Recruitment for online access panels

Anja S. Göritz
University of Erlangen-Nuremberg, Germany

This paper describes a German study which compared eight ways of recruiting members for an online access panel. Two thousand respondents, divided into four groups of 500, were invited to sign up with the panel via email, fax, flier or letter. Half of each sample's invitations offered a cash lottery, into which new panellists would be entered, whereas the other half of the invitations did not offer a lottery. Overall, email was the most successful means of solicitation, followed by flier and fax, which were equally efficient. Very few panellists were recruited via letter. The lottery was effective only with fliers. The composition of the recruited samples differed according to solicitation method. Fax-recruited individuals were older than those recruited by flier and email. Panellists recruited via email had been using the internet longer than flier- and fax-recruited panellists and they used the internet more often than those recruited via fax. After their recruitment, panellists were followed up in the first two studies run in the panel. The probability of their taking part in these studies and of completing these questionnaires was independent of the method by which they had been recruited.

Introduction

During the past decade, data collection via the world wide web has been established in theory and practice and various studies have shown that web-delivered research can yield valid results (e.g. Göritz & Schumacher 2000; McGraw *et al.* 2000; Göritz 2002). With regard to the recruitment of participants for web-based studies one can distinguish two forms. In ad hoc recruitment, participants are solicited on the basis of a stand-alone study, for example through search engines, banners, links, newsletters, news groups, mailing lists, word of mouth, or via offline media. Ad hoc recruitment is often expensive and its success is unpredictable. Consequently, many research organisations from both commercial and non-profit backgrounds have turned to pre-recruitment. To this end, many organisations have built so-called online access panels consisting of people who have registered to occasionally take part in web surveys. Panellists can be recruited through the same means as one-time participants. In

addition, panellists can be recruited by providing a link to the panel at the end of a stand-alone study (Göritz *et al.* 2002). In contrast to ad hoc recruitment, online access panels reduce the cost associated with locating appropriate respondents and ensure their immediate availability, along with many other benefits, which have been summarised elsewhere (see Göritz 2004a).

To run a panel economically, first we need to know how panellists can be recruited effectively; for example, recruitment success might depend on the offer of material incentives for signing up with the panel. The literature reveals only two experiments that have examined the influence of incentives on recruitment success for an online access panel. Müller-Peters *et al.* (2001) recruited members for a commercial market research panel through personal interviews. In Experiment 1, they either promised respondents an incentive worth DM10[1] or they did not promise any incentive for signing up with the panel. Interviewers who promised an incentive persuaded an average of 4.1 individuals to sign up with the panel, whereas interviewers who did not offer the incentive recruited an average of 3.2 panellists. However, of the no-incentive people who had expressed an interest in becoming panellists, only 23% actually registered with the panel, whereas 52% of the incentive people signed up.

In Experiment 2, respondents were either promised a DM10-cheque or to be entered into a lottery. Interviewers who offered the cheque recruited 4.5 people on average, whereas interviewers who mentioned the lottery persuaded only 3.2 recruits on average. Moreover, of the people with a cheque who had declared their interest in becoming panellists, 71% finally registered with the panel, whereas of the people entered into the lottery only 43% signed up. These experiments have shown that in an incentive versus non-incentive scenario, people are more inclined to sign up with a panel if an incentive is offered. Further, the larger the incentive, the more effective the incentive proves to be.

However, bearing in mind that these samples were small, an experiment was conducted at the University of Erlangen-Nuremberg to assess whether a cash lottery into which new panellists were promised to be entered would increase the number of recruits. Drawing on utility theory and on Experiment 1 by Müller-Peters *et al.* (2001), one would expect the chance to win money to be more attractive than a non-incentive scenario. Nevertheless, a lottery might prove ineffective as this involves an element of chance, which is not the case for guaranteed prepaid incentives (Göritz

[1] 1 DM (German mark) equals approximately 0.5 USD or 0.5 euros or 0.35 GBP.

2004b). Certainly in offline surveys, promised incentives have often achieved meagre response (e.g., Armstrong 1975; Linsky 1975; James & Bolstein 1992; Church 1993).

