

Multilevel Models for Assessing Growth with Attrition

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Abstract

Methods for modeling critical transitions are important for both educational and developmental research. However, as people progress through critical transitions, e.g., school to work; high school to college, growth rates may vary and change drastically as some persons successfully transition, while others do not. Within the multilevel framework for longitudinal modeling, one method that has been proposed for studying critical transitions is piecewise linear growth models (PLGM; Raudenbush & Bryk, 2002), in which coefficients of linear growth before and after the critical transition are estimated separately. This has the advantage of allowing the comparison of both variance in the growth parameters and relevant covariates before and after the transition period. Alternately, one can specify a quadratic growth model (Raudenbush & Bryk, 2002) to reflect the change in growth before and after the critical transition period.

However, complicating the estimation of growth are the patterns of attrition that commonly occur in longitudinal studies. Since attrition is most likely to occur in later waves of data, there may be a higher incidence of missing data after the critical transition. Further, drop-out patterns after a critical transition are more likely to be related to unobserved responses, i.e., those who unsuccessfully transitioned have lower responses and hence drop-out, and therefore be informative missing values. However, it is known that misspecification of the form of the missing data induces bias in the parameter estimates (Fitzmaurice et al., 1995). In this study, the effect of informative drop-out patterns on bias and power will be examined for both PLRM and polynomial random coefficients regression models in the presence of a transition effect. Results of a simulation study assessing bias and power of growth coefficients are presented and recommendations made regarding the preferred statistical model when data follow an informative drop-out pattern.

References

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