

PSY 6490: Meta-Analysis

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Office Hours: By Appointment

Office: 2827 Morrissey Hall

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Class Hours: TR 11:00 a.m. - 12:15 p.m.

Class Room: Morrissey Hall 2603

Required Texts

[1] M. Borenstein, L.V. Hedges, J.P.T. Higgins, and H.R. Rothstein. *Introduction to Meta-Analysis*. John Wiley & Sons, 2011. ISBN: 978-1-119-96437-7.

[2] H. Cooper. *Research Synthesis and Meta-Analysis: A Step-by-Step Approach*. SAGE, 2016. ISBN: 978-1483331157.

Required Software (Open Source)

[1] R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria, 2018. <http://www.r-project.org>.

[2] RStudio Team. *RStudio: Integrated Development Environment for R*. RStudio, Inc. Boston, MA, 2018. <http://www.rstudio.com/>.

Required Hardware

A personal laptop computer, running either OS X or Windows.

GitHub

This course will use GitHub for file sharing. A free account can be set up by visiting www.github.com. Our course GitHub site is: https://github.com/orgs/PSY6490/teams/psy6490_fall_2021

Prioritizing Wellness

Having a “normal” life in the face of a pandemic is impossible, so I encourage you first and foremost to have self-compassion. Even the strongest of us are struggling right now, so we need to take care of ourselves and recognize that none of this is “normal.” We also need to show compassion for others, now more than ever. Thus, the first and most important guiding principle of this course is that we will prioritize physical and mental wellness, both for ourselves and others, above all other things.

Virtual Office Hours and Meetings via Zoom

Given ongoing concerns about health and safety during the pandemic, I will be conducting all office hours and other meetings virtually, via Zoom, until further notice. You can schedule a virtual meeting with me at any time via email. My Zoom personal meeting id is: **865 911 5844**, which can be reached directly via my personal link: <https://slu.zoom.us/my/cortrudolph>. I am also happy to answer question via email, chat on the phone [cell: +1(313)720-7082], or discuss topics through the discussion board on our GitHub site.

Flexibility in Course Delivery/Modality

Given that we are still operating in the context of a pandemic, there is a possibility that we will experience some disruption to our ability to meet in person at some point this semester. If this does occur, we will meet virtually via Zoom during our normally-scheduled class time. As a reminder, my Zoom personal meeting id is: **865 911 5844**, which can be reached directly via my personal link: <https://slu.zoom.us/my/cortrudolph>.

Course Description

This course introduces students to the purposes and methods of quantitative research synthesis, including systematic procedures for the sampling of primary research studies, the evaluation and classification of their substantive and methodological features, and the analysis and interpretation of study findings via meta-analytic synthesis.

More generally, meta-analysis is a secondary research endeavor that involves the systematic review, combination, and interpretation of accumulated findings in a particular domain of inquiry. Outcomes of meta-analysis play an important role in influencing policy and in improving research programs in any given field. Within psychology, traditional forms of secondary research (e.g., narrative reviews and so-called vote-counting reviews) are subject to serious weaknesses in the trustworthiness and replicability of conclusions. As a result, quantitative meta-analysis has gained attention as a more appropriate approach to secondary research.

Course Goals

The course is designed to foster expertise in meta-analytic techniques for summarizing and interpreting quantifiable findings from primary studies, with a particular emphasis on how these techniques apply to psychological research. More specifically, students who successfully complete this course will:

1. Be able to identify suitable topics for research synthesis efforts and to define variables and associations of interest therein.
2. Be able to identify, access, and systematically search key sources and to assess the adequacy of their literature searching efforts.
3. Be able to identify, extract, and code relevant data from primary studies, including information about independent and dependent variables, study design, implementation, and statistical results.
4. Be able to describe and anticipate information management issues in the conduct of meta-analyses.
5. Be able to evaluate study quality and to make corollary decisions as to which studies should be included in and excluded from a research synthesis.

