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Title

Assessing the size of model misfit in structural equation models

Abstract

Assessing the fit of a structural equation model (SEM) is not fundamentally different from assessing the size of a mean difference using a z test. However, there are three key differences: (1) In a z test, the parameter involved in the null hypothesis is the parameter of interest, whereas in SEM the residual means and covariances are not the parameters of interest. (2) In a z test the null hypothesis is univariate, whereas in SEM we deal with a multivariate null hypothesis. (3) In a z test we deal with simple null hypothesis, whereas in SEM we deal with a composite null hypothesis.

The first difference implies that one needs to relate the model misfit results to the consistency with which parameters of interest are estimated. The second difference implies that in a z test there is only one effect size to consider, although we are free to choose the most suitable one for the analysis (e.g., unstandardized, standardized, or relative), whereas in SEM t effect sizes are to be considered where the overall effect size of the misfit will simply be a summary measure, however imperfect, of these t effect sizes. The third difference simply implies that statistical theory for obtaining confidence intervals will necessarily be more involved in SEM than in a z test.

I describe unstandardized and standardized effect sizes of the SEM misfit (piecewise and overall), I provide statistical theory for constructing confidence intervals for all of them, and relate them to current goodness of fit practices in SEM.

Brief CV

Prior to joining the University of South Carolina, **Alberto Maydeu-Olivares** was ICREA-Academia Distinguished Professor of Psychology at the University of Barcelona (Spain). Previously, he had been Assistant Professor of Econometrics and Statistics at the Universidad Carlos III de Madrid, Associate and then Full Professor of Psychology at the University of Barcelona, and Professor of Marketing and of Quantitative Methods at the IE Business School in Madrid.

He received a Ph.D. in Clinical/personality Psychology from the University of Barcelona and a Ph.D. in Quantitative Methods from the University of Illinois. Among other awards, he has received a Fulbright Scholarship, the American Psychological Association Dissertation Award (Division 5), the Catalan Young Investigator Award, and the Cattell (Young Investigator) award from Society of Multivariate Experimental Psychology. He was elected President of the Psychometric Society (2013) and he is currently an editor of *Psychometrika*. He has edited the volumes *Contemporary Psychometrics* (Lawrence Erlbaum, 2005 –with J.J. McArdle), and the *Handbook of Quantitative Methods in Psychology* (Sage, 2009 – with R. Millsap) and has published over 70 articles in refereed journals.

His research interest focuses on structural equation modeling and item response theory (IRT), and more generally in developing new quantitative methods. His early research



focused on social problem solving (how individuals solve real life problems) and optimism. He is probably best known for his research on goodness of fit tests for very sparse categorical data (with applications to educational testing), and models for preference and choice (with applications to marketing but also to personnel selection). His most recent work focuses on goodness of fit testing of structural equation models, the use of instrumental variable methods to overcome common method bias, and statistical methods for adjusting for faking in personnel selection.
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