

CRIM 795: Meta-Analysis

Spring 2024, Wednesday 10:30 AM–1:10 PM, Peterson Hall 2411

Instructor

- Instructor: David B. Wilson, PhD
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- Office Hours: By appointment

Office Hours

I'm happy to meet with students throughout the week. My schedule is relatively flexible this semester. You can send a text to my cell phone or email me to set up a Zoom meeting. If I'm available, these can be on short notice.

I will communicate with the class through email using your Mason email account. Please authorize that account and either check it regularly or set up automatic forwarding to your preferred email address.

Course Description

Meta-analysis is a method of synthesizing quantitative results across studies that examine a common empirical relationship. Meta-analysis is part of the general category of reviews called systematic reviews or research synthesis. As part of this course, students will become conversant in the issues and controversies of systematic reviews and meta-analysis and will develop competencies in applying meta-analysis methods to social science studies.

As part of this class, students, either individually or in groups, will conduct a small-scale meta-analysis. I encourage you to consider doing a replication of an existing meta-analysis. It is challenging to do a full-scale meta-analysis in less than one year, so it is essential to pick a focused topic in an area with ideally no more than ten studies. If you choose to work on a project individually, you will be expected to help double-code studies on another project, and others will help double-code on yours.

Most of the class assignments will be related to your project, with a final write-up due during finals week. There will be no exams.

Course Prerequisites

This course requires a basic understanding of statistical methods from basic descriptive statistics through multiple regression analysis (Stats I and II in our doctoral program).

Course Objectives and Learning Methods

The objectives for this course are:

1. Understand the differences between systematic reviews, meta-analysis, and traditional narrative reviews
2. Know the steps in conducting a systematic review and meta-analysis
3. Be able to formulate an appropriate problem for meta-analysis
4. Be able to develop and implement a systematic search strategy for identifying all relevant literature
5. Be able to create a coding protocol for meta-analysis, including creating the inclusion and exclusion criteria
6. Know how to compute effect sizes from a range of available statistics
7. Understand the basic analytic methods of meta-analysis
8. Understand the difference between fixed and random effects models
9. Be able to assess study heterogeneity
10. Be able to conduct moderator analyses that assess the relationship between study characteristics and effect size
11. Understand the issue of publication selection bias, methods of minimizing its effects, and methods of detection
12. Be familiar with reporting standards
13. Be able to effectively communicate the results of a meta-analysis

Class Time

Most weeks I will prepare a mini lecture related to that weeks topic. However, most of our time will be spent seminar style, discussing the readings and your projects. As such, you must come prepared. I will typically divide class time into a mini lecture, a discussion of any topic I want to highlight from the readings, issues and questions you as students wish to discuss, and time devoted to your project. The latter will include progress reports, identifying problems encountered, and facilitating forward progress.

I encourage each of you to email me questions or topics you wish to discuss before class. I will also take questions organically in class, but questions emailed to me will get priority.

Course Requirements and Grading

- Participation/Preparation: 20%
- Homework Assignments: 30%
- Critique of Published Meta-analysis: 10%
- Final Project Write-up: 40%

I will base the class participation grade on several factors, including your participation level in class discussions, arriving for class having read the assigned materials, and submission via email of questions based on class readings. The homework assignments are mostly designed around the class project. I may modify and adapted these assignments as needed throughout the semester. I will note which you can do as a group and which you must complete on your own. A preliminary list of assignments is below:

1. Summary of the topic for your meta-analysis (one per group)
2. Inclusion/exclusion criteria (one per group)
3. Search strategy (one per group)
4. Effect size exercise (one per student)
5. Coding protocol (one per group)
6. Pilot coding protocol (one per student)
7. Analysis of effect sizes (one per student)
8. Categorical moderator analysis (one per group)
9. Regression-based moderator analysis (one per group)
10. Assessment of publication bias (one per group)
11. Creation of a forest plot (one per group)
12. Critique of a published meta-analysis (one per student)
13. Final write-up (one per student)

Regarding #13: Although the projects may be in groups, you will be expected to write-up the final results independently. Doing so will provide you with the opportunity to demonstrate to me your master of the course concepts. You can re-use the assignments your group has previously submitted, modifying as needed.

Software

This course will primarily use R, although you may also use Stata if you so wish.

Required book

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.

Additional readings will be made available on Blackboard or are available online via Mason's library.

Class Schedule

Note: This is subject to change, including adding or changing the readings.

1/17/2024: Introduction to meta-analysis

1. Lipsey and Wilson; Chapters 1 and 2
2. Cooper, H., Hedges, L. V., & Valentine, J. C. (2019). Research synthesis as a scientific process. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (pp. 3-16). Russell Sage Foundation.

1/24/2024: Problem formulation and systematic searching

1. **Assignment 1:** Summary of your topic
2. Kugley, S., Wade, A., Thomas, J., Mahood, Q., Jørgensen, A. M. K., Hammerstrøm, K., & Sathe, N. (2016). Searching for studies: A guide to information retrieval for Campbell. Campbell Systematic Reviews.

