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FROM THE EDITORS

THE SUITABILITY OF SIMULATIONS AND META-ANALYSES FOR SUBMISSIONS TO *ACADEMY OF MANAGEMENT JOURNAL*

Academy of Management Journal's (*AMJ*'s) mission requires theoretical and empirical contributions, encourages broad-scope, novel, and interesting research questions, and signals openness to theoretical approach, empirical design, level of analysis, and region of origin of the theory, method, and data. Despite the encompassing nature of the mission, *AMJ* editors frequently field questions about the types of theoretical and empirical approaches that are suitable in order for a manuscript to be placed in our peer review process. As such, it is necessary to reflect periodically on the types of submissions that are appropriate and, if short of a formal policy about submission type, offer some guidelines on whether certain approaches have mission fit. These days, the application of two approaches—simulation based and meta-analytic—are trending upward in terms of their use and influence within the organization sciences. Authors frequently ask whether they are appropriate for use in submissions to *AMJ*. Like other approaches, such as the use of experimental or laboratory research (Colquitt, 2008), the answers to questions concerning these approaches take the form of "when" rather than "if." In this essay, we describe generally when meta-analysis and simulations may be successfully used in submissions to *AMJ* and when their use may not be appropriate for full review. The suggestions here should be interpreted as guidelines with fuzzy boundaries, rather than black-and-white policy statements. We may not be able to anticipate all of the possible uses for these techniques and certainly do not want to discourage researcher creativity when applying different methods.

SIMULATIONS

Simulations use computer models to operationalize the real world and create a computational representation of the linkage between underlying mechanisms and constructs in a simplified world (Davis, Eisenhardt, & Bingham, 2007). Simulations influence scientific conclusions in many fields, including management (e.g., Cohen, March, & Olsen, 1972; March, 1991). They have three key strengths. First, they can take steps in the direction of internal validity and can lead researchers to specify constructs, assumptions, and underlying mechanisms precisely (Davis et al., 2007). Second, they allow for thought experiments (Carley, 2001), wherein researchers can vary assumptions and behavioral rules and parameters at minimal cost. In this vein, simulation researchers can also model extreme cases. Third, in simulations, researchers can examine cross-level processes (e.g., local–global interactions, temporal dynamics) simultaneously. Simulations can therefore be valuable when the theory seeks to explain complexity (Grimm et al., 2005)—tipping points, catastrophes, and thresholds—and temporal phenomena, such as changes or evolution (Langley, 2007). These strengths notwithstanding, a simulation *alone*—being a computational representation of empirical reality, rather than directly measured observations or experience—typically does not satisfy *AMJ*'s mission to "publish *empirical* research that tests, extends, or builds management theory and contributes to management practice." Researchers can use simulations in submissions to *AMJ* provided they complement or enhance empirical designs. In the section below, we offer some possibilities for using simulations effectively in submissions to *AMJ*.

Simulations to Evaluate Alternative Models

Simulations can be used as a creative starting point in the "strong inference" (Platt, 1964) tradition. For example, Tarakci, Greer, and Groenen (2016: 416–417) first outlined three assumptions: "power is static," "power is based on competence," and "power equality cannot exist." Based on these assumptions, they developed a hypothesis—using simulations—that power holders' competence

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moderates the relationship between power disparity and group performance. They then further empirically validated the assumptions and their hypothesis using lab and field studies.

Simulations as a Triangulation Tool

Triangulation validates findings from multiple sources. Research that leverages multiple methods to address a research question increases confidence in the findings and facilitates deeper understanding. Simulations offer opportunities to complement designs with other strengths. For example, Lin, Zhao, Ismail, and Carley (2006) matched 80 simulated organizations with 80 real cases, enabling them to conclude that no organizational design guarantees high performance under crisis situations.

