

SOCI 8200
Fall Semester 2008
Introduction to Hierarchical Linear and Structural Equation Modeling

Professor:	Dr. Tom McNulty	Office:	Baldwin 312
Class Hours:	TTH 11:00-12:15 (period 73)	Phone:	542-3194
Room:	Baldwin Hall, 114A	Email:	tmcnulty@uga.edu
Office Hours:	TTH 3:30-4:30		

Course Overview: This is a special topics seminar that focuses on applications of hierarchical linear models (HLM) and structural equation models (SEM). The class begins with a review of the logic, structure, and basic estimation principles of HLM. Applications of two-level linear models are illustrated, including estimating organizational effects on individuals and examining individual change overtime. We then consider generalizations to three-level models. The SEM portion of the class will focus on developing SEM models, including conventional linear regression models, path models, confirmatory factor analysis, and structural equation models. Examples and computer assignments will reinforce the student's understanding of HLM and SEM and provide the practical skills to apply the techniques discussed in class. The course takes a hands-on, workshop approach with emphasis on the computer application, interpretation, and diagnosis of HLM and SEM.

Reading Materials: The following are available at the University Bookstore. Additional readings are listed below in the Course Outline and will be placed in the Baldwin Hall mailroom. I may add or substitute readings as the semester progresses.

Raudenbush & Bryk (2002)	<u>Hierarchical Linear Models</u> (2 nd ed.). Sage.
Raudenbush et al. (2004)	<u>HLM 6: Hierarchical Linear & Nonlinear Modeling</u> . Scientific Software International, Inc.
Douglas A. Luke.	Multilevel Modeling. Sage
Schumacker & Lomax (2004)	A Beginner's Guide to Structural Equation Modeling (2 nd ed.). Lawrence Erlbaum Associates, Inc.
Arbuckle (2005)	AMOS 6.0 User's Guide. AMOS Development Corp.

Requirements & Expectations: The seminar assumes that students have a solid understanding of basic statistics and familiarity with regression analysis. Students are required to attend class regularly. Final course grades are based on a series of computer assignments that illustrate the logic and practical application of HLM and SEM.

COURSE OUTLINE

THE LOGIC OF HIERARCHICAL LINEAR MODELS

Raudenbush & Bryk, Ch. 1 & 2 (for more technical discussions, see chapters 3 & 14)
HLM6: Ch. 1

DATA CONSIDERATIONS & CREATING (MDM) FILES IN HLM6

HLM6: Ch. 2, pp. 14-36

Assignment 1: create HSB.MDM with HSB1.SAV & HSB2.SAV

ILLUSTRATION OF THE BASIC TWO-LEVEL MODEL

Raudenbush & Bryk, Ch. 4 (review Ch. 2, 23-29)
HLM6: Ch. 2, pp. 16-23, 26-36

Rowan, Raudenbush, & Kang (1991). "Organizational design in high schools: A multilevel analysis." *American Journal of Education* 99(2): 238-266.

Assignment 2: two-level analyses using HSB.MDM

- One-Way ANOVA Model
- Regression with Means-as-Outcomes
- Random Coefficient Model
- Intercepts- and Slopes-as-Outcomes Model

APPLICATIONS IN ORGANIZATIONAL RESEARCH

Raudenbush & Bryk, Ch. 5

Lee & Bryk (1989). "A multilevel model of the social distribution of high school achievement." *Sociology of Education* 62: 172-92.

Assignment 3: estimate an intercepts- and slopes-as-outcomes model – HSB.MDM

COURSE OUTLINE (cont.)

APPLICATIONS IN THE ANALYSIS OF INDIVIDUAL CHANGE

Raudenbush & Bryk, Ch. 6 (160-176, 181-185)

Huttenlocher et al. (1991). "Early vocabulary growth: Relation to language input and gender." *Developmental Psychology* 27(2): 236-249.

Assignment 4: estimate a quadratic growth model – VOCAB.MDM

THREE-LEVEL MODELS

Raudenbush & Bryk, Ch. 8 (228-245)

HLM6, Ch. 3 & 4

The Basic Three-Level Model (228-237)

Assignment 5: estimate a basic three-level model – EG.MDM

Analysis of Individual Change within Organizations (237-245)

Bellair and McNulty (2008). "Gang membership, drug selling, and violence in neighborhood context." Forthcoming in *Justice Quarterly*.

Assignment 6: model individual change within organizations – EG.MDM

COURSE OUTLINE (cont.)

STRUCTURAL EQUATION MODELING

INTRODUCTION

Schumacker & Lomax Ch. 1
AMOS6: Part I, Ch. 1

DATA ENTRY & EDITING ISSUES

Schumacker & Lomax Ch. 2
AMOS6: Part I, Ch. 3

SEM BASICS

Schumacker & Lomax Ch. 4
AMOS6: Part II, Ch. 1-3

MODEL FIT

Schumacker & Lomax Ch. 5
Schumacker & Lomax Ch. 5 example with Grant.sav (factor.amw)

REGRESSION MODELS

Schumacker & Lomax Ch. 6
AMOS6: Part II, Ch. 4: Conventional Linear Regression
AMOS6: Part II, Ch. 14: Regression with an Explicit Intercept

PATH MODELS

Schumacker & Lomax Ch. 7
Schumacker & Lomax Ch. 7 example with Union.sav

Simons et al. (2007). "Identifying the psychological factors that mediate the association between parenting practices and delinquency." *Criminology* 45(3):481-517.

CONFIRMATORY FACTOR MODELS

Schumacker & Lomax Ch. 8
AMOS6: Part II, Ch. 8: Factor Analysis
AMOS6: Part II, Ch.12: Simultaneous Factor Analysis for Several Groups

Ullman (2006). "Structural equation modeling: Reviewing the basics and moving forward." *Journal of Personality Assessment* 87(1):35-50.

COURSE OUTLINE (cont.)

DEVELOPING STRUCTURAL EQUATION MODELS

Schumacker & Lomax Ch. 9 & Ch. 10

Schumacker & Lomax Ch. 10 example with Fig10.1.sav

Dorsey et al. (2007). "Coparenting conflict and parenting behavior in economically disadvantaged single parent African American families: The role of maternal psychological distress. *Journal of Family Violence* 22:621-630.

CONDUCTING A SPECIFICATION SEARCH

Schumacker & Lomax Ch. 11

AMOS6: Part II, Ch. 22

Schreiber et al. (2006). "Reporting structural equation modeling and confirmatory factor analysis results: A review." *The Journal of Educational Research*: 323-337.

RECOMMENDED TUTORIALS

AMOS6: Part II, Ch. 5: Unobserved Variables

AMOS6: Part II, Ch. 6: Exploratory Analysis

AMOS6: Part II, Ch. 7: A Nonrecursive Model

AMOS6: Part II, Ch. 11: Felson & Bohrnstedt's Girls & Boys