Exploratory Structural Equation Modeling: An Integration of the Best Features of Exploratory and Confirmatory Factor Analysis

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Abstract

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), path analysis, and structural equation modeling (SEM) have long histories in clinical research. Although CFA has largely superseded EFA, CFAs of multidimensional constructs typically fail to meet standards of good measurement: goodness of fit, measurement invariance, lack of differential item functioning, and well-differentiated factors in support of discriminant validity. Part of the problem is undue reliance on overly restrictive CFAs in which each item loads on only one factor. Exploratory SEM (ESEM), an overarching integration of the best aspects of CFA/SEM and traditional EFA, provides confirmatory tests of a priori factor structures, relations between latent factors and multigroup/multioccasion tests of full (mean structure) measurement invariance. It incorporates all combinations of CFA factors, ESEM factors, covariates, grouping/multiple-indicator multiple-cause (MIMIC) variables, latent growth, and complex structures that typically have required CFA/SEM. ESEM has broad applicability to clinical studies that are not appropriately addressed either by traditional EFA or CFA/SEM.

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