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Meta-analysis selection bias in marketing research

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ABSTRACT

The tendency of meta-analytic authors to select particular studies is called selection bias. Selection bias can affect the strength of the meta-analytic estimate and the attention that scholars devote to the results. This research is, in effect, a meta-analysis of the effect sizes reported or calculated from 94 meta-analysis studies of various topics in marketing research. The analysis reveals that estimates depend on the publication status of the included studies. The greater the percentage of studies that were published in academic journals vs. non-published studies, the greater is the size of the meta-effects, and the more published studies from leading journals the meta-analysis includes, the stronger the effect size. The meta-analytic effect size is a mediator for the influence of both the ratio of unpublished studies and the ratio of studies from leading journals on the probability of a meta-analysis to be published in a leading journal, which increases the number of citations to a meta-analysis. The findings of this study have several implications for meta-analysts, editors, reviewers and the marketing community on how to conduct and read current and future meta-analysis in marketing research.

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1. Introduction

It is a well-known problem that preferential publication of significant and strong results over non-significant and weak results leads to a literature that provides a false impression regarding the size of the effect in question. There is strong evidence from several fields of science that this “publication bias” exists (Dickersin, 2005). By including published and unpublished studies in their quantitative review, meta-analysts try to mitigate the problem that the publication status of a study (i.e., whether the study is published or unpublished) is related to the effect size estimate in the study. The efforts to include studies of various publication statuses and the tendency of meta-analytic authors to select particular studies—whether intentionally or not—are called selection biases (Ferguson & Brannick, 2012). The current study identifies and examines selection bias in 94 meta-analyses in marketing research and its consequences for academia.

Selection bias arises from the selection decision of a meta-analyst, whereas publication bias is based on the decision of authors and editors to submit and to publish a manuscript, which precedes the selection decision of the meta-analyst. Although it is a different kind of bias, a selection bias might have similar consequences as a publication bias because certain studies are more likely to be selected than other ones, which influences the strength of the meta-analytic estimate and the

attention scholars pay to the results. These consequences are of importance for both practitioners and scientists. Biased estimation of effects can lead to wrong decisions of practitioners and cause harm because inefficient measures are chosen. Biased findings can steer future research endeavors and achievements of academics in the wrong direction, lead to wastage (i.e., unnecessary work), and harm the pursuit of scientific truth (Knight, 2003). A thorough investigation of a selection bias is essential to evaluate the true value of meta-analytic findings.

This study contributes to the literature in several ways. First, the study contributes to the research about meta-analyses by examining for the first time the selection bias of meta-analysts and its consequences for academia. Second, the study contributes to our general knowledge about publication bias, which is related to the selection bias. The findings indicate not only that whether a study is published influences the size of an effect (which has been the focus of prior research on publication bias) but also that where (i.e., journal outlet) the study is published can bias the findings reported in the study. Third, the study provides details about the existence and extent of selection bias in the field of marketing. These insights provide implications for marketing researchers on how they should conduct, review, and read current and future meta-analyses.

2. Background and hypotheses

To avoid publication bias, scholars recommend that meta-analysts make a purposeful attempt to collect both published and unpublished studies (e.g., Borenstein, Hedges, Higgins, & Rothstein, 2009). Unpublished studies are produced by academic institutions that

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are not controlled by publishers, such as working papers or unpublished doctoral theses (Hopewell, Clarke, & Mallett, 2005).

Meta-analysts have better access to published studies, as a representative sample of unpublished studies does not exist (Ferguson & Brannick, 2012; Kepes, Banks, McDaniel, & Whetzel, 2012). While other scientific fields such as medicine have developed registers that help scientists to track unpublished research, this has not been done in marketing research. It is, therefore, easier and more likely for a meta-analyst in marketing to access and to include primarily published studies compared to unpublished studies. However, even among published studies, those that are published in leading journals are more easily accessible (e.g., the meta-analyst's academic institution might not have a subscription to non-leading journals).

Meta-analyses vary in the percentage of included studies that have differing publication statuses, which at least partly depends on the efforts a meta-analyst exerts into searching and retrieving the studies (Banks & McDaniel, 2011). For instance, there is meta-analysis that puts much effort into retrieving unpublished studies. Other meta-analyses are based on systematic issue-by-issue searches of particular journals, usually the leading journals in the field as well as topic-related journals. Such issue-by-issue searches increase the likelihood that relevant studies from the searched journals are included. Studies from other journals that are searched by other means (e.g., a keyword search in electronic databases) might be overlooked because effect size estimates worthy of inclusion might not be detected this way (e.g., the relevant effects might not be mentioned in the abstract of the study that is searched for the occurrence of keywords). Furthermore, the number of citations to a study makes it easier to identify a study when searching references of previously found studies, which consequently favors studies published in leading journals that have high citation rates.

