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Pooling Correlation Matrices in Meta-Analysis: Addressing Hierarchical Effect Size Dependencies

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Oral presentation

Pooling Correlation Matrices in Meta-Analysis: Addressing Hierarchical Dependencies

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Abstract

Meta-analyzing correlation matrices has become an essential tool for synthesizing relationships among constructs, measures, or concepts across studies. Traditional univariate and multivariate meta-analytic models allow researchers to create a single, pooled correlation matrix which can then be used in advanced analyses, such as meta-analytic structural equation or network modeling. However, the presence of multiple correlation matrices derived from diverse sources within studies—such as different samples, locations, or labs—introduces hierarchical dependencies. This effect size multiplicity complicates the pooling process and has been largely overlooked in existing meta-analytic approaches. To address this challenge, we propose a Multilevel, Multivariate, and Random-Effects Modeling (MLMV-REM) framework that pools correlation matrices and accounts for their hierarchical dependencies. This innovative framework enables meta-analysts to explore various assumptions about random-effect dependencies, facilitating the selection of an appropriate meta-analytic baseline model. By incorporating hierarchical structures into the analysis, our approach enhances the exploration of heterogeneity of pooled correlation matrices at various levels of analysis.

Keywords

Correlations; multilevel meta-analysis; multivariate meta-analysis;

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