MEASURING UNCERTAINTY IN A PREDICTIVE MODEL: A CASE STUDY

Elizabeth Stojanovski[1] and Kerrie Mengersen[2]

[1]*School of Mathematical and Physical Sciences, University of Newcastle, Australia*
[2]*School of Mathematical Sciences, Queensland University of Technology, Australia*

The Bayesian approach has the ability to estimate models that may be otherwise unidentifiable. The aim of the study is to develop a multivariate model that incorporates distributional issues as well as uncertainty evident in the present data. These issues include high non-normality and small sample size relative to the number of estimated parameters. Furthermore, some health domains in the present study are measured using self-report scales which are prone to be overestimated and consequently subject to biases. In addition to modelling in a general Bayesian framework that permits general levels of uncertainty to be adjusted for in the modelling process via the utilisation of different prior distributions, the Bayesian framework has the ability to further model particular data properties. A Bayesian model is posed in which parameters are initially assumed known while this assumption is later relaxed by imposing prior distributions on the loadings and precisions. An investigation of the potential measurement error bias is conducted by constructing a hierarchical additive model. The stability and sensitivity of the results is also discussed.