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):

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

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

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

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

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 / $\ln(\tau^2)$is the between-study variance, that is transformed with a log link function to ensure that the variance cannot become negative
- $z_{i1}, \ldots, z_{iq}$are the values of *q* scale variables that may be related to the amount of heterogeneity (e.g. year of publication, risk of bias,…)
- $\alpha_1, \ldots, \alpha_q$ 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