Research in Higher Education, Vol. 44, No. 4, August 2003 (© 2003)

THE IMPACT OF LOTTERY INCENTIVES ON STUDENT SURVEY RESPONSE RATES

Stephen R. Porter*,** and Michael E. Whitcomb‡

Lottery incentives are widely used by institutional researchers despite a lack of research documenting the effectiveness of postpaid incentives in general and lottery incentives in particular. A controlled experiment tested the effects of lottery incentives using a prospective college applicant Web survey, with e-mails sent to more than 9,000 high school students. The impact of the level of lottery incentive on response rates and response bias is discussed.

KEY WORDS: survey research; student surveys; incentives.

INTRODUCTION

Student survey data have grown increasingly important for institutions of higher education, both in terms of internal assessment and their use in external performance indicators. But as the use of student and alumni data have increased, response rates to surveys have been falling in surveys of the general population (Bradburn 1992; de Leeuw and Heer, 2002; Smith, 1995; Steeh, 1981) as well as student surveys (Dey, 1997). It is now common for educational researchers to use survey data in which the response rate is less than 50%. For example, four recent studies using student surveys report response rates of 46%, 45%, 34%, and 31% (Henderson-King and Kaleta, 2000; Kahn and Nauta, 2001; Pike, 2000; Umbach and Porter, 2002). Low response rates raise the question of how representative our data are and whether our research results can truly be generalized to all students (Dey, 1997; Dillman, Eltinge, Groves, and Little, 2002; Jones, 1996). Increasingly, educational researchers are faced with the prospect of simply maintaining—rather than increasing—survey response rates.

As response rates continue to shrink, researchers face increasing costs to counter survey nonresponse. Second and third mailings, for example, must be

*Director of Institutional Research, Wesleyan University.

‡Assistant Director of Institutional Research, Wesleyan University.

**Address correspondence to: Stephen R. Porter, Wesleyan University, 237 High Street, 322 North College Building, Middletown, CT 06459. E-mail: sporter@wesleyan.edu

0361-0365/03/0800-0389/0 © 2003 Human Sciences Press, Inc.

larger if the initial mailing elicits a weak response pool. Given that survey research is one of the most common activities in institutional research (Schlitz, 1988), researchers must refine their data collection tools to counter this growing trend.

Based on a survey of institutional researchers (which we describe below), one popular method for increasing response rates in student surveys is the use of lottery incentives. A lottery incentive is a postpaid reward offered to survey recipients for responding to a survey, in which every recipient who responds is entered in a drawing (similar to a lottery) for one or more prizes. The use of lottery incentives may be growing as researchers move from paper to electronic survey formats. Unlike mailed surveys, it is impossible to include prepaid incentives, such as a dollar bill, with an e-mail survey or an e-mail notice about a Web survey (Couper, 2000). Incentives paid on completion are possible with Web surveys, however, as these can always be mailed to respondents after they finish the survey.

While lottery incentives appear to be a popular and perhaps growing method for increasing response rates, the extensive survey research literature on postpaid and lottery incentives indicates they have little or no impact on survey response (Church, 1993; James and Bolstein, 1992; Singer, van Hoewyk, and Maher, 2000; Warriner, Goyder, Gjertsen, Hohner, and McSpurren, 1996). When applied to higher education, however, this research may not be relevant. Previous studies have been conducted on members of the general population, and it may be possible that college students are more price sensitive than the average person. If so, lottery incentives may have an impact on response rates in student surveys while not having any impact on response rates in surveys of the general population.

The purpose of this article is to investigate the impact of lottery incentives on student survey response rates. A survey of institutional researchers, described below, indicates that lottery incentives are quite common and are believed to be an effective method for increasing response rates. Are these incentives truly effective, or are they simply a waste of resources that could be better allocated during a survey administration? To answer these questions, we conducted a randomized experiment testing the effectiveness of several different prize amounts on the probability of student survey response.

While educational researchers have investigated the impact of questionnaire format (Boser, 1990), survey length (Adams and Gale, 1982), bad addresses (Grosset, 1995), multiple follow-ups (Cote, Grinnell, and Tompkins, 1986; Smith and Bers, 1987), and offers of feedback (Powers and Alderman, 1982) on student survey response rates, no research has been conducted concerning the impact of lottery incentives on student survey response rates. The lack of research in this area seems surprising, given administrators' reliance on survey data in the decision-making processes, declining response rates, and the scarce resources of many institutions. Together, these issues place increased relevance on student survey response rates to administrators who wish to tap student feedback and opinion as part of their decision-making processes.

