

## **A Joint assessment of outcomes in quantitative evidence synthesis**

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### **Abstract**

Quantitative research synthesis (or meta-analysis) has seen significant methodological development in the application of multivariate methods for the comparison of multiple endpoints. Multivariate meta-analysis offers some advantages over separate univariate analyses including the ability to borrow strength across studies and outcomes. The issue of heterogeneity among studies is very important in meta-analysis and partly entails the estimation of the heterogeneity variance. A number of iterative and non-iterative estimators for the heterogeneity variance have been proposed with no clear consensus on the best estimator with respect to selected performance indices. We present an overview of the univariate random effects meta-analytic approach including an example on application in randomized clinical trials. A multivariate alternative to the extended DerSimonian-Laird (DL) method (the commonly used method) will be presented. A comparison of the bias and mean square error from a simulation study indicates that, in some circumstances, the proposed method performs better than the multivariate DL method. Other topics of interest in multivariate meta-analysis will be discussed including network meta-analysis and integrating meta-analysis into structural equation models (SEM) that can be implemented in the mainstream SEM software including MPLUS.