SC 704: Topics in Multivariate Statistics
Fall 2011

Tuesday/Thursday 3:00 – 4:15 pm
O’Neill 245

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About the Course
This applied course is designed for students in sociology, education, nursing, organizational studies, political science, psychology, or social work with a prior background in statistics at the level of SC703: Multivariate Statistics. It assumes a strong grounding in multivariate regression analysis. The major topics of the course will include OLS regression diagnostics, binary, ordered, and multinomial logistic regression, models for the analysis of count data (e.g., Poisson and negative binomial regression), treatment of missing data, and the analysis of clustered and stratified samples. All analyses in the course will be conducted using Stata, but no previous Stata experience is necessary.

Readings
Required textbooks:


Recommended textbook:

Course reserves online:
Access “read for next week” entries that are not from the required purchases as .pdf files through the library website (http://www.bc.edu/libraries/) or through the link on the course Blackboard page (https://cms.bc.edu/webct.entryPageIns.dowebct).
Software
This course requires the use of the program Stata. The most current version is available on the computers in the Sociology graduate student lounge. For use on your own computer, you have two options: (1) access the program through remote connection to apps.bc.edu, or (2) purchase the program through BC’s Research Services. Ask your department administrator about Campuswide GradPlan. Prices start at $29 (price for a six-month student license).

Assessment
Grading scale
A  93 – 100%  A-  90 – 92%  B+  87 – 89%
B     83 – 86%  B-  80 – 82%  C  60 – 79%
F     0 – 59%

Task                  Due date                  Percentage of grade
Article of the week  Weekly, Tuesdays (N = 10)  10 at 1% each: 10%
Project proposal     September 20                10%
Project update I     October 18                 20%
Project update II    November 15                20%
Presentation         December 6 or 8            20%
Final paper draft    December 15               20%

Article critique of the week
For each week, I’ve selected a recent publication from a major sociology journal that uses a technique we’re covering in class that week. Their use of methods might be exemplary, or it might leave you wondering why such a good journal accepted such a weak paper! Make a list of what you think the authors did well and what they did poorly. In class we’ll discuss the article, and you’ll submit your list to receive credit. I will simply note whether your work is complete or incomplete rather than judge the content of your responses, so don’t worry if you don’t understand every last thing the authors did. Bring your questions to class and we’ll work them out. Because the purpose of this exercise is to prepare for class discussion, I will not accept late work.

Specific questions to ask yourself while reading and listmaking include: Does this analysis best answer the research question given the data the researchers had available, or is there a discrepancy between the research question and its empirical operationalization? Would you have chosen different statistics instead of or in addition to the statistics employed? Were you left with any critiques of the data or methods, or did the authors anticipate your concerns? If you had the data at hand, would you be able to replicate the analysis? Were the results interpreted clearly and correctly? Were the results presented effectively in tables and/or figures? Are the interpretations fair, or do they seem to go beyond what the data can really support?

Research project
I find that the best way to learn statistics is to practice them on real data that mean something to you. Therefore, the major product of this course will be a journal-style research article (i.e., 20-35 pages in length, including the standard sections: title page, abstract, introduction, methods, results, discussion, references, tables/figures). The article is required to
include two or more of the methods covered in class from September 20 onward. For example, you might run a test of mediation in a complex survey dataset, or one outcome that requires binary logistic regression and a second that requires Poisson regression, or a multinomial logistic regression on multiply-imputed data. (Neither using Stata for your analyses nor testing a simple OLS regression model “count” towards your two methods.)

In mid-September you’ll submit a one or two page project proposal. In mid-October and November you will submit written “updates” that will be drafts of sections of the paper. For instance, for one update you might submit the introduction and methods sections, and for the next update you might submit the results and discussion sections, or you might want me to look at revisions of your introduction and methods sections. Precisely what you turn in will be up to you, although I’m happy to make recommendations on a case-by-case basis. On December 6 or 8, you’ll give a conference-style presentation of your project in class, and on December 15, you’ll submit your completed paper. Assignments submitted after 11:59 pm on their due dates will be graded, but will assume a late penalty of 10 points per day.

Although it’s certainly not a requirement, you should seriously consider using this project as an opportunity to meet a degree requirement (e.g., area exams), prepare a conference presentation, and/or develop a submission for publication. If you’re already working on a project, I encourage you to use this course to develop it. If you’re starting from scratch, many datasets are publicly available from universities and government agencies, and many more are available to researchers through BC’s subscription to the Inter-University Consortium for Political and Social Research (ICPSR) at the University of Michigan. Be aware that the deadline to submit a paper for presentation at ASA 2012 in Denver will be in mid-January, and your course paper will fit their submission criteria.

