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**Web surveys as part of a mixed mode strategy for populations
that cannot be contacted by e-mail**

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Abstract

Potential respondents to web surveys are usually contacted by e-mail. For general target populations e-mail addresses are usually not available. We explore whether a sequential mixed mode web/mail strategy can be used for such a population to encourage respondents to choose the web mode. In our sequential mixed mode web/mail survey respondents were first encouraged to reply by web and in a follow-up were also offered mail questionnaires. In spite of the fact that our target population (high school students) is presumed to be relatively computer savvy, we find that almost 2/3 of the respondents nonetheless prefer responding by mail. In the first stage (when respondents can only reply on the web) phone reminders increase the number of web responses. In the second stage (when respondents may choose between responding by mail or by web) mail incentives increase the number of mail responses but do not affect the number of web responses.

Keywords: web survey, Internet survey, incentive, phone reminder, mixed mode

1. Introduction

Much web survey research is not conducted on general populations but on staff or students at a particular university (Tse et al., 1995; Schaefer and Dillman, 1998; Jones and Pitt, 1999; Paolo et al., 2000), company employees (Parker, 1992; Couper et al., 1999) or other closed populations (Zhang, 1999). The target populations are usually chosen such that it is possible to contact respondents by e-mail. This makes the survey easier to administer and keeps the cost down. Much of the Web survey research that is conducted on general populations (Comley, 1996; Schillewaert et al., 1998; Flemming and Sonner, 1999, Witte et al., 2000) uses convenience samples rather than probability samples¹. Traditionally, survey sampling aims for probability samples (Kish, 1965) because the probabilistic (random) selection mechanism can be used to generalize the results to the population.

In the study presented in this paper respondents are contacted by mail and have the choice of responding on the web (stage 1) and either on the web or by mail (stage 2). This design is important because if a large number of the target population chooses to respond on the web cost savings might be realized. We are aware of only one study in which a general target population is contacted by mail with both mail and web response options.

Quigley et al. (2000) conducted a study with several study arms among active duty personnel, military spouses, civilians, and reserve members. When web and mail response options were offered simultaneously 23% of responses were obtained on the web and 77% by mail. When web and mail responses were offered sequentially, 73%

responded on the web and 27% by mail. However, overall response rate was slightly lower also (37% vs 42%). The response rate might have suffered because the mail response option was only offered at the last moment.

We wish to assess whether a general population can be encouraged to respond over the web rather than by mail. To accomplish this the web response mode is emphasized and hard copies of the questionnaire are not mailed out until the second follow-up. Given that the response modes web and mail are offered sequentially, it is not clear to what extent incentives and phone reminders in our survey protocol affect one or the other response mode. We investigate this also.

2. Method

We fielded a sequential mixed mode (web/mail) survey.² In the first stage respondents were asked to respond via the web. The option of requesting a hard copy of the questionnaire was given, but a hard copy itself was not included. In the second stage, non-respondents were mailed a hard copy of the questionnaire in addition to the web survey option. In the first stage, a random subset of respondents received phone reminders. In the second stage, a random subset of non-respondents received incentives in form of 3\$ McDonald's gift certificates. The incentives were mailed out with the hard copy of the questionnaire. In addition to the above, in the first stage all respondents also obtained a reminder by mail (without a hard copy) and in the second stage two reminders by mail (a postcard, and a letter with a hard copy of the questionnaire).

The survey was sent by mail to college-bound high school students. A sample frame was commercially available through americanstudentlist.com. We obtained a systematic sample of 1,750 college-bound high school students graduating in 2001. The

survey was fielded on 2/22/2001 for 90 days. The survey asked youth to rate various future employment financial incentive packages and took about 30 minutes to complete.

3. Results

We were interested in exploring the following hypotheses:

- 1) Can a majority of respondents be convinced to respond on the web? Given that high school students are relatively Internet savvy, we expected this to be true.
- 2) Are phone reminders effective for web surveys? Given that phone reminders are known to be effective for other survey modes (Dillman, 2000) we expected this to be true also.
- 3) Are mail incentives effective in increasing the response rates for web surveys in the second stage of a sequential fielding protocol? Consistent with the literature on incentives for single mode surveys, we expected an increase for both mail and web.

Contrary to our expectations, only 124 out of 352 (35.2%) of the responses were received on the web. This is further illustrated in Figure 1 where the cumulative number of responses received both the web and the mail response options are plotted over time.

Figure 1 approximately here

Our second research question concerned the effect of phone reminders on web responses. The phone reminders had a substantial effect on the response rate. The response rate³ among people who received no phone reminder was 17.8%. The response rate among people who received a phone reminder was 30.3% (the difference is

significant at $\alpha < 0.0001$). Phone reminder calls were placed before hard copies of the questionnaire were mailed out. The phone reminder increased the web response rate and had no residual effect on the mail response mode that was offered later.

Our third research question concerned the effect of incentives in the second stage of the sequential design. The incentives were sent to non-responders shortly after the questionnaires were mailed but after the web survey had been in the field for a couple of months (see Figure 1). Because incentives were only given to non-responders, we estimate the incentive effect by comparing the response rate among people who did not respond before the first hard copies of the survey were sent out (day 35).

The response rate on or after day 35 with incentives is 31.5% (196 out of 690) and without incentives 5.6% (52 out of 1060) (significantly different at $\alpha < 0.0001$). This suggests that the use of incentives is effective in the second stage of the design. The incentives in our survey protocol increased the number of responses received by mail; it did not increase the responses obtained via the web. Among those who received an incentive, 154 people responded over the web on or after day 35. This compares to 153 respondents of those who did not receive an incentive.

