Spring 2019

Syllabus is Subject to Revisions

SOCI 30005 Statistical Methods of Research II

Department of Sociology, SOCI: 30005

Instructor Stephen Raudenbush, sraudenb@uchicago.edu

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Teaching Assistants

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Office Hours Thu (s) 1100 am – 100 pm

Class Hours Tue(s) and Thu(s)
930 am until 1050 am
Foster Hall – 1130 East 59th Street - **Room 505**

Lab Hours

Walker 303
Thu(s) Session 1: 1200 noon until 120 pm and
Thu(s) Session 2: 130 pm until 250 pm

Pre-requisites

Applied statistics up to and including applications of multiple regression (e.g., Statistical Methods of Research I, SOCI 20004/30004)

Course Content

This course provides an introduction to the statistical methods most commonly used in sociology and related social sciences. These include methods for continuous, binary, counted, ordinal, and multinomial data. We shall build our understanding of these methods on a foundation that includes fluency with joint, marginal, and conditional distributions, statistical independence, and with expectation, variance, and summation operators. We'll emphasize the framing of theoretical models, identification assumptions, and alternative strategies for estimation. All statistical ideas are embedded in case studies including the National Adult Literacy Survey, the National Educational Longitudinal Survey of 1988, the National Longitudinal Survey of Youth, High School and Beyond, and the National Survey of Primary Education in Thailand. Students are encouraged to analyze their own data for the final project. In our case studies, we shall consider the issues motivating the research, the key research questions, and reports of findings. We'll then re-analyze the data using the techniques described above and, based on this reanalysis, critically evaluate the validity of inferences in light of key assumtions. Thus, the course will consider all statistical choices and inferences in the context of the broader logic of inquiry with the aim of strengthening our understanding of that logic as well as of the statistical methods.

Text

Agresti, Alan, and Finlay, Barbara (1997). Statistical Methods for the Social Sciences, Fifth Edition. Prentice Hall.

Recommended software:

STATA or SPSS for PC

Student Work

There will be three assignments using data provided by the instructor and a final project. There may also be occasional quizzes and short assignments.

Regular assignments	60 points
Final project	40 points
Quizzes and short assignments	extra credit

Students may work in groups (of no more than three people) on the three assignments. Late assignments will not be accepted for credit because an answer key will be distributed on the day the assignments are due. The final project will involve re-analysis of data and a research report and must be done individually. Students are encouraged to analyze their own data for the final project.

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Course Schedule

Date	Topics	Readings
April 2	Overview of course; Joint, marginal, and conditional probability with application to binomial, Poisson, and normal distributions	AF: 2,3,4
April 4	Expectation, variance, and covariance with application.	AF: 6.8.9
April 9	Estimation: Maximum likelihood, least squares, and method of moments	Class Notes
April 11	Linear regression: theoretical model, identification, estimation, Matrix representation	AF: 11
April 16	General linear model, multivariate normal distribution, multivariate hypothesis testing, model comparison.	AF 12
April 18	Analysis of covariance: ignorable treatment assignment, weighting, and fixed effects	AF 12
April 23	Random effects and hierarchical linear models; comparison to fixed effects	Raudenbush, 2009
April 25	3 level models and cross-classified random effects models	Raudenbush and Bryk (RB), Chapters 8, 12
April 30	Logistic regression and the generalized linear model	AF 15
May 2	Extension to multilevel data	RB, Chapter 10, part 1
May 7	Linear probability models, probit models	AF 15;
May 9	Extension to multilevel data	RB, Chapter 10, part 1
May 14	Log-linear models for counted data	RB, Chapter 10, part 1
May 16	Extension to multilevel data	RB, Chapter 10, part 1

Date	Topics	Readings
May 21	Ordinal regression with extension to multilevel data	RB, Chapter 10, part 2
May 23	Extension to multilevel data	RB, Chapter 10, part 2
May 28	Multinomial regression with extension to multilevel data	RB, Chapter 10, part 2
May 30	Extension to multilevel data	RB, Chapter 10, part 2
June 4	Variable selection models	TBA
June 10-14	**Exam week**	

Bibliography

1. Agresti, Alan, and Finlay, Barbara. (2018). *Statistical Methods for the Social Sciences, Fifth Edition*. Glenview, IL: Pearson.

2. Raudenbush, S. W. (2009). Adaptive centering with random effects: An alternative to the fixed effects model for studying time-varying treatments in school settings. *Education Finance and Policy*, *4*(4), 468-491.

3. Raudenbush, S.W., and Bryk, A.S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Thousand Oaks, CA: Sage.