

HDE 298: Longitudinal Analysis in Developmental Research

Fall Quarter, 2018

Meeting Time: Tuesdays 1:10 -5:00 PM
Location: 1106 Hart

Instructor: Siwei Liu
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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%.

Textbook:

Hedeker, D., & Gibbons, R. D. (2006). *Longitudinal data analysis*. Hoboken, NJ: Wiley. Additional readings will be available online.

Schedule of Topics:

Week 1 **Introduction to Longitudinal Analysis**
Readings: HG1
Assignment 1: Information Sheet; 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)
Optional: Wolfinger & Change (1995)
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**
Readings: Singer & Willett (2003) Chapter 5
Assignment 6: Growth Curve Analysis with Time-Varying Predictors
- Week 7** **Growth Curve Model in the SEM Framework**
Readings: Bauer (2003); Bollen & Curran (2006) Chapter 2
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** **Nonlinear Change/Guest Speaker**
Readings: Grimm & Ram (2009); Ran & Grimm (2007); Singer & Willett (2003) Chapter 6