4. Discussion

This research shows high-school respondents favor the mail response option over the web response option even when the web response option is emphasized. Given that our target population is assumed to be web savvy, this is likely to be true for other populations also. Our research applies to surveys where the initial contact is made by mail. This is a small but very important category of web surveys because for many

populations email addresses are not available. An alternative of course is to conduct a mail-only survey. Schonlau et al. (2002) and Fricker and Schonlau (2002) argue that a mixed mode strategy is more economical than a mail-only survey if a sufficiently large number of responses are received over the web. For one case they estimate that roughly 600 web responses are required to make the mixed mode strategy more economical.

The fraction of web respondents to total respondents in this study, 35.2%, is much lower than the one reported in Quigley et al. (2000), namely 73%. The following two reasons contribute to explaining this difference: One, Quigley et al. added a mail response mode only in the last reminder (in fact, adding a mail response option was a last minute decision). Two, their target population (the military) might be more compliant initially which would boost the fraction of web responses.

There is a vast literature on incentives and phone reminders for other survey modes but we are not aware of literature that discusses the use of incentives for a similar survey protocol. Overall, we find that the use of mail incentives increases response rate. However, the increase is due entirely to the number of *mail* responses and there is no evidence that the number of *web* responses are affected. Two factors may have contributed to this: One, by the time the mail response and the incentives were introduced the web survey had been in the field for a considerable period of time. It is not clear what would happen if the incentives were introduced at the very beginning. Two, the incentives were sent by postal mail rather than electronically. The medium through which the incentives are sent may affect the respondents' choice of response mode.

We found that the phone reminders are effective for web surveys. This was expected based on what is known about other survey modes (Dillman, 2000). We

speculate that the reason why this has not appeared in the literature before because phone reminders are very costly and web surveys often aim to be economical.

Notes

1. If one defines the target population narrowly enough many convenience samples are probability samples for those target populations. However, those narrowly defined target populations are almost never of interest and it is better to think of the sample as a convenience sample of a greater target population.

2. The study, from which this paper draws its survey results, was sponsored by the Office for Accession Policy, Office of the Under Secretary of Defense for Personnel and Readiness, U.S.A.

3. Response rates refer to the definition RR4 (The American Association for Public Opinion Research, 2000). RR4 includes incompletes and uses the number of estimated eligible non-respondents rather than the total number of non-respondents. We estimated that 86.5% of the non-respondents with unknown eligibility are eligible. This corresponds to the fraction of web respondents that passed the screening test.

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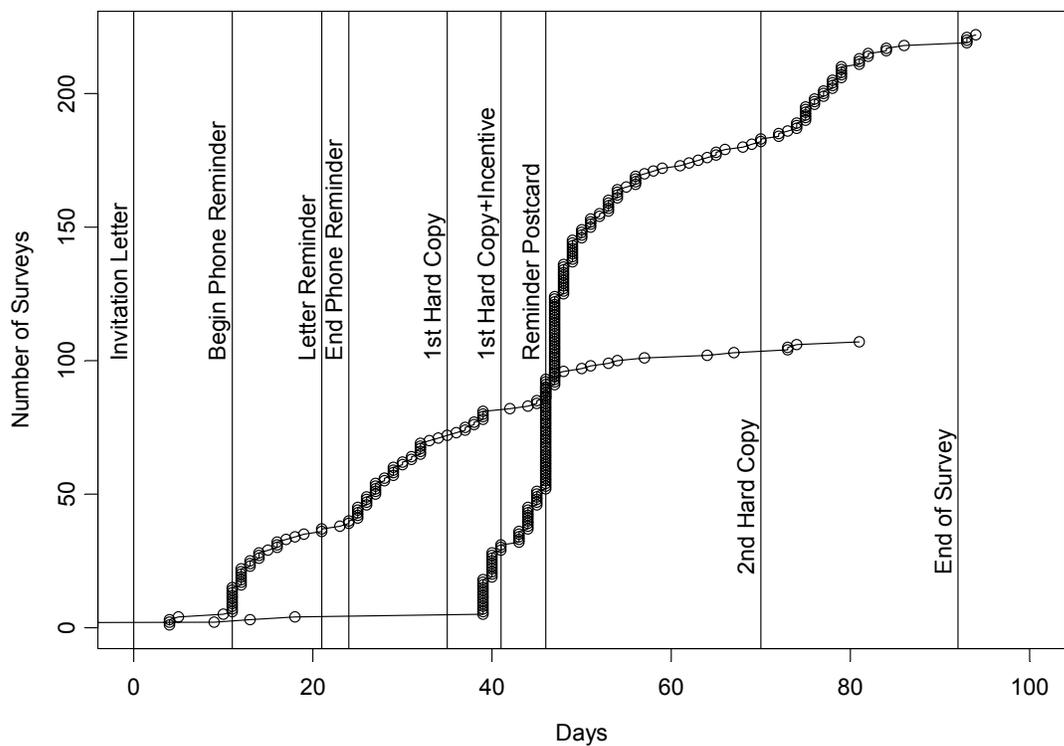


Figure1: Plot of the number of surveys returned over time (i.e. the number of days since the survey start (2/22/01)). The two curves correspond to web responses (earlier on the horizontal axis) and to mail responses (later on the horizontal axis). Vertical bars indicate the time of various mail-outs, phone reminders, and incentives. (The 1st hard copy was sent out in two batches, one with and one without incentives)