

**Seminar in Meta-Analysis  
Psychology 4343  
&  
Psychology 6303**

**Fall 2018**

**Instructor: Lawrence D. Cohn, Ph.D.**

**Office hours: Tuesdays, Wednesdays, & Thursdays: 3:00 p.m. – 4:00 p.m.  
or by appointment  
(E-mail: Lcohn@utep.edu)**

Time: Tuesdays & Thursdays 1:30 – 2:50 p.m.

Place: Room C304, Classroom Building

This course will introduce you to the techniques and statistical procedures underlying meta-analysis. We will read and discuss some of the classic (and exciting) meta-analytic reviews that have been written during the past two decades; we will also discuss the controversies surrounding the use of quantitative procedures for integrating research findings in medicine, public health, and the behavioral sciences. In so doing, we will meet an underlying goal of the class: a review of basic statistical concepts (e.g., sampling distributions, statistical power, fixed versus random effects models) that make statistics ‘come alive’. Finally, each student will initiate a (small) meta-analysis, which involves identifying a research question, locating and retrieving relevant studies, coding the relevant variables within each study, extracting the desired data, conducting statistical analyses, and drafting a final paper.

Locating and retrieving relevant studies is a critical step (indeed, perhaps the most critical step) in the execution of a meta-analytic review. This semester we will collaborate with two UTEP reference librarians (Ms. Angela Lucero & Mr. Jacob Galindo) who will provide training in the use of databases and search procedures for identifying the population of studies to include in your meta-analytic review.

The intent of the course is to provide you with “hands-on-experience” in conducting, reading, and evaluating quantitative reviews. The mini-meta-analysis will serve as the basis for much of your hands on learning. It is important that you initiate this project relatively quickly (i.e., by the beginning of the 3<sup>rd</sup> week of classes). I will schedule bi-weekly meetings with each seminar participant, beginning the second week of the semester. These meetings should help keep you on track and address questions regarding the retrieval, coding and data analysis aspects of your project. Optimally, your mini meta-analysis will evolve into a full fledged review that can be presented at a scientific conference or submitted for publication. Several former students continued working on their meta-analytic reviews, or initiated new ones, after completing the seminar and published their work in leading journals, including *Psychological Bulletin*, *Journal of*

*Memory and Language*, and *Physiology and Behavior*. So please try to use this class and your mini-meta-analysis as a tool for making a genuine contribution to a body of literature that excites you. Undergraduate students and graduate students have successfully pursued this goal in past years.

Class participation is essential in this type of course and I expect you to be actively involved in seminar discussions based on weekly reading assignments. Please be sure to bring a calculator to class.

Course grades will be determined on the basis of two exams (each contributing 25% of your grade) one term paper (25% of your grade), and homework assignments (25% of your grade). **The paper (mini-meta-analysis) is due on Monday November 26<sup>th</sup> 2018.** The **tentative dates** for the exams exam are listed on the following sheets.

**Required Texts:**

Hunt, M. (1997). *How science takes stock: the story of meta-analysis*. New York: Russell Sage Foundation. Available at the UTEP Bookstore.

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

Littell, J.H., Corcoran, J., & Pillai, Vijayan (2008). *Systematic reviews and meta-analysis*. New York: Oxford University Press.

**Additional Resources** (Available at the UTEP Library):

Borenstein, M., Hedges, L.V., Higgins, J.P.T., & Rothstein, H.R. (2009). *Introduction to meta-analysis*. West Sussex, United Kingdom: Wiley.

Cooper, H., & Hedges, L. V., & Valentine, J.C. (2009). *The handbook of research synthesis and meta-analysis (second addition)*. New York: Russell Sage Foundation

Hunter, J.E., & Schmidt, F.L. (2004). *Methods of meta-analysis (2<sup>nd</sup> edition)*. Newbury Park: Sage

**Required Articles (asterisks denote additional readings for graduate students):**

In addition to the required texts, I will distribute articles for class reference and discussion. The latter materials will be available in pdf format and include:

APA (2008). Reporting standards for research in psychology: Why do we need them? What might they be? American Psychologist, 63, 839-851.

Bailar, J. C. (1997). The promise and problems of meta-analysis. New England Journal of Medicine, 337, 559-561.