6. Understand effect size metrics.
7. Be able to analyze and integrate study outcomes, including methods for combining results across studies and for testing differences between studies, and the effects of methods of outcome integration on research synthesis outcomes.
8. Be able to interpret the results of a research synthesis with regard to conclusions, limitations, and generalizability.
9. Be able to prepare a meta-analytic synthesis in accordance with current best practices (i.e., Meta-Analysis Reporting Standards [MARS], Primary Reporting Items for Systematic Reviews and Meta-Analysis [PRISMA]), consensus statement on quality of reporting in meta-analyses [QUORUM].
10. Be able to identify threats to the validity of conclusions derived from meta-analyses.
11. Will craft a submission-ready a meta-analytic review that reflects best practices with regard to the preparation and reporting of research syntheses.
12. Students will become subject matter experts in the area of their meta-analytic review.

Overview of Course Format:

Our weekly class meetings will blend both lecture and hands-on activities. I will lecture on different topics important to the understanding and application of meta-analysis, but the class will be openly structured for Q & A. As you will need to understand the topics at a theoretical as well as operational level, the mathematics of various procedures will be discussed in some detail. In addition, significant class time will be spent on applied exercises (e.g., running analyses using statistical software and interpreting subsequent output; case studies, etc.) and working together on a group-based meta-analysis project. The purpose of performing these application activities is to give you practical and hands-on experience before being required to do so in a real-world setting.

Readings are assigned for each week of class. I expect that the assigned readings are complete BEFORE each class meeting (note there is no reading that needs to be done before the first class).

Course Requirements:

Face Masks

Throughout the COVID-19 pandemic, key safeguards like face masks have allowed SLU to safely maintain in-person learning. If public health conditions and local, state, and federal restrictions demand it, the University may require that all members of our campus community wear face masks indoors.

Therefore, any time a University-level face mask requirement is in effect, face masks will be required in this class. This expectation will apply to all students and instructors, unless a medical condition warrants an exemption from the face mask requirement (see below). When a University-wide face mask requirement is in effect, the following will apply:

- Students who attempt to enter a classroom without wearing masks will be asked by the instructor to put on their masks prior to entry. Students who remove their masks during a class session will be asked by the instructor to resume wearing their masks.
- Students and instructors may remove their masks briefly to take a sip of water but should replace masks immediately. The consumption of food will not be permitted.
- Students who do not comply with the expectation that they wear a mask in accordance with the University-wide face mask requirement may be subject to disciplinary actions per the

rules, regulations, and policies of Saint Louis University, including but not limited to those outlined in the Student Handbook. Non-compliance with this policy may result in disciplinary action, up to and including any of the following:

- dismissal from the course(s)
- removal from campus housing (if applicable)
- dismissal from the University

To immediately protect the health and well-being of all students, instructors, and staff, instructors reserve the right to cancel or terminate any class session at which any student fails to comply with a University-wide face mask requirement.

When a University-wide face mask requirement is not in effect, students and instructors may choose to wear a face mask or not, as they prefer for their own individual comfort level.

ADA Accommodations for Face Mask Requirements Saint Louis University is committed to maintaining an inclusive and accessible environment. Individuals who are unable to wear a face mask due to medical reasons should contact the Office of Disability Services (students) or Human Resources (instructors) to initiate the accommodation process identified in the University's ADA Policy. Inquiries or concerns may also be directed to the Office of Institutional Equity and Diversity. Notification to instructors of SLU-approved ADA accommodations should be made in writing prior to the first class session in any term (or as soon thereafter as possible).

Attendance & Participation:

This is an advanced doctoral level seminar, with a group-based project that requires full participation. As such, attendance is required and expected. That being said, I will strive to be very flexible in accommodating the challenges and realities associated with the current state of the world. Most importantly, if you are feeling sick, stay home.

