Proposed Course Syllabus

Course Information

Course Title: Introduction to Systematic Review and Meta-Analysis

Course Description

Systematic reviews and meta-analyses have become essential tools in fields like healthcare, education, and policy, where evidence-based decision-making is increasingly prioritized. This graduate-level course provides an in-depth introduction to these methods focusing on both theoretical concepts and practical applications. Advanced topics such as network meta-analysis will also be covered. Additionally, students will learn how to write meta-analysis reports in APA format and use R software to conduct quantitative analyses through assignments.

Textbooks

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. John Wiley & Sons.
Cooper, H. (2017). Research synthesis and meta-analysis (5th ed.). Sage. ISBN 9781483331157
Harrer, M., Cuijpers, P., Furukawa, T.A., & Ebert, D.D. (2021). *Doing Meta-Analysis with R: A Hands-On Guide*. Boca Raton, FL and London: Chapman & Hall/CRC Press. ISBN 978-0-367-61007-4.

Tentative Topics and Readings

** BHHR = Borenstein et al. (2009) book
** HC = Cooper (2017) book
** HCFE = Harrer et al. (2021) book
Week 1: Introduction to Systematic Review and Meta-analysis | R and RStudio (HC p.1-29, HCFE ch.2)
Week 2: Framing the Question | Inclusion Criteria | Literature Search | Coding Sheets (HC p.30-109)
Week 3: Documenting Search Results | Assessing Risk of Bias (HC p.110-188, HCFE ch.15)
Week 4: Effect Sizes in Observational Designs and Experimental Designs (BHHR p.17-49, HCFE ch.3)
Week 5: Fixed-Effect and Random-Effects Model | Between-Study Heterogeneity (BHHR p.61-85, HCFE ch.4)
Week 6: Outlying and Influential Studies | Sensitivity Analysis | Forest Plot (HCFE ch.5, 6)
Week 7: Publication Bias | Funnel Plot (BHHR p.277-291, HCFE ch.9)
Week 8: Moderator Analysis: Subgroup Analysis and Meta-Regression (BHHR p.149-187, HCFE ch.7, 8)
Week 9: Power Analysis | Reporting and Reproducibility of Meta-Analysis (HCFE ch.14, 16)
Week 10: Network Meta-analysis (HCFE ch.12)
Week 11: Multivariate Meta-Analysis (HCFE ch.11)
Week 12: Bayesian Meta-Analysis (HCFE ch.13)

Assignments

Group Project: Students will be required to collaborate on a semester-long meta-analysis project and to prepare a comprehensive written report in adherence to APA format. The report must include the following sections: problem formulation, data collection and evaluation, data analysis, and a discussion section highlighting how their meta-analyses contribute to understanding the chosen research topic. Additionally, each group will give a 15-minute presentation summarizing their project's goals, process, and key findings.

Homework 1: Report an initial search for the meta-analysis project using at least three databases.
Homework 2: Examine and critique effect size calculations in a published meta-analysis.
Homework 3: Report research question(s), literature review, and data screening of the meta-analysis using the Cochrane Guidelines.
Homework 4: Perform moderator analyses using datasets from published meta-analyses in R.
Homework 5: Final report of the meta-analysis project and group presentation.