- Bonett, D.G. (2008). Meta-analytic interval estimation for bivariate correlations. Psychological Methods, 13, 171-181. \*\*\*
- Borenstein, M., Higgins, J.P.T., Hedges, L.V., & Rothstein, H.R. (2017). Basics of meta-analysis:  $I^2$  is not an absolute measure of heterogeneity. Research Synthesis Methods, 8, 5-18.
- Byrnes, J.P., Miller, D.C., & Schafer, W.D. (1999). Gender differences in risk taking: a meta-analysis. Psychological Bulletin, 126, 367-383.
- Chabris, C.F. (1999). Prelude or requiem for the 'Mozart' effect? Nature, 400, 826-827.
- Chen, H., Cohen, P, & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. Communications in Statistics—Simulation and Computation®, 39: 860–864.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (Second Edition). New Jersey: Lawrence Erlbaum. (Selected power tables, pp. 30-31, 34 – 37, 90 – 95).
- Cohen, J. (1990). Things I have learned (so far). American Psychologist, 45, 1304-1312.
- Cohen, J. (1992). A power primer. Psychological Bulletin, 112, 155-159. \*\*\*
- Cohn, L.D., & Becker, B.J. (2003). How meta-analysis increases statistical power. Psychological Methods, 8, 243-253.
- Collins, M. & Carey, TA (2015). Identification of Real and Artfactual Moderators of Effect Size in Meta-Analysis, Multivariate Behavioral Research, 50:1, 109-125.\*\*\*
- Cote, I.M., & Jennions, M.D. (2013). The procedure of meta-analysis in a nutshell. In J. Koricheva, J. Gurevitch & K. Mengersen (Eds) Handbook of Meta-analysis in Ecology and Evolution. New Jersey: Princeton University Press.
- Eysenck, H.J., (1978). An exercise in mega-silliness. American Psychologist, p. 517.
- Feinstein, A. R. (1995). Meta-analysis: Statistical alchemy for the 21<sup>st</sup> century. J. Clinical Epidemiology, 48, 71-79. \*\*\*
- Field, A. (2003). Can meta-analysis be trusted? The Psychologist, 16, 642-645.
- Gigerenzer, G. (2002). Calculated risks (Chapter 5: Breast cancer screening). London: BMJ.
- Glass, Gene, V. (1976). Primary, secondary, and meta-analysis of research. Educational Researcher, 10, 3-8.

- Glass, Gene, V. (1999). Meta-Analysis at 25. Paper presented to the Office of Special Education Programs Research Project, Directors' Conference, U.S. Department of Education, Washington, D.C., July 15, 1999.
- Glass, G.V. (2015). Meta-analysis at middle age: a personal history. Research Synthesis Methods, 6, 221-231.
- Haddock, C.K., Rindskopf, D., Shadish, W.R. (1998). Using odds ratios as effect sizes for meta-analysis of dichotomous data: a primer on methods and issues. Psychological Methods, 3, 339-353.\*\*\*
- Hedges, L.W. (1987). How hard is hard science, how soft is soft science: the empirical cumulativeness of research. American Psychologist, 42, 443-455.
- Hedges, L.V. & Becker, B.J. (1986). Statistical methods in the meta-analysis of research on gender differences. In J.S. Hyde & M.C. Linn (Eds.) The psychology of gender. Baltimore: John Hopkins University Press.
- Hedges, L.V., & Vevea, J.L. (1998). Fixed- and random effects models in meta-analysis. Psychological Methods, 3, 486-504.\*\*\*
- Hunter, J.E., & Schmidt, F.L. (2000). Fixed effects vs. random effects meta-analysis models: implications for cumulative research knowledge. International Journal of Selection and Assessment, 8, 275-292.
- Hsu, L.M. (2004). Biases of success rate differences shown in binomial effect size displays. Psychological Methods, 9, 183-197.\*\*\*
- Ingelfinger, J.A., Mosteller, F., Thibodeau, L.A., & Ware, J.H. (1994). Using meta-analysis for research synthesis: pooling data from several studies. In Biostatistics in clinical medicine (Third Edition). New York: McGraw-Hill.
- Kisamore, J.L., & Brannick, M.T. (2008). An illustration of the consequences of meta-analysis model choice. Organizational Research Methods, 11, 35-53.\*\*\*
- LeLorier, J., Gregoire, G., Benhaddad, A., Lapierre, J., & Derderian, F. (1997). Discrepancies between meta-analyses and subsequent large randomized, controlled trials. New England Journal of Medicine, 337, 536-542.
- Liberati, A. (1995). "Meta-analysis: statistical alchemy for the 21<sup>st</sup> century": discussion. J. of Clinical Epidemiology, 48, 81-86. \*\*\*
- Lilienfeld, S.O. (2002). When worlds collide: social science, politics, and the Rind et al. (1998) child sexual abuse meta-analysis. American Psychologist, 57, 176-188.

- Lipsey, M.W., & Wilson, D.B. (1993). The efficacy of psychological, educational, and behavioral treatment. American Psychologist, 48, 1181-1209.
- Moher D, Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L.A., and PRISMA-P Group (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*, 4:1.
- Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed.1000097
- Murlow, C.D. (1995/1997). Rationale for systematic reviews. In I. Chalmers & D.G. Altman (Eds) Systematic Reviews. London: BMJ Publishing Group.
- Orwin, R.G. (1983). A fail-safe N for effect size in meta-analysis. Journal of Educational Statistics, 8, 157-159.\*\*\*
- Reed, J.G., & Baxter, P.M. (2009). Using reference databases. In H. Cooper, L.V. Hedges, & J.C. Valentine (Eds.) Handbook of research synthesis and meta-analysis (2nd edition). New York: Russell Sage.
- Rosenthal, R. (1987). Appendix: statistical tables. In R. Rosenthal Judgment studies: design, analysis, and meta-analysis. New York: Cambridge University Press.
- Rosenthal, R. (1995). Writing meta-analytic reviews. Psychological Bulletin, 18 (2), 183-192. \*\*\*
- Rosenthal, R (2005). Binomial Effect Size Display. In B.S. Everitt & D.C. Howell (Eds) Encyclopedia of Statistics in Behavioral Sciences. Chichester: Wiley.
- Rosenthal, R., & Rubin, D.B. (1982). A simple, general purpose display of magnitude of experimental effect. Journal of Educational Psychology, 74, 166-169.
- Rothstein, H.R., & Hopewell, S. (2009). Grey literature. In H. Cooper, L.V. Hedges, & J.C. Valentine (Eds.) Handbook of research synthesis and meta-analysis (2nd edition). New York: Russell Sage.
- Smith, M.L., & Glass, G.V. (1977). Meta-analysis of psychotherapy outcome studies. American Psychologist, 32 (9), 752-760.
- Stroup, D.F. et al (2000). Meta-analysis of observational studies in epidemiology: a proposal for reporting. Journal of the American Medical Association, 283, 2008-2012. \*\*\*
- Thompson, S.G., & Pocock, S.J. (1991). Can meta-analysis be trusted? Lancet, 338, 1127-1130.

vom Brocke, J., Simons, A., Riemer, K., Niehaves, B., Plattfaut, R., & Cleven, A. (2015). Standing on the shoulders of giants: Challenges and recommendations of literature search in Information Systems research. Communications of the Association for Information Systems, 37(1), 205-224.

White, H.D. (2009). Scientific communication and literature retrieval. In H. Cooper, L.V. Hedges, & J.C. Valentine (Eds.) Handbook of research synthesis and meta-analysis (2nd edition). New York: Russell Sage.

## **SEMINAR SCHEDULE**

### **DATE**

### **TOPIC**

August 28      **Introduction to Meta-Analysis**  
Reading: Hunt, M., How science takes stock (Chapters 1, 2, 3, & 4)

August 30      **History of Meta-Analysis**

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Sept. 4          **Statistical Power**  
**Class Discussion: How science takes stock**

September 6    **Meta-Analysis: Problem Formulation**  
**Literature Retrieval & Publication Bias**  
  
Reading: Reed & Baxter, 2009  
Rothstein & Hopewell, 2009  
Murlow, C., 1995/1997  
Glass, G., 1976  
Lipsey & Wilson, 2001, Chapters 1, 2, & 4  
Cohen, J., 1992\*\*\*  
Cote & Jennions, 2013

