Two approaches for computing standard errors and confidence intervals for correlations in the case of indirect range restriction

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Abstract

A frequent topic of psychological research is the estimation of the correlation between two variables from a sample that underwent a selection process based on a third variable. Due to indirect range restriction, the sample correlation is a biased estimator of the population correlation, and a correction formula is used (Thorndike, 1949). In the past, bootstrap standard error and confidence intervals for the corrected correlations were examined with normal data (Li, Chan, & Cui, 2011). The present study proposes a large-sample estimate (an analytic method) for the standard error, and a corresponding confidence interval for the corrected correlation. Monte Carlo simulation studies involving both normal and nonnormal data were conducted to examine the empirical performance of the bootstrap and analytic methods. Results indicated that with both normal and nonnormal data, the bootstrap standard error and confidence interval were generally accurate across simulation conditions (restricted sample size, selection ratio, and population correlations) and outperformed estimates of the analytic method. However, with certain combinations of distribution type and model conditions, the analytic method has an advantage, offering reasonable estimates of the standard error and confidence interval without resorting to the bootstrap procedure's computer-intensive approach.