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Does gender influence online survey participation?: A record-linkage analysis of university faculty online survey response behavior

Grinell Smith
San Jose State University, grinell.smith@sjsu.edu

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Online Survey Response Behavior

by

William G. Smith, PhD

San José State University

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INTRODUCTION

Does it make sense to imagine a “typical” survey respondent, and if so, what are the characteristics of such a person? Further, does what is known about demographic factors that correlate to response behavior with regard to traditional modes of survey administration, mail and telephone, apply to surveys administered online? Because surveys have served for more than a century as a convenient, inexpensive, and reliable way to gather large amounts of data and have informed decisions over an enormous range of topics, answering these questions is critical. However, even after a century of use, much is still unknown about who actually responds to surveys and why. Survey non-response behavior is notoriously complex, poorly understood, and is influenced by an unknown number of rather mechanical factors, including survey length, pre-notification, follow-up reminders, survey format and graphical presentation (Goyder, 1987; Sheehan, 2001), and determining what factors influence or correlate with survey non-response behavior is difficult in part because detailed information about non-respondents is often impossible to gather.

In some cases it is possible to compare data about the sampling frame available from non-survey-based sources with survey response data to determine if there are differences in respondents and non-respondents on variables of interest (Goyder, 1987). One technique, called record-linking, provides such a mechanism for direct comparison of survey data with information about all members of the sampling frame (both respondents and non-respondents). Although conducting a record-linking study requires access to information about all members of the sampling frame under study, many

groups, such as professional organizations, clubs that keep registries, trade unions, various branches of the armed forces and the like maintain information about their members and so quite a number of potential sampling frames for record-linking studies exist.

Survey response and non-response studies have shown that trends in who responds to surveys do indeed exist, at least with regard to traditional modes of survey administration. In general, more educated and more affluent people are more likely to participate in surveys than less educated and less affluent people (Curtin, Presser, and Singer, 2000; Goyder, Warriner, & Miller, 2002; Singer, van Hoewyk, & Maher, 2000), women are more likely to participate than men (Curtin et al 2000; Moore & Tarnai, 2002; Singer et al 2000), younger people are more likely to participate than older people (Goyder, 1986; Moore & Tarnai, 2002), and white people are more likely to participate than non-white people (Curtin et al 2000; Groves, Singer, & Corning, 2000; Voight, Koepsell & Daling, 2003). Relevance of the survey topic has also been shown to influence response rates (Groves et al, 2000), as has response burden (Goyder, 1987) survey fatigue (Saxon et al, 2003), and even such factors as the focus of the study, the methods of contact, the methods of data collection, and the wording of the questionnaire title (Dillman, 2000; Dillman & Frey, 1974; Goyder, 1987; Hox & Deleeuw, 1994; Lund & Gram, 1998; Miller, 1991).

Because administering surveys online is a comparatively new mode of survey deployment, mode effects specific to online surveys are not as well-characterized nor as clearly understood as those regarding more traditional modes. But because the use of online surveys in social science research is quickly becoming routine in some areas and is

certain to continue growing in importance (Dillman et al,1999) it is important to describe online mode effects where they exist and explain their presence as richly as possible. This study seeks to add to the emerging literature helping to define and understand the correlation between demographic characteristics of members of the sampling frame and online survey response behavior by investigating how socio-demographic factors, gender in particular, affect online survey response behavior.

A record-linking technique is employed to compare the gender and other demographic data of online survey respondents directly to available demographic data of all members of the sampling frame. The sampling frame is chosen in order to minimize the possible effect of as many other potential correlates to non-response behavior as possible; thus, the sampling frame consists entirely of university faculty members of a large research university in the southeastern United States with a full-time faculty of approximately 1000. Gathering data from such a sampling frame is assumed to minimize potential swamping effects of education level, as all members of the sampling frame are extremely highly educated relative to the general population. Likewise, because university faculty members are roughly homogeneous with regard to Internet access (Fleck & McQueen, 1999), geographic location, occupation, and to a lesser extent income, it is assumed that restricting the sampling frame in this way will reduce the effects of many other potential socio-demographic correlates.

