

**Syllabus for
Meta-Analysis - EDP 381C
Unique Number: 10695
Spring, 2016**

Course Description:

This course is designed to help students master the statistical techniques used to conduct quantitative meta-analyses. This class will focus on helping students learn how to calculate various kinds of effect sizes and to use them to conduct and make appropriate inferences from meta-analyses, to describe and discuss quantitative meta-analytic methods and associated results and to understand the statistics used in a broad array of meta-analytic scenarios.

Pre-requisites:

Meta-analysis is a complex technique. This is an *advanced* Quantitative Methods seminar and is designed to focus primarily on the statistical analyses involved and not on the process of gathering the meta-analytic data that will be analyzed.

Mathematical/Statistical skills: This course requires the use of several intermediate graduate-level mathematical/statistical skills. Students are required to have mastered (actually, aced) correlation and regression techniques as well as experimental design and the fundamentals of matrix algebra. In this class, you will not be provided with an in-depth review of the concepts involved in these pre-requisite skills.

Computer programs: While some of the analyses conducted will be greatly facilitated by the use of a computer program such as Excel, SPSS syntax, SAS, etc., this course is not designed to teach students how to use these programs either in and of themselves or for meta-analytic purposes. Students should come into the class feeling comfortable with the use of Excel and SPSS (or SAS, R or STATA) syntax. Some examples using Excel or SPSS will be provided during class time but students will be responsible for mastering the software that will best fit their needs.

Calculator: Students must have access to a calculator that can be used to perform the relevant mathematical functions (such as taking the natural log, the exponent, square root, etc.) during class time. Therefore, please be sure to bring a calculator to class! However, a calculator will likely not suffice for the calculated required in all take-home assignments.

Class-time distractions: Do not text, surf the internet, check Facebook, email, etc. during class time as this distracts both you and students seated around you. Turn off phones unless you need to be contacted for dependents' care.

Meeting time and location:

Days: Tuesday and Thursday

Time: 9:30-11am*

Place: SZB 444

Instructor:

Name: Dr. Tasha Beretvas

Office: SZB 538E

Office hours: Thursdays, 2-3:30pm*, and by appointment.

E-mail: tberetvas@austin.utexas.edu

Note: Do not call me. I don't answer my office phone. Use email for correspondence.

*Due to prior professional commitments, there are a few class and formal office hour times when I will be out of town and thus unavailable. For missed formal office hours, do contact me in advance to set up an additional appointment. For missed class times, I will do my best to post a video of the lecture and any activities for you to observe and engage in during my absence.

Missed office hours will include:	1/21; 3/31
Missed face-to-face classes will include:	2/2; 3/31; 4/12

Last, my sincerest apologies but unfortunately my schedule is very full. As soon as you know that you might need to meet with me outside of my regularly scheduled office hours, please be sure to contact **both** me and the teaching assistant to find a date/time for an appointment (in case she has better availability than me).

Teaching Assistant:

Name:	Rose Stafford
Office:	SZB 538P
Office hours:	Tuesdays, 1:00-2:30pm, and Wednesdays, 11am-12:30pm, and by appointment
E-mail:	rose.stafford@utexas.edu

Note that if you have questions about course material or assignments then you need to email to set up an appointment to discuss your questions. You will not learn the relevant material by my or the TA's giving you an answer over email. So when you have a question, please come to my or the TA's office hours. If you cannot make those times, email me (and the TA) and suggest dates/times that you can meet and we're VERY happy to work with you to help you answer your questions!

Course Materials

Required: The course closely follows sections of the material covered in the **second edition** of the *The Handbook of Research Synthesis* (Cooper & Hedges, 2009) textbook. Note that the text provides additional topics not covered in class that should prove to be a useful resource for applied meta-analysts. While this book is available as an electronic resource in our library, it is a great resource and well worth owning! (I have listed some additional meta-analysis textbook resources at the end of the syllabus).

Optional: Class handouts matching the overheads used by the instructor will be made available on CANVAS (<http://canvas.utexas.edu>) to students by 6a.m. on the day of the relevant class meeting. I update overheads to match class progress and cannot guarantee to offer them any earlier. Please do not ask me to do so. Reading the handouts does not provide the student with the learning experiences or materials equivalent to those obtained by attending class. The handouts provide a skeleton of what is being covered each day and will thus be an incomplete version of the material actually covered. They are designed so that the students can pay attention without scribbling down everything that's being said. The handouts contain spaces for the student to fill in the additional material and to practice working through examples that are provided in class.

