

Synthesizing data from pretest-posttest-control-group designs in mediation meta-analysis

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Abstract

This study aims to address the theoretical and practical concerns for mediation meta-analysis (MMA) conducted under pretest-posttest-control-group (PPCG) designs. Once a bivariate treatment effect has been established, it is common for researchers to investigate the underlying mechanisms using MMA. However, several challenges arise when applying MMA to PPCG designs, including the presence of a binary independent variable, heterogeneously defined treatment and control conditions, and violations of the homogeneity of variance assumption in practical settings. Moreover, an open question remains regarding the formulation of MMA under PPCG designs, specifically whether it should be based on posttest scores (referred to as PSMMA) or on pretest-posttest change scores (referred to as CSMMA). To address these concerns, this study employs theoretical discussions and Monte Carlo simulations to demonstrate the feasibility of MMA under PPCG designs and to compare the performance of CSMMA and PSMMA. The results indicate that CSMMA outperforms PSMMA, primarily in terms of statistical power. The study also provides a summary of procedures for computing bivariate correlations and conducting MMA, aimed at assisting substantive researchers. Furthermore, an empirical example is presented, and practical recommendations are provided to conclude the study.

Keywords: mediation meta-analysis, pretest-posttest-control-group design