

Visualization of heterogeneity in forest plots

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The findings of a collection of studies addressing a common research question can be visualized in terms of a forest plot, showing the effect sizes of the individual studies together with a corresponding confidence interval. A four-sided polygon (sometimes called a summary 'diamond') is often added to such a plot to depict the results from a meta-analysis pooling together the effect sizes, where the center of the polygon corresponds to the pooled estimate and the ends of the polygon represent the bounds of the confidence interval for the pooled estimate. However, this only communicates the size of the average effect and how precisely it is estimated. In addition, it is equally important to indicate the degree of heterogeneity among the findings, that is, the variability in the underlying true effects. Such information (e.g., the results from the Q-test, the I² statistic, and the estimate of τ^2 from a random-effects model) is often only added textually underneath the plot. In this talk, I will describe several alternative visualizations of the amount of heterogeneity in terms of the prediction interval and by showing the entire prediction distribution. This also raises interesting issues when applying a back-transformation of the results (such as exponentiation when meta-analyzing log-transformed estimates or the hyperbolic tangent function when meta-analyzing Fisher r-to-z transformed correlation coefficients), since this impacts not only the shape of the prediction distribution, but also what the back-transformed estimates represent. The various types of visualizations discussed are already implemented in the metafor package for R and can be readily used by practitioners.

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