APPLIED LONGITUDINAL DATA ANALYSIS: AN INTRODUCTION

Instructors: Nilam Ram, PhD
Lawrence Lo

Focus:
This workshop is focused on key methodological issues associated with the analysis of longitudinal data in the social sciences. General areas to be covered include the manipulation, organization, and description of longitudinal data, and application and implementation of longitudinal analysis techniques to the types of empirical data obtained in the social sciences. The purpose is to assist students in the acquisition of skills in the formulation of research questions, design of studies, measurement devices, methods of analysis, and implementation.

Goals:
The workshop is designed to help students gain a number of skills that shall be useful in their study of developmental or other change-based processes. In particular, students should gain abilities related to research conceptualization, research design, data analysis, results interpretation, and the presentation and critique of empirical research. In addition to tackling general issues regarding the link between research questions and analytical methods, the course will survey intraindividual change and variability concepts and methods (e.g., growth curve modeling and extensions) and provide some introductory exposure to multilevel modeling frameworks. Computer Lab time will be used to orient participants to data manipulation, graphing, and analysis using the R program.

Prerequisites:
There are no specific prerequisites for this course. The students for which it is targeted include advanced developmental students and others who are interested in how longitudinal methods can contribute to their scholarly interests and pursuits. A substantial level of expertise in statistics and data analytical procedures (e.g., multiple regression analysis) and interest in and access to an on-going research project with longitudinal data is a plus.

Format:
As much as possible, a seminar atmosphere will be maintained in the scheduled sessions. Most days, half the time will be spent in a lecture/discussion, and half will be spent in the computer lab working through examples and/or analyzing one's own data. Participants are encouraged to bring research issues and data pertinent to their own interests for discussion and critique.

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PRELIMINARY SCHEDULE

Jun 18: <u>Introduction</u>

Morning *Introduction to Longitudinal Research*
Five Objectives of Longitudinal Research

Computer Lab: Introduction to Longitudinal Analysis
Introduction to R (Getting Data into the Program)

Afternoon *Intraindividual Change & Variability*
Reading: Nesselroade (1991), Ram & Gerstorf (2009)

Computer Lab: Describing Longitudinal Data
Long & Wide Data Files
Longitudinal Descriptives & Plots

Jun 19: <u>Intraindividual Change I</u>

Morning *Two-Occasion Models of Change*
Auto-Regressive & Difference Score Models,
Measurement: Factorial Invariance

Computer Lab: Two-Occasion Models of Change
Univariate Two-Occasion Models
Auto-Regressive & Difference Scores

Afternoon *Growth Curve Analysis I: Introduction*
Multilevel Model of Change

Computer Lab: Growth Models I
Linear Growth Model (by individual)
Individual-level Regression/Growth

Jun 20: <u>Intraindividual Change II</u>

Morning *Growth Curve Analysis II:*
Linear Growth Model (Analysis & Output)

Computer Lab: Growth Models II
Linear Growth Model (between-person differences)
Multilevel Regression/Growth

Model Tables & Plots

Afternoon *Growth Curve Interpretations, Considerations, & Extensions*
Alternative Time Metrics, Rescaling, & Recentering
Alternative Error Structures
Non-linear Growth Models

Computer Lab: Growth Models III
Rescaling & Recentering
Exponential Growth Model

Jun 21: <u>Intraindividual Variability I</u>

Morning *Intraindividual Variability: Univariate*
Dynamic Characteristics I
Net Intraindividual Variation

Computer Lab: Intraindividual Moments
Intraindividual Variability Summaries (iM, iSD, etc.)

Afternoon *Intraindividual Variability: Bivariate*
Dynamic Characteristics II
Intraindividual Covariation

Computer Lab: Intraindividual Correlations & Regressions
Multilevel Model of Intraindividual Covariation

Jun 22: <u>Intraindividual Variability II</u>

Morning *Intraindividual Variability: Multivariate*
Intraindividual (P-technique) Factor Analysis

Computer Lab: Intraindividual Factor Analysis
5-steps for P-technique

Afternoon *Intraindividual Dynamic Processes*
Intraindividual Dynamics

Wrap-up: Intraindividual Change & Variability
Five Objectives of Longitudinal Research