Advanced Social Statistics
Sociology 6290
Fall 2014
Course Time: Wednesday 5:30-9:10
Course Location Social Science Computer Lab 2308 FAB

Instructor: David M. Merolla, Ph.D
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Office Hours: Wednesday 2-3pm, Thursday 10-11am, or by appointment

Required Textbook: Tabachnikck, Barbara, and Lind Fidell. 2007. *Using Multivariate Statistics 5th Ed.* New York: Pearson Publishing. ISBN:0-205-45938-2

Other Requirements: Required course readings posted on Blackboard

Students must have access to SPSS to complete homework assignments and projects

Students must have a calculator capable of calculating square roots

Course Description:

This course is an advanced course on statistical methods used in sociology and other social sciences. The course is designed to provide students the necessary skills to both understand contemporary statistical research and conduct such research. As such, the course will cover the mathematical/ technical aspects of advanced statistical procedures as well as the conceptual bases for these techniques. Additionally, the hands on nature of the course will allow students to increase their skills using computer applications for statistical analysis and data management. The course will review and extend previous knowledge of data screening, bivariate statistical techniques and multiple regression. The course will then move to topics such as generalized linear modeling, exploratory factor analysis, path analysis using covariance structure analysis, confirmatory factor analysis, structural equation modeling, and multi-level modeling.

Student Learning Objectives

1. Students will demonstrate mastery of basic data screening and bivariate statistical techniques and understand how these analyses assist with more advanced techniques.
2. Students will demonstrate a mastery of multiple regression including regression diagnostics, using dummy variables, using interaction terms and using polynomials.
3. Students will understand the basics of generalized linear modeling, factor analysis, structural equation modeling and multi-level modeling. Students will understand the situations when such methods are used and how to interpret output from these models.
4. Students will be able to determine the benefits and drawbacks of using particular statistical techniques to answer specific research questions, and the bases of such choices.
5. Students will be able to articulate the relationship between statistical techniques and conceptual research problems.
6. Students will be able to use SPSS to produce appropriate statistical analyses, diagnose possible issues with the analyses and interpret the analyses.
7. Students will be able to present the results of statistical techniques in a form consistent with current standards in academic journals and professional meetings.

General Course Policies

Attendance: Attendance in class is mandatory. **Students who miss more than two meetings will not be eligible for a grade of A.** Repeated absences may result in being asked to drop or withdraw from the course with a failing grade. Students arriving more than 15 minutes late will be counted as absent. Please contact me immediately if you cannot consistently be in class and ready to begin at 5:30pm.

Assignments. Students are required to complete all assignments by the due date; students who have difficulty with a particular assignment on time are expected to contact the instructor to discuss these problems **prior to the assignment due date.** Assignments not completed by the due date will not be eligible for full credit and will be evaluated at the instructor's discretion.
Quality is key. If you are not already of the persuasion that you wouldn't want to put your name on half-baked & last-minute "efforts," may you come around soon to that way of thinking. Take pride in your work; do it well enough to claim it as your own.

Reading. Students are required to read all course materials by the time class begins and notify the instructor if they have difficulty completing required reading. If you did not understand a particular reading or concept please come to class with questions regarding that reading. I believe that you should have free access to all of assigned readings free of charge through the WSU libraries, if you have any difficulties accessing a specific paper, please contact me as soon as possible, it is possible that the citation in the syllabus is erroneous. **Please do not pay to access a course reading.**

Office Hours. Office hours are designed for me to answer specific questions or assist with specific aspects of an assignment. Please come to office hours with questions ready and attempt to complete assignments independently prior to coming to office hours. If you think you will need more that 20 minutes of time, please schedule an appointment.

Focus. Students are expected to be focused on class presentations during class time. **Cell phone use in class is strictly prohibited; students who use cell phones in class will not be eligible for a final grade of A, no exceptions**

Final Grades. Final grades submitted by the instructor are **final.** If you believe that there has been a clerical error or other mistake you may inquire for an accounting of your grade. However, grades will be based solely on your scores on course assignments and will not be arbitrarily adjusted at the end of the term. Students who 'need' a particular grade should ask me early in the semester about whether they are on track.

Academic Honesty. Students are expected to display academic integrity in all of their work for this course. Academic dishonesty includes cheating, fabrication, and plagiarism. Any student suspected of dishonesty in their work will receive a zero for the assignment in question and referred to the department chair for further disciplinary action. If you have any questions about academic honesty or plagiarism, please contact me.

Honor Code. Students are bound by the Wayne State University honor code which states: "Wayne State University holds its students to the highest academic standards. Pride in the University and in oneself requires students to maintain an environment free from any breach of academic honesty. As lifelong representatives of Wayne State, we seek to cultivate honor, integrity, and civility in order to ensure that we earn our degree honestly and that we provide an ethical platform for our continued success"

Registration. Students may *drop* a class for fifteen-week classes through the end of the fourth week of class (September 15th). Classes that are *dropped* do not appear on the transcript. Beginning the fifth week of class students are no longer allowed to drop but must *withdraw* from classes. It is the student's responsibility to request the withdrawal through the registrar's office. Failure to do so will result in a grade of F. Students must be passing at the time of the request to get a 'WP.' After the 10th week (November 9th) you cannot withdrawal from the course and will receive a letter grade. Incomplete grades are given in very limited circumstances to students who are passing the course and cannot complete final assignments due to unforeseen extenuating circumstances. Students that get a grade of incomplete must complete all assignments by January 30th 2014. Student who are not registered for this course may not attend course meetings.