Data from respondents to a web-based survey of the university's faculty members are compared with socio-demographic data maintained by the university's division of human resources, university colleges, and departments for socio-demographic correlates with gender. In the case where a significant difference in response rate of males and

females is observed, demographic information about the members of the sampling frame is examined to determine if the gender difference appears to be fundamental or, instead, appears epiphenomenal to other potential factors, such as the academic rank or tenure status of respondents.

LITERATURE REVIEW

Record-Linking

Record-linking is one of four general approaches to non-response analysis (the other being time-of-response analysis, non-response follow-up studies, and panel surveys) (Porter & Whitcomb, 2005). The advantage of record-linking studies, of course, is the opportunity to consider response data in the context of data about all members of the sampling frame, and the logic behind record-linking techniques is straightforward: a sampling frame for which records of all members is identified, a survey is administered within that sampling frame, and survey response data is linked to records for all members of the sampling frame. Analysis of linked data can then be used to understand aspects of non-response behavior (Goyder, 1986, 1987; Goyder et al, 2002; Moore & Tarnai, 2002; Porter & Whitcomb, 2005).

Online Survey non-response

The increasing availability of computers and Internet connections signals the growth of what has already become an important avenue for administering surveys (Dillman et al, 1999; Dillman & Bowker, 2001) and points to the need to determine whether, and to what extent, what is known about survey non-response to traditional surveys administered via mail or telephone corresponds to surveys administered online.

The relative novelty of online surveying notwithstanding, reports suggest that although response rates are typically lower for online surveys as compared to traditional surveys (McMahon et al., 2003; Solomon, 2001; Couper, 2001; De Leeuw and Heer, 2002), many demographic and other correlates with non-response to online surveys may indeed mirror those of more traditional modes of survey administration (Couper et al, 2007; May, 2000).

However, it is unclear whether *all* correlates to online non-response mirror those of more traditional modes of administration. Some investigations of online survey response behavior suggest that, in contrast to traditional surveys, men may respond to web-based surveys in greater proportions than women ((Kehoe & Pitkow, 1996; Kwak and Radler, 2002; Sax, Gilmartin &Bryant, 2003; Smith & Leigh, 1997), although other studies report that, similar to traditional survey modes, women respond in greater proportions than men (Kwak & Radler, 2002; Sax et al, 2004; Underwood, Kim, & Mattiea, 2000). Clearly, a more detailed understanding of the influence of such a basic demographic factor as gender on online survey response behavior is of critical concern to everyone who conducts or relies upon research involving online surveys.

METHODOLOGY

This study considers the following general research questions in a bounded population of well-educated middle-class and upper-middle-class professional people: Are web-based survey non-respondents different from survey respondents? If so, is there a relationship between non-response and demographic characteristics of members of the sampling frame? Specifically, this study investigated whether differences in non-response

error in a web-based survey of higher education faculty members results from differences in web-based survey response rates along three demographic dimensions: gender, academic rank, and tenure status.

Participants

Nine-hundred-eighty-one full-time faculty members of a large state university in the southeastern U.S. were invited via an email message to participate in an online survey. Five days later, a follow-up email was sent. These two emails constituted all of the efforts made to solicit responses from the sampling frame.

Table 1 presents the percentages of female and male faculty members of various ranks in the sampling frame. Table 2 presents the percentages of female and male faculty members of various tenure statuses in the sampling frame.

Table 1

Percentage Of Female And Male Faculty Members Of Various Ranks

	Total	*% of Total*	*% Female*	*% Male*
All Faculty	981	100	36	64
Full Professor	323	33	19	81
Associate Professor	254	26	37	63
Assistant Professor	240	24	45	55
Instructor/Lecturer	128	13	55	45
Other/Not Specified	36	4	53	47

Table 2

Percentage of Female and Male Faculty Members of Various Tenure Statuses

	Total	*% of Total*	*% Female*	*% Male*
Tenured	540	55	27	73
Tenure-Track	248	25	40	60
Non-Tenure-Track	123	13	59	41
Not Specified	70	7	51	49

