

Conditional Design Effects for Structural Equation Model Estimates

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Abstract

Complex surveys involve design elements such as clustering, stratification, and unequal survey weights, and a large literature exists on the effect of these design characteristics on the estimation of univariate parameters such as totals and means. This article extends that literature by looking at design effects on multivariate parameters, as obtained from a structural equation model (SEM). The variance of SEM parameters is affected by clustering, stratification, and weighting, but also by measurement error and nonnormality. Moreover, these design effects may interact. I show how “conditional design effects” of these different survey error components on SEM parameter estimates may be estimated. An application to a structural equation model involving reciprocal effects between latent variables and correlated error terms demonstrates the conditional effects of clustering, measurement error, and nonnormality.

Key Words: Latent variable, design effect, complex sampling, SEM.