

SOC 213

SOCIAL STATISTICS II

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Course Description

This course provides an introduction to statistical models for analyzing categorical data. The main topics include: (1) logistic/probit models (including multinomial logit, logit models for ordinal data), (2) loglinear models (especially for the analysis of mobility tables), and (3) event history analysis for longitudinal data. The exposition covers model specification, estimation, hypothesis testing, and interpretation of the results, but the emphasis is on applications of these models in social science research. Research articles in sociology are used to illustrate the application of these models and techniques.

Textbook

Daniel Powers and Yu Xie. 2000. *Statistical Methods for Categorical Data Analysis*. Academic Press.
Selected journal articles are to be assigned throughout this course.

Recommended

For statistical background:

Alan Agresti. 1996. *An Introduction to Categorical Data Analysis*. Wiley.

For working with STATA statistical software:

J. Scott Long and Jeremy J. Freese. 2001. *Regression Models for Categorical Dependent Variables Using STATA*. College Station, TX: STATA Corporation.

For working with SAS statistical software:

Paul Allison. 1999. *Logistic Regression Using the SAS System*. Cary, NC: SAS Institute.
Paul Allison. 1995. *Survival Analysis Using the SAS System*. Cary, NC: SAS Institute.

Requirement

There are 2 components of the requirements:

1. Problem-set and/or computer exercise (60%). There will be a series of problem-sets and/or computer exercises. The purpose of these assignments is to help students understand statistical concepts and mechanics through learning by doing. Students may discuss among themselves and consult reference books. The exercises will be graded on a 0-10 scale, each contributing equally toward the final grade.
2. A research paper (40%). Students work on statistical analyses of an empirical problem throughout this course and develop a research paper along the way. The format of the research paper should model articles in the sociological journals (e.g., *American Sociological Review*, *Journal of American Sociology*). The evaluation of the paper is based on sophistication and rigorousness in applying the statistical models and techniques taught in this course to substantive research issues. There are several stages in the process of developing this research paper:

Sept. 19: Brief proposal for the research paper is due.
Oct. 24: Full proposal for the research paper is due.
Dec. 9: Research paper is due.

Course outline

August 27/29

Introduction and Preliminaries

- The use of categorical data analysis in sociology
- The generalized linear model framework

Readings:

PX: Chapter 1-2

Sept.3/5

Logistic Models for Binary Data I

- Model specification
- Model estimation

Readings:

PX: Chapter 3.1-3.3

Mare, Robert. 1981. "Change and Stability in Educational Stratification."
ASR 46: 72-87.

Petersen, Trond. 1985. "A Comment on Presenting Results from Logic
and Probit Models." *ASR* 50: 130-31.

Sept. 10/12

Logistic Models for Binary Data II

- Interpretation of the results
- Further issues in model specification and test

Readings:

PX: Chapter 3.4-3.6

Raftery, Adrian E. and Michael Hout. 1993. "Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education, 1921-75." *Sociology of Education* 66: 41-62.

Evans, John H., Bethany Bryson, and Paul DiMaggio. 2001. "Opinion Polarization: Important Contributions, Necessary Limitations." *AJS* 106: 944-59.

Sept. 17/19

Simple Models and Association Measures for Two-way Contingency Tables

- Contingency tables
- Measures of association

Readings:

PX: Chapter 4.1-4.3.

Sept. 24/26

Loglinear Models and Mobility Tables

- Patterns of mobility: model specification
- Model Interpretation

Readings:

PX: Chapter 4.4-4.5

Duncan, Otis Dudley. 1979. "How Destination Depends on Origin in the Occupational Mobility Table." *AJS* 84: 793-803.

Hauser, Robert M. 1979. "Some Exploratory Methods for Modeling Mobility Tables and Other Cross-Classified Data." Pp. 413-58 in *Sociological Methodology* 1980, edited by K.F. Schuessler. San Francisco, CA: Jossey-Bass.

*Michael Hout. 1983. *Mobility Tables*. Sage.

Oct. 1/3

Models and Association Measures for Multi-Way Tables

- Rationales and model specification
- Applications

Readings:

PX: Chapter 4.6

Mare, Robert D. 1991. "Five Decades of Educational Assortative Mating." *ASR* 56: 15-32.

Oct. 8/10

Association Models for Ordinal Variables (optional)

- The motivation
- Model specification

Readings:

PX: 4.5

Clogg, Clifford C. 1982. "Using Association Models in Sociological Research: Some Examples." *AJS* 88: 114-134.

Xie, Yu. 1992. The Log-Multiplicative Layer Effect Model for Comparing Mobility Tables." *ASR* 57: 380-95.

Oct. 17, 22/24

Event History Analysis I: Model for Discrete-Time Event History

- Motivation, data structure, and descriptive statistics
- Models for discrete-time event history

Readings:

PX: Chapter 5.1-5.3

Allison, Paul. 1995. *Survival Analysis Using the SAS System*. SAS Institute. Chapters 1-2, 7.

Zhou, Xueguang, and Liren Hou. 1999. "Children of the Cultural Revolution: the State and the Life Course in the People's Republic of China." *ASR* 64: 12-36.

Van den Bulte, Christophe and Gary L. Lilien. 2001. "Medical Innovation Revisited: Social Contagion versus Marketing Effort." *AJS* 106:1409-35.

Oct. 29/31

Event History Analysis II: Semi-parametric Model

- The Cox model
- Applications

Readings:

PX: Chapter 5.4

Allison, Paul. 1995. *Survival Analysis Using the SAS System*. SAS Institute. Chapter 5.

Upchurch, Dawn M., and James McCarthy. 1990. "The Timing of a First

Birth and High School Completion.” *ASR* 55: 224-234.

Nov. 5/7

Event History Analysis III: Extensions

- Repeated events
- Models for event counts

Readings:

PX: Chapter 5.5-5.7.

McFarland Daniel A. 2001. “Student Resistance: How the Formal and Informal Organization of Class rooms Facilitate Everyday Forms of Student Defiance.” *AJS* 107: 612-78.

Xueguang Zhou. 2001. “Political Dynamics and Bureaucratic Career Patterns in the People’s Republic of China.” *Comparative Political Studies* 34: 1036-1062.

Xueguang Zhou. 1993. “The Dynamics of Organizational Rules.” *AJS* 98: 1134-66.

Nov. 12/14

Models for Ordinal Dependent Variables

- Model specification and estimation
- Interpretation of results

Readings:

PX: Chapter 6.

Greeley, Andrew M. and Michael Hout. 1999. “Americans’ Increasing Belief in Life After Death: Religious Competition and Acculturation.” *ASR* 64: 813-835. See also “critique and reply” in *ASR* 2001 66: 146-158.

Emerson, Michael O. and George Yancey. 2001. “Does Race Matter in Residential Segregation?” *ASR* 66: 922-935.

Nov. 19/21

Models for Multinomial Logit Models

- Model specification and estimation
- Interpretation of results

Readings:

PX: Chapter 7.

Petersen, Trond, Ishak Saporta and Marc-David L. Seidel. 2000. “Offering a Job: Meritocracy and Social Networks.” *AJS* 106: 763-816.

Nov. 26.

Review