

**Seminar in Meta-Analysis**  
**Psychology 6303 (CRN 19369) Fall 2022**

Hudspeth Hall, Room 313  
Mondays & Wednesdays 3:00 – 4:20 p.m.

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

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**Office Hours:** Tuesdays & Thursdays: 10:30 a.m. – 12:00 p.m. or by appointment

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**Welcome!**

Welcome...this course will introduce you to the techniques and statistical procedures underlying meta-analysis. We will also discuss the controversies surrounding the use of quantitative procedures for integrating research findings in medicine, public health, education, and the behavioral sciences. We will also discuss some basic statistical concepts (e.g., sampling distributions, statistical power, fixed versus random effects models) that make statistics ‘come alive’. Each seminar participant will initiate a mini meta-analysis, which involves identifying a research question, systematically locating and retrieving relevant studies, coding relevant variables within each study, extracting effect size data, conducting statistical analyses, and drafting a final paper.

The intent of the course is to provide you with “hands-on-experience” 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 either weekly or bi-weekly meetings with each seminar participant, beginning the first week of the semester. These meetings should help keep you on track and resolve questions regarding the retrieval of studies, coding, and data analysis aspects of your mini-meta-analysis. Optimally, your mini meta-analysis will evolve into a full-fledged review paper that can be presented at a scientific conference or submitted for publication. **Several former students continued working on their mini-meta-analytic reviews, or initiated new ones, after completing the seminar and then published their work in leading journals, including *Psychological Bulletin*, *Journal of Memory and Language*, and *Physiology and Behavior*.** So please use this class and your mini-meta-analysis as a tool for making a genuine contribution to a body of literature that excites you. 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 and homework computations. Please be sure to bring a calculator to class.

Course grades will be determined on the basis of two exams (each contributing 25% to your grade) one term paper (20% of your grade), homework assignments (25% of your grade), and class participation (5% of your grade). **The paper (mini-meta-analysis) is due on Monday November 21<sup>st</sup> 2022 (no extensions).** The tentative dates for the exams are listed on the following sheets.

**Required Texts:**

Borenstein, M., Hedges, L.V., Higgins, J.P.T., & Rothstein, H.R. (2021; Second Edition). *Introduction to Meta-Analysis*. Hoboken, New Jersey: Wiley. Available at UTEP Bookstore.

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. Available at UTEP Bookstore.

**Optional Text :**

Borenstein, M. (2019). *Common Mistakes in Meta-Analysis and How to Avoid Them*. Englewood, New Jersey: Biostat, Inc. (ISBN: 978-1-7334367-1-7).

**Optional Resource Text** (if you use “R”):

Harrer, Cuijpers, Furukawa, & Ebert (2022). *Doing Meta-Analysis with R: A Hands-On Guide*. Boca Raton, FL: CRC Press (imprint of Taylor & Francis Group)

**REQUIRED ARTICLES:**

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:

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

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).

Cohn, L.D., & Becker, B.J. (2003). How meta-analysis increases statistical power. Psychological Methods, 8, 243-253.

- 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.
- 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.
- 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.
- Orwin, R.G. (1983). A fail-safe N for effect size in meta-analysis. Journal of Educational Statistics, 8, 157-159.
- Page, M.J., McKenzie, J.E., Bossuyt, P.M. et al. (2021). The PRIMSA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, 372:n71.
- Rosenthal, R. (1987). Appendix: statistical tables. In R. Rosenthal Judgment studies: design, analysis, and meta-analysis. New York: Cambridge University Press.
- 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.

Siddaway, A.P., Wood, A.M., & Hedges, L.V. (2019). How to do a systematic review: a best practice guide for conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. Annual Review of Psychology, 70, 747-770.

Thompson, S.G., & Pocock, S.J. (1991). Can meta-analysis be trusted? Lancet, 338, 1127-1130.

### **OPTIONAL ARTICLES:**

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. [Example of a well crafted meta-analysis]

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.

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.

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.

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, G.V. (2015). Meta-analysis at middle age: a personal history. Research Synthesis Methods, 6, 221-231.

Hedges, L.V., & Vevea, J.L. (1998). Fixed- and random effects models in meta-analysis. Psychological Methods, 3, 486-504.

Hsu, L.M. (2004). Biases of success rate differences shown in binomial effect size displays. Psychological Methods, 9, 183-197.

Kisamore, J.L., & Brannick, M.T. (2008). An illustration of the consequences of meta-

analysis model choice. Organizational Research Methods, 11, 35-53.

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.

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.

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# SEMINAR SCHEDULE (Tentative)

## Week 1 (Aug. 22 & 24)

Introduction to Meta-Analysis

**Begin Reading:**

Hunt: How science takes stock (Chapters 1, 2, 3, & 4)

Borenstein et al: Introduction to Meta-analysis (Preface, Chapters 1 & 2)

Lipsey & Wilson: Practical Meta-Analysis (Chapter 1)

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## Week 2 (Aug. 29 & 31)

Statistical Power

Meta-Analysis: Problem Formulation, Literature Search & Retrieval

Publication Bias

**Seminar Discussion:**

**How Science Takes Stock**

**Brief Seminar Discussion:**

**Lipsey & Wilson (Chap. 1);**

**Borenstein et al. (Preface, Chap. 1, &2)**

**Begin Reading:**

Borenstein et al. (2021). Chap. 45 “When does it make sense to perform a meta-analysis?”