Assessments:

Readings from the textbook have been assigned for almost every topic covered (see Topics handout). Occasionally additional readings will be distributed. Students may choose to read the selections either before or after the class sessions, whichever better helps to solidify their learning.

There will be four types of assessments during the semester (performance on which will contribute to students' final grade) including:

- In-class group quizzes (Ungraded)
- Homeworks (**50%**)
- Mini-meta-analysis (**25%**)
- Methodological Meta-Meta-Analysis Project (**25%**)

The only way to master meta-analysis (as is the case with most mathematical topics or techniques) is to practice using them. Thus, the assignments are designed to provide students with the opportunity to apply meta-analytic techniques. However, because this is a Quantitative Methods course, there will also be an opportunity to explore meta-analysis methodology a little bit more deeply through the Methodological Project.

Homeworks

Practice using the concepts and formulas we will cover in class will be provided in the form of homeworks. These homeworks will typically be facilitated by students' use of some statistical software program for the computation of results. While students are encouraged to seek the help of the TA and the instructor with necessary concepts, homework ***must*** be the work of the individual student.

Students should assume that homeworks will be assigned weekly – on Thursdays and due Tuesdays. It is possible that this won't happen every week – it will depend the speed with which we cover material.

(The homeworks will be worth a total of **50%** of the final grade).

Note: Students should - on their own time - also construct and do their own homework by conducting all analyses demonstrated in class. Students will not learn by simply watching the instructor conduct analyses!

Mini-meta-analysis

A mini-meta-analysis project will be assigned to answer an applied meta-analytic research question that can be assessed by synthesizing studies' estimates of one of the standardized mean differences, δ . Each student will choose a substantive meta-analytic research question of "interest". Each student will then gather a minimum number* of applied studies (offering at least a minimum number of δ estimates) that employ quantitative methods to investigate the relationship between the relevant variables and that have sufficient information that can be used to estimate effect sizes.

Students will be required to submit a proposal for the mini-meta-analysis for review by the instructor. The proposal* will list the research question [and relevant variable(s)] and provide abstracts for the studies that will provide the data to be meta-analyzed.

The student will then calculate the relevant effect size estimate for each study and summarize the effect size across studies. A summary* of these results along with a description of the search for the articles, etc. will be provided to the instructor for assessment. The student will also code a study characteristic that distinguishes the studies and that the student hypothesizes might be related to the relevant effect size and investigate this relationship statistically. Additional analyses typically expected in a meta-analysis will also be required and detailed at a later time. These will be summarized and provided to the instructor as part of the final version* of each mini-meta-analysis project.

Note: The data being gathered must not be part of data previously gathered by the student.

*Fuller details will be provided about this assignment later in the semester.

The proposal will be due at the start of class at the start of class on **March 24th**. The final project will be due at the start of class on **April 7th**.

(The proposal and final project are together worth **25%** of the final grade).

Review Quizzes

It is important that students keep up with the material that is being covered. I have found that (unfortunately) one of the best ways to “strongly encourage” students to master material is through the use of quizzes. However, to minimize anxiety, these quizzes will not contribute directly to your final grade. Students will not be required to memorize formulas and can use class notes. In addition, these will be completed in small groups. However, only a certain amount of class time will be dedicated to completing the quizzes and therefore it will help to have reviewed material before taking each quiz. Students will be forewarned of upcoming quizzes at the end of the prior class. Note that while the review quizzes will not be graded per se, preparation for them and completion of them will hopefully help you better master the material!

(The reviews will be worth **0%** of the final grade although the benefits resulting from studying for and working on them should be priceless).

Methodological Meta-Meta-Analysis Project

This is a graduate level *Quantitative Methods* course, thus there is one final requirement that involves students’ focusing on meta-analytic methodology. Each student must choose a methodological dilemma in meta-analysis [e.g., how to synthesize correlations (using Fisher’s Z_r or not?), or how to synthesize multivariate effects (done correctly, or is univariate synthesis conducted, etc.?), or how researchers handle results from the test of homogeneity, how researchers handle missingness, how publication bias is addressed, etc]. There will then be two options.

