

## Multilevel Longitudinal Models

May 2018 Social and Behavioral Sciences Research Initiative Workshop  
University of Illinois at Urbana-Champaign

Presented by Dr. Lesa Hoffman: <http://www.LesaHoffman.com/>

**Course Textbook:** Hoffman, L. (2015). *Longitudinal Analysis: Modeling Within-Person Fluctuation and Change*. Taylor and Francis: <http://www.PilesOfVariance.com/>

Multilevel models are known by many synonyms (e.g., hierarchical linear models, general linear mixed models). Their defining feature 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 longitudinal data, such as flexible strategies for modeling change and individual differences in change, examining predictors at each level, and the use of all available complete observations, even if unbalanced across subjects. This two-day workshop is an applied introduction to multilevel models for longitudinal data for conditionally normal outcomes. Beginning from a base of general linear models, we will examine how to use fixed and random effects to describe the effects of time. We will also examine how individual differences can be predicted by time-invariant predictors. SAS will be the primary software package utilized for examples, but syntax and output using SPSS, STATA, and Mplus are also available. Participants should be familiar with the general linear model (e.g., analysis of variance and regression), but no prior experience with multilevel models or knowledge of advanced mathematics is assumed.

Day	Time	Reading	Activity
Friday May 4	8:30–10:00	Ch. 1	Lecture 1: Introduction to Multilevel Models
	10:00–10:20		<i>Break</i>
	10:20–11:45	Ch. 3	Example 1: General Linear Models and Repeated Measures ANOVA using Multilevel Modeling Software
	11:45–1:15		<i>Lunch (on your own)</i>
	1:15–2:30	Ch. 5	Lecture 2: Describing Within-Person Change over Time
	2:30–2:45		<i>Break</i>
	2:45–3:45	Ch. 6	Example 2: Polynomial Random Effects Models for Change
	3:45–5:00		Lectures and examples continued, questions, and discussion
Saturday May 5	8:30–10:00	Ch. 7	Lecture 3: Time-Invariant Predictors in Longitudinal Models
	10:00–10:20		<i>Break</i>
	10:20–11:45	Ch. 7	Example 3: Time-Invariant Predictors of Polynomial Change
	11:45–1:15		<i>Lunch (on your own)</i>
	1:15–2:30		Example 3 continued
			Lecture 4: Crossed Random Effects for Repeated Measures Designs
	2:30–2:45		<i>Break</i>
	2:45–3:45	Ch. 12	Example 4: Crossed Random Effects for Subjects and Items
3:45–5:00		Lectures and examples continued, questions, and discussion	