references) (double spaced) will be due at the end of the semester. This will be a scholarly research paper structured as a journal article in

which you discuss your research question, review the literature, develop a small number of sound hypotheses, and test them using your dataset and the methods of this course.

We want to find for each of you a dataset that best suits your particular interests. The purpose of this paper is to facilitate your transformation from consumers to producers of knowledge. For some of you, this will be a first attempt at original research. The paper may serve as a foundation for continued work beyond this semester, and I encourage you to view it as work toward eventual publication. Many students have used this paper as a basis for their empirical paper or Master's thesis requirements of their program.

2. Presentation

Each of you will Powerpoint-present your papers in the style of a 10-15 minute conference paper session presentation.

3. Research Paper Proposal

A 5-7 page, double-spaced paper proposal will be due mid-semester. The proposal should discuss your research question and its background, your dataset, the potential independent and dependent variables available in the data that will be used in your analyses, and the methods. Each of you will meet individually with me to discuss your proposal.

4. Homework Assignments

Ten homework exercises will be assigned over the semester. Early assignments will ask you to apply statistics to concrete research problems using variables and data that I give you and/or your own data; later assignments will ask you to apply exercises to the individual datasets that you have selected for your research papers. These assignments are intended to help you keep on top of the materials, to actively engage you in the research process, and to provide feedback to the instructor.

Grading Breakdown

INDIVIDUAL ASSIGNMENT GRADES

Assignment	Points	Percent of final grade
10 Homeworks	200 (20 points each)	40%
Research Proposal	40	8%
Paper Presentation	40	8%
Final Paper	220	44%
Total	500	100%

FINAL COURSE GRADE

Point total	Percentage	Letter grade
500 to 465	>=93%	A
464 to 450	90-92.9	A-
449 to 435	87-89.9	B+
434 to 415	83-86.9	B
414 to 400	80-82.9	B-
399 to 385	77-79.9	C+
384 to 365	73-76.9	C
364 to 350	70-72.9	C-
349 to 300	60-69.9	D
299 to 0	<60%	F

Assignment Submission Policy

All assignments must be submitted through Blackboard on the dates/times listed on the schedule below.

Course Schedule

(forthcoming)

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu/ or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.htmlprovides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* *http://emergency.usc.edu/*will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.