For both options, each student will have to select a meta-analytic methodological dilemma. The student will then find a minimum* number of recent methodological (simulation or derivation) articles (up to one of which may be a textbook chapter) that discuss or investigate this or a facet of the selected meta-analytic dilemma. The student will compose a summary* of the dilemma – what is the dilemma?, what are the possible approaches to address the dilemma?, what is the impact of using one approach over another?, what has been found in previous methodological research?. For the more applied project option, students will need to find a

minimum* number of applied meta-analyses in a field of substantive interest that have had to confront this dilemma. The student will then summarize how the methodological dilemma was addressed in each of the applied meta-analyses that are being summarized. The student will then use data from one of the applied studies – or from having gathered a new set of effect sizes – to demonstrate the different results that can occur based on the approach chosen. The project should include a discussion about the results that were found (maybe expected differences were not found, or they were – why?). Last, the student will describe* what has not yet been investigated (methodologically) with regard to the dilemma, the student will offer guidelines for applied meta-analytic researchers who might encounter this dilemma and mention ideas for future methodological research about this dilemma

For the more methodological option, in addition to describing the dilemma and what previous research has found, the student will have to emphasize what has *not* been resolved about the methodological dilemma (i.e., make the case for their proposed methodological study). The student will then have to propose a methodological study including a real (meta-analytic) data study and a small-scale simulation study intended to address the methodological issue that is as yet unresolved, and note expected findings with associated guidelines for applied researchers.

As with the mini-meta-analysis projects, a proposal* will be due (on ***April 21st***) to the instructor several weeks before this final project is due. (The final project will be due at the end of semester on the last class day, ***May 5th***).

(The project is worth **25%** of the final grade).

*Fuller details will be provided about this assignment later in the semester.

Makeup Assignments:

By UT Austin policy, students must notify the instructor of their pending absence at least fourteen days prior to the date of observance of a religious holy day. If a student must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, then the student will be given an opportunity to complete the missed work within a reasonable time after the absence.

Only in exceptional circumstances (including a verifiable medical excuse) and only with ***prior*** permission from the instructor will a student be able to hand in an assignment late. Without this permission, the student will be penalized for late work. For each 24-hour period that the assignment is delayed, **10%** will be deducted from the assignment's score. Because assignments are due at the beginning of class, each 24-hour period will start coincident with the class's beginning at 9:30am. There will be no exceptions to this penalty.

If a student becomes ill on the day that an assignment is due, it is the student's responsibility to contact the instructor and to arrange delivery of the assignment by the time it is due. In this case, if the assignment is not complete, then the student will receive credit only for what was attempted. It is important to complete the homework **before** the day on which it is due.

I do **not accept emailed** assignments unless agreed to in advance.

Grading System:

Grades are assigned based on percentage of accumulated points:

A : 93-100; *B+*: 86-89; *C+*: 76-79; *D*: 60-69; *F*: 0-<60
A-: 90-92; *B* : 83-86; *C* : 73-76;
B-: 80-82; *C-*: 70-72;

Graduate students must receive a minimum overall grade of a *C* (i.e. 73%) to be awarded credit (**CR**) for the course.

Attendance:

Students are responsible for all material presented in lectures. It is expected that students will attend lectures, however attendance will not be taken. If a student misses a class, then the ***student is responsible*** for obtaining both the course material that was missed as well as any class announcements from his/her classmates.

Students are expected to arrive ***on time*** for the beginning of class. Students anticipating late arrival should notify the instructor before class. A pattern of tardiness can ***negatively affect*** your grade.

Assignments are due at the ***beginning*** of class on the due date indicated either in the syllabus or during class (for homeworks). If a student cannot attend on the days when an assignment is due, then the student is responsible for notifying the instructor ***in advance*** and arranging timely delivery of the assignment.

Scholastic Dishonesty Policy:

Each graded assignment ***must*** be the work of the individual student. Practice in class and review quizzes provide opportunities for collaboration; graded assignments do not.

The University defines academic dishonesty as cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Scholastic dishonesty also includes, but is not limited to, providing false or misleading information to receive a postponement or an extension on a test or other class assignment, and submission of essentially the same written assignment for two courses without the prior permission of faculty members.

