The Correlation Coefficient as an Effect Size Measure Within the Framework of Item Response Theory

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Keywords: effect size, classical test theory, item response theory, Rasch model, rating scale model, measurement error.

Abstract

As item response theory (IRT) becomes popular in educational and psychological testing, there is a need of reporting IRT-based effect size measures. In this study, the product-moment correlation coefficient is generalized into such a measure. A disattenuation procedure based on average reliability is proposed to correct the attenuation on the sampling variance of the correlation coefficient due to measurement error. Monte Carlo simulations were conducted to investigate whether the direct use of the correlation coefficient and the disattenuation procedure were appropriate. The independent variables were (a) item response model, (b) test length, (c) sample size, and (d) magnitude of correlation. The dependent variable was the empirical correlation coefficient. The results indicated that the direct use of the correlation coefficient in the IRT context was appropriate. However, the disattenuation procedure underestimated the empirical sampling variances substantially, especially when the correlations between traits were large. The bootstrap is recommended because it yielded accurate estimates of the sampling variances of the correlation coefficient.