The survey instrument, adapted from Mitchell (1998) probed issues likely to be correlated with a decision to participate in a survey and was divided into 3 parts. The first part was designed to collect socio-demographic information such as gender, college affiliation, department, academic rank, tenure status, and general field of expertise. It also asked respondents about the number of invitations to participate in survey research they receive and how often they decide to participate. The second part contained questions probing factors that may influence a decision to participate in survey research, such as salience of the survey topic, response burden on the respondent, general attitudes toward surveys, past experience with survey research, and survey fatigue. However, because only response data is needed to calculate cross-tabulations it was not necessary that the survey instrument reliably measure underlying constructs of salience, response burden, or survey fatigue in order to test the study's primary research hypotheses. Therefore, no assessment of the survey instrument's degree of internal consistency (reliability) in gauging these underlying constructs is conducted.

Response data is compared with data about all of the members of the sampling frame[i] and a series of Pearson's chi-square statistics is calculated to test for significant relationships between response rates and gender, academic rank, and tenure position. Bivariate tabulations generating significant relationships are identified. An alpha level (level of significance) of .05 is used throughout data analysis, unless otherwise noted.

RESULTS

Of the 981 faculty invited to participate, 278 submitted surveys for a response rate of 28%. Of the 278 respondents, 127 (46%) reported their gender as female and 151 (54%) as male, while the sampling frame consisted of 353 females (36%) and 628 males (64%). Thus the response rate for female faculty members was 36%, compared to a response rate for male faculty members of 24%. In other words, female faculty members contributed disproportionately to the respondent data set. Tables 3 and 4 present the percentages of respondents according to academic rank and tenure status, broken down by gender.

Table 3

Gender and Academic Rank of Respondents

	% Female	*% Male*	*% of Total*	*n*
Professor	20	80	31	79
Associate Professor	52	48	25	63
Assistant Professor	59	41	28	71
Instructor/Lecturer	60	40	16	43

Note. $n = 256$

Table 4

Gender and Tenure Status of Respondents

	% Female	*% Male*	*% of Total*	*n*
Tenured	36	64	55	152
Tenure-track	52	48	24	66
Non-tenure-track	65	35	21	60

Note. $n = 278$

Chi-square analysis comparing respondent and sample frame data revealed that a significantly larger percentage of female faculty members returned surveys than did their male counterparts($\chi^2 = 15.844$, df = 1, $p < .001$), while no significant relationship between survey response rate and academic rank[ii] of faculty members ($\chi^2 = 2.33$, df = 3, n.s.) or tenure status of faculty members ($\chi^2 = 1.46$, df = 2, n.s.) was found.

However, even though chi-square analysis did not reveal a significant relationship between survey response rate and academic rank, significant differences in survey response rates of female and male faculty members revealed significant differences *within* two of the four categories of academic rank: female associate professors responded in greater numbers than their male counterparts, ($\chi^2 = 8.57$, df = 1, $p < .01$) as did female assistant professors ($\chi^2 = 7.66$, df = 1, $p < .01$). Likewise, even though chi-square analysis did not reveal a significant relationship between survey response rate and tenure status, significant differences in survey response rates of female and male faculty members were observed *within* two of the three categories of academic rank: female tenured professors

responded in greater numbers than their male counterparts ($\chi^2 = 7.46$, df = 1, $p < .01$) as did female tenure-track professors ($\chi^2 = 4.26$, df = 1, $p < .05$).

LIMITATIONS

The principle limitations of this study stem from the fact that data from only one sampling frame, a large public research university, is considered. University faculty members undoubtedly have significantly different socio-demographic characteristics from the general population of possible online survey-takers, so conclusions should not be generalized beyond this limited population. Additionally, because only one institution was studied using an instrument specifically designed to probe issues related to survey non-response, observations presented here may not be representative of faculty members of other colleges or universities, further limiting the generalizability of the conclusions. Finally, the availability of socio-demographic records of all members of the sampling frame is limited to aggregate information such as gender, departmental size, tenure, academic rank, and the like. This, coupled with the necessary anonymity of survey respondents, prevents detailed analysis of individual behavior patterns or the systematic characterization of individual non-responders. Although it is hoped that the information gained in this study will be useful, clearly it will take many more studies designed specifically to overcome the sorts of methodological and operational limitations of this study to fully illuminate the nature of online survey response behavior.