Disability. If you have a documented disability that requires accommodations, you need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Assignments and Grading

1. Participation (10%):

As well as coming to class on time, students are expected to actively participate in class. Just coming to class will not gain participation points. Students are expected to come to class prepared and to stay focused on the course. You will be asked questions during this course.

2. Homework (20%):

There will be five homework assignments for this course. Most of the homework assignments will require the use of SPSS. All homework assignments must be completed in a professional manner (e.g., typed, proofread, complete sentences, no SPSS tables, etc...). Students must complete homework assignments on time. If you cannot complete an assigned homework on time, please contact Dr. Merolla at least 24 hours before class to avoid receiving a zero for that assignment.

3. Exams (25%):

There will be two exams a midterm exam on October 3rd and a final exam on December 5th. These exams may cover any topic from either reading or class, and will require students to answer written questions as well as use or interpret SPSS output and/or journal article tables. Each exam is worth 50 points. If for whatever reason you cannot make an exam, please contact Dr. Merolla at least 24 hours before the exam to determine an appropriate solution.

4. Final Paper and Presentation (45% points):

Each student must complete a quantitative research paper using a multivariate statistical technique. The research paper should be on a topic of interest to you. Students are encouraged to talk with their faculty advisors or other mentors for advice on appropriate research questions and datasets. Additionally, the nature of the research paper may be altered given students status and needs (e.g., you are working on a dissertation, you have a paper in progress, etc…), so please contact me if you have any specific questions regarding your paper.

The final paper should be in the style of a submission to a contemporary academic journal. In addition, students will give oral presentations of their papers in class on November 30th. These presentations will be similar to research talks given at academic conferences and should be accompanied by a handout, a PowerPoint presentation, or both.

The final paper will be graded based on 1) completion of each task on time (see below), 2) a well articulated research question, 3) the appropriateness of the methodology chosen, 4) the execution of the quantitative analyses, 5) the written presentation of the quantitative analyses including tables, and 6) the overall clarity and professionalism of the writing and oral presentation of the research.

Timeline for Final Research Paper:

September 12th (Friday): Turn in research question/topic, annotated bibliography with at least 5 citations (10 preferable), and possible datasets to be used

October 17th (Friday): Students turn in description of dataset, hypotheses and descriptive statistics for their final paper

November 5th: Rough Drafts of papers can be submitted for review (optional)

December 3rd: Oral Presentations

December 10th: Final Papers Due

All work, including participation, will be graded on the following scale:

"A" level work consists of cogent, well-articulated, and well-developed written presentation, demonstrating exceptional understanding, preparation, insight, originality, logical argumentation, and factual accuracy. "A" level work is completed on time and according to the guidelines. "A" level work is considered excellent.

"A-" level work consists of cogent, well-articulated, and well-developed written presentation, demonstrating very good understanding, preparation, insight, originality, logical argumentation, and factual accuracy. "A-" level work is completed on time and according to the guidelines. "A-" level work is considered very good.

"B+" level work consists of well-written work that demonstrates an acceptable understanding, preparation, insight, originality, logical argumentation, and factual accuracy. "B+" work is acceptable graduate level work, but only shows a basic grasp of concepts and ideas and with only satisfactory levels of communication.

"B" level work consists of work that reflects a minimally adequate understanding, preparation, insight, originality, logical argumentation, and factual accuracy. "B" level work is considered mediocre and is the lowest passing grade in the course.

"B-" level work is not adequate in either form or content, thereby not fully meeting the minimum requirements. "B-" level work is not passing at the graduate level. A final grade of "B-"will require you to retake this course.

"C" level work shows the barest understanding of the subject or task assigned, is poorly written, and fails to make a coherent argument. A final grade of "C" may lead you to be removed from the graduate program.

Other Suggested Resources/ Further Reading:

The course textbook is a survey book, which covers most topics briefly. If you need or want additional resources for topics/techniques covered in this course I recommend the following titles (those marked with asterisk are owned by the WSU Library):

Regression

McClendon, McKee. 1994. *Multiple Regression and Causal Analysis.* Itasca, IL: Peacock Publishers.

*Aiken, Leona, Stephen West and Raymond Reno. 1991. *Multiple Regression: Testing and Interpreting Interactions. Thousand Oaks, CA: Sage Publications.*

Generalized Linear Models

Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables.* Thousand Oaks, CA: Sage Publications

*Liao, Tim Futing. 1994. *Interpreting Probability Models: Logit, Probit and Other Generalized Linear Models.* Thousand Oaks, CA: Sage Publications. (Quantitative Applications in the Social Sciences # 101).

