

Response Effects of Prenotification, Prepaid Cash, Prepaid Vouchers, and Postpaid Vouchers: An Experimental Comparison

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Abstract

In a web-based experiment with 1,750 randomly sampled university students, we investigated the effect of mailed prenotification plus prepaid cash, mailed prenotification plus a prepaid voucher, mailed prenotification plus a postpaid voucher, and mailed prenotification on its own as compared to a control group without prenotification or incentives. Dependent measures were response, retention, and item nonresponse. Mailed prenotification over no prenotification increased response and retention and decreased item nonresponse. Prenotification plus prepaid cash maximized response and retention. Item nonresponse was lowest with prenotification plus postpaid vouchers and second lowest with prenotification plus prepaid cash. In addition, we compared the cost for all experimental groups. Total costs were highest for prenotification plus prepaid cash, but costs per respondent or per retainee were highest in the control group. In sum, this experiment shows ways of improving participation in web surveys.

Keywords

incentives, response rate, retention rate, item nonresponse, web survey, prenotification, experiment

Introduction

Low costs and the ease of setting up a web survey (Porter, Whitcomb, & Weitzer, 2004) have made web-based surveys widespread. However, response rates in web surveys are lower than in other survey modes (Manfreda et al., 2008; Shih & Fan, 2008). One way to increase participation is to provide incentives (Göritz, 2006). Despite suggestions to use prepaid incentives (e.g., Bosnjak and Tuten,

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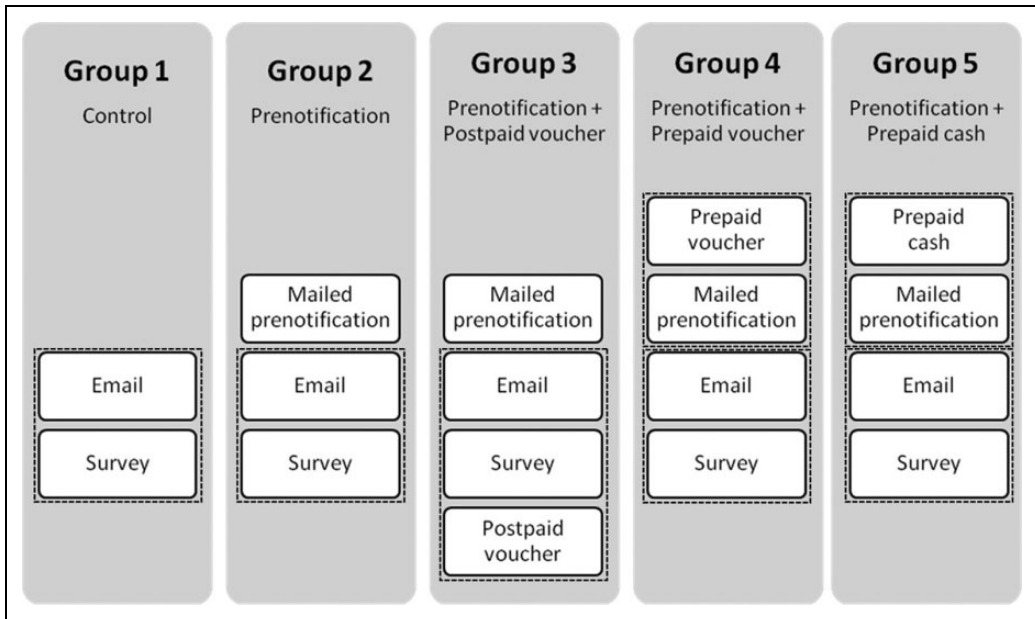


Figure 1. Experimental design.

2003; Heerwegh, 2006), research on prepaid incentives in web surveys is scarce (Görizt, 2014). One of the reasons for the rare use of prepaid incentives might be that their effects are yet largely unknown for web surveys. Another reason might be that delivering many prepaid incentives, that is, all incentives that cannot be sent via e-mail, requires a sampling frame that includes mail addresses (Dykema, Jones, Piché, & Stevenson, 2013; Kaplowitz, Lupi, Couper, & Thorp, 2012). Nevertheless, many settings would allow for prepaying incentives in principle, for example, surveys of employees, customers, students, members of particular organizations, or members of online panels. Moreover, in the United States, mailing addresses of the general population can be easily obtained using the United States Postal Service (USPS) Computerized Delivery Sequence File, and in some European countries named individuals can be obtained from population registers or electoral rolls.

