

STATUS OF REPLICATION STUDIES IN MARKETING: A VALIDATION AND EXTENSION

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This paper validates the status of replication studies in marketing. It examines the extent replication is present in marketing, compares its findings with previous findings, and ascertains the relative need for replication studies in marketing. Relatively few replications were found in a survey of the studies in the Journal of Marketing, Journal of Marketing Research and Journal of Consumer Research from 1986-1995. The article concludes with a discussion of a comprehensive inventory of past and new replication research recommendations and focuses on several strategies that would help to improve the quality of replication studies in our discipline.

INTRODUCTION

Replication is at the heart of any science. Science, the logic of inquiry, allows us to obtain knowledge that is free of bias. Yet, replication is seldom practiced in any research discipline. In view of the critical role that replications play in scientific inquiry, it may be useful to ascertain the extent replication constitutes a viable dimension of scholarship in marketing.

A survey of the professional journals or textbooks about research in marketing suggests that scholars in marketing have paid only a limited amount of attention to what Kassen (1960, p. 54) has termed "an elemental principle of competent research," namely replication. Recently, Easley, Madden, and Dunn (2000) have contended that the marketing discipline has scorned good science by revering new theory formulation and shunning studies that had prominent replication attributes. For the past two decades or so, other scholars in marketing have also lamented the lack of replication tradition in this discipline (Brown and Coney 1976; Leone and Schultz 1980; Reid, Soley, and Wimmer 1981; Zinkhan et al. 1990; Madden 1992; Hubbard and Armstrong 1994). Leone and Schultz (1980, p. 11),

for example, argue that (1) the absence of a replication tradition has severely hindered knowledge development in marketing, and (2) the scientific foundation of the marketing discipline thus appears "to be more marsh than bedrock."

Accordingly, this study seeks to validate the status of replication studies in marketing. It (a) examines to what degree replication is evidenced in the marketing journals, (b) ascertains the relative need for replication, (c) presents several recommendations for enhancing replication in marketing, and (d) offers strategies that would help to improve the quality of replication studies in marketing. The paper is organized as follows. First, an overview of the role of replication in scientific research is presented. Second, studies on replication research in marketing are explored. Third, the extent replication research is present in marketing is examined. Fourth, the relative need of replication in marketing is ascertained. We conclude with a discussion of recommendations for enhancing the quality of replication studies and strategies for improving the quality of replication studies in marketing.

THE ROLE OF REPLICATION IN SCIENTIFIC RESEARCH

The Popperian view of knowledge acquisition contends that as researchers we improve our state of

knowledge by failing to disconfirm or by confidently disconfirming our hypotheses (Popper 1959). As Popper (1959, p. 45) notes, "we do not take even our own observations quite seriously, or accept them as scientific observations, until we have repeated and tested them." Tukey (1969, p. 85), commenting about Sir Ronald Fisher, the father of experimental design, observes that "repetition is the basis for judging variability and significance and confidence. Repetition of results, each significant is the basis, according to Fisher, of scientific truth."

The extant literature is replete with evidence promoting the importance of replication research. Replication research is considered "the most important criterion of genuine scientific knowledge" (Rosenthal and Rosnow 1984, p. 9), "generic to all science" (Campbell and Jackson 1979), "one of the basic principles of competent research" (Kassen 1960), "a basic tenet of scientific advancement" (Smith 1970), and should be "adequately evidenced for any professional field that claims to be grounded on scholarship" (Muma 1993).

As Campbell and Stanley (1966, p. 3) have suggested, successful experiments today "will need replication and cross-validations at other times under other conditions before they can become an established part of science, before they can be theoretically interpreted with confidence." Smith (1970, p. 971) notes that "if the goal of scientific research is to render established truths, then the neglect of replication must be viewed as scientific irresponsibility," and Muma (1993) adds that if replication is not well represented in the literature for a field, the scholarly base of the field is questionable.

