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Plausible values of latent variables: A useful approach of data reduction for psychiatric measures

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A challenge in application of psychiatric measures is there are too many variables/items in a scale (e.g., depression, anxiety). The often used data reduction approaches are to generate total scale scores or estimated factor scores. The former is simply to sum item scores and the latter is to estimate factor scores from factor analysis model. However, the problems are: the total score does not take into account of measurement errors; and using factor scores or IRT scores as dependent variables in further analysis gives biased slopes. Such biases can be alleviated by using a recently developed technique - plausible values of latent variables that are a set of generated values of factor scores using MCMC Bayesian approach. The plausible values can be estimated not only for continuous latent variables (e.g., factors), but also for categorical latent variables (e.g., latent classes). The plausible values of factors or latent class membership can be used as observed variables for further analysis and provide more accurate parameter estimates, compared with the traditional estimates of latent variables (e.g., factor scores or IRT scores). When the plausible values are used in subsequent analysis, multiple imputed plausible value data sets are used and analyzed just like multiple imputations (MI) data sets, i.e., by combining the results across the imputations using Rubin's (1987) method. This presentation will demonstrate how to estimate and apply plausible values of depression and anxiety scales using real-world research data.

Biography

Jichuan Wang has completed his PhD from the Sociology Department, Cornell University and Post-doctoral studies from the Population Studies Center, University of Michigan. He is a senior biostatistician at Children's Research Institute, CNHS. He has published three statistical books and authored/co-authored more than 100 peer-reviewed journal article with more than 30 first-authored. He has been serving as Editorial Board Members of five academic journals.

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