The selective sampling of studies can produce an incorrect estimate of the true effect (Renkewitz, Fuchs, & Fiedler, 2011). It is difficult to determine the exact nature of the selection bias, because we do not know the true effect of the relationship that is investigated in a meta-analysis. Whether the findings in top journals are upward biased or the findings in lesser journals or of unpublished studies are downward biased can only be inferred from the empirical distribution of meta-analytic effect sizes (Egger & Smith, 1998).

2.1. The influence of whether and where a study is published on meta-analytic effect sizes

In marketing research, it has been shown that the percentage of significant results reported in journal articles has increased over the years, particularly in the leading journals (Hubbard & Armstrong, 1992). Several studies in medicine and psychology have surveyed reviewers, editors, and authors and found that studies with results rejecting the null hypothesis are more likely to be published (e.g., Coursol & Wagner, 1986; Dickersin, Chan, Chalmers, Sacks, & Smith, 1987; Greenwald, 1975). In order to investigate the reasons for the lack of insignificant results in publications, several cohort studies have examined the process from study initiation to dissemination of results by following studies approved by research ethics boards (e.g., Cooper, DeNeve, & Charlton, 1997; Dickersin, 1997; Easterbrook, Berlin, Gopalan, & Methews, 1991; Olson et al., 2002). They found that the majority of researchers do not submit manuscripts with non-significant results. In addition to the self-selection of authors, the editorial staff is responsible for a publication bias because studies are more likely to be rejected due to the lack of an incremental contribution to the literature.

The publication bias suggests that the publication status is related to the effect size (e.g., Egger, Smith, Schneider, & Minder, 1997; Rust, Lehman, & Farley, 1990). Meta-analytic authors' tendency to select published studies more than unpublished studies aggravates the publication bias problem (Renkewitz et al., 2011). The more unpublished studies that are included, the weaker the meta-analytic effect size will be.

To date, publication bias studies have focused on the relationship between publication status and effect size by examining whether a study was published. Another plausible, yet barely investigated approach is to search for variations in the quality of publication outlets and their relationship with effect sizes. The underlying idea is that the size of the effect denotes the explanatory potential and, by this, the usefulness of a theory (Aguinis, Dalton, Bosco, Pierce, & Dalton, 2011). The more variance in the dependent variable that is explained, the more useful the underlying theory is thought to be. Combs (2010, p. 11) explains this as follows: "A theory might find support, but its explanatory power—that is, the effect size observed—is so weak that further efforts to develop the theory might not be warranted. ... Small effects also raise questions about managerial relevance. ... If managers begin to act on theories that are supported by small effects, they are not likely to notice positive results even when they occur."

Because the standards of methodological rigor and theory development that are considered acceptable in leading journals are higher than in non-leading journals (e.g., Lehmann, 2005; Varadarajan, 2003) and because effect sizes signal a theory's usefulness and the rigorous application of methods, the editors and reviewers of leading journals are more likely to select studies with strong effect sizes, thus suppressing weak results. Also authors, who have strong findings or who are more careful and thorough in their work and better control for confounding factors and thus find stronger findings, might be more likely to select these findings for a submission to a leading journal. In other words, censorship due to authors, editors, or reviewers in marketing research is related to the size of effects reported in the studies (Rust et al., 1990).

H1. The ratio of studies published in leading journals in a meta-analysis is positively related to the meta-analytic effect size.

2.2. Consequences of selection bias on publication of and citations to a meta-analysis

Strong and significant effects are considered as important and attract more attention by scholars than weak or non-significant effects. The importance of research findings is evaluated in academia in at least two measurable ways: first, by the gatekeepers of publication outlets (editors and reviewers), who decide which findings are worthy of being published, and second, by scholars who indicate the importance of the findings by citing these studies.

Tierney, Clarke, and Stewart (2000) have shown that meta-analyses of individual cancer patient data with significant and impressive results tend to be published in journals with higher impact factors. While the importance of the effect size is rather obvious in medical science, because it indicates how successful treatments and interventions are, studies in business research are more concerned with the mere significance of an empirical finding (Ellis, 2010). We suggest that effect sizes in meta-analyses in marketing research influence their publication success, because they indicate a relative contribution. The magnitude of a meta-analytically derived effect size denotes explanatory potential of theories: theories that explain a larger portion of the variance in relevant outcomes are more useful than those that explain a small portion (Aguinis et al., 2010; Bacharach, 1989). The theoretical relevance increases the likelihood of authors to submit their meta-analysis papers to a top journal and it influences the decision of editors and reviewers to support these papers during the review process. Because we assume that the meta-analytic effect size depends on the publication status of the studies included in the meta-analysis, we formulate the following mediation hypothesis that describes the consequences of selection bias on the probability of a meta-analysis to be published in a leading journal.

H2. The meta-analytic effect size is a mediator for (a) the ratio of unpublished studies and (b) the ratio of studies published in leading journals included in a meta-analysis on the probability that the meta-analysis is published in a leading journal.

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