1/31/2024: Systematic searching and eligibility criteria

1. **Assignment 2:** Initial eligibility criteria
2. **Assignment 3:** Search strategy
3. Watch Rayyan tutorial
<https://www.youtube.com/watch?v=1YWABilWWIg&t=650s>

2/7/2024: Effect size calculations

1. Lipsey and Wilson, Chapter 3
2. Sánchez-Meca, J., Marín-Martínez, F., Chacón-MoscOSO, S. (2003). Effect-size indices for dichotomized outcomes in meta-analysis. *Psychological Methods*, 8, 448–467. [Available via Library]
3. Hedges, L. V. (2007). Effect sizes in cluster-randomized designs. *Journal of Educational and Behavioral Statistics*, 32, 341–370.

2/14/2024: Effect size calculations (continued) and coding forms

1. **Assignment 4:** Effect size exercise
2. Review formulas on Wilson's effect size calculator
at: <https://www.campbellcollaboration.org/research-resources/effect-size-calculator.html>

3. Wilson, D. B. (2022). The relative incident rate ratio effect size for count-based impact evaluations: When an odds ratio is not an odds~ratio. *Journal of Quantitative Criminology*, 38, 323-341. <https://doi.org/10.1007/s10940-021-09494-w>

2/21/2024: Coding protocol and data structures

1. Wilson, D. B. (2009). Systematic coding. The handbook of research synthesis and meta-analysis. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (pp. 159-176). Russell Sage Foundation.
2. Lipsey and Wilson, Chapters 5

2/28/2024: Basic Meta-analysis

1. **Assignment 5:** Draft coding protocol
2. Lipsey and Wilson; Chapter 6
3. Weisburd, Wilson, Woodrich, Chapter 11 (Pages 1 thru the top of page 20)

3/6/2024: Spring Break

3/13/2024: Homogeneity testing

1. **Assignment 6:** Pilot coding protocol
2. Lipsey and Wilson; Chapter 6
3. Borenstein et al. 2010
4. Langan, D., Higgins, J. P., Jackson, D., Bowden, J., Veronika, A. A., Kontopantelis, E., ... & Simmonds, M. (2019). A comparison of heterogeneity variance estimators in simulated random-effects meta-analyses. *Research Synthesis Methods*, 10(1), 83–98.

3/20/2024: Moderator analysis (ANOVA style)

1. **Assignment 7:** Analysis of effect sizes
2. Lipsey and Wilson; Chapter 7
3. Weisburd, Wilson, Woodrich, Chapter 11 (Pages 20 thru end)

3/27/2024: Moderator analysis (Regression style)

1. **Assignment 8:** Categorical moderator analysis

2. Lipsey, M. W. (2003). Those confounded moderators in meta-analysis: Good, bad, and ugly. *The Annals of the American Academic of Political and Social Sciences*, 587, 69–81.

4/3/2024: Assessing publication-selection bias

1. **Assignment 9:** Regression-based moderator analysis
2. Vevea, J. L., Coburn, K., & Sutton, A. (2019). Publication bias. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (pp. 383–429). Russell Sage Foundation.
3. Pustejovsky, J. E., & Rodgers, M. A. (2019). Testing for funnel plot asymmetry of standardized mean differences. *Research Synthesis Methods*, 10(1), 57–71.

4/10/2024: Creating forest plots and interpreting effect sizes

1. **Assignment 10:** Assessment of publication bias
2. Lipsey and Wilson; Chapter 8
3. Anzures-Cabrera, J., & Higgins, J. P. T. (2010). Graphical displays for meta-analysis: An overview with suggestions for practice. *Research Synthesis Methods*, 1, 66–80.
4. Tanner-Smith, Emily (2011). Workshop on Robust Standard Errors. <https://www.youtube.com/watch?v=emraBWPz3tA>

4/17/2024: Meta-analysis reporting standards

1. **Assignment 11:** Create a forest plot
2. PRISMA Checklist
3. PRISMA Flow diagram
4. Pigott, T. D., & Polanin, J. R. (2020). Methodological guidance paper: High-quality meta-analysis in a systematic review. *Review of Educational Research*, 90(1), 24-46.

4/24/2024: Network meta-analysis and loose ends

1. **Assignment 12:** Critique of a published meta-analysis
2. Wilson, D.B., Tanner-Smith, E. and Mavridis, D. (2016), Network meta-analysis. *Campbell Systematic Reviews*, 12: i-11. <https://doi-org.mutext.gmu.edu/10.4073/cmpn.2016.1> [Available via Blackboard]

5/8/2024: Final Project Due (No class)

1. **Assignment 13:** Final write-up

Gender Identity and Pronoun Use

If you wish, please share your name and gender pronouns with me and how best to address you in class and via email. I use he/him/his for myself, and you may address me as Dr. or Prof. Wilson in email and verbally.

Statement on Academic Integrity

I expect adherence to the University Honor Code (<http://oai.gmu.edu/honor-code/>). If I witness a suspected violation of the Honor Code, I will follow the standard reporting procedures outlined in the University Handbook.

The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and relatively simple principles to follow at all times are that: 1. All work submitted must be your own. 2. When using the work or ideas of others, including fellow students, give full credit through accurate citations. 3. If you are uncertain about the ground rules on a particular assignment, ask for clarification.

The use of generative AI (e.g., ChatGPT) is inappropriate for any class assignment.

No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving them credit. Writers give credit through accepted documentation styles. This class will adhere to the APA citation and referencing style, as it is the dominant approach in criminology. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please ask.

Students with Disabilities

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please visit <http://ds.gmu.edu/> for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474.