Contribution ID: **137**   Type: **Poster**

Location-Scale Models in Meta-Analysis: A Comparison of Analytic Frameworks

Thursday 24 July 2025 17:10 (20 minutes)

Abstract

Location-scale models have recently been proposed for their use in meta-analysis, allowing the simultaneous testing of moderators of the mean (location) and variance (scale) of the distribution of true effects. They provide a powerful tool for evidence synthesis to address questions that have not yet been explored, and their implementation in the metafor R package makes them more accessible to applied meta-analysts. A simulation study conducted by our team found that, out of the different frequentist and likelihood-based methods currently available to researchers in metafor, profile-likelihood intervals and permutation tests generally perform better in terms of interval estimation and Type I error rates, respectively. However, a number of scenarios were identified where all methods under comparison showed a poor performance, sometimes even running into estimation problems. These issues were more frequent in conditions with a small to moderate number of studies, which are ubiquitous in practice, raising concern on the applicability of location-scale models in many applied scenarios.

Bayesian inference provides an interesting alternative to frequentist and likelihood-based methods, and the use of priors has the potential to solve some of the estimation problems and limitations which may arise when analysing small datasets. Location-scale models may also be fitted within a Bayesian framework using the brms R package. In this study, we used several example datasets to compare the results of the different analytic frameworks available nowadays to fit location-scale models in meta-analysis.

Keywords

Meta-analysis; meta-regression; location-scale; heterogeneity

Primary authors: LOPEZ LOPEZ, Jose Antonio; Mr ALBALADEJO-SÁNCHEZ, Manuel J (University of Murcia, Murcia (Spain)); Prof. VIECHTBAUER, Wolfgang (Maastricht University (Maastricht, The Netherlands))

Presenters: LOPEZ LOPEZ, Jose Antonio; Mr ALBALADEJO-SÁNCHEZ, Manuel J (University of Murcia, Murcia (Spain)); Prof. VIECHTBAUER, Wolfgang (Maastricht University (Maastricht, The Netherlands))

Session Classification: Poster Session 4

Track Classification: Statistical analyses: Statistical analyses