DISCUSSION

This study probed for the existence of gender bias in online survey response behavior, and indeed, a difference in the online survey response rates of female and male members of a selected sampling frame is reported. In fact, the difference is significant at the 99.9% level of confidence. What is the explanation for the observation that female and male faculty members did not respond to requests to participate in the online survey research equally? Is the observed difference in response behavior meaningful in itself, or is it merely an artifact of some other difference between faculty members that also correlates to gender? One possible conclusion is that differences in female and male faculty response rates *is* meaningful in itself and is a product of differences in female and male values operating in a gendered online environment. For example, in the context of social exchange theory, England (1989) argues that a gender bias is inherent in *any* communication in which actors are assumed to make exchange decisions from the concept of separative selves. She and others (see, for example, Chodorow, 1978) contend that males are more likely to possess or place a high value on separative characteristics than females, while females, on the other hand, are more likely to possess or value characteristics more consistent with connective selves, such as empathy or emotional closeness. If this interpretation is accurate, differences in response rates could be viewed as coming from differences in the way males and females make decisions and value actions in the online environment. Specifically, if becoming a survey respondent is more readily perceived as behavior consistent with connective selves than with separative selves, or is more highly valued by those with characteristics of connective selves, one would expect a higher survey response rate for females than males. Such “social

distance" models have been offered as possible explanations for some survey response behavior (see, for example, Tu & Liau, 2007).

In fact, one faculty member characterized her willingness to participate in research in strikingly connectivist terms in an email she sent to me after she had become a respondent. In commenting on a survey item that asked respondents to choose a method of survey administration to which they'd most likely respond, she writes:

> Your last question presumes that one form of surveying is more acceptable to me than another. This is not the case. I am philosophically wanting to support other people's research, even as I want them to support mine. I respond to ALL requests for research participation, regardless of how they are communicated to me.

At least in this particular case, it certainly seems that response was perceived as behavior consistent with connective selves.

When one views response behavior in the context of the online environment, the conclusion that observed differences in response rate are a product of gender differences becomes more powerful. This is because differences in the way females and males inhabit cyberspace may exaggerate the effects of differences in how females and males undergo social exchange, resulting in differences in online survey response rates. As many studies illustrate, gender can strongly shape behavior in cyberspace and has been shown to correlate with online activities (Jackson, Ervin, Gardner & Schmidt, 2001; Kendall, 1999; Lucas & Smith, 2004; Morahan-Martin, 1998; Ogen and Chung, 2003; O'Brien, 1999; Tannen, 1991; Travers, 2003; Turkle, 1995). Notably, some researchers maintain that females are more likely to engage in online activity characterized by communication and exchanging of information whereas males are more likely to engage in online activity characterized by seeking of information (Jackson et al., 2001). Responding to an email by accessing an online survey, completing it, and returning it, is

certainly more a process of online information-exchange than it is a process of online information-seeking. From this standpoint, it is reasonable that a higher response rates among female faculty than male faculty was observed. It is possible that the differences in the way females and males inhabit cyberspace compound the effects of differences in the way female and male values operate in social exchange, with the end result being a disproportionate number of female respondents to the online survey.

Gender-related differences in response rates within the categories of academic rank and tenure status, where they exist, are also consistent with this conclusion. In each case, where significant differences were found, return rates of female faculty were higher than return rates of male faculty. Specifically, observed response rates of female associate and assistant professor were higher than observed response rates of male associate and assistant professor, and observed response rates of female tenured and tenure-track professors were higher than observed response rates of male tenured and tenure-track professors.