By accepting this syllabus and participating in this course, you have agreed to these guidelines and ***must*** adhere to them. Students who violate University rules on scholastic dishonesty will receive an F for the course grade, be referred to the appropriate university officials, and may receive a maximum penalty of suspension from the University. For more information on scholastic dishonesty, students may review the Student Judicial Services website: <http://www.utexas.edu/depts/dos/sjs/>.

Disability Accommodation

Students who have a documented disability that may impair their ability to complete assignments or otherwise satisfy course criteria are encouraged to meet with the course instructor to identify, discuss and document any feasible instructional modifications or accommodations. They must notify the instructor no later than the end of the second week of the semester/term in which the course is offered. Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>

Emergency Evacuation Policy

Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform me in writing during the first week of class.
- In the event of an evacuation, follow my instructions or those of the TA.

Do not re-enter a building unless you're given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

Additional Meta-Analysis Texts

Borenstein, M., Hedges, L. V., Higgins, J. P. T. and Rothstein, H. R. (2009). *Introduction to meta-analysis*. John Wiley & Sons, Chichester.

Card, N. A. (2012). *Applied meta-analysis for social science research*. New York: Guilford.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Academic Press, San Diego, CA.

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

Sutton, A. J., Abrams, K. R., Jones, D. R., Sheldon, T. A., & Song, F. (2000). *Methods for meta-analysis in medical research*. John Wiley & Sons, Chichester.

Tentative Schedule and List of Topics

The following lists the topics that we will attempt to cover during this course. Listed beside the topics are the corresponding chapters and selection of pages from the textbook.

It is up to you to decide whether to read the chapter before or after you've "enjoyed" the relevant lecture and activities. We will frequently work through some of the examples presented in the textbook so you can refer back to the text at a later time to ensure mastery of the material covered.

You will notice that we are not even coming close to covering every chapter in the text. The focus in this class will be on the statistics used in meta-analysis. There are a host of other concerns that you will encounter should you embark on your own applied meta-analysis. The textbook (as well as several other textbooks) provides a full resource that can help you with many of these additional concerns and dilemmas.

Last, note also that Homework deadlines are not listed as those will be assigned in class as a function of the speed with which we cover material. You will always have a week to complete homeworks.

Dates ^a	Topic	Chapter	Pages
1/19 1/21	Introduction to Meta-Analysis	1, 2, 3	3–47
1/26 1/28	Estimating the Standardized Mean Difference Effect Size δ for independent groups' designs	12	221–223 225–227
2/2 2/4 2/9 2/11 2/16	Combining δ Estimates Testing Homogeneity Fixed and Random-effects models' synthesis Transforming statistics into δ Estimates	14 12	257–264 270–273 231–233
2/18 2/23 2/25 3/1 3/3 3/8	Explaining variability in Effect Sizes Using Study/Sample Descriptors (Meta-regression / Moderator analyses) Mixed-Effects Models	15	280–293
3/10	<i>Review</i>		
3/15 3/17	<i>SPRING BREAK</i>		
3/22	Calculating δ from repeated measures / matched groups / ANCOVA designs	12 +	227–230 Morris&Deshon
3/24	<i>Mini Meta-analysis project proposal due</i>		
3/24 3/29 3/31 4/5	Handling dependent effect sizes using generalized least squares (GLS) and robust variance estimation (RVE)	19 and 20 (GLS) and RVE articles+	(19) 357–376
4/7	<i>Final Mini Meta-analysis project due</i>		

Meta-Analysis Course
List of Topics

<u>Dates^a</u>	<u>Topic</u>	<u>Chapter</u>	<u>Pages</u>
4/7	Combining Correlations (ρ)	12	231
		14	264–265
			273-274
4/12	Effect Size Estimates for Categorical Data	13	237-253
4/14	Missing Data, Publication Bias	21	399-416
4/19		23	435-452
4/21	Using HLM to estimate random-effects MA ^b	16	295-315
4/21	<i>Methodological Project Proposal Due</i>		
4/26	Reliability Generalization Studies ^b		+
4/28	Meta-analysis of Single-case Design Study Results ^b and MASEM ^b	20	+
			377-395
5/3	<i>Review</i>		
5/5	<i>Final Methodological Project Due</i>		

Key: ^a These are tentative dates.

^b might be omitted depending on time.

+ Additional readings will be distributed.