

USING NESTED STRUCTURES TO SELECT MODELS FOR DEVELOPMENTAL TRAJECTORIES OF COGNITIVE ABILITIES IN ADULTHOOD

Michelle Williams

Dr. Phillip Wood, Dissertation Supervisor

ABSTRACT

Change over time can be modeled through a variety of statistical techniques including, but not limited to, linear or quadratic slope-intercept (SI), repeated-measures MANOVA, and single-factor growth models. Choice of method for modeling longitudinal data is often based on convention or familiarity with a particular modeling approach. It is argued that this should not be common practice, but rather the data and model comparisons should be used to inform the choice of model.

The current work shows how several growth models are actually special cases of the free curve slope-intercept (FCSI) model, and as such, the models are nested within the FCSI model. Given the nested structure, model comparisons can be made using chi-square difference tests as well as comparisons of alternative fit indices (e.g., AIC, BIC, RMSEA) to determine the best model for a given dataset. This idea is illustrated through application to an example dataset that included longitudinal measurements of cognitive ability information over adulthood.

Substantively, the results suggest that crystallized abilities change at a non-linear rate that is not adequately characterized by the commonly used quadratic or linear slope-intercept model. Specifically, the FCSI model was indicated as appropriate for all crystallized abilities. Fluid abilities, however, showed a more constant rate of change than crystallized abilities, consistent with the literature. More specifically, the three fluid abilities were adequately modeled by a linear SI, a quadratic SI, and a single-factor growth model that showed a linear tendency.