In the context of modeling, Bollen (1989) maintains that (a) replication is an important check on whether an association is a sampling fluke and (b) it provides a check on the pseudo-isolation assumption, because if the model is correct, we expect it to hold in different samples and with different types of data. In addition, it determines whether the final models reflect capitalization on chance in one sample or a robust association in another (Bollen 1989, p. 62).

STUDIES ON REPLICATION RESEARCH IN MARKETING

As argued in current literature, replication research is crucial to science and is particularly needed in any research discipline. Recently, Hubbard and Armstrong (1994) examined a 50 percent simple random sample of issues from *Journal of Marketing* (JM), *Journal of Marketing Research* (JMR), and *Journal of Consumer Research* (JCR) for the period 1974-1989. They found that only 2.4 percent of the 835 empirical studies qualified as replications with extension; none of the 835 empirical studies was straight replication. Of the 20 replication with extension studies, 15 percent (3) supported, 25 percent (5) indicated partial support, and 60 percent (12) conflicted with the outcomes of the original articles' results. Hubbard and Armstrong also reported that between the time periods 1974-1979 and 1980-1989, there was a reduction from 2.2 percent to 1.5 percent in all research papers devoted to extensions, and the proportion of replication with extensions as a percent of empirical studies decreased from 3.1 percent to 1.9 percent.

Zinkhan et al. (1990) also studied a systematic sample of 263 empirical papers appearing in JMR and JCR from 1975-1984 and in JM from 1981-1985. They found that only 4.9 percent of them were replications with extension. Twenty-three percent of the extensions supported, whereas 31 percent partially supported, and 46 percent conflicted with the original studies' results.

Brown and Coney (1976) examined all 1971-1975 issues of JM and JMR, and the 1974-1975 issues of the JCR. The data revealed the paucity of replications. Only 2 percent of the articles could be classified as some form of a replication. In an investigation of replication attempts in advertising, Reid, Soley, and Wimmer (1981) found that 30 studies out of the 501 advertising articles published qualified as replications (4) and replication with extensions (26). Of the 30, 40 percent completely supported the original result; 20 percent provided partial support; and 40 percent produced conflicting results.

METHOD

JM, *JMR*, and *JCR* were selected to represent the field of marketing. Rated among the leading academic journals, they have the highest citation index ranking. A content analysis of these journals was performed to determine the extent of replication research in marketing. To ensure an adequate time horizon and to provide a comprehensive picture of the state of replication in marketing, a complete review of all articles appearing in the three journals from 1986 through 1995, inclusive, was made.

All full-length articles, research notes, comments, and reflections published in the *JM*, *JMR*, and *JCR* from 1986-1995 were included in the analysis. Conceptual pieces introduced new constructs, theories or conceptual frameworks, or major modifications thereof, including agendas for research. Empirical pieces pertained to the development and testing of hypotheses or descriptive data analyses and to the discussion of findings as they relate to theoretical, methodological, and/or managerial issues. Empirical studies and empirical research notes were further examined to see if they were replications.

Replications attempt to "repeat, as closely as possible a previous scientific investigation, recognizing that some aspects of the original study will probably be different" (Campbell and Jackson 1979, p. 4). Various labels such as "literal," "direct," "exact," and "strict," all refer to the attempt to repeat, as closely as possible, the design of a previous investigation. The terms "conceptual," "systematic," and "constructive" all refer to the "replication of the concept of a previous investigation to a somewhat different type of measurement" (Campbell and Jackson 1979, p. 4).

Hendrick's (1991, p. 41) and Lykken's (1968 p. 155-156) classification framework was used as a basis for reviewing the marketing literature. Specifically, the articles in the three marketing journals were grouped into *strict*, *partial*, *operational*, or *conceptual* replication. If the study involved a replication, it was reviewed to see whether it resulted in confirmation or disconfirmation of the original study. The data from these analyses were used to draw conclusions about

the degree of replication and to ascertain the relative need for replication in marketing.

The following operational definitions (Lykken 1968, p. 155-156; Hendrick 1991, p. 41) were employed:

- (a) A *strict* or *lateral* replication involves exact duplication of the first investigator's sampling procedure, experimental conditions, measuring techniques, and methods of analysis (Lykken 1968, p. 155). If successful, a strict replication confirms an earlier finding but has no novelty value. If unsuccessful, it introduces a confusion into the specific realm of science.
- (b) A *partial* replication repeats the research exactly in some respects, but introduces change in other respects. Partial replications offer more in new information but are higher in risk because nothing can be concluded if such replications fail.
- (c) An *operational* replication attempts to duplicate only the sampling and experimental procedures of the first study (Lykken 1968, p. 155). The purpose is to test whether the investigator's "experimental recipe" (i.e., the salient conditions and procedures) will, in other hands, produce the results that he or she obtained (Lykken 1968).
- (d) A *conceptual* or constructive replication demands that an independent researcher start with only the findings of a study and formulate his or her own methods to test the hypotheses. Conceptual replications offer more in new information but are higher in risk since nothing can be concluded if such replications fail.

In addition, a distinction needs to be made between external replication and internal replication. *External* replication is where the empirical evaluation of result replicability employs a new and independent sample of subjects. In contrast, analyses that use data from the sample in hand is *internal* replication. Because only external replication analyses invoke true replication (Thompson 1994), the former--external replication--

Table 1
Replication Status in Marketing

1986-1990							
<u>Journal</u>	<u>Number of Articles</u>	<u>Empirical Papers</u>	<u>Replication</u>	<u>%</u>	<u>Qualitative Research</u>	<u>Conceptual/Theoretical</u>	<u>Comments/Legal</u>
<i>JCR</i>	284	231	(7)	3 %	13	21	19
<i>JM</i>	171	74	~	0 %	~	66	31
<i>JMR</i>	208	199	(7)	3.5 %	~	1	8
Totals	663	504	(14)	2.8 %	13	88	58
1991-1995							
<u>Journal</u>	<u>Number of Articles</u>	<u>Empirical Papers</u>	<u>Replication</u>	<u>%</u>	<u>Qualitative Research</u>	<u>Conceptual/Theoretical</u>	<u>Comments/Legal</u>
<i>JCR</i>	288	184	(2)	1 %	13	26	5
<i>JM</i>	151	99	(4)	4 %	~	33	19
<i>JMR</i>	198	183	(2)	1 %	1	9	5
Totals	578	466	(8)	1.7 %	14	68	29

is the focus of this article. We are not dismissing internal replications involving cross-validation, jackknife, and bootstrap approaches as worthless. Instead, these are worthwhile strategies that researchers can employ to empirically investigate the likely replicability of their research results. It should be noted, however, that few researchers feel able to or are willing to conduct external replication analyses because of the opportunity costs.

RESULTS

Table 1 shows the total number of research papers (1241) with the various breakdowns (empirical papers, qualitative research reports, conceptual pieces, and comments/legal developments). Of the 970 empirical papers, only 22 (2.3 percent) qualified as replications. Of the replications, four appeared in *JM*, nine in *JMR*, and nine in *JCR*.

Between the time periods 1986-1990 and 1991-1995, a reduction from 2.8 percent (14 out of 504) to 1.7 percent (eight out of 466) occurred in all empirical papers devoted to replication. The results of our

study parallels the work of Hubbard and Armstrong (1994). Thus, the results of this study suggest that the concerns expressed by Brown and Coney (1976) and others about the lack of replication tradition have not led to serious improvements.

The data in Table 2 shows the frequency of replication research in marketing. The data reveal that there were few replications published in the journals in question. The 22 replications accounted for only 2.2 percent (22 out of 970) of all empirical papers. Of the 22 replications, ten (45 percent) were partial replications, five (23 percent) were operational replications, six (27 percent) were conceptual replications, and one (approximately five percent) was a strict replication.

