

## **Bayesian structural equation modeling for data from multiple cohorts**

High levels of prenatal alcohol exposure (PAE) result in significant cognitive deficits in children, but the exact nature of the dose response relationship is less well understood. To investigate this relationship, data were assembled from six longitudinal birth cohort studies examining the effects of PAE on cognitive outcomes from early school age through adolescence. Structural equation models (SEMs) are commonly used to capture the association among multiple observed outcomes in relation to an underlying latent variable of interest. However, conventional SEMs could not be fitted in this context because different outcome measures were used in the six studies. In this paper we describe and implement a multi-group Bayesian SEM that maps the unobserved cognition variable to a broad range of observed outcomes. The relation between these variables and PAE is then examined while controlling for potential confounders via propensity score adjustment. By examining different possible dose-response functions, the proposed framework is used to investigate whether there is a threshold PAE level that results in minimal cognitive deficit.

Keywords: Bayesian inference; cognition; fetal alcohol spectrum disorders; prenatal alcohol exposure; structural equation modeling;