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# Data Analysis of Repeated Measures: Estimating a Multi-Group Multivariate Linear Growth Model

Fur-Hsing Wen

Department of International Business,  
Soochow University

## Abstract

This paper demonstrates the data analysis of the repeated measures from the Taiwan Education Panel Survey (TEPS). Based on the four data waves on the TEPS, we consider two abilities (general and mathematic) and two population groups (male and female students) to construct a multi-group multivariate linear growth model. Because the two-group multivariate repeated measures belong to the different populations and the different research variables, the residual terms of linear growth models may imply heterogeneity of the error covariance structure. We treat the error covariance structure as an unrestricted structure to compare the various types of models. The results from the HLM on the complete data (2,806 students) reveal that the male and female students in this study have the same error covariance structure but have distinct linear growth trajectories. In addition, comparisons of the competitive models and related suggestions are discussed in the results and conclusion sections.

**Keywords:** multi-group analysis, longitudinal data, nested, hierarchical linear modeling, linear growth model