**Academic Honesty**
Your work must be your words and ideas. When writing papers, use quotation marks around someone else’s exact words and identify whose words they are. If you come across a good idea, by all means use it in your writing, but be sure to acknowledge whose idea it is. Do not allow another student to copy your work. Failure to comply will result in (a) automatic failure of the assignment, and (b) a report to the Dean and the Committee on Academic Integrity. For further information, please review the College’s policies on academic integrity here: http://www.bc.edu/offices/stserv/academic/resources/policy.html#integrity

**Schedule**

September 6 and September 8

Lecture / Stata session topics

- Sept. 6: Using Stata
- Sept. 8: Locating and using data for secondary research, presented by Rani Dalgin and Barbara Mento from BC Research Services

Read for next week

- Long chapters 2 and 4
September 13 and September 15
Lecture / Stata session topic

- Ordinary least squares (OLS) regression: Review and diagnostics

Read for next week


To do for next week

- Research project proposal
- Assessment of Glavin, Schieman, and Reid

September 20 and September 22
Lecture / Stata session topic

- Complex survey data

Read for next week

• Staff, Jeremy, Angel Harris, Ricardo Sabates, and Laine Briddell. 2010. “Uncertainty in Early Occupational Aspirations: Role Exploration or Aimlessness?” *Social Forces*, 89(2): 659-84.

To do for next week
• Assessment of Staff, Harris, Sabates, and Briddell

**September 27 and September 29**
Lecture / Stata session topic
• Mediation

Read for next week

To do for next week
• Assessment of Schmutz and Faupel

**October 4 and October 6**
Lecture / Stata session topic
• Moderation

Read for next week
• Enders chapters 1, 2, and 10

To do for next week
• Assessment of Belinda and Feliciano
October 11 and October 13
Lecture / Stata session topic
- Missing data

Read for next week
- Enders chapters 7, 8, and 9

To do for next week
- Assessment of Schafer and Shippee
- Project update I

October 18 and October 20
Lecture / Stata session topic
- Missing data

Read for next week
- Long chapter 3
- Long & Freese chapter 4

To do for next week
- Assessment of Williams and Guerra

October 25 and October 27
Lecture / Stata session topic
- Binary outcomes

Read for next week
- Long chapter 5
- Long & Freese chapter 5
To do for next week

- Assessment of Bailey, Tolnay, Beck, and Laird

**November 1 and November 8**

***Note: No class November 3 due to home football game***

Lecture / Stata session topic

- Ordinal outcomes

Read for next week

- Long chapter 6
- Long & Freese chapters 6 and 7

To do for next week

- Assessment of Coverdill, Lopez, and Petrie

**November 10 and November 15**

Lecture / Stata session topic

- Nominal outcomes

Read for next week

- Long chapter 9 section 5 only

To do for next week

- Research project update II
- Assessment of Buchmann, Condon, and Roscigno
November 17
Lecture / Stata session topic
  - Log-linear analysis
To read for 11/29
  - Long & Freese chapter 8
  - Long chapter 8

November 22
Informal peer review of sections of one another's papers

November 24
No class; happy Thanksgiving!

November 29 and December 1
Lecture topic
  - Count data
To read for next week
To do for next week
  - Assessment of Faris and Felmlee

December 6 and December 8
Class presentations

December 15
Final paper draft due by 11:59 pm
Additional sources, for your reference

On Stata:
- Acock book
- *Stata Journal*
- The *Getting Started with Stata* (Mac, Unix, and Windows versions) manuals, available for loan at O’Neill or for purchase at http://www.stata.com/bookstore/gs.html
- Resources to help you learn and use Stata: http://www.ats.ucla.edu/stat/stata/
- SPost: Postestimation analysis with Stata: http://www.indiana.edu/~jslsoc/spost.htm

Relevant titles in the “little green” Sage series:

Full-length textbooks:


On the web:

- Least squares: http://hadm.sph.sc.edu/COURSES/J716/demos/LeastSquares/LeastSquaresDemo.html
- PRODCLIN: http://www.public.asu.edu/~davidpm/ripl/Prodclin/
- Mediation: http://www.public.asu.edu/~davidpm/ripl/mediate.htm
- Moderation: An introduction: http://davidakenny.net/cm/moderation.htm
- Statistical power calculators:
  - http://biostat.mc.vanderbilt.edu/twiki/bin/view/Main/PowerSampleSize
  - http://www.danielsoper.com/statcalc/default.aspx#c17
  - http://wwwpsycho.uni-duesseldor.de/aap/projects/gpower/

Other books, chapters, and articles:


