

**Seminar in Meta-Analysis
Psychology 4345
&
Psychology 6303**

Fall 2016

Instructor: Lawrence D. Cohn, Ph.D.

**Office hours: Tuesdays & Thursdays: 4:30 – 6:00 p.m. or by appointment
(E-mail: Lcohn@utep.edu)**

Time: Tuesdays & Thursdays 9:00 – 10:20

Place: Room 209, Liberal Arts 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 staff members at the UTEP library (including Ms. Angela Lucero, Mr. Jacob Galindo, and Mr. Harvey Castellano) 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 end of the second 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*, the *Journal of*

Memory and Language, and the *Journal of Gynecologic Surgery*. So try and use this class and mini-meta-analysis to make 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), homework assignments (25% of your grade). **The paper (mini-meta-analysis) is due on Tuesday November 22nd 2014.** 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.

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 (2nd 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. ***

- 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.
- 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 Artifactual 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 21st 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.
- 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 21st 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, 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 23 **Introduction to Meta-Analysis**
Reading: Hunt, M., How science takes stock (Chapters 1, 2, 3, & 4)

August 25 **History of Meta-Analysis**
Information Literacy I: Introduce Task #1

August 30 **Statistical Power**
Class Discussion: How science takes stock

September 1 **Meta-Analysis: Problem Formulation**
Literature Retrieval & Publication Bias
Information Literacy II: A Comparison of Results of Novice and Expert Searchers (Ms. Sol Lopez & Task # 1)

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

September 6 **Coding Studies**
Preliminary review of proposed class projects
Effect Sizes (d , r , & Hedges unbiased g)
Binomial Effect Size Display

September 8 *Information Literacy III: Strategies & Techniques for Identifying the Relevant Literature for Your Meta-Analytic Review*
Presentation by Ms. Sol Lopez, UTEP Librarian. Meet at UTEP Library

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

September 13 **Combining and Weighting Effect Sizes**

Class Discussion: The Mozart Effect

[Information Literacy IV: Begin Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]

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

September 15 **Testing for Homogeneity (Hedges Analogue to ANOVA)**

September 20 **Comparing Studies: Focused Tests (Contrasts)**

Class Discussion: When worlds collide

[Information Literacy IV: Continue Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]

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

September 22 **How Meta-Analysis Increases Statistical Power
Simpson's Paradox**

Reading: Cohn & Becker, 2003
Smith & Glass, 1977

September 27 **Class Discussion: The benefits of psychotherapy**

[Information Literacy IV: Continue Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]

September 29 **Exam # 1**

October 4 **Effect Sizes: Rates and Proportions**

Class Projects: Status Reports

[Information Literacy IV: Continue Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]

October 6	<u>Class Discussion:</u> How hard is hard science and how soft is soft science? Reading: Ingelfinger et al., 1994; Hedges, 1987
October 11	Fixed and Random Effects Models <i>[Information Literacy IV: Continue Scheduling Individual Meetings with Ms. Sol Lopez, UTEP Librarian]</i>
October 13	Fixed and Random Effects Models (con't)
October 18	Converting Effect Sizes and Combining Probabilities
October 20	<u>Class Discussion:</u> Interpreting findings and how to know when numbers deceive you Reading: Breast Cancer Screening. In G. Gegerner (2002) <u>Calculating risks</u>
October 25	Meta-Analysis: Controversies Class Discussion Reading: Cohen, J., 1990 *** LeLorier, J. et al, 1997; Bailar, 1997; Fienstein, A.J., 1995; Liberati, A., 1995*** Field, A.P. (2003)
October 27	Meta-Analysis: Controversies (Con't)
October 28	[COURSE DROP DEADLINE]
November 1	Writing Meta-Analytic Reviews Readings: Rosenthal, 1995; Stroup et al, 2000
November 3	Writing Seminar I: Tricks of the Trade
November 8	Exam # 2

November 10 **Pre- and posttest designs and designs with multiple outcomes**

November 15 **A comparison of statistical approaches to meta-analysis:
1) Hedges & Olkin 2) Hunter & Schmidt 3) DerSimonian-Laird**

November 17 ***Information Literacy V: Lessons Learned*
Presentation by Ms. Sol Lopez
“Problems & Pitfalls Experienced by Seminar Students This Semester
While Undertaking Their Literature Searches**

November 22 **Presentation of seminar projects
(Mini Meta-Analyses Due. No Extensions!!!!)**

November 24 **No Class: Thanksgiving**

November 29 **Writing Seminar II: Review of seminar papers**

December 1 Remaining Issues