TEXAS A&M UNIVERSITY

Course Syllabus

Course Information

Course Title: Introduction to Systematic Review and Meta-Analysis
Instructor: Naike Wang

Course Description

This graduate-level course provides an in-depth introduction to systematic reviews and meta-analysis, with a focus on both theoretical concepts and practical applications. Advanced topics such as network meta-analysis will also be covered. Practical application will be emphasized through hands-on assignments using R.

Required 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, Meta-analysis, and R (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

Homework Sets: There will be four Homework Sets throughout the semester. These assignments are directly related to readings and topics covered in class. Several Homework Sets will provide practice using R to perform meta-analytic modeling techniques.

Project: This assignment will be a written report of the meta-analysis that you have worked on throughout the semester. The project will require the development of a coding sheet and search of computerized reference databases. Students are also expected to apply appropriate quantitative research synthesis methods to their data. The project is expected to be written in APA format. Each student (or group) will complete a brief presentation related to their project.