

Applied Multilevel Models for Longitudinal and Clustered Data

ICPSR Summer Workshop in Boulder, Colorado
7/9/2012 – 7/13/2012

Presented by:

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ICPSR Materials will be available for download at:
<http://psych.unl.edu/hoffman/Sheets/ICPSR.htm>

For further resources and online course materials, please visit:
<http://psych.unl.edu/hoffman/HomePage.htm>

COURSE OVERVIEW

Multilevel models are known by many synonyms (i.e., hierarchical linear models, general linear mixed models). The defining feature of these models is their capacity to provide quantification and prediction of random variance due to multiple sampling dimensions (across occasions, persons, or groups). Multilevel models offer many advantages for analyzing longitudinal data, such as flexible strategies for modeling change and individual differences in change, the examination of time-invariant or time-varying predictor effects, and the use of all available complete observations. Multilevel models are also useful in analyzing clustered data (e.g., persons nested in groups), in which one wishes to examine predictors pertaining to individuals or to groups. This workshop will serve as an applied introduction to multilevel models, beginning with longitudinal data and continuing onto clustered data.

The first day will be spent reviewing general linear models and then introducing the multilevel model. The second day will be spent fitting unconditional longitudinal models and on the rules of model comparisons. The third day will be spent on two-level conditional (predictor) models for longitudinal data. The fourth day will be spent examining two-level conditional models for clustered data. The fifth day will be spent on three-level models for clustered longitudinal data or other special topics. The primary software package utilized for instruction will be SAS, but examples using SPSS and STATA will also be provided. The course will also include daily opportunities for hands-on practice in which participants may use any of these programs (SAS, SPSS, or STATA). Participants should be familiar with the general linear model (e.g., ANOVA and regression), but no prior experience with multilevel models or knowledge of advanced mathematics (e.g., matrix algebra) is assumed.

TENTATIVE SCHEDULE OF EVENTS

Day	Time	Topic
Monday	9:00–10:15	Lecture 1: Review of General Linear Model
	10:30–11:45	Example 1: General Linear Models
	1:15–2:30	Lecture 2: Concepts in Modeling Within-Person Change and Fluctuation
	2:45–4:00	Lecture 2, continued
	4:00–5:00	Lab Time 1: Introduction to Data Manipulation SAS
Tuesday	9:00–10:15	Lecture 3: Describing Within-Person Change via Multilevel Models
	10:30–11:45	Lecture 3, continued
	1:15–2:30	Example 3: Unconditional Longitudinal Models of Change
	2:45–4:00	Lecture 4: Describing Within-Person Fluctuation via Multilevel Models
	4:00–5:00	Lab Time 2: Fitting Unconditional Longitudinal Models
Wednesday	9:00–10:15	Lecture 5 : Time-Invariant Predictors in Longitudinal Models
	10:30–11:45	Example 5: Time-Invariant Predictors
	1:15–2:30	Lecture 6: Time-Varying Predictors in Longitudinal Models
	2:45–4:00	Example 6: Time-Varying Predictors
	4:00–5:00	Lab Time 3: Fitting Conditional Longitudinal Models
Thursday	9:00–10:15	Lecture 7: Two-Level Models for Clustered Observations
	10:30–11:45	Example 7: Conditional Clustered Models in SAS and SPSS
	1:15–2:30	Lecture 8: Multilevel Models for Crossed Observations
	2:45–4:00	Example 8: Crossed Random Effects Models
	4:00–5:00	Lab Time 4: Fitting Conditional Clustered Models
Friday	9:00–10:15	Lecture 9: Three-Level Models for Clustered Longitudinal Data
	10:30–11:45	Lecture 9, continued
	1:15–2:30	Example 9: Clustered Longitudinal Models
	2:45–4:00	Open Lab Time
