

Main Model (Location-Scale Model)

The following formula was used in the main model to test predictors of the outcome variability (Viechtbauer & López-López, 2022):

$$y_i = u + u_i + \varepsilon_i$$

$$u_i \sim \mathcal{N}(0, \tau_i^2) \text{ and } \varepsilon_i \sim \mathcal{N}(0, v_i),$$

$$\ln(\tau_i^2) = \alpha_0 + \alpha_1 z_{i1} (\text{univariable approach})$$

$$\ln(\tau_i^2) = \alpha_0 + \alpha_1 z_{i1} + \dots + \alpha_q z_{iq} (\text{multivariable approach})$$

Where:

- y_i is the observed value of the outcome measure (treatment effect) for i studies
- u is the average true treatment effect in the population of studies
- u_i is a normally distributed random effect that allows for heterogeneity in the underlying true outcomes
- ε_i is the normal distributed sampling error of the i th trial.
- τ^2 is the between-study variance, with a log link function to ensure that the variance cannot become negative
- z_{i1}, \dots, z_{iq} are the values of q scale variables that may be related to the amount of heterogeneity (e.g. year of publication, risk of bias,...)
- $\alpha_1, \dots, \alpha_q$ are the scale coefficients with α_0 denoting the intercept (“traditional” random-effects models only include an intercept term for τ^2)

References

Viechtbauer, W., & López-López, J. A. (2022). Location-scale models for meta-analysis. *Research Synthesis Methods*, 13(6), 697–715. <https://doi.org/10.1002/jrsm.1562>