How to Select Prior Variance in Bayesian Approximate Measurement Invariance?

Measurement invariance (MI) is a pre-requisite for comparison between groups under the framework of latent variables. But in traditional multi-group factor analysis, scalar invariance is almost unachievable in practice (Marsh et al., 2018). The Bayesian approximate MI proposed by Muthén and Asparouhov(2013) compensates for this limitation to some extent by providing a zero-mean, small-variance prior for the differences in measurement parameters. However, two main problems in this method have hindered its application. Firstly, model evaluation remains underdeveloped. Secondly, there is no guideline for the selection of prior variance (e.g., De Bondt & Van Petegem, 2015; Fong, 2014). To address the latter problem and set a foundation for further research, four different priors were provided to recover the latent mean difference under different conditions using one-factor models. The simulation study conditions include: model size, number of groups, ratio of group size to model size and noninvariant size. Recommendations were provided based on the results to help researchers get unbiased and effective estimates in an approximate MI analysis, and a real data set was analyzed to demonstrates the validity and practical usefulness of this guideline. Moreover, future studies should develop guideline for fitting criteria because simulation study has found that model is still well-fitting when estimates are biased. In addition, based on the results of simulation study, future studies are also suggested to estimate the noninvariant size of datasets and then choose the prior.

Key words: Bayesian, approximate measurement invariance, prior variance