We conducted an experiment to examine the effects of mailed prenotification plus a postpaid shopping voucher, mailed prenotification plus a prepaid shopping voucher, mailed prenotification plus prepaid cash, and mailed prenotification without incentive as compared to a control group without both prenotification and incentive (Figure 1). Dependent variables were the response rate (i.e., the percentage of invitees who submitted the first page of the survey), the retention rate (i.e., the percentage of responders who stayed until the last page of the survey), and item nonresponse (i.e., the number of questions that retainees skipped). Furthermore, we compared survey costs for all experimental groups.

Survey Participation

There are many theoretical frameworks to explain survey participation (for overviews, see, e.g., Glaser, 2012; Goyder, Boyer, & Martinelli, 2006). One of the most frequently used frameworks is social exchange theory (Goyder & Boyer, 2008; Goyder et al., 2006). This theory conceives of survey participation as an exchange relation between the surveyor and the (potential) respondent (Dillman, 1978, 2007; Heerwegh, 2006; Hill & Willis, 2001; Lavrakas, 2008; Marcus, Bosnjak,

Lindner, Pilischenko, & Schütz, 2007). Potential respondents commit to the exchange if they expect benefits such as incentives and the ability to voice one's opinion to exceed the anticipated costs of participation such as time, effort, and potential infringements of privacy (Becker & Mehlkop, 2011; Glaser, 2012; Lavrakas, 2008).

Thereby, some items that are part of the exchange may extend beyond their face value. For example, beyond their monetary value, prepaid incentives might be perceived as unconditional tokens of appreciation, which increase trust (Dillman, 2007). Moreover, beyond its mere semantics, a survey request including incentives may trigger social norms such as reciprocity (Hechter & Opp, 2001), which may evoke an informal obligation to participate. According to Coleman (1994) and Opp (2013) a violation of internalized norms is costly to the individual, because the violation rouses feelings of psychological discomfort, shame, reduced self-esteem, and so on, while norm-following is rewarding (cf. Mazar, Amir, & Ariely, 2008; Opp, 2013; Posner & Rasmusen, 1999). However, the effect of norms might vary due to several factors (Goyder et al., 2006). For example, invitees may not have internalized a particular norm, some norms are imprecise or may be overruled by particular personality traits or by lack of time. Survey participation should increase if surveyors find means to trigger a social norm to participate.

To get a comprehensive picture about the effect of incentives on survey participation, it is important to look at several facets of participation simultaneously, for example, response, retention as well as item nonresponse (Felderer, Kreuter, & Winter, 2013). These facets might differ in their sensitivity to a respondent's level of motivation. Item nonresponse—as a form of satisficing (Krosnick, 1991)—is more subtle than unit nonresponse and dropout. However, just like unit nonresponse and dropout, item nonresponse is an undesirable behavior that at best reduces statistical power and at worst distorts the outcome (Groves, 1989). Beatty and Herrmann (2002) give three reasons for skipping a question: (1) low motivation on the part of the respondent, (2) high cognitive burden of answering the question, and (3) high sensitivity of the question. Incentives are unable to alter the sensitivity of a question or the cognitive burden of answering it. However, incentives may increase motivation to respond to a survey item, despite the item being burdensome or sensitive.

Hypotheses

In our experiment, we compare a control group (Group 1) to a prenotification group (Group 2) to assess the net effect of mailed prenotification (see Figure 1). In keeping with social exchange theory, prenotification can convey information about an upcoming survey and about its personal and social importance; moreover, it asks for cooperation (Dillman, 2007; Stafford, 1966) and may thus trigger the social norm to respond. Furthermore, the production and mailing of prenotification entails costs for the surveyor, which may heighten the perceived importance of the survey (Dillman, 2007; Dillman, Smyth, & Christian, 2009). In addition, mailed prenotification, which involves a tangible letter, may underscore the surveyor's trustworthiness (Dillman, 2007; Dillman et al., 2009), as 95% of all e-mails, which are intangible, are spam (Bitkom, 2010). This trustworthiness might also be promoted by embedded logos and graphics, which allows good visualization of the sponsoring organization (Dykema, Jones, Piché, & Stevenson, 2013). Furthermore, prenotification can raise the awareness of an upcoming survey invitation. It makes the request foreseeable and appear more legitimate. Mailed prenotification can also act as a reminder to check an otherwise unchecked e-mail inbox. According to Millar and Dillman (2011), the main benefit of mailed prenotification is the ability to deliver a banknote in advance.

In line with these deliberations, studies have shown that mailed prenotification increases participation in web surveys (Crawford et al., 2004; Dykema, Stevenson, Day, Sellers, & Bonham, 2011; Kaplowitz, Hadlock, & Levine, 2004; Porter & Whitcomb, 2007; Porter et al., 2004). Millar and Dillman (2011), by contrast, found mailed prenotification ineffective. One reason might be that they

mailed an access code. Invitees had to take extra steps before responding, such as switching from reading the mailed prenotification to turning on their computer, opening a browser, and entering the URL as well as an access code manually (Millar & Dillman, 2011; Millar, O'Neill, & Dillman, 2009). As in our study, information to access the survey was sent via e-mail, invitees only needed to click on an embedded link to respond. Based on social exchange theory as well as on empirical findings, we posit the following hypothesis:

Hypothesis 1: Mailed prenotification (Group 2) increases response (Hypothesis 1a) and retention (Hypothesis 1b) and reduces item nonresponse (Hypothesis 1c) as compared to the control group (Group 1).

In Groups 3, 4, and 5 of our experiment, we combined mailed prenotification with different incentives (see Figure 1). Comparing each of these incentive groups to prenotification only (Group 2) gauges the net effect of each of these incentives.

In Group 3, invitees were promised a €5 voucher to be received upon completion of the survey. Theoretically, a postpaid incentive such as this voucher compared to no incentive should be a benefit to the respondent (Diekmann & Jann, 2001; Dillman, 2007; Glaser, 2012; Goyder et al., 2006; Lavrakas, 2008). However, an invitee might perceive a postpaid incentive as distrustful on the part of the surveyor with adverse effects for participation (Becker & Mehlkop, 2011; Fox, Crask, & Kim, 1988). In a similar vein, postpaid incentives demand trust by the invitee that the surveyor will fulfill his or her part of the exchange and hand over the incentive after survey completion. Accordingly, some mail surveys found that the response rate is lower with postpaid incentives than without an incentive (Church, 1993; Diekmann & Jann, 2001). In addition, the particular form of a postpaid incentive used in the study at hand—a voucher—might dampen or even nullify the potential participation enhancement of a postpaid incentive. Vouchers have an only indirect monetary value, and they appeal to only those individuals who are interested in the voucher-specific offer. Moreover, redeeming a voucher incurs transaction costs, such as searching for a product—while buying the product possibly requires additional money—obligation to shop with a particular retailer rather than with a freely chosen one, registering at the retailer's website, and potential infringements of privacy resulting from registration. Moreover, Göritz, Wolff, and Goldstein (2008) speculated that those invitees might be driven away from responding who resent that a nonprofit survey supports a for-profit company such as the retailer as the recipient of tax money. To sum up, there are too many qualifications as well as question marks due to a lack of previous results on postpaid vouchers in web surveys to postulate a positive effect of a postpaid voucher on survey participation. Therefore, we pose an exploratory research question rather than a directional hypothesis:

Research Question 2: Does mailed prenotification plus a postpaid voucher (Group 3) affect response (Research Question 2a), retention (Research Question 2b), and item nonresponse (Research Question 2c) as compared to mailed prenotification on its own (Group 2)?

In Group 4, invitees received mailed prenotification along with a prepaid voucher worth €5. According to social exchange theory, a prepaid incentive should be a benefit to the respondent on several levels. The invitee has immediate command of the incentive. As an up-front service by the surveyor, the invitee might perceive a prepaid incentive as a gesture of goodwill, which can generate trust toward the surveyor and might help establish a social exchange relationship between invitee and surveyor (Becker & Mehlkop, 2011; Dillman, 2007). Moreover, such a gesture can trigger a process of reciprocation (Gouldner, 1960) in the invitee, which can evoke a feeling of social commitment to this relationship and/or an obligation to return something upon receiving such a favor (Becker & Mehlkop, 2011; Dillman, 2007; Heerwegh, 2006). Refusing a survey request after receiving a prepaid incentive can be understood as a violation of the reciprocity norm and thus incur

psychological costs for those who have internalized such a norm (cf. Mazar et al., 2008; Posner & Rasmusen, 1999). These deliberations are similar to Malinowski (2013), who assumes that reciprocated exchange is based on trust, and a good relationship leads to socially prescribed reactions to offers. Moreover, prepaid incentives can activate a cognitive frame that specifies the social expectation that an adequate response to the up-front service would be to participate (Becker & Mehlkop, 2011). However, as described in the previous section, the particularities of the prepaid incentive used in this study—a voucher—might attenuate or nullify the potentially participation enhancement of a prepaid incentive per se. Moreover, despite being a prepaid incentive, a prepaid voucher might fail to trigger reciprocity: Individuals who assume that the costs associated with the voucher accrue to the surveyor only when the individual cashes their voucher may not perceive declining the survey request as a violation of reciprocity. In addition, there is no prior research that has examined the effect of prepaid vouchers compared to no incentive in a web survey. Therefore, we explore:

Research Question 3: Does mailed prenotification plus a prepaid voucher (Group 4) affect response (Research Question 3a), retention (Research Question 3b), and item nonresponse (Research Question 3c) as compared to mailed prenotification on its own (Group 2)?

As there is no prior research that has examined the effect of a prepaid versus postpaid voucher in a web survey, we explore:

Research Question 4: Does mailed prenotification plus a prepaid voucher (Group 4) affect response (Research Question 4a), retention (Research Question 4b), and item nonresponse (Research Question 4c) differently than mailed prenotification plus a postpaid voucher (Group 3)?

In Group 5, a €5 bill was mailed along with prenotification. As this was a prepaid incentive, all advantages of a generic prepaid incentive apply. The particular form of this incentive—cash—should be attractive to individuals, as it is money in the hand and thus can buy any commercial item from any vendor at any time. There is also some empirical research that attests to the effectiveness of prepaid cash in web surveys: Dykema et al. (2013) found that a mailed invitation sent along with \$2 in cash increased retention in a web survey by 8.2 percentage points as compared to a mailed invitation without incentive. However, because of the small sample size, this difference did not reach a conventional level of significance. In a web survey, Parsons and Manierre (2014) found that mailed invitation sent along with \$2 in cash increased response by 11.8 and retention by 7.7 percentage points as compared to a mailed invitation without incentive. In Millar and Dillman (2011), completion increased by 17 percentage points when mailing prenotification including \$2 in cash as compared to prenotification on its own. Messer and Dillman (2011) showed that prepaying \$5 in cash increased participation by 18 percentage points over not including an incentive. Hence, we posit,

Hypothesis 5: Mailed prenotification plus prepaid cash (Group 5) increases response (Hypothesis 5a) and retention (Hypothesis 5b) and decreases item nonresponse (Hypothesis 5c) as compared to mailed prenotification on its own (Group 2).

When comparing the effects of prepaid cash and a prepaid voucher, the previous deliberations imply that prepaid cash increases participation more than a prepaid voucher. Various studies have confirmed that cash outperforms other incentives such as vouchers, and so on, in mail surveys (Becker & Mehlkop, 2011; Church, 1993; Furse, Stewart, & Rados, 1981; James & Bolstein, 1990; Yammarino, Skinner, & Childers, 1991; Yu & Cooper, 1983). When looking at available data from web surveys, in Birnholtz, Horn, Finholt, and Bae (2004), participation was higher with prepaid cash than with a prepaid voucher. Thus, we postulate:

Hypothesis 6: Mailed prenotification plus prepaid cash (Group 5) increases response (Hypothesis 6a) and retention (Hypothesis 6b) and decreases item nonresponse (Hypothesis 6c) as compared to mailed prenotification plus a prepaid voucher (Group 4).