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September 11   **Coding Studies**  
**Preliminary review of proposed class projects**  
**Effect Sizes (d, r, & Hedges unbiased g)**  
**Binomial Effect Size Display**

September 13   *Information Literacy I: Strategies & Techniques for Identifying*

*the Relevant Literature for Your Meta-Analytic Review  
Presentation by Ms. Angela Lucero & Mr. Jacob Galindo,  
UTEP Reference Librarians. Meet at UTEP Library*

**Reading:** White, 2009  
Vom Brocke, 2015  
Moher et al., 2009

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September 18      **Combining and Weighting Effect Sizes**  
**Class Discussion: The Mozart Effect**  
*[Information Literacy IV: Begin Scheduling Individual Meetings with  
Ms. Angela Lucero & Mr. Jacob Galindo, UTEP Reference Librarians]*

Reading: Hedges & Becker, 1986  
Rosenthal & Rubin, 1982  
Rosenthal, 2005  
Lipsey & Wilson, 2001, Chapter 8

September 20      **Testing for Homogeneity (Hedges Analogue to ANOVA)**

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September 25      **Comparing Studies: Focused Tests (Contrasts)**  
**Class Discussion: When worlds collide**  
*[Information Literacy IV: Continue Scheduling Individual Meetings with  
Ms. Angela Lucero & Mr. Jacob Galindo, UTEP Reference Librarians]*

Reading: Lipsey & Wilson, 2001, Chapter 7  
Hedges & Becker, 1986  
Lilienfeld, S.O.

September 27      **How Meta-Analysis Increases Statistical Power**  
**Simpson's Paradox**  
Reading: Cohn & Becker, 2003  
Smith & Glass, 1977

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Oct. 2              **Class Discussion: The benefits of psychotherapy**

Oct. 4              **Exam # 1**

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October 9	<b>Effect Sizes: Rates and Proportions</b> <b>Class Projects: Status Reports</b> <i>[Information Literacy IV: Continue Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]</i>
October 11	<b><u>Class Discussion:</u> How hard is hard science and how soft is soft science?</b>  Reading: Ingelfinger et al., 1994; Hedges, 1987
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October 16	<b>Fixed and Random Effects Models</b>
October 18	<b>Fixed and Random Effects Models (con't)</b>
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October 23	<b>Converting Effect Sizes and Combining Probabilities</b>
October 25	<b><u>Class Discussion:</u> Interpreting findings and how to know when numbers deceive you</b>  Reading: Breast Cancer Screening. In G. Gegerzner (2002) <u>Calculating risks</u>
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October 30	<b>Meta-Analysis: Controversies</b> <b>Class Discussion</b> Reading: Cohen, J., 1990 *** LeLorier, J. et al, 1997; Bailar, 1997; Fienstein, A.J., 1995; Liberati, A., 1995*** Field, A.P. (2003)
Nov. 1	<b>Meta-Analysis: Controversies (Con't)</b>
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November 6	<b>Writing Meta-Analytic Reviews</b> Readings: Rosenthal, 1995; Stroup et al, 2000
November 8	<b>Writing Seminar I: Tricks of the Trade</b>
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<b>November 13</b>	<b>Exam # 2</b>
November 15	<b>Pre- and posttest designs and designs with multiple outcomes</b>
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November 20	<b>A comparison of statistical approaches to meta-analysis: 1) Hedges &amp; Olkin 2) Hunter &amp; Schmidt 3) DerSimonian-Laird</b>
November 22	<b>No Class: Thanksgiving</b>
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November 27	<b><i>Information Literacy V: Lessons Learned</i> Presentation by Ms. Angela Lucero &amp; Mr. Jacob Galindo “Problems, Pitfalls, &amp; Solutions Identified by Seminar Students Undertaking Their Literature Searches”</b>
November 29	<b>Presentation of seminar projects (Mini Meta-Analyses Due. No Extensions!!!!)</b>
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December 4	<b>Presentation of seminar projects (con’t)</b>
December 6	<b>Writing Seminar II: Review of seminar papers</b>
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