More importantly, the data suggest that there is a good reason to be concerned about unreplicated research, for a majority of replications conflicted with the outcomes of the original articles' results. Ten (45 percent) out of the 22 studies disconfirmed or did not support the previously published results,

Table 2
Replication Studies in Marketing

Study	Study Replicated	Type of Replication	Supported/ Not Supported	Findings
1. Ailawadi, Farris & Parry (1994)	Balasubramanian & Kumar (1990) <i>JM</i>	Operational Replication	Not Supported	Being unable to find empirical support for the model with any of the three data sets they argue that further research should rely on other variables.
2. Akaah and Riordan (1989)	Crawford (1970) <i>JM</i>	Partial Replication	Partially Supported	The results indicate several significant changes in ethical judgements; three organizational factors underlie differences in ethical judgements.
3. Beatty & Talpade (1994)	Foxman, Tansuhaj, & Ekstrom (1989) <i>JCR</i>	Partial Replication	Not Supported	The replication showed a clear connection between product importance and adolescent influence. Nor was the previous financial resource findings supported.
4. Brown & Rothschild (1993)	Webb & Ray (1979) <i>JAR</i> ; Webb (1979) <i>JCR</i>	Partial Replication	Not Supported	Neither recognition or recall of brands is affected to any great extent by significant increases in advertising clutter.
5. Chattopadhyay & Alba (1988)	Hastie & Park (1986) <i>PR</i>	Conceptual Replication	Not Supported	Recall can be a predictor of attitude given the proper context and a theoretically justifiable recall measure.
6. Cronin & Taylor (1992)	Parasuman, Ziethaml, & Berry (1985) <i>JM</i>	Operational Replication	Not Supported	Performance-based measure of service quality may be an improved means of measuring the service quality construct.
7. Davis, Inman, & McAlister (1992)	Dodson, Tybout, & Sternthal (1978) <i>JMR</i>	Conceptual Replication	Not Supported	The hypothesis that overall evaluation of promoted brands would decrease is rejected. Promotion provides a strong influence at the point of choice.
8. Dodds, Monroe, & Grewal (1991)	Render & O'Connor (1976) <i>JAMS</i>	Partial Replication	Supported	Favorably brand and store information positively influenced perceptions of quality and value and subjects' willingness to buy.
9. Hock (1988)	Hock (1987) <i>JPSP</i>	Conceptual Replication	Supported	Predictive accuracy of marketing experts was low overall, and novices were no more accurate than everyday consumers in predicting consumer opinions.
10. Homer (1990)	MacKenzie, Lutz, & Belch (1986) <i>JMR</i>	Partial Replication	Not Supported	Contrary to expectations, processing involvement does not produce substantial differences in the specification or strength of the causal paths.
11. John & Sujan (1990)	Whitney & Kunen (1983) <i>JEC</i> ; Tversky (1985) <i>DP</i>	Conceptual Replication	Supported	Younger children's failure to consider underlying attributes can be traced to common types of processing deficits.
12. Kellaris and Cox (1989)	Gorn (1982) <i>JM</i>	Partial Replication	Not Supported	No evidence that product preferences can be conditioned through a single exposure to appealing or unappealing music.

