



Course title:	Meta-Analysis	
Course #/term:	SW 865 001, Winter 2022	
Time and place:	Tuesday, 1:00PM to 4:00PM, SSW1794*	
Credit hours:	3	
Prerequisites:	Doctoral standing or permission of instructor	
Instructor:	Anao Zhang	
Pronouns:	He/Him/His	
Contact info:	Email: zhangan@umich.edu	Phone: (734)647-6787
	You may expect a response within 12 hours	
Office:	3704 SSWB	
Office hours:	TBD, or by appointment	
* I am in the process of securing a better classroom for the course and will update you if successful		

1. Course Statement

a. Course description

This is a doctoral-level method course focused on advanced methodologies in research synthesis. Upon completion, students will be able to conduct a systematic review and meta-analysis study of publishable quality. The first two weeks of the course will provide a comprehensive introduction to systematic review, including developing a research topic, selecting databases, crafting search keywords, and conducting literature search and data extraction in a rigorous and transparent (replicable) way. The rest of the semester will focus on methodologies of meta-analysis. We will start with calculating standardized mean difference (SMD) as well as converting other statistics into the SMD metric. We will then discuss pooling SMD effect sizes using fixed versus random effects models. Meta-regression analysis will also be introduced to facilitate moderator analyses. Advanced methods to address dependent effects, i.e., multi-level meta-analysis, generalized least squares, and robust variance estimation, will be introduced and practiced during the latter part of the semester. Additional topics including assessing publication bias, meta-analysis of correlations and meta-analyzing categorical effects will be discussed if time permits. The R Software will be used for all analyses in this course.

b. Course content

Procedures and techniques of conducting a systematic review. Statistical theories for effect size estimates, models of synthesis: fixed- versus random-effects models, and advanced methodologies to address complex data structure, e.g., dependent effect sizes, missing data, etc. Depending on time available, we may be able to cover advanced topics in meta-analysis, like Bayesian meta-analysis or network meta-analysis.

2. Class Requirements

a. Text and class materials

Strongly Recommended

Cooper, H., Hedges, L., & Valentine, J. (2019). Handbook of research synthesis and meta-analysis. Russell Sage Foundation, New York.

Other Great [and FREE] Resources

Harrer, M., Cuijpers, P., Furukawa, T.A, & Ebert, D. D. (2019). Doing Meta-Analysis in R: A Hand-on Guide. https://bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/.

Chen, D. G. D., & Peace, K. E. (2013). Applied meta-analysis with R. Chapman and Hall/CRC. Access here: https://search.lib.umich.edu/catalog/record/014833259?query=Applied%20Meta-analysis%20using%20R&utm_source=MLibrary

b. Class schedule

The schedule outlines book chapters for each week. **Additional readings can be easily found on Canvas under the module section.**

Date/Time	Agenda	Suggested Readings & Assignments
Jan. 11 th (W1)	Course intro., intro. to evidence synthesis, and statistics review	Syllabus Chapter 1, 2, 4
Jan. 18 th (W2)	Details and techniques in systematic reviews	Chapter 5, 6, 7
Jan. 25 th (W3)	Intro. to meta-analysis	Chapter 3, 8, 9, 10
Feb. 1 st (W4)	Standardize mean difference (SMD)	Chapter 11
Feb. 8 th (W5)	Transforming stats to get delta	
Feb. 15 th (W6)	Delta for repeated measure designs	
Feb. 22 nd (W7)	Pooling SMDs: fixed- versus random-effects model	Chapter 12
Mar. 1 st	Winter Break	
Mar. 8 th (W9)	Meta-regression	Chapter 16
Mar. 15 th (W10)	Dependent effects – generalized least square	Chapter 13, 15
Mar. 22 nd (W11)	Robust variance estimation	
Mar. 29 th (W12)	Publication bias	
Apr. 5 th (W13)	Meta-analysis of correlations	
Apr. 12 th (W14)	Advanced Topics	

c. Assignments

This course has two types of assignments: (1) coding exercises; and (2) an **optional** SRMA project. How you will be graded based on these assignments will be elaborated in section e. Grading later in the syllabus. Coding exercises are typically due one week after the class. The optional SRMA project is a semester long project. Below I provide a brief description for each types of assignment and you will find more details about each assignment in class.

Coding Exercises:

For each statistical procedure, it is one thing to understand its underlying theories and mechanisms but another to carry out the procedure, a.k.a. actually doing it. Most of the theories and mechanisms will be covered in class and example codes will be shared as well. You will have the opportunity throughout the semester to practice using those codes through coding exercises. For each exercise, I will provide part of the results and you will need to finish the rest.

SRMA Project:

You are asked to find a partner, either from or outside the class, to form into a research team to carry out a publishable systematic review and meta-analysis study throughout the semester. Overall, the research question formation is expected to be done in January, literature search and screening to be done in late January, February, and early March. Data extraction and coding will occur in March, and data analysis will be completed in April. I will work with each team closely throughout the semester and will guide your manuscript write-up along the way. You don't have to be completing a full SRMA to obtain an A+ in this class – a smaller size project will also work. I will share more detail in class 1. Please know that this assignment is optional but **STRONGLY RECOMMENDED**. Partly because the real-world data is always more challenging than those easily cleaned data when you encounter during classroom settings. Your learning would be so much better if you can simultaneously apply what you learned in classroom to real world practices.

d. Attendance and class participation

Given this is an advance doctoral method seminar, you are expected to attend all classes. In accordance with the school's [Policy on Class Attendance](#), students are expected to attend all of the scheduled classes. However, the instructor understands that graduate study can be at times stressful and we may have to miss one class to address other important life matters. Therefore, every student will have a "personal day absence" for this course without impacting their final grades. Students may request additional "**excused absence**" which requires (1) notifying the instructor at least 72 hours (3 days) in advance, and (2) explaining the reason(s) of skipping the class. The instructor will respond within 24 hours informing the student if an "excused absence" is granted. Absence requests made within 72 hours (3 days) before the class are *typically not* considered as an "excused absence" *unless otherwise determined by the instructor*.

e. Grading

Methodological courses are often stressful, and it is my belief that the stress of grades should be alleviated for efficient learning. Therefore, all students are expected to obtain an A for this class as long as you make reasonable effort to learn the content. If you follow through all the coding exercises, you will have the full 80% credit for the course. If you make effort to go through a real SRMA project, you will have 90% credit for the course, which is equivalent to A. If you have are able to carry a full-blown meta-analysis with at least a

preliminary full draft that reflects reasonable efforts to submit your manuscript after the course, you will have A+ for this class.

Additional School and University policies, information and resources are available here:

<https://sww.umich.edu/standard-policies-information-resources>. They include:

- *Safety and emergency preparedness*
- *Mental health and well-being*
- *Teaching evaluations*
- *Proper use of names and pronouns*
- *Accommodations for students with disabilities*
- *Religious/spiritual observances*
- *Military deployment*
- *Writing skills and expectations*
- *Academic integrity and plagiarism*