



# Synthesizing results of multiple randomized experiments to establish causality in mediation testing



Dov Eden <sup>a,\*</sup>, Eugene F. Stone-Romero <sup>b</sup>, Hannah R. Rothstein <sup>c</sup>

<sup>a</sup> Program in Organizational Behavior, Faculty of Management, Tel Aviv University, Israel

<sup>b</sup> Management Department, Virginia Tech, United States

<sup>c</sup> Management Department, Zicklin School of Business, Baruch College, United States

## ARTICLE INFO

### Keywords:

mediation  
mediation testing  
meta-analysis  
research synthesis

## ABSTRACT

Mediation has to do with the transfer of causality from an independent variable to a dependent variable via a third variable called a “mediator.” Because the experimental method is the universally recognized gold standard for establishing causality, we propose that conducting two experiments, one manipulating the independent variable and another manipulating the hypothesized mediator, most rigorously tests mediation hypotheses. When there are several experiments in which the independent variable was manipulated and also several experiments in which the mediator was manipulated, synthesizing these two sets of experiments using meta-analysis yields the ultimate mediation evidence. If these experiments were conducted in the field, both internal validity and external validity would be maximized. An example of the synthesis of multi-experiment mediation tests is provided and its potential and limitations are discussed.

© 2015 Elsevier Inc. All rights reserved.

## 1. Introduction

Mediation has to do with the transfer of causality from an independent variable to a dependent variable via a third variable called a “mediator.” In the words of MacKinnon, Cox, and Baraldi (2012, p. 1), “...a mediating variable explains the process by which one variable causes another.” Because causality is at the heart of mediation, Stone-Romero and Rosopa (2004) pioneered the idea of testing mediation hypotheses using two true experiments and subsequently discussed some problems associated with such tests (Stone-Romero & Rosopa, 2008, 2011). Two-experiment mediation testing is becoming current in experimental social psychology (Bullock, Green, & Ha, 2010; Spencer, Zanna, & Fong, 2005; for a recent example see Kifer, Heller, Perunovic, & Galinsky, 2013). We adopted the two-experiment approach to mediation testing and extended it to synthesizing field-experimental replications using meta-analysis to test mediation hypotheses and to generalize the results.

We take as our point of departure Stone-Romero and Rosopa’s succinct statement: “The only way that one can make credible inferences about mediation is to perform two or more experiments” (p. 283). The present article extends this argument. Furthermore, it has been suggested (Eden, 2009, 2011) that meta-analysis be applied to cumulate multi-experimental results, thereby further increasing our confidence in mediation findings. Moreover, if these sets of meta-analyzed true experiments were conducted in the field, external validity is also enhanced without compromising internal validity, allowing us to grab the proverbial validity stick by both ends. Such meta-analytic results enable us to test mediation hypotheses most rigorously. This facilitates not only the development of theory, but also the improvement of practice. Valid research-based conclusions are especially important in HRM because practitioners need to be confident about the effects of interventions aimed at improving various individual, group, and organizational outcomes (e.g., performance, group cohesion, employee well-being, and attendance). In addition, evidence about mediation is crucial in the

\* Corresponding author at: Program in Organizational Behavior, Faculty of Management, Tel Aviv University, Tel Aviv 69978, Israel.  
E-mail address: [doveden@post.tau.ac.il](mailto:doveden@post.tau.ac.il) (D. Eden).

testing of theories (e.g., about the mediating effect of stress on relations between stressors and strain). As the research-methods literature makes clear, in terms of the criterion of causal inference, the results of mediation research that uses randomized experimental designs are far superior to those of studies that use quasi-experimental or nonexperimental designs (Cook & Campbell, 1979; Shadish, Cook, & Campbell, 2002; Stone-Romero, 2010).

The overall purpose of this article is to demonstrate the use of a meta-analytic approach to assessing mediation on the basis of the synthesized findings of research that uses true, randomized experimental designs. In the interest of doing so, we provide examples from research on the effects of managers' expectations on the performance of their subordinates as mediated by managers' leadership behavior and the self-efficacy of their subordinates.

