Advanced Statistics II Structural Equation Modeling Psychology 144 Fall, 2007

Instructor

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There is no required text for the course; here are several recommended references

Principles and Practice of Structural Equation Modeling, Second Edition (Methodology In The Social Sciences) (Paperback)

by Rex B. Kline (a very good overview of the general principles) <u>http://www.amazon.com/Principles-Practice-Structural-Equation-Methodology/dp/1572306904/ref=ed_oe_p/104-8004448-</u> <u>2578365?ie=UTF8&qid=1184184508&sr=8-1</u>

Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming (Multivariate Applications Series) (Paperback) by Barbara M. Byrne

(an excellent guide to the details of AMOS using complex examples) http://www.amazon.com/Structural-Equation-Modeling-AMOS-Applications/dp/0805841040/ref=sr_1_1/104-8004448-2578365?ie=UTF8&s=books&qid=1184184661&sr=1-1

A Beginner's Guide to Structural Equation Modeling (Paperback) by Randall E.

Schumacker, Richard G. Lomax (received very good reviews) http://www.amazon.com/Beginners-Guide-Structural-Equation-Modeling/dp/0805840184/ref=pd_sim_b_2_img/104-8004448-2578365?ie=UTF8&qid=1184184614&sr=8-38

Latent Variable Models: An Introduction to Factor, Path, and Structural Equation Analysis (Latent Variable Models: An Introduction to) (Paperback) by John C. Loehlin

http://www.amazon.com/Latent-Variable-Models-Introduction-Structural/dp/0805849106/ref=reader_req_dp/104-8004448-2578365

Multiple Regression and Beyond (Hardcover) by <u>Timothy Z. Keith</u> (this was the "text" for ANOVA and Regression; it gives a fairly good initial introduction to SEM)

http://www.amazon.com/Multiple-Regression-Beyond-Timothy-Keith/dp/0205326447

About the Course

This course has only one goal: For you to become skilled at *structural equation modeling* (SEM, pronounced "ess eee em"). SEM is the most powerful and most conceptually sophisticated statistical tool currently available in social science. SEM allows us to specify and test models of social and behavioral phenomena that involve latent variables—variables which are not directly observed but whose existence is inferred from observed variables—as well as cause-and-effect connections among those variables. Recent software developments have made it possible for normal humans to gain a good intuitive understanding of the methods and to use them successfully without mastering the enormously complex equation specification and estimation procedures that underlie SEM. That is what we will do. The software we will use is AMOS (Analysis of MOment Structures), which is licensed to and runs as a module in SPSS.

Organization of the Course

It won't really be organized. Doing SEM is an art, not a science. We will simply do lots of it, together, and I will tell you what I'm thinking as we do it. If it seems useful or appropriate, I will assign homework. If it doesn't, I won't. As always, homework is handled as "do it until you get it right." One year, a student suggested that a large-scale class project might be a valuable learning tool. Another year, the class worked on several senior thesis projects being done by class members. Once you have established a base of skills, we will decide whether one of those or some other direction seems most likely to be of value to you.

Expectations

To be comfortable with SEM, you should have a strong background in multiple (least-squares) regression. Some familiarity with exploratory factor analysis is helpful but not essential.

I expect that you will be here for every class. This is an apprenticeship in which you learn a skill by working with someone who is (for the moment) better than you are and with people who are just as puzzled as you are. You cannot gain this skill by reading a text or class notes or by asking someone (even me) to summarize what was covered. If you cannot be in class, let me know in advance and explain why.

Tentative Topics

- Statistical Basics and Overview of SEM.
- Path Analysis (beginning with a review of multiple regression): *Tests hypotheses about cause-and-effect connections among measured variables*.
- Confirmatory Factor Analysis (beginning with a review of exploratory factor analysis): *Tests hypotheses about the existence of latent variables that can be inferred from observed, measured variables.*
- Hybrid (or Structural) Models: *Tests hypotheses about cause-and-effect connections among both measured and latent variables.*
- Multiple-group SEM: *Tests whether the same latent structure can be found in different groups.*
- Advanced Topics
 - o Nonrecursive Models.
 - o Latent Mean Structures & Latent Growth/Change Models.