



Practical Uses of Structural Equation and Item Response Model Equivalency

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Abstract:

Although equivalency between Structural Equation (SEM) and Item Response (IRT) models is well known, it is not widely clear under what circumstances is better to choose one approach over another. This work compares performance of the Diagonally Weighted Least Squares (DWLS) and Maximum Likelihood/Expectation-Maximization (ML/EM) algorithm performances in the scale extremes where indicator information is minimum. Such algorithms are widely used, respectively, in SEM and IRT models. Precision of parameter estimation is also examined according to parameter type. Simulation studies, using open-source R packages, demonstrate the ML/EM performs better than DWLS at scales extremes and that, in general, ML/EM estimations are more precise the DWLS ones, especially regarding IRT discrimination parameters. Also, anecdotally, understanding how a difference on population factor mean is accommodated on model parameters is much more intuitive using IRT models which concentrates all the difference on indicator difficulty parameters.

Anecdotally,

Keywords:

Identification, common factor, estimation precision, discrimination, difficulty

References:

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