It must be said, however, that this explanation does nothing to explain why female associate and assistant professors responded in greater numbers than female professors, instructors, or lecturers, nor why female tenured and tenure-track faculty responded in greater numbers than female tenure-ineligible faculty. Any number of conjectures could be put forward as possible explanations for these observations. Perhaps the professor rank, which is 81% male, is also generally less familiar with Internet technology because it is a generally more aged rank, and the effect of age masked any gender effect that may exist. Perhaps because professors made up a larger percentage of the total faculty than other ranks, the consequent weighting within chi-square analysis prevented a possible

gender bias within that rank from becoming apparent. On the other end of the ranking structure, perhaps a similar weighting effect was at work due to the fact that instructors and lecturers are the only ranks in which females outnumber males. Or perhaps instructors, lecturers and tenure-ineligible faculty are not as likely to engage in research of their own and therefore do not value reciprocal participation within exchange relationships in the same way faculty of other ranks do, thereby reducing the effect of gender within exchange and diminishing the overall effect of gender to insignificance. Unfortunately, given the data at hand, there is no way to gauge the utility of any of these conjectures.

Of course, the data presented here do not directly support the conclusion that a *causal* link between gender and response behavior exists. One test of the conclusion that observed differences in response behavior are in fact a result of differences in gender and not some other difference would be to demonstrate that other variables that influence response behavior are independent of gender. One such potential variable is the area of expertise of faculty members. The data certainly suggest that faculty in some areas of expertise are more likely than faculty in other areas of expertise to respond to online survey requests, particularly online survey requests of the kind this study employed. It is possible, for example, that social surveys themselves may be viewed as non-salient by some academics, while academics who use survey research in their own work may be more likely to view survey research as salient and will, therefore, be more likely to return surveys. In a study of university faculty in the U.K., Mitchell (1998) reported that response rates to a postal survey varied significantly between academic departments, with the physical sciences having the lowest response rates (30%) and the social sciences

having the highest (63%). However, as Goyder (1986) concludes from his research about surveys on surveys, “a survey organized around the topic of “what do people think of surveys?” seems to appeal to those opposed to surveying, as well as to the “professional respondents” who thrive on being interviewed on any topic” (p. 39). If the differences in response rates were in fact related to differences in area of expertise, which in turn were related to gender, one would expect to observe a gender-response rate relationship, yet be incorrect in assuming the difference in response rate was evidence of a direct gender effect.

In this study, because the survey contains an item asking respondents to record their departmental affiliation, it was possible to make somewhat reasonable assumptions regarding respondent areas of expertise, and chi-square analysis for a relationship between response behavior and area of expertise revealed a strong relationship, significant at the 99.9% level of confidence. Unfortunately, the ambiguous nature of the concept “area of expertise” and the unavailability of more detailed information regarding respondent and non-respondent areas of expertise seriously undermined the validity of using statistical methods for analyzing this variable for possible gender relationships. Thus, while several aspects of the relationship between response rate and area of expertise with respect to gender were interesting, they could not be viewed as anything beyond merely anecdotal observations.

As a final consideration, it is worth noting that the observed difference in response behavior by gender did not manifest itself in an environment free from gender inequity. The sampling frame for this study consisted of faculty members at a large research university, and with respect to gender the distribution of the sampling frame is

not equitable: only 36% of the faculty in the sampling frame are female. This gender imbalance is even more pronounced when one considers academic rank: more than four-fifths of faculty who hold the rank of full professor are male but less than half of faculty who hold the rank of instructor or lecturer are male. The same imbalance holds when one considers tenure status: nearly three quarters of the tenured faculty are male; fully 60% of those in tenure-track positions are male; but only two fifths of the non-tenure-track faculty are male. In short, at the institution under study, being female correlates with low academic rank and low tenure status. It is unclear how gender inequities in the environment under study relate to observed differences in response rate by gender.

As is often the case, this study offers far more questions than it does unambiguous answers; however, each such study is important if it adds to what is known. The results and observations of this study, therefore, are offered as points in the growing collection of data describing how demographics and online survey response behavior interact.

ENDNOTES

[i] Because no method for linking item response data gathered by the survey instrument data to similar data corresponding to all members of the sampling frame, details about item-response data is not presented. Only bulk data corresponding to response or non-response is presented.

[ii] Twenty-two of the 278 survey respondents did not respond to the item about academic rank and were defined as non-respondents in this chi-square calculation.

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