Study	Study Replicated	Type of Replication	Supported/ Not Supported	Findings
13. Kent & Allen (1994)	Burke & Srull (1988) <i>JCR</i> ; Keller (1987) <i>JCR</i> ; Keller (1991) <i>JCR</i>	Partial Replication	Partially Supported	The competitive interference findings were replicated when subjects were exposed to test and competing ads for unfamiliar brands, but not for familiar brands.
14. Lim, Olshavsky, & Kim (1988)	Huber and McCann (1982) <i>JMR</i>	Partial Replication	Not Supported	The authors found no evidence of inferencing between attributes unless inferences were explicitly induced.
15. MacKenzie, Podsakoff, & Fetter (1993)	MacKenzie, Podsakoff, & Fetter (1991) <i>OBHDP</i> (Replicated one of three studies)	Strict Replication	Supported	Organizational Citizenship Behaviors have an important impact on managers' overall evaluations of sales performance.
16. McAlister, Bazeman, & Fader (1986)	Bazeman, Magliozzi, & Neale (1985) <i>OBHP</i>	Partial Replication	Partially Supported	Equal and high power channel members are shown to be made more profitable by the constraint. Low channel members are shown to be less profitable by a goal setting mechanism.
17. Moore & Reardon (1987)	Harkins & Petty (1981) <i>JSPS</i>	Conceptual Replication	Supported	The polarization of thoughts and attitudes in response to strong versus weak arguments were found to be greater when subjects are exposed to multiple message sources than to a single source.
18. Novak & MacEvoy (1990)	Kahle, Beatty, & Homer (1986) <i>JCR</i>	Operational Replication	Not Supported	Kahle et al.'s claim of superiority of LOV (List of Values) over VALS (Values and Life Styles) was not supported.
19. Robinson (1988)	Robinson & Fornell (1985) <i>JMR</i>	Replication	Supported	Through pioneering a new industrial market is not easy, many pioneers develop important and sustainable competitive advantages.
20. Ryans & Weinberg (1987)	Ryans & Weinberg (1979) <i>JMR</i>	Operational Replication	Supported	Ryans and Weinberg's (1979) model and its specific operational form are consistent with these data from one company.
21. Stayman & Aaker (1988)	Batra & Ray (1986) <i>JCR</i> ; Edell & Burke (1987) <i>JCR</i> ; Holbrook & Batra (1987) <i>JCR</i>	Conceptual Replication	Not Supported	Under at least some conditions, A_{ad} does not totally mediate the effect of feeling responses. Results contrast with those found by previous researchers.
22. Zinkham & Shermohamad (1986)	Morton (1967) <i>JQ</i>	Operational Replication	Partially Supported	Trend analysis provide some support for Riesman's theory, especially in the case of male-oriented publication.

DP: *Developmental Psychology*
 JAR: *Journal of Advertising Research*
 JCR: *Journal of Consumer Research*
 JECp: *Journal of Experimental Child Psychology*
 JM: *Journal of Marketing*
 JMR: *Journal of Marketing Research*

JSPS: *Journal of Personality and Social Psychology*
 JAMS: *Journal of the Academy of Marketing Science*
 JQ: *Journalism Quarterly*
 OBHDP: *Org. Behavior and Human Decision Processes*
 OBHP: *Organizational Behavior and Human Performance*
 PR: *Psychological Review*

seven (32 percent) completely supported or verified the original studies' outcome, and five (23 percent) partially supported the previous published results.

Important to the utility of replications is when the replication occurred. Twelve (55 percent) of the replications were published within five years of the original, four (18 percent) were published within six to ten years of the original study, and six (27 percent) were published more than a decade after the original study. Acknowledging who conducted the replication is also important. Five (23 percent) included or involved the original author or experimenter. Latter replications were partially or completely supported.

To ascertain the relative need for replication, we estimated the likelihood of false findings in the marketing literature and the number of replications that would be required to isolate possible false findings. For the 970 empirical papers identified over the ten year period, we assume that, on the average, each involve at least four parametric or nonparametric analyses. Thus, based on 3880 (970×4) basic statistical analyses, the .01 and .05 confidence levels indicate that approximately 39 to 194 false findings, respectively, are likely to occur in the marketing empirical literature for the period in question. If we use more conservative estimates because of the built-in safeguards in post hoc analyses, it may be appropriate to divide the raw numbers in half. Thus, 20 ($970 \times 2 \times .01$) to 97 ($970 \times 2 \times .05$) false findings may still be possible.

We assume that at least ten percent of our 970 empirical papers are potential candidates for replication because they are pioneering research. Replicating pioneering research is generally the most useful. The studies that investigated replication research in marketing suggest that 40 percent to 60 percent of replications disconfirm the findings in the original studies. Thus, at least 39 ($970 \times .10 \times .40$) to 58 ($970 \times .10 \times .40$) quality replications should have been published over the ten year period instead of the 22. Thus, we should, at a minimum, be doubling or tripling our replications of pioneering research.

DISCUSSION AND CONCLUSION

The content analysis reveals that replications are infrequently published, and when they are, the results often tend to conflict with the previously published results. Nonetheless, it may be argued that in the hard sciences, replication research is more likely to support an original work because there are certain physical laws that do not change. Marketing phenomena, however, are in a constant change. Thus, it is highly unlikely that a marketing replication would ever totally support the findings of the original study. The fact that we sometimes obtain partial support is outstanding and noteworthy.

