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Investigating Factorial Invariance of Latent Variables Across Populations When Manifest Variables Are Missing Completely

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Abstract

Difficulties arise in multiple-group evaluations of factorial invariance if particular manifest variables are missing completely in certain groups. Ad hoc analytic alternatives can be used in such situations (e.g., deleting manifest variables), but some common approaches, such as multiple imputation, are not viable. At least 3 solutions to this problem are viable: analyzing differing sets of variables across groups, using pattern mixture approaches, and a new method using random number generation. The latter solution, proposed in this article, is to generate pseudo-random normal deviates for all observations for manifest variables that are missing completely in a given sample and then to specify multiple-group models in a way that respects the random

nature of these values. An empirical example is presented in detail comparing the 3 approaches. The proposed solution can enable quantitative comparisons at the latent variable level between groups using programs that require the same number of manifest variables in each group.

Keywords:

confirmatory factor analysis | factorial invariance | missing data | structural equation modeling

Notes

[1]EQS (Bentler, 2006) scripts and output files for all models presented in this article are available on request from the first author.

[2]Mplus (Muthén & Muthén, 2007) scripts and output files for all pattern mixture models presented in this article are available on request from the first author.

[3]Analysis scripts and output files for all models presented in this article using the random data approach are available on request from the first author.

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Dynamic but Structural Equation Modeling of Repeated Measures Data

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