Advanced Statistics and Research Design (18:820:585:02)
Rutgers University
Spring 2009
Graduate School of Applied and Professional Psychology
CAS Room 219, Wednesday, 5-7:45
Rutgers Sakai at https://sakai.rutgers.edu/portal
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Course objectives
The primary goal of this course is to provide sufficient knowledge to become a good consumer of scientific articles. This course is designed to broaden and cultivate understanding of Generalized Linear Models (GLMs) with a heavy focus on multiple regression analysis, and to introduce fundamental concepts of factor analysis and path analysis. Students will learn to how to critically evaluate empirical papers and to construct an empirical paper of their own, such as dissertation. The class will be taught based on, but not limited to, the following two textbooks.

Textbooks

Required class presentation and participation
Each student is responsible for choosing one published article and presenting it in class for 15 minutes. At least one week prior to the scheduled presentation, a presenting student should make the published article available for reading, and other students will be expected to critically read and discuss it in class for additional 15 minutes. This class participation will count 15% towards the final grade.

Three evaluation papers
Students are required to write a total of three evaluation papers after reading assigned empirical research articles and each evaluation paper will count 25% towards the final grade. These three papers replace term papers or exams. For the exact questions and the writing format, follow the posted instruction at http://qsappweb.rutgers.edu/cstudents/comps/GenComps/GenComps05_q1.pdf

Other course requirements
- Students must pass the Human Subjects Certification Test and submit a copy of the official letter certifying this by no later than April 1, 2009. For more information, check the following Rutgers website at http://orsp.rutgers.edu/HSCPLetter.asp
- There may be a few short computer homework projects assigned as needed.

Class attendance
If students miss more than three classes out of the 15-week schedule, no passing grade will be given.

Grading
- Homework lab-projects (10%), class participation (15% plus extra)
- Three evaluation papers (75%)

Note: Class schedule and policy may be modified.
Weekly class schedule (subject to change)

Week 1 (1/21)  First class, Introduction to class, association and causation
Week 2 (1/28) No class (make-up class scheduled on 5/6/09)
Week 3 (2/4) ARC Computer Lab (Introduction to SPSS, basic functions and data handling)
Week 4 (2/11) Multiple regression – Assumptions and applications
Week 5 (2/18) Multiple regression – Categorical predictors and model selection, interpretation
Week 6 (2/25) Multiple regression – Interactions and multicollinearity
Week 7 (3/4) ARC Computer Lab (Multiple regression exercise)
Week 8 (3/11) Logistic regression, Computer Project #1 Due
Week 9 (3/18) Spring Break
Week 10 (3/25) Multivariate analysis of variance and covariance, Paper #1 Due
Week 11 (4/1) Principal component analysis (PCA) and factor analysis (FA)
Week 12 (4/8) ARC Computer Lab (PCA/FA exercise)
Week 13 (4/15) Basic concepts of structural equation modeling (SEM), Computer Project #2 Due
Week 14 (4/22) Make-up class, Paper #2 Due
Week 15 (4/29) Make-up class
Week 16 (5/6) Make-up class, Last class, Final paper (#3) due by 5/6/09

Recommended readings
In addition to textbook chapters, there will be additional articles (see below) that students are expected to read and produce a summary report (limit it to one page) each week, starting from the second week. The purpose of the summary report is to create an easy guide sheet in preparation for the qualifying exam. You may team up with other students to get better understanding of the articles and to produce more helpful summary reports. The exact order of articles to read and summarize will be announced each week.

(6) Shavelson Workbook (pp. 130-132).