Title: The effects on parameter estimates and goodness-of-fit statistics when selecting different input matrices and estimation techniques in confirmatory factor analyses of the General Health Questionnaire

Authors: Wei Chun Wang and Everarda Cunningham, Swinburne University of Technology

Email: ecunningham@swin.edu.au Phone: +61 3 9215 7316

Abstract

Researchers often pay minimal attention to the assumptions that underlie the valid application of particular statistical tests. In structural equation modelling (SEM), the most common approach to analysis of data is to analyse a covariance matrix based on Pearson product-moment (PPM) correlations and use maximum-likelihood (ML) as the estimation technique. However, PPM correlations assume that the data are continuous and ML estimation requires the data to be multi-variate normal. When data are ordinal, covariance matrices based on polychoric correlations are appropriate. When data violate the assumption of multivariate normality, weighted least squares (WLS) may be a more appropriate estimation method. The aim of this study is to compare the parameter estimates and goodness-of-fit statistics obtained when different input matrices and estimation techniques are used in a series of confirmatory factor analyses (CFAs) of the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988). The GHQ comprises 12 items and uses a four-point ordinal response scale. Distributions of item responses are invariably non-normal and, while different factor structures have been reported, the most commonly supported structure suggests that the GHQ comprises three factors. The data set analysed comprises responses to the GHQ from 259 Australian immigrants who emigrated from what was previously known as Yugoslavia. For the three-factor CFAs, input covariance matrices were based on PPM or polychoric correlations and estimation methods employed were either ML or WLS. While definitive conclusions could not be drawn because the population parameters were unknown, a

comparison of the parameter estimates and goodness-of-fit statistics obtained provided support for using polychoric correlations and WLS estimation when analyzing ordinal, non-normal data.