SELF-SELECTED AND RANDOMLY SELECTED RESPONDENTS IN A COMPUTER NETWORK SURVEY

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A computer survey collects data directly from respondents. Usually respondents type responses on a personal computer (Synodinos and Brennan 1988), but networks permit remote data collection and this may become a routine research tool. Computer network surveys can improve response rates and increase self-disclosure (Kiesler and Sproull 1986; Martin and Nagao 1989; Sproull 1986; Waterton and Duffy 1984). They also can encourage self-selection. People can learn of a survey through an electronic bulletin board or distribution list and complete the survey electronically as easily as they reply to their electronic mail. Computer surveys convey little social information, so respondents experience less evaluation anxiety than when they respond in other forms of survey administration (Erdman, Klein, and Greist 1985; Servan-Schreiber and Binik 1989; Sproull and Kiesler 1986).

During our administration of a computer network survey of 300 oceanographers, an additional 104 persons spontaneously asked to participate. Although they are unrepresentative, surveys using self-selected respondents are common and sometimes are the only kind available (Wainer 1986). Using comparisons of the random sample with the self-selected group, we sought to understand this motivated responding and the biases entailed. Motivation to respond or self-select seems due partly to ease of response and partly to a desire to give voice (e.g., Goyder 1987). If such respondents care about their responses, they will give more information with fewer mistakes (Petty and Cacioppo 1984). If involved with an issue or in the community,

respondents will give information that supports their beliefs (Sears et al. 1980).

Method

We drew a stratified random sample of 300 individual subscribers to the Ocean Division of SCIENCEnet ($N = 1,100$), a computer network managed by Omnet, Inc. (Hesse et al., in press). Based on previous network usage, we drew half the sample from those below the median in usage and half from those above the median. We compared the random sample with 104 subscribers who asked to participate in the study.

Together with Omnet, we sent electronic mail to the random sample, saying the survey "would benefit" the SCIENCEnet community and announcing a lottery prize of $250. Nonrespondents were reminded 3 weeks and 9 weeks later. At the same times, Omnet posted a message on an electronic bulletin board accessible to all members of the network inviting participation in the survey.

The 93-item survey was a separate electronic mail message. Respondents could read it and reply electronically, print it, or request a copy by postal mail. The survey asked about respondents' scientific activities and experiences with computer networks. Besides four open-ended questions, items were fixed choice or short answer. The 30-minute survey cost respondents about $5.00, based on charges to each respondent's Omnet account.

Results

The response rate from the random sample was 76 percent. Random sample respondents with above-median network usage had a response rate of 86 percent; below-median respondents had a response rate of 66 percent. Among sampled respondents, above-median network usage was correlated with responding electronically rather than on paper (66 percent vs. 48 percent).

We compared the 104 self-selected respondents with the random sample using Mann-Whitney U tests (M-W) and analyses of variance. Since previous research (Kiesler and Sproull 1986) suggests that electronic responses may differ from paper responses on attitude items, for these items we examined electronic responses separately.

INFLUENCE OF SURVEY ADMINISTRATION

Random sample and self-selected respondents were similar in years since Ph.D., rank, subfield, publications, professional stature, and

prestige of their institutions. However, experience with networks predicted self-selection. The self-selected group used SCIENCEnet more ($F = 3.15$, $p < .10$), used other networks more (M-W $= -1.84$, $p < .10$), read more oceanography boards (M-W $= -4.72$, $p < .01$), and used networks more to access remote data or programs and do online searches ($F = 3.94$, $p < .05$). Of the self-selected group, 96 percent responded electronically versus 58 percent of the random sample (M-W $= -7.01$, $p < .001$). Also, self-selected respondents replied earlier ($F = 4.92$, $p < .03$). But among respondents who replied electronically, the difference was not significant ($F = 1.34$, $p = .25$).

ACTIVE MOTIVATION TO RESPOND

Self-selected respondents gave higher-quality responses. Their open-ended responses were longer ($F = 2.92$, $p < .10$), and their fixed responses had fewer missing values: 5 percent versus 12 percent ($F = 25.30$, $p < .001$).

Self-selected respondents spent more money to respond: they had less institutional support for network costs and several paid personally, whereas no randomly selected respondents did (M-W $= -2.96$, $p < .01$).

Self-selected respondents knew more oceanographers ($F = 2.8$, $p < .10$) and subscribed to more group distribution lists (M-W $= -2.48$, $p < .05$). Self-selected respondents had more positive attitudes toward scientific computer networks, reporting them as more useful for many purposes such as coordinating group research and learning new things ($F = 1.68$–9.09). Also, they wrote more about the benefits of electronic communication and less about its drawbacks (interaction $F = 6.81$, $p < .01$).

BIAS

We modified Cochran's (1963) equation to estimate univariate bias based on the differences between self-selected respondents (μ_s) and the random sample (μ_r). The standardized percent bias was ($\mu_r - \mu_s$)/μ_r and represents the percentage that a mean would change by using the self-selected group rather than the random sample. Average bias was 22 percent. For multivariate bias, we compared regressions using the random sample and the self-selected group separately (Hawkins 1975). Typically, using the self-selected group increased the apparent impact of network usage. For example, if we had studied only self-selected respondents, networking would seem more important to social centrality than scientific stature is—a somewhat different interpretation than we gather from the random sample.

Discussion

Self-selected respondents probably participated because the survey was on-line, easy to access, and easy to answer. Also, the survey was relevant to a community in which they were involved and to topics about which they had knowledge and opinions. These results are consistent with previous research on motivation to respond (e.g., Goyder 1987). Since the self-selected participants were unintended, ours is not a controlled study of participation bias. Also, our population was somewhat homogeneous. But considering the remote locations of many respondents in such places as New Zealand and the Arctic, the potential of a computer network survey to attract unusual participation seems clear. In the future, planned comparisons of self-selected samples with random samples under a variety of conditions and in more heterogeneous groups could contribute to our understanding of the nature of motivated response and participation bias.

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