Proposed Graduate 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.

Lecture Outline and Readings

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

** BHHR = Borenstein et al. (2009) book
** HC = Cooper (2017) book
** HCFE = Harrer et al. (2021) book

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 collection and screening of the meta-analysis.
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.