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Workshop: Introduction to Meta-Analysis

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Workshop: Introduction to Meta-Analysis

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Introduction

In the last 40 years, meta-analysis has become a popular statistical methodology for systematically synthesizing the empirical findings in prior studies. Glass (1976) coined this methodology as “Meta-analysis” and referred to it as an “analysis of analyses”. Since then, the use and application of meta-analysis has proliferated in numerous fields in academia, such as psychology, law, management, education, information systems, medicine, and public policy (Barrick & Mount, 1991; Becker, 2001; Chen & Harvey, 2013; Dalton & Dalton, 2008; Egger, Smith, & Phillips, 1997; He & King, 2008; Hunter & Schmidt, 1996, 2004; Kendall & Maruyama, 1985; Steblay, Dysart, & Wells, 2011).

The major reason for popularity of meta-analysis across various fields is the increasing growth of empirical research on different topics and the need for a methodology that can systematically synthesize and summarize their findings. Unlike traditional qualitative reviews on a given topic, which are rather subjective and descriptive in nature, meta-analysis provides objectivity and applies a systematic quantitative process that can be replicable (Hunter & Schmidt, 1996). To that end, meta-analysis incorporates the results of primary empirical studies with independent samples in calculating a pooled effect size, which are then statistically analyzed to: (a) obtain an average magnitude of the effect, (b) examine heterogeneity among the effect sizes, and (c) search for the characteristics of the studies that can explain the heterogeneity (Eden, 2002; Hunter & Schmidt, 2004; Lipsey & Wilson, 2001). The goal of this workshop is to provide an introductory overview of the meta-analysis. The workshop also briefly discusses different stages of a meta-analytic process.

The Proposed Workshop

A meta-analysis is a method of scientific inquiry that involves multiple stages: (1) Defining the research question; (2) literature search; (3) coding of variables of interests; (4) calculating pooled effect sizes; (5) statistical analysis and interpretation, and (6) publication (Hunter & Schmidt, 2004; Lipsey & Wilson, 2001; Rosenthal, 1991). This workshop briefly discusses these stages to help the participants understand the basics of each of these stages.

(1) Defining the research question. As in any research study, the first stage in a meta-analysis is to define the research question as clearly as possible. This includes proposing conceptual and operational definitions of the different constructs related to the research question. The workshop discusses some examples to help understand how such research question can be formulated

(2) Literature search. Once the research question is formulated, the next stage is to conduct a comprehensive literature review on the relationships pertinent to the research question. This stage consists of defining the keywords, selecting the search databases, and drafting the criteria for inclusion of the studies. This workshop explains how to conduct such literature search and define the criteria for inclusions.

(3) Coding of variables of interest across studies. Once studies with independent samples are included in the meta-analysis, the next stage is to record the main characteristics of the studies. The characteristics of the studies can be classified as theoretical, methodological, and contextual variables. Theoretical characteristics are those related to the research question of the meta-analysis, whereas methodological

variables are characteristics related to the study design. Finally, contextual variables refer to those characteristics that, despite are not related with the research question or the study design, could also have an influence in the results. This workshop discusses the coding procedure and the nature of these different variables.

(4) *Calculating pooled effect sizes.* After the coding process is completed, pooled effect sizes are calculated to quantitatively synthesize the results of prior primary studies. Depending on the study design and the type of dependent variables (continuous, dichotomous), different techniques can be applied for calculating the pooled effect sizes (e.g., pooled correlation, pooled difference in average values (*d*)). This workshop briefly describes these pooled effect-sizes and explains how they can be calculated.

(5) *Statistical analysis and interpretation.* The pooled effect-sizes calculated in each study, and their sampling variances are used in statistical analyses with three main objectives: (1) to calculate an average effect size and its confidence interval; (b) to assess the heterogeneity of the effect sizes, and (c) to search for moderator variables that can explain the heterogeneity among effect sizes across primary studies (possible theoretical or methodological explanations for the heterogeneity in data) (Rosenthal, 1991). The details about how to statistically analyze the pooled effect sizes are discussed in this workshop.

(6) *Publication.* The workshop is concluded by presenting the examples of well-cited meta-analyses (e.g. Montazemi & Qahri-Saremi, 2015; Sharma, Bottom, & Elfenbein, 2013) to explain the meta-analytic results can be presented in form of academic publications.

Conclusion

Meta-analysis includes a family of quantitative methods for systematically reviewing a domain of scientific literature on a topic and statistically synthesizing knowledge garnered in different empirical studies. The widespread use of meta-analysis in the management and information systems literatures attests to its growing stature in these fields as a tool for integrating accumulated knowledge, explaining the inconsistent findings on a topic, and identifying gaps in the literature for future research. The objective of this workshop is to provide a conceptual and procedural introduction to meta-analysis. The workshop begins with explaining the meta-analysis concept, rationale, and available methods. It then moves to a more practical discussion of the major stages involved in conducting a meta-analysis, including articulating the research questions, searching for empirical studies, developing a coding scheme, calculating pooled effect-sizes for fixed-effects and random-effects meta-analyses, conducting moderation analyses on the pooled effect sizes, and presenting results. If time permits, this workshop may also introduce some of the common statistical tools for meta-analysis, such as the available R packages for meta-analysis. This workshop can be of interest to the scholars in any field who are interested in learning more about the meta-analysis.

REFERENCES AVAILABLE FROM THE AUTHOR(S)