Lipsey & Wilson, 2001 (Chap. 2) “Problem specification & study retrieval”

Rothstein & Hopewell, 2009 “Grey literature”

Siddaway et al. (2019). “How to do a systematic review”

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## Week 3 (Sept. 7)

Coding Studies

Effect Sizes (initial introduction):  $d$ , Hedges  $g$ ,  $r$ , and  $OR$

Binomial Effect Size Display

**Brief Seminar Discussion:**

**Lipsey & Wilson (Chap. 2); Siddaway et al; Rothstein et al.**

**Seminar Discussion:**

**Preliminary review of proposed seminar projects**

**Begin Reading:**

Rosenthal & Rubin, 1982

Rosenthal, 2005

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## **Week 4 (Sept. 12 & 14)**

Weighting & Combining Effect Sizes: Hedges g (standardized mean difference)

### **Begin Reading:**

Chabris, 1999 (The Mozart Effect); Steele et al. (1999) [Note: both are Letters to the Editor]  
Borenstein et al., 2021 (pp. 17-22, 25-28)  
Hedges & Becker, 1986 (pp. 14-42)

**Information Literacy I: *Begin Scheduling Individual Meetings with  
Ms. Angela Lucero, Department head, UTEP Library***

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## **Week 5 (Sept. 19 & 21)**

Combining effect sizes: Hedges g (con't)  
Extracting effect sizes

Fixed Effect vs. Random Effects Models and Analyses

### **Seminar Discussion: The Mozart Effect**

### **Begin Reading:**

Borenstein et al., 2021. Chaps. 10 – 13 (pp. 57-79)  
Lilienfeld (2002) “When worlds collide: social science, politics, and the Rind et al. (1998)  
child sexual abuse meta-analysis.”  
Lipsey & Wilson, 2001. Tables B10, B11, B12 (use as a resource)

**Information Literacy I: *Continue Scheduling Individual Meetings with  
Ms. Angela Lucero, Department head, UTEP Library***

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## **Week 6 (Sept. 26 & 28)**

Fixed Effect vs. Random Effects Models and Analyses (con't)

**Seminar Discussion: “When worlds collide...”**

**EXAM #1 \*\*\*\*\***

**Begin Reading:**

Borenstein et al., 2021 Chaps 15-17 (97 - 125); Chap. 19 (139-153)  
Hedges, 1987. “How hard is hard science, how soft is soft science?”

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## **Week 7 (Oct. 3 & 5)**

Fixed Effect vs. Random Effects Models & Analyses (Con't)  
Heterogeneity: Cochran's  $Q$ ,  $I^2$ , Precision Intervals vs. 95% Confidence Intervals  
Subgroup Analysis; focused contrasts

**Seminar Discussion: “How hard is hard science, how soft is soft science?”**

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## **Week 8 (Oct. 10 & 12)**

Weighting & Combining Effect Sizes: Correlations

**Begin Reading:**

Borenstein et al., 2021 (Chap. 6, 39-41)

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## **Week 9 (Oct. 17 & 19)**

Weighting & Combining Effect Sizes: Odds ratios

**Seminar Discussion: Status Update (Problems & Progress): Seminar Participants' Mini-Meta-Analyses**

**Begin Reading:**

Borenstein et al., 2021. Chap. 5 (pp. 33-38); Chap. 42 (369-376).

Haddock et al. (1998). Using odds ratios as effect sizes for meta-analysis of dichotomous data: a primer on methods and issues.

Chen et al., 2010. How big is a big odds ratio?

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## **Week 10 (Oct. 24 & 26)**

Weighting & Combining Effect Sizes: Odds Ratios (con't)

**\*\*\* EXAM # 2 \*\*\***

**Begin Reading:**

Cohn & Becker, 2003 "How meta-analysis increases statistical power"

Page et al., 2021 "The PRIMSA 2020 statement: an updated guideline for reporting Systematic reviews"

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## **Week 11 (Oct. 31 & Nov. 2)**

Writing Meta-Analytic Reviews

Simpson's paradox

**Seminar Discussion: "How meta-analysis increases statistical power?"**

**Seminar Writing Exercise: Improving Prior Seminar Papers**

**Begin Reading:**

Borenstein et al., 2021 (Chap. 38 (343-348))

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## **Week 12 (Nov. 7 & 9)**

Meta-Analysis: Pre-Post Designs

### **Begin Reading:**

Bailar, 1997. The problems and promise of meta-analysis.

Borenstein et al., 2021 (pp. 413 - 423)

Eysenck, 1978. An exercise in mega-silliness.

LeLorier et al., 1997. "Discrepancies between meta-analyses and subsequent large randomized, controlled trials."

Liberati, 1995. "Meta-analysis: statistical alchemy for the 21<sup>st</sup> century.

Thompson & Pocock, 1991. "Can meta-analysis be trusted?"

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## **Week 13 (Nov. 14 & 16)**

**Seminar Discussion: LeLorier et al., 1997. "Discrepancies between meta-analyses and subsequent large randomized, controlled trials."**

**Seminar Discussion: Meta-Analysis: Controversies & Debates**

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## **Week 14 (Nov. 21 & 23) (Mini Meta-Analyses Due Nov. 21<sup>st</sup>.... No Extensions!!!!)**

Loose Ends

Common misstates in meta-analysis

**Seminar Discussion: Presentation of Seminar Participants' Mini-Meta-Analyses**

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## **Week 15 (Nov. 28 & 30)**

**Seminar Discussion: Presentation of Seminar Participants' Mini-Meta-Analyses**

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