

Multivariate Data Analysis II -- MultiLevel Models
CEP 935
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Coursepack & textbook @ College Store 333-0505. SBS also has 8 copies.

Class Hours: Tuesday and Thursday, 10:20 - 12:10, 220 Natural Resources
Lab (denoted with * in class days): Room 218 Natural Resources
Office Hours: Tuesday, Thursday, 12:10-12:50, Thursday, 3:00-4:00, by appointment.
Electronic blackboard: <http://blackboard.msu.edu/courses/fs01cep935001/>

What are Multilevel Models?

Multilevel models deal with various forms of nested data. Examples in the social sciences include students nested within schools, repeated measures nested within people, treatments nested within delivery centers, friends (alters) nested within people (egos). The nesting violates standard assumptions of independence, as common membership in schools, treatment centers, etc makes observations dependent. Multilevel models account for these dependencies as well as expand the range of questions that can be addressed at both levels.

Course Content

This course begins with an introduction to multilevel (or hierarchical) linear models. This includes links to the general linear model (e.g., Regression & ANOVA), and inclusion of random effects. We then move to extensions of non-linear models (e.g., logistic regression), varied applications (e.g., growth models) and alternative designs (e.g., cross-nesting -- students within neighborhoods and schools).

Mathematical Difficulty

This course is intended to allow you to do more than just run a software package to generate output. In order to understand multilevel models and relate them to traditional techniques (such as multiple regression) we will need to use mathematical representations. Further, where applicable, we may need to uncover the statistical theory at the heart of a particular estimation approach.

Since many multilevel models are represented using matrix algebra, we will learn matrix algebra as needed.

Prerequisites: Students should have completed CEP 933 or equivalent and must be comfortable with basic algebra skills. Students who have not completed CEP933 must be comfortable with multiple regression, including the interpretation of output, basic

formulas and conceptualization of calculations, statistical inference, and applications to substantive issues.