Obviously, an inconsistency exists between the acceptance of replication as a requirement of science and the behavioral commitment on the part of researchers in marketing (Brown and Coney 1976; Madden, Franz, and Mittelstaedt 1979; Reid, Soley, and Wimmer 1981; Hubbard and Armstrong 1994). Recognizing the need for a replication tradition is one thing, but demonstrating the behavioral commitment to replication is another.

A number of reasons or arguments have been advanced to explain why there is lack of behavioral commitment to publish or encourage replication research. Some of these are the lack of funds, time, availability of comparable group of subjects, adequately established reward structure for replication research, willingness on the part of authors to share methodological details, willingness on the part of editors to publish or encourage replications, and interest either because of staleness or importance of topic or perceived creativity (Kassen 1960; Madden 1992; Easley, Madden, and Dunn 2000).

Empirical evidence suggests a strong editorial bias against publishing replications (Neuliep and Crandall 1990). In addition, Reid, Rotfeld, and Wimmer (1982) found that would-be replicators of work appearing in the major marketing journals have a 50 percent chance of obtaining the necessary information and materials for replication. Madden, Franz, and Mittelstaedt (1979) also point out the

lack of availability of measurement instruments and detailed instructions and procedures. Such insufficient specification casts doubt on the basic validity of marketing research knowledge since replication is essentially impossible and "is the basis of scientific truth" (Tukey 1969, p. 85).

Encouraging Replications

Below, we provide a synthesis of past and new suggestions to encourage and to increase the likelihood that replication would be built into our scientific agenda. First, modifications in editorial policy are needed. Hubbard and Armstrong (1994) provide evidence that clearly communicated changes in editorial policies facilitate publication of replications. Such editorial policies should actively encourage the submission of manuscripts that replicate (Reid, Soley, and Wimmer 1981). Though the *Journal of Consumer Research*'s editorial policy clearly notes that replication research is accepted, the journal rarely publishes replication studies.

The marketing journals should have a separate section for replication studies (Brown and Coney 1976; Brown and Gaulden 1980; Hubbard and Armstrong 1994) and should consider appointing a section editor for replication studies. A separate section could be set aside for replication research, along the lines of Research in Brief or Research Notes. To conserve space, reports of replications could be restricted to two or three pages or 500 words with the tacit agreement that the replicator would make detailed information available to interested parties.

Second, there is the need to indoctrinate beginning researchers into a replication tradition. Thus, replication research should be an integral part of doctoral training, and graduate students should be allowed to conduct replications for their degree requirements (Tukey 1969, p. 89; Reid, Rotfeld, and Wimmer 1982). As Tukey (1969, p. 89) posits, "once we recognize that research is a continuing, more or less cyclic, process, however, we see that we can segment it in many ways."

Third, there is the need to develop publication guidelines to ensure that each published article contains adequate information to allow an independent check of the results (Madden, Franz, and Mittelstaedt 1979; Reid, Soley, and Wimmer 1981) and to make researchers aware of the need to keep research materials (Reid, Rotfeld, and Winner 1982). Many published works fail to provide adequate information permitting replication. If researchers would accept more responsibility for spelling out the minimum essential conditions and controls for producing their results, operational replication would be facilitated. On the other hand, the review process has the responsibility to raise questions about the lack of such details.

As Reid, Soley, and Wimmer (1981, p. 11) indicate, empirical studies, at the very minimum should include information about the research design, sample size, basic description of procedures, statistic used, p level, mean and standard deviation for each variable, operational definitions for all independent and dependent variables, and power estimates. For example, the *Journal of Marketing* now requires that the aspiring authors agree to make available their data for five years after the publication date. This is definitely a step in the right direction.

Fourth, an abstracting service could be established to collect and disseminate replication studies (Zinkhan et al. 1990). We might take a lesson from the American Psychological Association with its *Journal Supplement Abstract Services (JSAS)*, which encourages publication of both replications and research containing non-significant findings (Kelly, Chase, and Tucker 1979).