The health and well-being of SLU's students, staff, and faculty are critical concerns, as is the quality of our learning environments. Accordingly, the following University policy statements on in-person class attendance are designed to preserve and advance the collective health and well-being of our institutional constituencies and to create the conditions in which all students have the opportunity to learn and successfully complete their courses.

1. Students who exhibit any potential COVID-19 symptoms (those that cannot be attributed to some other medical condition the students are known to have, such as allergies, asthma, etc.) shall absent themselves from any in-person class attendance or in-person participation in any class-related activity until they have been evaluated by a qualified medical official. Students should contact the University Student Health Center for immediate assistance.
2. Students (whether exhibiting any of potential COVID-19 symptoms or not, and regardless of how they feel) who are under either an isolation or quarantine directive issued by a qualified health official must absent themselves from all in-person course activities per the stipulations of the isolation or quarantine directive.
3. Students are responsible for notifying their instructor of an absence as far in advance as possible; when advance notification is not possible, students are responsible for notifying each instructor as soon after the absence as possible. Consistent with the University Attendance Policy, students also are responsible for all material covered in class and must work with the

instructor to complete any required work. In situations where students must be absent for an extended period of time due to COVID-19 isolation or quarantine, they also must work with the instructor to determine the best way to maintain progress in the course as they are able based on their health situation.

4. Consistent with the University Attendance Policy, students may be asked to provide medical documentation when a medical condition impacts a student's ability to attend and/or participate in class for an extended period of time.
5. As a temporary amendment to the current University Attendance Policy, all absences due to illness or an isolation/quarantine directive issued by a qualified health official, or due to an adverse reaction to a COVID-19 vaccine, shall be considered "Authorized" absences

Midterm Exam:

A midterm examination will be given. This is a review and critique of a published meta-analysis of your choosing. You will be presenting your critique to the class during midterm week. The tangible component of this examination is the "deck" of slides that accompanies your presentation. Please bring a hard copy of your slides to the exam and send an electronic file via email to the instructor.

Final Exam:

There is a final exam presentation. You will be asked to put together a 20 to 25-minute lecture that introduces a concept in meta-analysis that we have not touched upon throughout the semester. The tangible component of this examination is the "deck" of slides that accompanies your presentation. Please bring a hard copy of your slides to the exam and send an electronic file via email to the instructor.

Meta-Analysis Project:

This class incorporates a semester-long meta-analysis project. In groups of 2-3 individuals, you will be crafting a complete meta-analytic review suitable for submission to a conference and/or publication. During the first two weeks of the semester, you should begin to form a sense of the research domains each of you are interested in exploring, the teams you want to form, and the specific orientation or purpose that you would like to pursue for your synthesis. More details of this project are outlined below:

Meta-analytic reviews follow a general process, which you will be following throughout this project:

1. Identify, define, and describe a research domain and/or research problem, and establish a clear purpose for the meta-analytic synthesis ("problem specification").
2. Define the population of studies in the research domain, and identify and retrieve as much of the population as possible through systematic and exhaustive literature searches ("study retrieval").
3. Formulate clear and explicit criteria for inclusion and exclusion of studies from a synthesis ("study eligibility criteria").
4. Develop and use a protocol for coding primary studies for substantive and methodological features of interest, given the purposes of the synthesis ("coding of study features").
5. Employ meta-analytic techniques for summarizing and interpreting quantifiable findings from primary studies, including the calculation of various kinds of effect sizes and confidence intervals.

6. Following best-practice reporting guidelines, craft a report that aggregates information from primary studies and presents the synthesized findings, taking into account substantive and methodological features, the nature of the research questions in the domain, and the types of data.

