

# Bayesian SEM with Informative Priors: Precautions and Guidelines

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## Suggested talk duration (15-60 minutes)

20 minutes

## Summary (max. 500 words)

Bayesian estimation is frequently suggested as a viable estimation method in small sample contexts. In a systematic literature review, we investigated the legitimacy of broadly applying Bayesian methods to address small sample sizes for structural equation models, instead of using frequentist methods (e.g. maximum likelihood estimation). Based on this review, we concluded that Bayesian estimation requires the inclusion of prior information for it to perform well with small samples. In fact, the use of only default (i.e., diffuse) priors can cause more bias than with frequentist methods, especially for the variance parameters in the model.

This conclusion raised a lot of new questions: e.g. is prior information required on all parameters? Likewise, how informative should the distribution(s) be? In a simulation study, we therefore investigated the performance of Bayesian estimation with varying combinations of informative and non-informative priors for a latent growth curve model with a distal (long-term) outcome under conditions with small samples. We varied the level of informativeness of the prior distributions, as well as the parameters on which the informative priors were placed. A selection of the informative prior distributions was specified in a way that can also be used in practice. As a result, applied researchers can easily incorporate our findings into their own work.

The goal of the simulation study is to find out which parameters require prior information, how informative these prior distributions should be to obtain accurate results, and what happens when prior distributions are specified that deviate from the true population values.

## Relevance to conference theme

This presentation focuses on precautions of using Bayesian methods in a small sample context, and presents guidelines for researchers who want to use Bayesian estimation to analyze structural equation models, specifically latent growth curve models, with a small sample size.

## Keywords (max. 3)

Bayesian estimation, small samples, informative priors