

## BRIEF REPORT

# The Relationship Between Response Rate and Effect Size in Occupational Health Psychology Research

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This study investigated the relationship between response rate and effect size in self-report survey research. The correlation between response rate and effect size was calculated for 4 variable combinations, and the results were combined using meta-analytic procedures. The correlation of response rate and effect size was not significant for any individual sample. The average correlation between response rate and effect size was  $-.15$ , with a nonsignificant corrected variance across studies of  $.02$ . These results suggest only a small relationship between the response rate of a survey and the reported effect size between variables.

Research in occupational health psychology is frequently characterized by reliance on self-report data collected by means of employee surveys. Indeed, survey research is one of the most widely used methods of data collection in organizations (Sackett & Larson, 1994). For example, in 1988 Gallup reported that between 1978 and 1988, 70% of organizations had been involved in employee attitude surveys, and a majority indicated they were likely to use such a survey in the future (Rosenfeld, Edwards, & Thomas, 1993).

One of the criticisms of self-report data collection methods such as surveys is the potential for systematic biases to influence the results. One such bias is nonresponse. Nonresponse bias poses a threat to the generalizability of the findings if the obtained responses do not adequately reflect the attitudes of the population as a whole. This concern emerges when (a) the sample of respondents differs from the popu-

lation along variables of interest and (b) such differences result in the distortion of the "true" effect. The purpose of this research was to empirically test the assumption that nonresponse bias is a threat to the validity of survey results in occupational health psychology research.

Nonresponse bias has received considerable attention in the survey methodology research. Discussions about this issue invariably begin with the assumption that nonresponse can seriously bias survey estimates and, as a result, may distort conclusions drawn from the research (e.g., Fowler, 1988; Oppenheim, 1966; Singer & Presser, 1989; Smith, 1983). Specifically, the validity of survey findings may be questioned if nonresponse is large (Smith, 1983) and the attitudes of nonrespondents differ systematically from those of respondents (Fowler, 1988; Smith, 1983). Research indicates that nonresponse rates for survey research in general are on the increase (Steeh, 1981), suggesting that the issue of nonresponse will continue to be an area of methodological concern. Recently, these traditional concerns have been challenged. Although response rates have continued to fall (e.g., Brehm, 1993), there are now data suggesting that response rate is not necessarily related to either sample representativeness or the accuracy of descriptive findings (for a review, see Krosnick, 1999).

The primary problem faced by survey researchers is that while nonresponse rates can be calculated, the mean score for nonrespondents cannot be obtained. As a result, the extent to which nonresponse biases

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the survey results is not known. In discussions of nonresponse, two alternatives are typically addressed: how to minimize it and how to estimate and correct for differences between respondents and nonrespondents. Neither alternative offers a resolution of the nonresponse problem. Techniques for minimizing nonresponse can be effective but, at best, have a moderate impact on response rates (Yammarino, Skinner, & Childers, 1991). A number of methods for estimating the attributes of nonrespondents have been proposed but have been found to be of limited usefulness (Smith, 1983).

The purpose of this study was to test the assumption that nonresponse influences the results of occupational health psychology research by investigating the relationship between response rate and survey results. In contrast to previous investigations that have focused on descriptive findings (Krosnick, 1999), we suggest that nonresponse bias should only be of serious concern to researchers if nonresponse distorts the *effect* of interest. That is, the observation that responders and nonresponders may differ on demographic characteristics or on mean scores is of limited interest to most researchers in occupational health psychology. Rather, given that the focus of most research is on the existence of relationships between variables, nonresponse bias is only of concern to our inferential tests if response rate is associated with effect size.

Accordingly, we hypothesized that there would be a significant negative correlation between response rate and effect size; as response rate increased, effect size would decrease. This hypothesis is based on the assumption that when response rate is low, only those individuals who have an interest in the attitude area under investigation are responding, and this tendency influences the mean effect size.

The relationship between response rate and effect size was explored using previously published work, by coding for response rate and the effect size for four variable combinations: tension–role ambiguity, role conflict–job satisfaction, organizational commitment–job satisfaction, and role ambiguity–job satisfaction. These relationships were chosen as the focus of investigation because (a) they typify the types of relationships investigated in occupational health psychology and (b) sufficient data have accumulated on these relationships to allow for proposed analysis. After the correlations between effect size and response rate were calculated, results were combined using meta-analytic procedures.

## Method

The first step of this research involved estimating the correlation between response rate and effect size for a number of job attitude relationships. Once this was accomplished, the results from these studies were pooled using meta-analytic techniques.