Interim reports:

In order to provide you with guidance and feedback throughout the research process, each research team will be asked to produce and turn in several interim drafts at various points in the semester, leading to the final research synthesis. Hard copies of reports will be due on the Thursday of any given week for which there is a report deadline; see the course schedule for more details. These interim drafts very closely match the general meta-analytic process outlined above:

- a. Problem specification report: This is basically a proposal outlining the research domain and the research problem that the team wishes to synthesize, and establishing a clear purpose for the proposed research synthesis.
- b. Study identification and retrieval report: In this report, you will define the population of studies in the research domain, and will report on the initial outcomes of your library searches. The paper should include a preliminary list of the bibliography of primary studies you are working with (i.e., “seminal” studies), and show that you have a strategy in place to identify as much of the population as possible through systematic and exhaustive library searches.
- c. Study eligibility criteria report: In this report the team will formulate clearly and explicitly the arrived upon criteria for inclusion and exclusion of studies, and show evidence for a more complete final list of studies to be included in the synthesis. An important part of this report will be to document inter-rater agreement on the inclusion/exclusion criteria and reliability when applying the criteria to make decisions about particular studies.
- d. Report on coding protocol development: Here the team will present their final protocol for coding primary studies for substantive and methodological features of interest.
- e. Report of the piloting and revising of the coding protocol: Team members will each independently apply the coding protocol to a subset of studies and compare their results. This is the crucial step of inter-rater reliability. For areas in which reliability is not satisfactory, the study feature coding protocol may need to be revised. The process and outcomes of piloting and revising of the coding protocol will be described in this report, and the final revised coding scheme will be presented.
- f. Report of the findings of the research questions addressed in the synthesis (including descriptive statistics and tables and graphs as appropriate): This is a pre-final draft, which I will provide you comments on. The comments will come in the form of a “letter to the editor,” and you will be asked to revise and resubmit your work, with the requested changes as part of your final paper.

Final report:

The final paper for each team will compile all interim reports in a coherent manner, resulting in a synthesis of the chosen research domain and problem. Depending on the research domain synthesized and the nature and purpose of your synthesis, your final paper may look like a report of a pilot, or it may read as a complete synthesis. Your grade in this project will not depend on your results (i.e., whether your hypotheses were confirmed, for example) or on the completeness of

the synthesis (e.g., whether you synthesized all 400 studies identified in the research domain). I will be looking primarily at your use of your research synthesis methods and at the quality of your evidentiary arguments, not your results.

Final paper grading

97-100% = A: Excellent to outstanding quality. The paper shows thorough research skills/understanding and creative intellectual engagement with the material. It also demonstrates sophisticated academic writing skills.

94-96% = A-: Good to excellent quality. The paper shows competent research skills/understanding, good development of ideas, and at least good writing skills.

90-93% = B+ : Fair quality. Acceptable paper, but showing some need for improvement. It demonstrates emerging research skills/understanding and/or minimally appropriate writing skills.

86-89% = B: Below average quality for graduate-level work. Needs improvement in research skills/understanding, development of ideas, and/or writing skills.

80%-85% = B-: Insufficient quality for graduate-level work. Lack in in research skills/understanding, development of ideas, and/or writing skills.

Since the research synthesis project is carried out collaboratively, the final paper will be a co-authored report; I will assign the same grade to all authors. It is the course participants' responsibility to negotiate and monitor that the research and writing processes are carried out in agreed-upon, fair collaboration.

Final Grading Breakdown

- Attendance & Participation: 10%
- Midterm: 20%
- Final Presentation: 20%
- Meta-Analysis Project: 50%

Syllabus Revisions

Other readings or activities may be assigned or substituted throughout the semester. Scheduling may be rearranged to accommodate guest lecturers or other events that may occur. Any changes made will be done as far in advance as possible to allow students the time necessary to prepare for class. The instructor reserves the right to make changes and/or additions to course policies as deemed appropriate.

