Bayesian Structural Equation Modeling and Its Current Researches

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***Abstract*:** Structural equation modeling (SEM) has been widely used in psychological researches to investigate the casual relationship among latent variables. Model estimation can be conducted under both the frequentist framework (e.g., maximum-likelihood approach) and the Bayesian framework. However, unnecessarily strict restrictions are applied on the model in traditional frequentist methods. This often leads to rejection of the model. In order to solve the problems caused by these restrictions, researchers can refer to the modification indices and modify the model until the fit index indicates good fit. But the use of modification indices is easily influenced by the subjective choice of the researcher, and can easily lead to an increase of Type I error rate and the over-fitting of the model. Combining with prior information, Bayesian structural equation modeling (BSEM) can solve the problems above easily and obtain good model fitting. Besides, Bayesian methods also have better performance in model identification and model fitting, parameter estimation. In recent years, with the prevalence of Bayesian statistics and its advantages in dealing with small samples, missing data and complex models in SEM, Bayesian structural equation modeling has developed rapidly. However, in China its application in the field of psychology is still insufficient. Therefore, this paper mainly focuses on presenting this new research method to applied researchers. We explain the theoretical and methodological basis of BSEM and several commonly used Bayesian structural equation models, as well as its advantages and disadvantages compared with the traditional frequentist approach. A real data set was also analyzed to compare the two estimation methods in detail and demonstrate the modeling steps of BSEM.

***Keywords*:** structural equation modeling, Bayesian estimation, maximum-likelihood estimation