## 2. Questionable inferences about mediation

The literature in HRM and related disciplines (e.g., industrial and organizational psychology, organizational behavior) is replete with the reports of research that purport to show evidence about mediation. Among the foci of such research are studies that claim to show the mediating effects of (a) critical psychological states (e.g., experienced responsibility) on the relation between job characteristics (e.g., autonomy) and work motivation (see Hackman & Oldham, 1976), (b) stress on the relation between stressors (e.g., role conflict) and strain (e.g., job-related tension; see Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964), and (c) job satisfaction on the relation between work role inputs and psychological withdrawal from work. In spite of the large number of nonexperimental studies on these and related topics, inferences about mediation from them rest on highly shaky empirical foundations. Sound inferences about mediation must be based on studies that use appropriate designs (i.e., true, randomized experiments). As Shadish (1996) noted, meta-analysis of the findings of nonexperimental studies provides a poor basis for making causal inferences in tests of mediation models.

## 3. Meta-analyzing two-experiment mediation studies

To demonstrate the use of the results of research that uses randomized experimental designs for testing mediation, we suggest a strategy in which mediation inferences are based on the findings of two meta-analyses. Each meta-analysis is conducted on a separate set of experiments. The first set includes experiments in which the independent variable was manipulated and the mediator was measured and the second set deals with experiments in which the mediator was manipulated and the dependent variable was measured. The findings of these two meta-analyses provide a sound basis for testing mediation hypotheses, keeping fidelity with the double causation implied by mediation:  $X$  causes  $M$  and  $M$  causes  $Y$ . They also constitute a firm basis for guiding practitioners to pull effective levers to produce the distal outcomes (e.g., performance) they seek. Actually, such results would provide two potential levers, as we would know that the change sought in the dependent variable(s) could be achieved by altering either the independent variable or the mediator—provided it is accessible to managerial influence—or, for maximal effect, both. Moreover, if the meta-analyzed sets of experiments were conducted in field settings, strong external validity would supplement the internal validity of the experimental designs. This would constitute a firm scientific basis for predicting how the causal chain would unfold in practice, once one (or more) of the “levers” was pulled. It would also contribute to an overarching goal of science, namely, generalization.

The two-experiment mediation logic can be extended to two or more mediators. Then there would be three or more sets of experiments and a like number of meta-analyses and we would speak of multi-experiment mediation synthesis. In principle, the potential for multi-experiment mediation testing is abundant. The practical limitation of this approach may be the dire dearth of experiments in HRM and related disciplines.

## 4. Synthesizing experiments to test mediation: an example

To explicate the two-experiment meta-analytic approach to providing evidence about mediation we meta-analyzed findings of experimental research relevant to the Pygmalion effect in management. First produced experimentally among school children (Rosenthal & Jacobson, 1968; for reviews see Rosenthal, 1991, 1994, 2002), this effect generalizes to adults in organizations (see reviews in Eden, 1990, 1992, 1993, 2003). It has been produced when raising managers' expectations boosts their subordinates' performance. McNatt's (2000) meta-analysis of 17 Pygmalion-at-work experiments yielded an overall Pygmalion effect size of  $d = 1.13$ . Kierein and Gold (2000) used different inclusion criteria and found an overall effect size of  $d = 0.81$  in 13 Pygmalion experiments. Cohen's (1988) rule of thumb is that  $d$  statistics of 0.80 and above are large. Thus, the meta-analyses show that we can produce large or very large Pygmalion effects among adults in organizations. Kisamore and Brannick (2008) recomputed these prior Pygmalion meta-analyses and reconfirmed these effect sizes. However, although Pygmalion theory hypothesizes mediators, none of these meta-analyses included any mediators.

## 5. Multi-experiment mediation testing of the Pygmalion effect

The Pygmalion mediation model (Eden, 1990, 1992, 2003) is displayed in Fig. 1. It is comprised of a causal chain that includes one independent variable, two mediators, and a dependent variable. There are three links indicating hypothesized causal effects: Manager Expectations → Manager Leadership → Subordinate Self-efficacy → Subordinate Performance. It hypothesizes that managers' leadership behavior (leadership hereinafter) mediates the causal effect of managers' expectations (expectations hereinafter) on subordinates' self-efficacy (self-efficacy hereinafter) and that self-efficacy, in turn, mediates the causal effect of leadership on subordinates' performance (performance hereinafter).

Download English Version:

<https://daneshyari.com/en/article/879558>

Download Persian Version:

<https://daneshyari.com/article/879558>

[Daneshyari.com](https://daneshyari.com)