HDE 205: Longitudinal Data Analysis

Spring Quarter, 2021

Meeting Time: Mondays 1:10 -4:00 PM
Location: Synchronous, online via Zoom

Instructor: Siwei Liu
Office Hours: By appointment
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Course Description and Goals:
This course is an introduction to statistical models for the analysis of longitudinal data commonly seen in developmental research. The goal is to help students gain quantitative skills that shall be useful in their study of developmental or other change-based processes. In particular, students should gain abilities related to longitudinal data manipulation, organization, description, and modeling, interpretation of results, and presentation and critique of empirical research. Students are expected to have knowledge of descriptive statistics, correlation, and multiple regression before taking this course.

Course Format:
Each week’s class will begin a lecture/discussion on selected topics, followed by hands-on experience with statistical software. SAS and R (for SEM) will be the main statistical programs used in class, but students are allowed to use other programs to complete the assignments.

Evaluation:
At the beginning of the course, students will be asked to prepare a set of longitudinal data they want to analyze. Throughout the quarter, students will complete weekly data analysis exercises and write short reports that present, describe, and elaborate their data. At the end of the quarter, a selection of relevant analyses will be compiled into a written document in the form of a complete empirical manuscript – with concentration on the Methods and Results sections, but also framed by concise introduction and discussion. Late assignments and papers receive an automatic deduction of 10% for each day late. Students are expected to follow the UC Davis Code of Academic Conduct, which can be found at http://sja.ucdavis.edu/files/cac.pdf

Evaluation is based on: (a) Assignments, 60%; (b) Final paper, 20%; and (c) Participation, 20%.

Recommended Textbook:

Additional readings will be available online.

Schedule of Topics:
Week 1 Introduction to Longitudinal Analysis
Readings: HG1
Assignment 0: Information Sheet
Assignment 1: Descriptives & Plots
Week 2  Measures of Change  
Readings: Rovine & Liu (2011)  
Assignment 2: Three Occasion Change Scores

Week 3  Repeated Measures ANOVA and MANOVA  
Readings: HG2-3; Hertzog & Rovine (1985)  
Assignment 3: Analysis with Repeated Measures ANOVA

Week 4  Covariance Pattern Model  
Readings: HG6; Liu, Rovine, & Molenaar (2012)  
Assignment 4: Repeated Measures ANOVA with Covariates; Covariance Pattern Model

Week 5  Introduction to Multilevel Growth Curve Model  
Readings: HG4-5  
Assignment 5: Basic Multilevel Growth Curve Analysis

Week 6  Multilevel Growth Curve Model: Extensions  
Assignment 6: Growth Curve Analysis with Time-Varying Predictors

Week 7  Growth Curve Model in the SEM Framework  
Assignment 7: Latent Growth Curve Analysis

Week 8  Multivariate Change  
Readings: MacCallum et al. (1997); Sayer & Cumsille (2001); Widaman et al. (2010)  
Assignment 8: Modeling Multivariate Longitudinal Data

Week 9  Missing Data  
Readings: HG14; Graham (2009); Little & Rhemtulla (2013)

Week 10  Memorial Day – No Class