Simulations as an Inductive Exploratory Tool

Simulations can be used as a means to develop inductive theory, as a starting point for a submission to *AMJ*. For example, aggregation from micro to macro is a common problematic issue in economics, finance, social psychology, and management (Powell, Lovallo, & Fox, 2011). How do phenomena that are local aggregate to global, individual to organizational, intra-organizational to interorganizational, or momentary to longitudinal? Simulations, especially agent-based models that simulate collective systems based on autonomous decision-making agents (e.g., Farmer & Foley, 2009), are potentially potent for exploring how micro mechanisms aggregate to macro phenomena. For example, Sytch and Tatarynowicz (2014) first empirically validated the micro-foundations of interorganizational network dynamics, and how dyadic and triadic local structures were formed. They then used an agent-based model to show how these micro-foundations shaped the emergence of a global network in an evolutionary dynamic process. Simulations can also provide insights regarding plausible micro mechanisms to support empirically grounded macro phenomena. As a first step in this direction, simulations may be fruitfully used in submissions.

Simulations to Evaluate Robustness

On a smaller scale, simulations can be used effectively to evaluate the robustness of a set of results against alternative sets of assumptions, distributional biases, and the like. For example, Dineen, Noe, Shaw, Duffy, and Wiethoff (2007) conducted a small-scale simulation to address the potential biasing effect of nonindependence between measures of mean and dispersion of satisfaction within teams. Overall, the simulation revealed no evidence of amplification or reduction in effect sizes under certain distributional assumptions, but slightly weaker different patterns when the actual level of interdependence was used. The conclusion of the simulation was that the actual reported results were likely under- rather than overestimated. Thus, the simulation provided a complement to the main empirical findings from their studies.

META-ANALYSIS

Meta-analytic reviews occupy a key place in the field of management. In years past, the use of meta-analysis was relatively straightforward and generally narrow in application. Meta-analysis began as the empirical complement to systematic qualitative reviews, providing a quantitative way of summarizing vast empirical findings and bringing some numbers to bear in resolving long-standing debates about the magnitude or the direction of well-studied relationships. Once thought to be the definitive or final word on a topic, meta-analytic results frequently raise more questions than they answer and, as a result, often invigorate the study on certain topics of interest. In a typical or standard meta-analytic summary, a relationship (e.g., job satisfaction and job performance; Judge, Thoresen, Bono, & Patton, 2001) or findings related to a construct of interest (e.g., justice; Colquitt, Conlon, Wesson, Porter, & Ng, 2001) are summarized empirically. A standard meta-analytic approach assesses a single association at a time, resulting in a meta-analytic or population-level correlation between two variables of interest. Following this, researchers frequently conduct subgroup analyses to assess the strength of the relationship across different types of designs, sample characteristics, theoretical grounding, and many other factors. Although rather informative, in its standard form, a meta-analysis is "unable to provide higher-level assessments, such as comparing competing models that might have multiple permutations of predictors, mediators, and outcomes" (Bergh et al., 2016: 477). In general, because of the inability to test a multivariate theory, a standalone, standard empirical summary frequently falls outside of the mission of *AMJ.* But, meta-analysis approaches can and have been used very effectively in submissions to *AMJ*; in fact, nearly 20 papers

using meta-analytic techniques were published in *AMJ* in the last decade. Below are three ways in which these approaches may be used effectively.

Theory-Testing Using Meta-Analytic Path Modeling

Meta-analytic path modeling, meta-analytic regression analysis, and meta-analytic structural equation modeling provide one avenue through which researchers can capitalize on the advantages of a quantitative summary data in a theory-testing environment. To illustrate simply, a researcher first estimates (or obtains from the recent empirical literature) all the meta-analytic correlations among a set of variables. These may include independent variables, mediators, moderators, and dependent variables. Once a meta-analytic correlation matrix is in place, these correlations are concurrently analyzed in a path model, providing a sample-level multivariate test. In such cases, the introduction and theory section of the article looks much like a normal theory development section and the path-modeling technique is simply a way of testing the hypothesized model using secondary metadata. For example, Jiang, Lepak, Hu, and Baer (2012) integrated and extended theory in strategic human resource management, resulting in a process model linked to the ability–motivation–opportunity theory. They tested their hypothesized model in a meta-analytic path model using available data from 120 different samples comprising more than 31,000 observations. This approach is powerful, but limited in that there must be sufficient numbers of studies for each dyadic pair of variables in order to estimate stable meta-analytic correlations. Thus, the approach is better suited to theory testing in mature, rather than emergent, research areas. Moreover, researchers must be cautious in terms of application and interpretations of findings, as the effect size data are sample level and typically different from the conceptual level of hypothesized relationships (e.g., individual, team, or organizational). Researchers should take care to avoid fallacies of the wrong level when applying this approach (Bergh et al., 2016).

