

Models of Error in Meta-Analysis

Within the context of meta-analysis, experimental/control action research studies can be analyzed using a fixed-effect or random-effects model of error. It is important to note that in a meta-analysis the terms fixed and random do not have the same meaning as they do with respect to independent variables in primary studies. In the context of analysis of variance/covariance, fixed effects are factors with levels that are deliberately arranged by the researcher. In contrast, random effects are factors with levels that are not deliberately arranged. Instead, random effects are factors which are randomly sampled from a population of possible samples.

A fixed-effect meta-analysis is based on an assumption of one true treatment effect common to every study in the meta-analysis and that any differences in observed effects are due to sampling error alone. A random-effects meta-analysis is based on an assumption that there is no common effect. In contrast, a random-effects meta-analysis allows for the possibility that the true effect size varies from study to study due to random sources of variation beyond sampling error and includes an estimate of that variance. (For a more thorough discussion regarding models used in meta-analysis, see Lipsey & Wilson, 2001; Hunter & Schmidt, 2004; Cooper, 2009; Borenstein, Hedges, Higgins, & Rothstein, 2009.)

References

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