University Policies

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual harassment, including sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. If you speak with a faculty member about an incident that involves a Title IX matter, that faculty member must notify SLU's Title IX Coordinator and share the basic facts of your experience. This is true even if you ask the faculty member not to disclose

the incident. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

Anna Kratky is the Title IX Coordinator at Saint Louis University (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886). If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK or make an anonymous report through SLU's Integrity Hotline by calling 1-877-525-5669 or online at <http://www.lighthouse-services.com/slu>. To view SLU's policies, and for resources, please visit the following web addresses: <https://www.slu.edu/about/safety/sexual-assault-resources/index.php> and <https://www.slu.edu/general-counsel>.

SLU's Title IX Policy (formerly called the Sexual Misconduct Policy) has been significantly revised to adhere to a new federal law governing Title IX that was released on May 6, 2020. Please take a moment to review the new policy and information at the following web address: <https://www.slu.edu/about/safety/sexual-assault-resources/index.php>. Please contact the Anna Kratky, the Title IX Coordinator, with any questions or concerns.

Accessibility and Disability Resources

Students with a documented disability who wish to request academic accommodations must formally register their disability with the University. Once successfully registered, students also must notify their course instructor that they wish to use their approved accommodations in the course.

Please contact the Center for Accessibility and Disability Resources (CADR) to schedule an appointment to discuss accommodation requests and eligibility requirements. Most students on the St. Louis campus will contact CADR, located in the Student Success Center and available by email at accessibility_disability@slu.edu or by phone at 314.977.3484. Once approved, information about a student's eligibility for academic accommodations will be shared with course instructors by email from CADR and within the instructor's official course roster. Students who do not have a documented disability but who think they may have one also are encouraged to contact to CADR. Confidentiality will be observed in all inquiries.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy was adopted in Spring 2015, and can be accessed at: https://www.slu.edu/provost/policies/academic-and-course/policy_academic-integrity_6-26-2015.pdf.

Additionally, each SLU College, School, and Center has adopted its own academic integrity policies, available on their respective websites. All SLU students are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions, and appeals. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Dean/Director of the College, School or Center in which your program is housed.

Student Success Center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center assists students with academic-related services and is located in the Busch Student Center (Suite, 331). Students can visit <https://www.slu.edu/life-at-slu/student-success-center/> to learn more about tutoring services, university writing services, disability services, and academic coaching.

University Writing Services

Students are encouraged to take advantage of University Writing Services in the Student Success Center; getting feedback benefits writers at all skill levels. Trained writing consultants can help with writing projects, multimedia projects, and oral presentations. University Writing Services offers one-on-one consultations that address everything from brainstorming and developing ideas to crafting strong sentences and documenting sources. For more information, visit <https://www.slu.edu/life-at-slu/student-success-center/> or call the Student Success Center at 314-977-3484.

Basic Needs Security

Students in personal or academic distress and/or who may be specifically experiencing challenges such as securing food or difficulty navigating campus resources, and who believe this may affect their performance in the course, are encouraged to contact the Dean of Students Office (deanofstudents@slu.edu or 314-977-9378) for support. Furthermore, please notify the instructor if you are comfortable in doing so, as this will enable them to assist you with finding the resources you may need.

University Counseling Center

The University Counseling Center (UCC) offers free, short-term, solution-focused counseling to Saint Louis University undergraduate and graduate students. UCC counselors are highly trained clinicians who can assist with a variety of issues, such as adjustment to college life, troubling changes in mood, and chronic psychological conditions. To make an appointment, call 314-977-8255 (TALK), or visit the clinic on the second floor of Wuller Hall.

Class Schedule

Note: Class schedule for planning purposes only; subject to change.

Week 01, 08/23 - 08/27: Course Introduction

Project work: Form project groups

Textbook readings: Borenstein et al. (2011, Part I); Cooper (2016, Chapter 1)

Other readings:

[1] K. Kraiger. “On learning from the past: A meta-analytic fable”. In: *Personnel Psychology* 38.4 (1985), pp. 799–801.

[2] F. Platz, R. Kopiez, A.C. Lehmann, and A. Wolf. “The influence of deliberate practice on musical achievement: a meta-analysis”. In: *Frontiers in Psychology* 5 (2014), p. 646.