Survey Costs

Because cost is a crucial consideration in many research projects, we determined the cost incurred in each of the experimental groups. Baseline costs that occurred equally for all groups such as server costs, labor of programming the questionnaire as well as labor of composing and sending the invitation e-mail and reminders vary from project to project depending on available resources (e.g., having web space that is free vs. not free of charge or having relatively cheap student programmers or not). In Groups 2 to 5 (see Figure 1), additional costs accrue for producing and mailing prenotification (i.e., paper, printing, envelope, postage as well as labor needed for these steps). In Groups 3 to 5, additional costs accrue for the incentives. Thereby, vouchers often have a cost advantage over cash, depending on the deal with the retailer. For example, the researcher might need to pay only vouchers that are eventually redeemed, or the researcher might obtain the vouchers at a discount. This applies even more to postpaid vouchers, since only survey retainees are able to redeem a voucher, whereas advance cash needs to be paid for every invitee. A cost advantage of vouchers versus cash was also present in our study as we had a deal with the retailer that only redeemed vouchers were charged. Besides the incentives' material costs, labor is needed for handling the incentives (e.g., procuring €5 bills at a bank, printing prepaid vouchers, putting €5 bills or the prepaid vouchers into the envelope of the prenotification letter, programming to display the postpaid voucher's code on the final page of the questionnaire).

Method

In a web-based experiment, a random sample of 1,750 students drawn from all academic disciplines at a German university were randomly assigned to one out of five groups (see Figure 1). The survey enquired about study conditions, self-rated competence, and student fraud such as cheating on exams and plagiarism. Group 1, the control group, was e-mailed an invitation to the survey (February 9, 2011). Groups 2 to 5 were mailed prenotification 1 week prior (February 2, 2011) to an invitation e-mail (February 9, 2011). Group 2 received a mailed prenotification only. Group 3 was announced a postpaid voucher worth €5 along with prenotification; the voucher code was displayed on the last survey page. Group 4 was mailed a prepaid voucher worth €5 along with prenotification. The vouchers could be redeemed at a large online retailer. Group 5 was mailed a €5 bill along with prenotification.

We chose €5 as a treatment dose for two reasons: (1) coinage is problematic to send in letters (Dillman, 2007), and €5 is the smallest bill in the European Union. (2) Considering wages of typical student jobs and an expected answering time of 30 min, incentives worth €5 should be perceived as appropriate. This is also consistent with Smaluhn (2007) who states that paying €1–2 for 10 min is common in commercial surveys.

The text of the prenotification was identical, with the exception of a short note if an incentive was provided. Due to the sensitivity of parts of the questionnaire, we used impersonal salutation in the prenotification. The prenotification contained general information about the study without mentioning student fraud. Students were informed that their university would be e-mailing a link to the survey shortly. To make the study appear more legitimate and to underscore its official character, logos of the university and the funding agency (see Authors' Note) were placed in the footer. Nonrespondents and dropouts in all five groups were sent up to two e-mail reminders (February 15 and 19, 2011). Anonymity was assured by several means: First, the university had no access to the responses.

Second, the researchers had no access to the personal data of respondents such as e-mail or mail addresses. Third, the survey was protected using secure sockets layer. Fourth, the university's data protection officer supervised data collection.

For analyzing response and retention, we determined the odds ratio (OR), and with item nonresponse, we determined the incidence rate ratio (IRR). For analyzing item nonresponse, we applied exact rate-ratio tests for Poisson counts, because item nonresponse is a count outcome in which most respondents provide answers to all or most questions, and few respondents refuse to answer a larger number of questions. An OR larger than 1 or an IRR smaller than 1 denote participation enhancement, while an OR smaller than 1 or an IRR larger than 1 denote inferior participation. For testing hypotheses, we determined the one-tailed probability of the OR or IRR. For exploring a research question, we indicate the 95% confidence interval of the OR or IRR.