In addition to the effect of incentives, recruitment success might also depend on how people are approached. In the literature there are three narrative reports on the effectiveness of various solicitation methods. Weßels and Zimmermann (2001) recruited online panellists by phoning a random household sample. Of all 8615 interviewees, 20% (1741) were internet users and willing to become panellists.[2] Of those, 41% (719) eventually signed up with the panel; hence, 8.3% of the interviewees became panellists. Likewise, Hellwig *et al.* (2003) recruited panellists by phone. Of the 2021 interviewees, 50% (1012) were connected to the internet, and of these, 38% (381) agreed to receive an invitation to join the panel via email. Of these in turn, 11% (43) actually signed up with the panel. Hence, altogether 2.1% of the interviewees, or 4.2% of the internet users in the original sample, became panellists. Finally, Venningen (2002) recruited online panellists by mailing 50,001 invitations to a random household sample, of which 82 letters were undeliverable. Only 1.1% (549) of the successfully contacted sample registered with the panel. In sum, these studies reveal that the proportion of panellists gained from the contacted sample varies with solicitation method, but in total it is small throughout (<10%).

The following experiment simultaneously compared four recruitment methods with regard to their effectiveness in recruiting panellists, namely email, fax, letter and flier. The email addresses were drawn at random from an online 'white pages' service, where internet users can leave their email address on a voluntary basis. The letter and fax samples were drawn from the public telephone directory. Fliers were distributed among passers-by on the street and laid out in public places. The four methods differ on three dimensions (see Table 1): (1) internet penetration, (2) degree of self-selection and (3) requirement to log on to the internet to join the panel.

With email compared to the other method, all contacts have internet access and therefore are more likely to be both technically able as well as to possess the skills needed to join the panel. Furthermore, email addresses are drawn from an online database that requires people to register themselves. It is logical to suppose that people who enlist in this directory are more tolerant of unsolicited email and more extraverted or curious, which might make them more likely to respond to surveys. Finally, for

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[2] Weßels and Zimmermann (2001) do not indicate the proportion of internet users in the sample.

Table 1 Features of the four solicitation methods

Method	Internet penetration (%)	Self-selection	Modal shift
Email	100	Medium	No
Fax	46–100	Low	Yes
Letter	46	Low	Yes
Flier	46–100	High	Yes

most email clients, one can simply click on a web address (URL) within the text of an email, and thereupon the page opens in the browser – no modal shift, that is, switching of the current environment is required.

In the fax sample, the internet penetration is unknown. It is probably lower than 100% but higher than in the general population. At the time of the mailing, 46% of the national population between the ages of 14 and 69 had internet access (GfK 2001). Having a fax number implies that one owns and is capable of operating a fax machine, hence via fax a comparatively technophile segment of the population is reached. It follows therefore that a member of the fax-owning sub-population, compared to a randomly selected person from the general population, is more likely to have internet access and be web literate. The frame used for drawing the fax sample is relatively unbiased by self-selection.[3] Finally, to join the panel, a switch from fax to internet is necessary.

The internet penetration in the letter sample probably comes closest to that of the general population. Similar to fax, the frame used for drawing the mail sample is relatively unbiased by self-selection and a switch from letter to the internet is necessary to join the panel.

Flier is the only method based on a haphazard rather than a random sample. Unlike the other three methods where each invitation targets only one person, regardless of whether this person is interested in the panel or not, with fliers, one invitation can address several people, because if a person is uninterested the flier is not lost and can be handed over to the next person. This procedure entails a high degree of self-selection and it is plausible that predominantly people with internet access and those interested in taking part in surveys take a flier. The percentage of internet users among the people who were initially approached is unknown, but presumably it is close to the internet penetration in the general population. However, the internet penetration among the people who take a flier is

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[3] Upon request, users can be removed or not be entered into this directory.

probably a lot higher than that of the general population. Finally, also with fliers it is necessary to take the extra step of logging on to the internet.

Table 1 shows that the four methods differ in a number of ways, which makes it impossible to attribute possible variations in the number of recruits to a single cause (e.g. the need for modal shift in order to join the panel). However, to ascertain reliable guidelines for recruiting panellists, this experiment aimed at comparing solicitation methods as they occur in practice. At this exploratory stage of research, a naturalistic approach is preferred to an artificial isolation of one trait at a time, which would result in precise but fragmented knowledge whose ecological validity would be questionable. Based on each method's configuration of characteristics, it was expected that email and flier would yield the most, fax an intermediate number, and letter the fewest panellists.

Registration of new panellists, however, is only the initial goal. The ultimate aim is reliable participation in subsequent studies. Therefore, it is essential to determine whether solicitation method and the offer of material incentives for signing up with a panel also influence response to later panel studies. On the one hand, panellists who are offered a material incentive may be more inclined to sign up with a panel than those who are not. On the other hand, people who are offered an incentive for signing up with a panel might be less likely to take part in the studies afterwards (because their only motivation was to receive the material reward). The following experiment therefore attempts to shed light on the unexamined influence of incentives and solicitation method on participation in subsequent panel studies.

Finally, this experiment was undertaken to examine whether different recruitment methods attract different types of panellists; that is, whether qualitative non-registration occurs. In the study by Hellwig *et al*. (2003), online panellists who had been recruited via telephone, banner, or pop-up window differed in terms of socio-demographics as well as in their internet usage. Knowledge of such an effect enables panel operators to tailor their recruitment campaigns to the desired segment of panellists. Neglecting qualitative non-registration, however, might lead to false generalisations of study results.

Method

Four different methods were used for soliciting potential panellists, namely email, fax, letter and flier. Only individuals with a German telephone area code of 0911 were contacted; this code covers the city of Nuremberg and

13 surrounding districts. In total, 500 emails, 500 letters, 500 faxes and 500 fliers were sent or distributed between 13 and 20 November 2000. In addition, the incentive was manipulated; that is, each mode's 500 invitations were split into two versions, whereby 250 contained information about a cash lottery and the other 250 did not. Invitations with and without lottery information were otherwise identical. In the lottery scenario, it was announced that a prize of 400 DM[1] ($2 \times 100 + 4 \times 50$) would be raffled among all the people registering with the panel by the end of the month. With the exception of minor modifications, all invitation texts were comparable.[4] The invitations contained a short description of the panel, which mentioned its non-profit purpose and its affiliation with the university. Contacted people were told that they had been drawn into a random sample. Furthermore, the text stated that to become a panel member, a computer with an internet connection and an email address were needed and that upon registration, panellists could expect to be invited to participate in occasional surveys via email. Small gifts and lotteries were announced for participation in later studies. Finally, the URL to the panel website was given. To distinguish which panellist belonged to which of the eight groups, there were 4×2 different URLs to the panel; that is, one for each group.[5] During the sign-up, panellists were also asked their sex, age, how many years they had been using the internet, and their frequency of use. The following paragraphs describe sampling and distribution details for each solicitation method.

Sampling and distribution methods

The 500 email addresses were drawn from the online catalogue of Deutsche Telekom Medien GmbH, which is available at www.email-verzeichnis.de. This sampling frame is a German 'white pages' service, where internet users can leave their personal email addresses on a voluntary basis. The number of email addresses in the catalogue for each of the 14 districts covered by area code 0911 was determined. Taking all the districts together, there were 2207 addresses. Next, proportional random samples were drawn from each district; for example, if the share

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[4] Unlike the other invitations, emails did not contain German umlauts (e.g. ä, ü, ö) to ensure compatibility with all email clients and they did not contain the official university letterhead.

[5] For example, emails with information about the lottery mentioned http://wiso-psychologie.uni-erlangen.de/panel_na, whereas emails without lottery pointed to http://wiso-psychologie.uni-erlangen.de/panel_aj. The referring URL was logged at the sign-up of every panellist. As an additional safeguard, the sign-up form asked panellists how they had found out about the panel. A cross-check of this statement with the logged URLs showed no discrepancies.

of email addresses of town A was 10%, then 50 addresses were drawn from A. All non-private entries (i.e. companies) were eliminated. To ensure a personal address with *Frau* or *Herr*, all entries that did not allow identification of the sex of the recipient were discounted. If an email bounced back due to a temporary failure (e.g. the user's disk quota was used up), three more attempts at delivery were made. Only later was it noticed that one recipient had two different addresses; hence, only 499 different people were actually invited via email.

The frame for the mail sample was the CD version of the public telephone directory. A random sample of 500 recipients was drawn from the roughly 300,000 entries with the area code 0911. Again, non-private entries and those precluding identification of sex were discounted. If a letter was returned, the reason for its undeliverability furnished by the German Post was recorded.

As the CD telephone directory listed fax numbers as well it was also used for drawing the fax sample. The sampling procedure was identical to that for letters, except that in this instance fax numbers were extracted. If a fax could not successfully be sent, the reason was recorded. If a line was busy, three more attempts were made.

Of the fliers, 500 were printed with the same text and layout as the letters, but without recipients' names and addresses. Prior to their distribution, the fliers with and without lottery information were shuffled. The fliers were disseminated in two ways. Most fliers (364) were distributed among passers-by in Nuremberg downtown. People were personally addressed by a student at various locations (railway station, shopping zone, etc.) and were asked if they would be interested in taking part in scientific studies from time to time. Those who showed interest were then asked if they had access to the internet. If the reaction was positive, people were invited to join the panel and handed one of the fliers. Because it had taken 16 hours to distribute the fliers in this way, the remaining 136 fliers were laid out both in the municipal library next to publicly accessible internet-PCs and in a local internet café, both with permission of the staff. It was impossible to determine exactly how many of the 136 deposited fliers had been taken by anyone but the number was estimated at 36.

Panellists were followed up in the first two studies run in the panel after the recruitment campaign. The first study was conducted from 20 December 2000 until 2 January 2001. The aim of this study was to examine the effectiveness of different mood induction procedures (see Göritz 2002). As regards the cash lottery, which was offered as an incentive to participate in the study, the amount and denomination were

each varied at two levels. This variation was independent of the way panellists had been recruited, as determined by a stepwise log-linear analysis (n = 155) of the $3 \times 2 \times 2 \times 2$ contingency matrix formed by solicitation method (fax, email and flier[6]), lottery information at recruitment (yes/no), cash prize offered in Study 1 (high/low), and denomination of cash prize offered in Study 1 (high/low). The most parsimonious yet significant model contained the main effects of solicitation method and lottery information and their interaction, L^2 = 13.43, df = 18, p = 0.77. Study 2 ran from 23 March until 8 April 2001. Its aim was to test a number of scale items to measure impressibility. In this study, every participant was given the opportunity to be entered into the same cash lottery.

Results

As a result of the recruitment campaign, 164 people signed up with the panel. Most of them (95%) registered within the first month; the last person registered after eight months. Hence, 8.2% of the 1999 invitations resulted in a registration.

Solicitation method

A chi-squared test indicated that deliverability varied among the four solicitation methods, χ^2 (3, n = 1999) = 145.93, p < 0.001 (see Table 2). Of the 499 emails sent, 75 (15.0%) did not reach their addressee due to an invalid address or a full mailbox. Of the 500 faxes, 229 (45.8%) could not be delivered.[7] Of the 500 letters, 113 (22.6%) were returned.[8] It was estimated that 100 of the 500 fliers (20.0%) could not be delivered. Pairwise tests revealed that deliverability was better with email than with fax, φ (phi) = 0.32, n = 999, p < 0.001; with email than with letter, φ = 0.10, n = 999, p = 0.002; with letter than with fax, φ = 0.25, n = 1000, p < 0.001; and with flier than with fax, φ = 0.27, n = 1000, p < 0.001. Therefore, with regard to deliverability, email was the most successful method, followed by fliers and letter and then fax.

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[6] There were too few cases for letter.

[7] Some 116 faxes (50.7%) could not be delivered because the numbers did not exist, 70 (30.6%) turned out to be telephone instead of fax lines, 23 (10.0%) could not be connected to, and 20 (8.7%) were busy on three different days.

[8] Some 47 (41.6%) recipients were unknown, 61 (54.0%) had moved, and 5 (4.4%) were deceased.

Table 2 Results and cost by solicitation method and lottery information

| | Counts | | | | Success | | | | |
Method	Distributed	Arrived	Recruits		Arrived/distributed (%)	Recruits/arrived (%)	Recruits/distributed (%)	Cost (euros)	Cost/recruit (euros)
Letter	500	387	5		77.4	1.3	1.0	339	67.80
No lottery	250	197	4		78.8	2.0	1.6	142	35.50
Lottery	250	190	1		76.0	0.5	0.4	197	197.00
Fax	500	271	21		54.2	7.7	4.2	379	18.05
No lottery	250	144	14		57.6	9.7	5.6	162	11.57
Lottery	250	127	7		50.8	5.5	2.8	217	31.00
Email	499	424	108		85.0	25.5	21.6	143	1.32
No lottery	249	218	58		87.6	26.6	23.3	44	0.76
Lottery	250	206	52		82.4	25.2	20.8	99	1.90
Flier	500	400[*]	28		80.0[*]	7.0[*]	5.6	253	9.04
No lottery	250	200[*]	7		80.0[*]	3.5[*]	2.8	99	14.14
Lottery	250	200[*]	21		80.0[*]	10.5[*]	2.8	154	7.33
Total	1999	1482[*]	164		74.14[*]	11.1[*]	8.2	1114	6.79

[*]Based on estimated deliverability for fliers.

Next, the number of recruited panellists relative to the number of successfully delivered (i.e. received) invitations was analysed. This recruited/received rate was different among the four methods, χ^2 (3, $n = 1482$) = 142.67, $p < 0.001$. Pairwise tests revealed that this rate was higher with email than with fax, $\varphi = 0.23$, $n = 695$, $p < 0.001$; with email than with letter, $\varphi = 0.35$, $n = 811$, $p < 0.001$; with email than with flier, $\varphi = 0.25$, $n = 824$, $p < 0.001$; with fax than with letter, $\varphi = 0.16$, $n = 658$, $p < 0.001$; and with flier than with letter, $\varphi = 0.14$, $n = 787$, $p < 0.001$. Hence, email was the most successful method in recruiting people who had received an invitation, followed by fax and flier, and then letter.

Finally, the number of recruits relative to the number of distributed invitations (regardless of whether successfully sent or not) was analysed. The four solicitation methods differed in this recruited/distributed rate, χ^2 (3, $n = 1999$) = 176.52, $p < 0.001$. Pairwise tests revealed that email was more successful than fax, $\varphi = 0.26$, $n = 999$, $p < 0.001$; than letter, $\varphi = 0.33$, $n = 999$, $p < 0.001$; and than flier, $\varphi = 0.24$, $n = 999$, $p < 0.001$. Moreover, letter was less successful than fax, $\varphi = -0.10$, $n = 1000$, $p = 0.001$; and than flier, $\varphi = -0.13$, $n = 1000$, $p < 0.001$. Hence, email

recruited the highest number of people, followed by fax and flier (both having a similar success rate), with letter being the least successful method.

Effect of incentive

Overall, there was no difference in the number of recruits between invitations with and without lottery incentive, $\varphi = 0.01$, $n = 1482$, $p = 0.87$.[9] Analysed by solicitation method, there was no significant difference between the lottery and the no-lottery scenario, as regards email ($\varphi = -0.02$, $n = 424$, $p = 0.75$), fax ($\varphi = -0.08$, $n = 271$, $p = 0.20$), and letter ($\varphi = -0.07$, $n = 387$, $p = 0.19$). With fliers, however, recruitment was more successful if the lottery was mentioned ($\varphi = 0.14$, $n = 400$, $p = 0.006$).

Sample composition

The question of whether different solicitation methods and incentives attract different segments of the population was examined. To test whether panellists recruited via different solicitation methods and with or without the lottery differed in sex, a hierarchical logit analysis was conducted; that is, sex was the dependent variable and solicitation method (fax, email and flier) as well as lottery information (yes/no) and their interaction were entered as predictors ($n = 159$).[10] The interaction as well as the two main effects could be removed from the saturated model without any significant deterioration of the model's fit, $L^2 = 8.67$, $df = 5$, $p = 0.12$. Three ANOVAs were used to determine whether differently recruited panellists differed in age as well as in two aspects of their internet usage. The main effect of solicitation method on age was significant, $F(2153) = 10.20$, $p < 0.001$. Scheffé post-hoc tests revealed that fax-recruited panellists were older than flier-recruited ($p = 0.001$) and email recruited panellists ($p < 0.001$). With regard to years of internet usage, the main effect of solicitation method was significant, $F(2153) = 11.57$, $p < 0.001$. Scheffé post-hoc tests revealed that email-recruited panellists had been using the internet for a longer period than flier-recruited ($p < 0.001$) and fax-recruited panellists ($p = 0.03$). Finally, regarding the intensity of internet usage, the main effect of solicitation method was again significant, $F(2153) = 8.90$, $p < 0.001$. A Games-Howell post-hoc test[11] revealed that email-recruited panellists use the internet more frequently than fax-recruited panellists ($p = 0.05$).

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[9] This analysis contained all successfully delivered invitations.
[10] Again, letter was omitted due to the paucity of cases.
[11] The Games-Howell post-hoc test was used because variances were unequal.

Follow-up

The freshly recruited panellists were invited to the first study run in the panel. Five recruits were to sign up with the panel only after Study 1 had started. The overall response rate in Study 1 was 70.4%. A stepwise hierarchical logit analysis was conducted to ascertain whether participation in Study 1 differed as a function of prior recruitment. That is, response status in Study 1 (responded/refused) was the dependent variable and solicitation method (fax, email and flier) as well as lottery information at recruitment (yes/no) and their interaction were entered as predictors ($n = 155$). The interaction as well as the two main effects could be removed without any significant deterioration of the model's fit, $L^2 = 2.97$, $df = 5$, $p = 0.70$. Thus, prior recruitment did not explain whether panellists took part in Study 1. To find out whether differently recruited respondents differed in their likelihood to prematurely abandon the survey, an otherwise identical analysis was conducted with dropout status from Study 1 (dropped out/ retained) as the dependent variable ($n = 110$). Again, the interaction as well as the two main effects could be removed without any significant deterioration of the model's fit, $L^2 = 5.97$, $df = 5$, $p = 0.31$.

In total, 161 panellists were invited to the second study. Three panellists-to-be had still not signed up with the panel before Study 2 commenced. The overall response rate in Study 2 was 55.3%. Again, a similar logit analysis with response status as the dependent variable ($n = 157$) was conducted. The interaction and the two main effects could be removed without any significant deterioration of the model's fit, $L^2 = 2.83$, $df = 5$, $p = 0.73$. An otherwise identical analysis was conducted with dropout status in Study 2 as the dependent variable ($n = 87$). Again, the most parsimonious yet significant model did not contain the interaction and the main effects, $L^2 = 4.55$, $df = 5$, $p = 0.47$.

Discussion

This experiment compared four solicitation methods to recruit respondents for an online access panel. It was found that email was by far the most successful method. The highest number of invitations reached their addressee, the highest number of people were recruited relative to the number of invitations issued, and the highest number of people were recruited relative to the number of successfully delivered invitations. With regard to the deliverability of invitations, flier was the second best method, followed by email and then fax. As regards the number of recruits relative

to the number of both invitations issued and successfully delivered invitations, email was followed by fax and flier, which were equally effective. Letter was almost totally ineffective. These results came close to prior expectations. Only the flier mode was originally presumed to be more successful. It is possible that people took a flier from the distributing student purely out of curiosity or because they wanted to help the student. Moreover, because they were addressed on the street, with fliers compared to the other methods, solicited people might have gained a poorer impression of the responsible organisation, thus moderating their willingness to help.