Week 02, 08/30 - 09/03: MA Step #1: Problem Formulation

Project work: Problem formulation and scoping review

Textbook readings: Borenstein et al. (2011, Chapter 40); Cooper (2016, Chapter 2)

Other readings:

[1] J.R. Platt. “Strong inference”. In: *Science* 146.3642 (1964), pp. 347–353.

Week 03, 09/06 - 09/10: MA Step #2: Searching the Literature

Project work: Problem specification report due

Textbook readings: Cooper (2016, Chapter 3)

Other readings:

[1] V.S Conn, J.C. Valentine, H.M. Cooper, and M.J. Rantz. “Grey literature in meta-analyses”. In: *Nursing research* 52.4 (2003), pp. 256–261.

Week 04, 09/13 - 09/17: MA Step #3: Gathering Information from Studies

Project work: Study identification and retrieval report due

Textbook readings: Borenstein et al. (2011, Part II); Cooper (2016, Chapter 4)

Other readings: N/A

Week 05, 09/20 - 09/24: MA Step #4: Evaluating the Quality of Studies

Project work: Develop study eligibility criteria

Textbook readings: Cooper (2016, Chapter 5)

Other readings:

[MARS](#)

[PRISMA](#)

Week 06, 09/27 - 10/01: MA Step #5: Analyzing & Integrating the Outcomes of Studies

Project work: Study eligibility criteria report due

Textbook readings: Borenstein et al. (2011, Part III); Cooper (2016, Chapter 6)

Other readings: N/A

Week 07, 10/04 - 10/08: Introduction to metafor

Project work: Report on coding protocol development due

Textbook readings: N/A

Other readings:

[1] W. Viechtbauer. “Conducting meta-analyses in R with the metafor package”. In: *Journal of Statistical Software* 36.3 (2010).

Week 08, 10/11 - 10/15: Categorical & Continuous Moderators in MA

Project work: Report on coding protocol piloting and revisions due

Textbook readings: Borenstein et al. (2011, Part IV)

Other readings: N/A

Week 09, 10/18 - 10/22: Midterm Examination Presentations

Project work: N/A

Textbook readings: N/A

Other readings: N/A

Week 10, 10/25 - 10/29: MA Step #6: Interpreting the Evidence

No Class Thursday, Fall Break

Project work: Coding and analysis

Textbook readings: Cooper (2016, Chapter 7)

Other readings: N/A

Week 11, 11/01 - 11/05: MA Step #7: Presenting the Results

Project work: Coding & analysis

Textbook readings: Borenstein et al. (2011, Chapter 41); Cooper (2016, Chapter 8)

Other readings: N/A

Week 12, 11/08 - 11/12: Special MA Topics - Threats to Validity

Project work: Coding & analysis

Textbook readings: Cooper (2016, Chapter 9)

Other readings: N/A

Week 13, 11/15 - 11/19: Special MA Topics - Publication Bias

Project work: “Report of Findings” due

Textbook readings: Borenstein et al. (2011, Chapter 30)

Other readings:

[1] J.L. Vevea and L.V. Hedges. “A general linear model for estimating effect size in the presence of publication bias’’. In: *Psychometrika* 60.3 (1995), pp. 419–435.

Week 14, 11/22 - 11/26: Special MA Topics - Psychometric MA

No Class Thursday, Thanksgiving Break

Project work: Coding & analysis

Textbook readings: Borenstein et al. (2011, Chapter 38)

Other readings:

[1] Schmidt et al. “Forty questions about validity generalization and meta-analysis’’. In: *Personnel Psychology* 38.4 (1985), pp. 697–798.

Week 15, 11/29 - 12/03: Midterm Examination Presentations

Project work: N/A

Textbook readings: N/A

Other readings: N/A

Week 16, 12/06 - 12/10: Final Paper Presentations

Project work: N/A

Textbook readings: N/A

Other readings: N/A