Fifth, attempts should be made to remove the perceived stigma or negative attitudes associated with replication studies (Madden, Franz, and Mittelstaedt 1979). Thus, replication should not only be encouraged but rewarded through promotion, tenure process, and annual evaluations.

Improving the Quality of Replications in Marketing

In this section, our objective is to further complement the arguments advanced by Rosenthal and Rosnow (1984), Rosenthal (1991), and Bornstein (1991). We focus on several strategies that, alone or in combination, would help improve the quality of replication studies in our discipline.

First, to enhance the utility of replication, the replication should be conducted early in the history of a particular research question. Whereas the first replication doubles our information about the research question, later replications provide only diminishing utility because a research finding will likely have a greater impact in its earlier years than in its later years. Replication protects against uncritical assimilation of specious findings. The longer research findings stay unchallenged, the greater the potential damage to a discipline when uncollaborated results filter into textbooks. Nonetheless, worth noting is that replications with extension should have some merit regardless of timing.

Second, the original researcher and the replicator of the study should be as independent as possible; the use of independent replicators increases the confidence that other researchers might have in the replication (Rosenthal and Rosnow 1984; Rosenthal 1991). While collaboration of replicator and original researcher is not desirable for resolving theoretical controversies, joint design of crucial experiments by researchers with opposing viewpoints may be a necessary strategy (Bornstein 1991).

Third, successful replication should focus on effect size as a more important summary statistic of the study rather than on significance level and should evaluate the success of a replication not in a dichotomous but rather in a continuous fashion (Rosenthal 1991). Rosenthal (1991) also recommends that the replication (a) report significance levels and various aspects of statistical power and (b) provide adequate information about effect size.

However, neither significance testing nor effect sizes typically inform the researcher of the likelihood that results will be replicated in future research. To estimate result replicability, researchers would have to employ one of the internal replication techniques such as the jackknife logic developed by Tukey and his colleagues, the bootstrap logic developed by Efron and his associates, or cross-validation methods. (For a detailed discussion, see Thompson 1989; Thompson 1994).

Fourth, concordance effect size in the original experiment and in the replication study is the most important index of the "success" of the replication. Consequently, replication studies should always test directly the homogeneity of effect sizes obtained in the original and replication experiments (Bornstein 1991). Fifth, replication studies should specify in detail the procedures that were implemented to prevent experimenter bias from influencing the outcome of the experiment (Bornstein 1991), as well as attempt to ascertain whether or not social or cultural changes have an influence on the dependent variable over time. Thus, staggered replication could be built into the same investigative effort or research program (Huck, Cormier, and Bounds 1974).

SUMMARY

Replication research in marketing is seldom encountered. When it is published, the results typically do not completely support the original published results. There is obviously a need for more replication studies in marketing. Through systematic programs of replication within the realm of pioneering research, we can begin to develop marketing generalization and marketing knowledge. Several recommendations for promoting a replication tradition in marketing were advanced. Several strategies also were advanced to improve the quality of replication in our field.

Sawyer and Peter (1983) note, "researchers should make added use of replication ... to provide more meaningful examination of theoretical questions in marketing research instead of relying solely on

classical inferential statistics." In the words of Bass (1993, p. 5), "replication, exception, confirmation, extension, revision, and the development and discovery of new phenomena, will further advance marketing science."

The absence of replication tradition raises serious questions about the validity of our discipline's body of knowledge (Brown and Gaulden 1980). Thus, considering the important role replication plays in scientific inquiry, we should not only encourage a tradition of systematic replications and double or even triple our replications of pioneering research, but we should also improve the quality of replication studies in our field.

The aforementioned generalizations are based on findings in the first tier journals. These findings demonstrate that the marketing discipline does not publish replication studies in the top-tier journals. However, it is critical for the discipline that replication studies are published somewhere. Thus, future research should extend this research by investigating second tier journals, third tier journals, and/or proceedings to see if they do in fact publish replications and to compare and contrast the results of the replication tradition with the first tier journals.

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