Results

Response

In total, 289 people (16.6%) submitted the first page of the survey (see Table 1). Response was highest with prenotification plus prepaid cash (28.1%) and lowest in the control group (9.9%). Hypothesis 1a postulated higher response with prenotification (Group 2) than without prenotification (Group 1). We found an OR of 1.75 ($p < .001$), which means that the odds of responding with prenotification are 75% higher than the odds of responding without prenotification. Thus, Hypothesis 1a was upheld. Research Question 2a explored whether prenotification plus a postpaid voucher (Group 3) affects response as compared to mailed prenotification on its own (Group 2). The postpaid voucher had no effect on response (OR = 0.93, CI [0.62, 1.40]). Research Question 3a explored whether prenotification plus a prepaid voucher (Group 4) affects response as compared to mailed prenotification on its own (Group 2). The prepaid voucher had no effect on response (OR = 0.83, CI [0.55, 1.27]). Research Question 4a explored whether prenotification plus a prepaid voucher (Group 4) affects response differently than mailed prenotification plus a postpaid voucher (Group 3). There was no difference (OR = 0.90, CI [0.59, 1.37]). Hypothesis 5a postulated higher response with prenotification plus prepaid cash (Group 5) than with prenotification only (Group 2). Hypothesis 5a was upheld (OR = 2.04, $p < .001$). Hypothesis 6a postulated higher response with prenotification plus prepaid cash (Group 5) than with prenotification plus prepaid voucher (Group 4). Hypothesis 6a was upheld (OR = 2.44, $p < .001$).

Retention

In total, 242 responders (13.9%) stayed until the final page of the survey (see Table 1). Retention was highest in the group with prenotification plus cash (28.1%) and lowest in the control group (9.9%). Hypothesis 1b postulated higher retention with prenotification (Group 2) than without prenotification (Group 1). Hypothesis 1b was upheld (OR = 2.23, $p = .05$). Research Question 2b explored whether prenotification plus a postpaid voucher (Group 3) affects retention as compared to mailed prenotification on its own (Group 2). The postpaid voucher had no significant effect on retention (OR = 1.38, CI [0.51, 3.74]). Research Question 3b explored whether prenotification plus a prepaid voucher (Group 4) affects retention as compared to mailed prenotification on its own (Group 2). The prepaid voucher had no significant effect on retention (OR = 1.43, CI [0.51, 4.04]). Research Question 4b explored whether prenotification plus a prepaid voucher (Group 4) affects retention differently than mailed prenotification plus a postpaid voucher (Group 3). There was no difference (OR = 1.04, CI [0.35, 3.13]). Hypothesis 5b postulated higher retention with prenotification plus prepaid cash (Group 5) than with prenotification only (Group 2). It was upheld (OR = 2.42, $p = .03$). Hypothesis 6b postulated higher retention with prenotification plus prepaid cash (Group 5) than with

Table 1. Response, Retention, and Item Nonresponse.

Group	Invitees	Responders (%)	Retainees (%)	Skipped Items
1. Control	345	34 (9.9)	22 (64.7)	7.4
2. Prenotification	348	56 (16.1)	45 (80.4)	5.5
3. Prenotification + postpaid voucher	350	53 (15.1)	45 (84.9)	3.1
4. Prenotification + prepaid voucher	348	48 (13.8)	41 (85.4)	4.2
5. Prenotification + prepaid cash	349	98 (28.1)	89 (90.8)	3.7

prenotification plus prepaid voucher (Group 4). Although retention was somewhat higher with prepaid cash than with prepaid voucher, the effect failed a conventional level of significance. Hence, Hypothesis 6b was rejected ($OR = 1.69, p = .17$).