### *Selection of Variable Combinations to Be Investigated*

The goal was to identify a series of studies investigating the same theoretical construct (e.g., the relationship between organizational commitment and job satisfaction) from which information about the effect size of two correlated variables and the study's response rate could be obtained, as well as to complete this task for a number of different constructs. This was accomplished by surveying a number of previously published meta-analyses in the organizational literature that investigated well-researched topics. We attempted to identify variable combinations (a) that were relevant to occupational health psychology research and (b) that provided sufficient data to test our hypotheses. The advantage with making use of previous meta-analyses is that the arduous task of identifying relevant research on a given topic has already been accomplished. The studies from the original meta-analyses were coded for response rate and effect size.

Four variable combinations were selected for inclusion in the present article. The four effect size relationships were (a) tension and role ambiguity (from Jackson & Schuler, 1985); (b) role conflict and job satisfaction (from Jackson & Schuler, 1985); (c) commitment and job satisfaction (from the meta-analysis of Mathieu & Zajac, 1990); and (d) role ambiguity and job satisfaction (from Jackson & Schuler, 1985).

### *Literature Search and Study Identification*

After the variables were selected, an extensive literature search was conducted to add to the existing database provided by the original meta-analyses. This was accomplished through Psychological Abstracts using relevant key words (e.g., role stress and job satisfaction, role ambiguity and job satisfaction, role conflict and job satisfaction) for the period 1982 to 1997. Once again, as many of the original articles were obtained as was possible and coded for effect size and response rate.

### *Coding*

A number of coding rules were used to complete the dataset. First, where more than one correlation between the variables of interest was reported for the same sample at the same point in time (e.g., multiple measures), the correlations were averaged before inclusion in the correlational analyses. Correlations for the same sample at more than one point in time were each included. Where more than one response rate was reported (multiple samples), the results for each sample were included. Studies measuring only less

Effect size- response rate <i>r</i> ( <i>p</i> )	% Response rate		Effect size- response rate <i>r</i> ( <i>p</i> )
	Min/Max	<i>M</i> ( <i>SD</i> )	
	.07/.78	69.33 (18.78)	22/93
	.05/.65	65.93 (22.02)	17/100
	.18/.82	57.55 (23.17)	14/96
	.03/.65	70.12 (19.83)	17/100

Kevin Kelloway. Min = minimum; Max = maximum.  
the overlap results in a correlation of  $-.28 (.06)$  between response rate and effect size.

direct measures of job satisfaction, such as pay satisfaction, were omitted.

As a result of coding, a total of 86 articles and 106 samples across the four variable combinations were included in the correlational analysis. Of these, 47 samples were included in more than one set of analyses.

### Data Analysis

Once the variables of interest were identified and the articles coded for effect size and response rate, the correlation between absolute effect size and response rate was obtained for each sample. The absolute effect size was used because the direction of the effect was not of interest in this study. Because it is possible that response rate may have no relationship to the effect size for some constructs but have an effect for other constructs, the correlation between response rate and effect size was computed separately for each variable combination so that if differences between variables emerged, these could be observed.

### Results

Descriptive statistics for effect size and response rate are presented in Table 1. Although the correlation between effect size and response rate was in the predicted direction for all four samples, none of the correlations were significant.

After the relationships between effect size and response rate were obtained for the four variable

a small negative relationship between the response rate of a survey and the reported effect size between variables. This correlation, however, is small and not statistically significant, suggesting that nonresponse is not likely to result in substantial bias in the results of a survey.

There are several potential limitations to the research reported here that should be noted. First, the results are based on a small sample of all potential attitude variable combinations in the occupational health psychology literature. Although the results of these analyses suggest that nonresponse bias is not likely to overly influence the effect size reported, it is possible that analyses with a different set of data may result in a different conclusion. However, it should be noted that the variable relationships selected for inclusion in this investigation were done so largely on the basis of the availability of data and that there is some range in response rate, thus reducing the likelihood that the findings can be attributed to range restriction. It is also possible that the attitudinal variables tapped in this study are not sufficiently sensitive to result in consistent nonresponse bias. More threatening topics, such as downsizing, violence, or sexual harassment, may be more influenced by nonresponse. A third potential threat to the findings concerns the "file-drawer problem" (Rosenthal, 1979). Because response rate is frequently used as an evaluation criteria for journal submissions, the number of published studies reporting low response rates is limited. It is possible that the collective effect size results of (unpublished) studies with lower response rates would influence the findings.

The results of this study suggest that disqualifying findings on the basis of a low response rate alone may not be justified; lower response rates do not necessarily denote bias in the effects of interest. The knowledge gained by a researcher through an expansive research program and a thorough understanding of the variables of interest are likely to result in a more accurate assessment of the validity of survey findings than is response rate. The results of this study should be regarded as positive for both researchers and survey administrators. For researchers, these analyses suggest that response rate is not likely to adversely affect the validity of findings. This study has practical implications for organizations as well.

Those developing and administering surveys within organizations have attempted to allay concerns about the potential bias of surveys. The results of this study lend empirical support to the argument in favor of survey research.

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