Exploratory Factor Analysis

Pett, Majorie A, Nancy R. Lackey, and John J. Sullivan. 2003. *Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Heath Care Research*. Thousand Oaks, CA: Sage Publications.

Confirmatory Factor Analysis/ Structural Equation Modeling

*Raykov, Tenko, and George A. Marcoulides. 2006. *A First Course in Structural Equation Modeling*. London, England: Psychology Press

Multi-Level Models

*Raudenbush, Stephen W., and Anthony Bryk. 2002. *Hierarachical Linear Models: Applications and Data Analysis Methods 2nd Ed*. Thousand Oaks CA: Sage Publications.

*Bickel, Robert. 2007. *Multilevel Analysis for Applied Research: It's Just Regression!*. New York: The Guilford Press

Course Schedule (subject to change)

Week 1 (August 27th): Introduction to the Course and Course Requirements

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Week 2 (September 3rd): Basic Stats Review Data Screening and Bivariate Association/ Introduction to SPSS Command Syntax

Read: Tabachnick and Fidell: Chapters 1-4

Week 3 (September 10th): Multiple Regression Review and Regression Diagnostics

Read: Tabachnick and Fidell: Chapter 5

Read: Mickelson, Rosyln Arlin. 1990. "The Attitude-Achievement Paradox Among Black Adolescents." *The Sociology of Education* 63(1):44-61.

Read: Beckett, Katherine. 1994. "Setting the Public Agenda: "Street Crime" and Drug Use in American Politics." *Social Problems* 41(3):425-447.

Week 4 (September 17th): Non-Linear Effects in Multiple Regression

Read: Roscigno, Vincent J., and James W. Ainsworth Darnell. 1999. "Race, Cultural Capital and Educational Resources: Persistent Inequalities and Achievement Returns." *Sociology of Education* 72(3)158-78.

Read: Evenson, Ranae J. and Robin W. Simon. 2005. "Clarifying the Relationship between Parenthood and Depression." *Journal of Health and Social Behavior* 46(4):341-58.

Read: Baron, Reuben M. and David A. Kenny. 1986. "The Moderator- Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic and Statistical Considerations." *Journal of Personality and Social Psychology* 51(6):1173-82

Week 5 (September 24th): Logistic Regression & Generalized Linear Models

Read: Tabachnick and Fidell: Chapter 10

DeMaris, Alfred. 1995. "A Tutorial in Logistic Regression." *Journal of Marriage and Family* 57(4): 956-68.

Nagasawa Richard and Zhenchao Qian, and Paul Wong. 2001. "Theory of Segmented Assimilation and the Adoption of Marijuana Use and Delinquent Behaviors among Asian Pacific Youth." *The Sociological Quarterly* 42(3): 351-72.

Ainsworth, James W. and Vincent J. Roscigno. 2005. "Stratification, School Work Linkages and Vocational Education." *Social Forces* 84(1): 257-84

Homework 2 Due

Week 6 (October 1st): Exam 1

Week 7 (October 8th): Multi-Level Modeling

Read: Tabachnick and Fidell: Chapter 15

Read: Huffman, Matt L. and Philip N. Cohen. 2004. "Racial Wage Inequality: Job Segregation and Devaluation across U.S. Labor Markets." *American Journal of Sociology* 109(4) 902-36.

Homework 3 Due

Week 8 (October 15th): Exploratory Factor Analysis

Read: Tabachnick and Fidell Chapter 13

Kroska, Amy. 2000. "Conceptualizing and Measuring Gender Ideology as an Identity." *Gender and Society* 14(3):368-94.

Students turn in description of dataset, hypotheses and descriptive statistics for their final paper

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Week 9 (October 22nd): Path Analysis with Covariance Structure Analysis

Read:

Stewart, Ednya B. 2006. "Family-and Individual-Level Predictors of Success for African American Students: A Longitudinal Path Analysis Utilizing National Data." *Journal of Black Studies* 36 (4):597-621.

Christie-Mizell, C. André. 2003. "Bullying: The Consequences of Interparental Discord and Child's Self-Concept." *Family Relations* 42(2): 237-51.
Homework 4 Due

Week 10: (October 29th): Confirmatory Factor Analysis

Read: Aragwala, Rina and Scott M. Lynch. 2006. “Refining Measurement of Women's Autonomy: An International Application of a Multi-Dimensional Construct.” *Social Forces* 84(4): 2077-2098.

Homework 5 Due

Week 11: (November 5th) : Structural Equation Modeling

Read: Tabachnick and Fidell: Chapter 14

Read: Woldoff, Rachael Anne. 2002. “The Effects of Local Stressors on Neighborhood Attachment.” *Social Forces* 81(1):87-116.

Week 12 (November 12th): Catch Up and Review Day

Week 13 (November 19st): Final Exam

Week 14 (November 26th) : Holiday- No Class

Week 15 (December 3rd): Student Presentations

December 10th- Final Papers Due