Furthermore, this experiment has examined whether a cash lottery, into which new panellists were promised to be entered, improves recruitment success. The lottery proved fruitless with letter, fax and email, but it was effective with fliers. Unlike the other invitations, a flier did not address a person by his or her name. Research on helpful behaviour has shown that the less responsibility is allowed to diffuse (e.g. by removing personal appeals or because nobody else is present), the more likely helping (i.e. an altruistic act) ensues (Latane & Nida 1981; Harrison & Wells 1991). Applying this theory to the current situation, the flier samples' less altruistic format may have rendered people more susceptible or perceptive to the lottery, as a form of extrinsic reward.

As there was no overall effect from the lottery, it is concluded that people did not join the panel in the hope of winning money. Rather, other reasons seem to have prevailed, such as the satisfaction of being consulted (Dillman 1978, p. 13), doing good for fellow human beings, having fun, being entertained, satisfying curiosity, helping research, or belonging to a panel community. Alternatively, the lottery might have been ineffective because lotteries are only promised and not prepaid incentives (Armstrong 1975; Linsky 1975; James & Bolstein 1992; Church 1993; Göritz 2004b). Consequently, it would be interesting to conduct recruitment experiments with prepaid incentives included. Finally, it might be possible that the (sum of) money to be won in the lottery was simply unattractive. Therefore, offering more money or different types of incentives such as contributions to charity or a per capita payment might boost recruitment success.

The freshly recruited panellists were followed up in the first two studies run in the panel. Their propensity to take part in these studies and their probability to abandon these questionnaires prematurely was independent of prior solicitation method and the offer of a lottery. Thus, there was no carryover from the recruitment into subsequent studies.

In discussing the generalisation of the present findings to commercial online access panels, two meta-analyses are possibly informative: Fox *et al.* (1988) have demonstrated that in offline surveys, academic institutions obtain higher response rates than market research companies. Likewise in online surveys, official survey sponsorship results in higher response rates than non-official sponsorship (Cook *et al.* 2000). Similar effects might hold true for recruitments for university versus commercial online access panels. However, when comparing Venningen's (2002) results with those of the present study, recruitments for commercial online access panels (1.1% success rate) do not appear to be less efficient than those for non-profit panels (1.3% success rate). Further studies are required to elucidate this question.

However, the consistently large portion of non-registrations across all recruitment methods so far evaluated calls into question another kind of generalisation, namely whether results obtained in surveys with online access panel samples are representative of the target population (e.g. the population of internet users). Some panel operators maintain that the representation problem does not pertain to their studies because their panel has been built from offline random samples. The current experiment has illustrated several problems with this assertion. First, most sampling frames are more or less skewed (e.g. unregistered telephone numbers, voluntary entries in databases). Second, considerable quantitative non-registration occurs with all solicitation methods. In both the present experiment and the literature, non-registration ranged from 99% for letter to 77% for email. Third, qualitative non-registration also occurs; that is, subsamples recruited via different solicitation methods differ in their composition. For example, in this study, fax-recruited individuals were older than flier- and email-recruited people. Panellists recruited via email had been using the internet longer than flier- and fax-recruited panellists and email recruits used the internet more frequently than fax-recruited panellists.

Recommendations for recruiting panellists

If the aim is to recruit panellists who are representative of a target population, the sample frame needs to be unbiased. This means that each unit of the target population has a specified non-zero chance of being sampled. For example, to recruit a panel sample that is representative of the population of internet users, one could mail invitations to a random sample that has been drawn from a telephone directory that also lists

addresses, as has been done in the present experiment. However, one needs to be aware of bias due to unregistered lines and addresses. Alternatively, one could use random-digit dialling and interview the person in the household with the most recent birthday, as was done by Weßels and Zimmermann (2001) and Hellwig *et al*. (2003). However, even if a relatively unbiased frame has been used, if considerable non-registration occurs, the resulting panel sample might not be representative.

The situation is different if representativity of the panel sample is of minor importance. This is the case if a panel is used to conduct experiments, or qualitative, exploratory, feasibility, or case studies (Göritz & Moser 2000). The primary concern then is to recruit panellists at the lowest possible cost. Table 2 gives an estimation of the cost of the different recruitment methods implemented in this study. The most cost-efficient method in terms of per capita costs is email without lottery, followed by flier with a lottery, followed by fax without lottery, and finally letter without lottery.

Acknowledgements

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