Item Nonresponse

After excluding filtered and optional items, the maximum number of answers was 148. Item nonresponse was lowest with prenotification plus postpaid voucher (each retainee skipped on average 3.1 items, see Table 1) and highest in the control group (each retainee skipped on average 7.4 items). Hypothesis 1c postulated lower item nonresponse with prenotification (Group 2) than without prenotification (Group 1). Hypothesis 1c was upheld ($IRR = 0.74, p < .01$). The IRR of 0.74 denotes that the number of missing items with prenotification is reduced by the factor 0.74 as compared to the control group. In other words, prenotification reduces item nonresponse by 26%. Research Question 2c explored whether prenotification plus a postpaid voucher (Group 3) affects item nonresponse as compared to mailed prenotification on its own (Group 2). The postpaid voucher reduced item nonresponse ($IRR = 0.57, CI [0.46, 0.70]$). Research Question 3c explored whether prenotification plus a prepaid voucher (Group 4) affects item nonresponse as compared to mailed prenotification on its own (Group 2). The prepaid voucher decreased item nonresponse ($IRR = 0.76, CI [0.62, 0.93]$). Research Question 4c explored whether prenotification plus a prepaid voucher (Group 4) affects item nonresponse differently than mailed prenotification plus a postpaid voucher (Group 3). Item nonresponse was higher with the prepaid than with the postpaid voucher ($IRR = 1.35, CI [1.07, 1.70]$). Hypothesis 5c postulated lower item nonresponse with prenotification plus prepaid cash (Group 5) than with prenotification only (Group 2). Hypothesis 5c was upheld ($IRR = 0.69, p < .001$). Hypothesis 6c postulated lower item nonresponse with prenotification plus prepaid cash (Group 5) than with prenotification plus prepaid voucher (Group 4). Prepaid cash caused somewhat less item nonresponse than a prepaid voucher ($IRR = 0.90, p = .14$). The effect failed a conventional level of significance; hence, Hypothesis 6c was rejected.

Survey Costs

Expenditures ranged from €1,350 in the control group to €3,436 in the prenotification plus prepaid cash group (see Table 2). Costs per responder as well as costs per retainee were highest in the control group and lowest with prenotification on its own.

Discussion and Conclusion

A web-based experiment among university students shed light upon the effects of mailed prenotification and of different incentives on response, retention, and item nonresponse. Seven of the nine hypotheses were upheld. Mailed prenotification increased response as well as retention and decreased item nonresponse. This replicates several studies (Crawford et al., 2004; Dykema et al.,

Table 2. Survey Costs.

Group	Baseline Cost (€)	Prenotification (€)	Incentives (€)	Total (€)	Costs (€) per			
					Sample Unit ^a	Invitee	Responder	Retainee
1. Control	1,350	0	0	1,350	3.86	3.91	39.71	61.36
2. Prenotification	1,350	276	0	1,626	4.65	4.67	29.04	36.14
3. Prenotification + postpaid voucher	1,350	276	125	1,751	5.00	5.00	33.05	38.92
4. Prenotification + prepaid voucher	1,350	276	215	1,851	5.26	5.29	38.36	44.91
5. Prenotification + prepaid cash	1,350	276	1,810	3,436	9.82	9.85	35.07	38.61

^aSample size in each group was 350, that is, we sent out 350 invitation e-mails. Some of these e-mails were returned as undeliverable but inviting these unreachable people incurred cost nevertheless.

2011; Kaplowitz et al., 2004; Porter & Whitcomb, 2007; Porter et al., 2004) and shows that prenotification can be seen as a vehicle of raising awareness and legitimacy of a forthcoming survey request and of providing motivating information. Although prenotification entails costs for the surveyor, due to prenotification's participation-enhancing effect the cost per responder and per retainee was lower than without prenotification. Thus, both from the perspective of increasing response to a survey and from a cost-benefit perspective, we recommend mailed prenotification without reservation.

The same is true for mailed prenotification plus prepaid cash over mailed prenotification on its own. Including a €5 bill with the prenotification increased response as well as retention and decreased item nonresponse. The beneficial effect of prepaid cash replicates prior research in web surveys (Birnholtz, Horn, Finholt, & Bae, 2004; Messer & Dillman, 2011; Millar & Dillman, 2011). Therefore, prepaid cash can be understood as a means of providing a benefit to respondents and/or of triggering norm-oriented behavior.

When comparing mailed prenotification plus prepaid cash to mailed prenotification plus a prepaid voucher, our hypotheses that cash would outperform a voucher were upheld with regard to response, but were statistically rejected with regard to retention and item nonresponse. However, we found nonsignificant tendencies that prepaid cash was superior to a prepaid voucher also with regard to retention and item nonresponse.