Using Meta-Analytic Data and Techniques in Testing Theory

Another approach to using meta-analytic techniques is found in Judge and Zapata (2015). In a test of situation strength and trait activation theories, these authors scoured the literature for sample-level correlations between personality and job performance. They then used occupation-level job evaluations scores from O*NET to predict the sample-level correlations between personality and job performance. The authors also reported robustness checks in which they performed simple, standard meta-analytic tests on the relationships between individual personality characteristics and performance and compared them to estimates found in more dated meta-analytic investigations in the literature. The goal of their study was to test predictions from two major theories of how personality relates to job performance, rather than to estimate population-level correlations. But, they drew on several meta-analytic principles and conducted "standard" meta-analytic tests to corroborate their findings.

Meta-Analysis as a Starting Point for Theory Building

One alternative use for a meta-analysis would be to search for population-level correlations as a starting point for theory building. If used as a building block for further theory extension, it is reasonable to think that a standard meta-analytic approach could be used as "Study 1," which could then be followed by extended predictions and tests using other empirical designs. This approach could be useful when there are strong, opposing theories regarding the direction or sign of the relationship between two key constructs. Researchers could use a standard meta-analysis to determine the direction and magnitude of the overall relationship, followed by theory building and testing in subsequent studies, given the nature and magnitude of the estimate of the population-level correlation. A caveat is that a "standard" meta-analytic study requires detailed and careful reporting of coding decisions, estimation decisions, and the results of the study. It may sometimes be infeasible to report a large-scale standard meta-analysis and follow it with theory building and testing within the same manuscript.

Meta-Analysis When Primary or Secondary Data are Difficult or Impossible to Obtain

In a creative study, Post and Byron (2015) examined the relationship between the proportion of women on corporate boards and the financial performance of the firms. To do so, these authors

conducted what could be considered a standard meta-analytic test, first determining the magnitude of the relationship between women on boards and performance, and then assessing the strength of the relationship across various contextual moderators. In this instance, the authors argued effectively that, because of the difficulty in obtaining primary data, their approach provided a reasonable test of their upper-echelons theory foundation. The authors noted the limitations of their approach, but made a case that it was a reasonable way of taking steps in the direction of theory testing "because none of the board, firm, or industry characteristics we considered to operate through our proposed theoretical mechanisms were adequately reported by a large enough number in the primary studies in our sample" (Post & Byron, 2015: 1562).

CONCLUSION

In this essay, we addressed the appropriateness of using simulations and meta-analysis in submissions to *AMJ*. The ideas and examples are offered as guidelines and are intended to inspire creativity in using these methods, not to discourage their use. There are certainly many more possibilities for simulations and meta-analytic techniques than we have outlined here. The aim was to provide simple illustrations of the conditions under which they can be used effectively in *AMJ* submissions. Our intent was not to provide a tutorial on "best practices" for simulations or meta-analysis-based investigations, as researchers cover these topics more extensively in other works. Certainly, the issue of approachability is important for both designs, as *AMJ* articles reach a wide, diverse audience, and should be written with accessibility to a wide audience in mind. Researchers should seek to conform to the current "gold standards" for their chosen approach. Simulations and meta-analytic designs are powerful and can produce novel insights into management-relevant theory and phenomenon. We aim to encourage their use in ways that align with the mission, but also to provide some clarity for prospective authors who may find value in these approaches.

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