With regard to our three exploratory questions, we found mixed results. The postpaid and the prepaid voucher had no net effect on response and retention and also did not differ from one another. However, the postpaid and the prepaid voucher decreased item nonresponse, whereby the postpaid vouchers decreased item nonresponse even more than the prepaid voucher. Apparently, the attractiveness of vouchers was relatively low, perhaps because vouchers have only an indirect monetary value, that might only appeal to a few individuals. Also, participants incur transaction costs on several levels when redeeming vouchers, and vouchers support for-profit companies. Theoretically, a prepaid voucher should be more effective than a postpaid voucher because the latter does not foster reciprocity. However, a prepaid voucher might fail to trigger reciprocity equally: Individuals might guess that the surveyor needs to pay for the vouchers only when the vouchers are redeemed. However, note that we found item nonresponse to be lowest for postpaid vouchers, which was the only postpaid incentive in this experiment. With a postpaid voucher, some respondents might fear losing eligibility for the voucher if they skip many questions.

However, as the (null) effects of vouchers were not postulated beforehand, further research needs to confirm these findings. From a general cost-benefit perspective, using vouchers as incentives

does not seem worthwhile, whereby postpaid vouchers are still cheaper than prepaid ones. However, when item nonresponse is a particular concern, employing postpaid vouchers might be useful after all.

We regard as the strong points of our study that it is a true experiment of a randomly drawn sample with several conditions that varied systematically. Yet, limitations and unanswered questions remain. First, despite its beneficial effects overall, prepaying money can lead to irritation on the part of invitees. Feedback from a few invitees suggests that cash incentives issued by a state-funded university are perceived as a waste of public funds. Such concerns were not raised in reference to vouchers of equal value.

Furthermore, some students in our sample might have learned about other students invited to the survey but were offered no incentive or a different incentive. Thus, treatment diffusion might have occurred. However, its extent and therefore possible impact is likely to be low because the study was conducted at a university with approximately 40,000 students who were selected at random.

As an outlook on future research, it would be interesting to compare prepaid cash with postpaid cash. However, in adhering to our privacy policy, the partnering university would have had to handle the allocation of the postpaid money. In our study, we needed to keep the burdens of the partnering university to an acceptable level. Consequently, future research should investigate postpaid cash alongside prepaid cash.

Some effects found in our student population might differ in other populations due to differences in age, wealth, exposure to research in general and exposure to questionnaires in particular, and so on. For example, students might be more inclined to use online vouchers than less web-literate populations. Furthermore, prior research indicates that participation (Groves, Singer, & Corning, 2000) and item nonresponse (Messer, Edwards, & Dillman, 2012) might be related to respondents' education, which is relatively high and homogeneous in a student sample. On the one hand, it is therefore important to replicate this experiment with other populations. On the other hand, however, students are an important and frequently used group for academic as well as market research. There are no *a priori* reasons why most effects revealed in this experiment should not be present in other populations. However, this speculation stands to be tested empirically.

In a similar vein, as the survey at hand was academically sponsored, the generalizability of the examined effects to different survey sponsorship, especially commercial sponsorship, remains to be examined in future studies.

Furthermore, the costs incurred in this survey are partially idiosyncratic, as each survey has its particular background of human, material, and immaterial resources. Therefore, the compilation of costs as derived from this survey is unlikely to be directly transferable to other projects but has orientational value.

The experiment at hand tested for an incentive dose of €5, which seemed appropriate for the student population examined. Our experiment cannot attest to the effect of a different dosage of incentive. Incentives should invoke an obligation on the part of the respondents and/or offer an appropriate compensation for the burdens of answering (Marcus et al., 2007). Thus, if the dosage of the incentive is too low in relation to a particular survey population, incentive effects are likely to be small or absent or even reversed. This points to the need to conduct future experiments that vary the dosage of incentive across different survey populations.

As a future prospect, longitudinal experiments would allow insights to be gained into participation behavior over time. For example, a prepaid incentive might establish a trustful relationship on the first contact, which might allow for switching from a prepaid incentive to a postpaid incentive in later waves and would therefore save costs as compared to issuing prepaid incentives in every wave.

As Couper (2000) noted, the concern for good survey participation needs to be weighed against other demands and restrictions such as accuracy, cost, and timeliness. Hence, when designing a survey, researchers need to base their decisions on different trade-offs. This experiment has shed light

onto some of the dependencies when trying to foster survey participation. While participation is important, in general (Couper, 2000), investing in incentives and in prenotification is even more important in small populations (e.g., to achieve sufficient power for statistical analyses) where low participation cannot be compensated by increasing sample size.

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