The cause behind the limited amount of research on student survey response rates lies in the difficulty of testing the effectiveness of incentives in student surveys: at least two randomly selected groups of students must be used, a control group receiving just a survey and one or more experimental groups receiving both a survey and an incentive. Comparing response rates across different administrations of a survey (for example, across years) instead of using randomized groups will not work, as other factors may affect response rates besides a change in survey administration. A similar rationale holds for comparing surveys across institutions, as school effects become confounded with incentive effects.

Yet using randomized control and experimental groups within an institution poses a problem for any college or university, as students in the control group will discover that other students have the possibility of winning a prize for filling out the same survey. Given communication among students and the likely negative reaction of the control group, successful implementation of a controlled experiment of incentives is simply not possible on our campuses; response rates may be lower for the control group simply because members of the group react negatively to the news that they were not offered an incentive.

We circumvent this problem by conducting a controlled experiment on high school students who have contacted the admissions office at a selective liberal arts college for information about applying. Since this college draws students from across the nation, we can split the survey sample into groups without worrying about communication between groups. In addition, because the high school students are seniors about to attend college, their sensitivity to a lottery incentive should be much more similar to the typical college student's sensitivity than a member of the general population.

Our research is useful given the prevalent use of lottery incentives in institutional research, the lack of evidence of their efficacy and thus the possible misallocation of survey resources, and the probable increase in their use as researchers begin moving from paper to electronic surveys. This article consists of four parts. After first reviewing the literature on lottery incentives and response rates, we determine the prevalence of such incentives in institutional research. We next describe the experiment and how it was conducted. We then analyze the data for differences in response rates and item nonresponse rates between the experimental groups.

LITERATURE REVIEW

Theory

Incentives are theorized to affect response rates by influencing how the respondent views the positive and negative aspects of survey participation. A psychological perspective on survey response posits that the norm of reciprocity plays an important role in an individual's decision whether to participate in a survey. Specifically, prepaid incentives are believed to increase the likelihood of survey re-

sponse because "people feel obligated to respond to positive behavior received with positive behavior in return," (Groves, Cialdini, and Couper, 1992, p. 480). Benefits provided to potential respondents can include small amounts of money (usually in the $1–$5 range), token gifts, mention of benefits that will accrue to groups to whom the respondent belongs, assistance to the research sponsor, or benefits to the population as a whole (Dillman, Singer, Clark, and Treat, 1996).

Economic exchange theory, however, posits that respondents will fill out and return surveys in exchange for specific monetary compensation, rather than feeling obliged or a because of a broader benefit received by society. Here the respondent views payments as compensation for work to be done (filling out a survey). Dillman (2000, pp. 14–15) argues that economic exchange simply does not hold when it comes to surveys. As evidence he cites survey research that promised payment to respondents on completion and that found no increase in response rates using this method. If the exchange of money between surveyor and respondent was an economic relationship, promised payments as well as actual payments should affect response rates.

If the psychological perspective holds, then we would expect lottery incentives to have no affect on response rates. The issue here is that the payment of the incentive after the survey has been returned does not invoke a sense of obligation on the part of the respondent. Prepaid incentives work precisely because they are obtained without any effort on the part of the respondent and because they may create a sense of duty on the part of the respondent. This norm of reciprocity arises because the token incentives are viewed as a gift rather than compensation for effort (Groves et al., 1992).

Alternatively, an economist might argue that lottery incentives do not work simply because the benefits appear too diffuse. With a lottery, the expected benefit is not the monetary amount of the incentive but the amount of the incentive multiplied by the probability that the respondent will be selected a winner in the lottery. The implication is that only larger lottery incentives will have an impact, as they will have a larger expected value for the respondent. (Alternatively, increasing the probability of winning should also have the same effect.) An additional complication here is to what extent the respondent actually believes that a lottery exists and will be run fairly.

In sum, both the psychological and economic approaches to understanding survey participation would predict that postpaid incentives should have little or no impact on response rates. We turn next to the research on survey incentives to see if these predictions are correct.

Evidence

The empirical research on incentives indicates a conclusive positive impact on response rates; however, this impact very much depends on the type of incentive. Incentives can be divided into two groups based on when the survey recipi-

ent receives the incentive—either with the survey (known as pre-payment) or after the survey has been completed and returned (post-payment).

Numerous studies of various populations have examined the impact of prepaid incentives on survey response, and the results indicate that their use invariably increases response rates (Church, 1993; Fox, Crask, and Kim, 1988; Furse and Stewart, 1982; Heberlein and Baumgartner, 1978; Hopkins and Gullickson, 1992; James and Bolstein, 1990; Jobber and Saunders, 1988; Singer, Groves, and Corning, 1999; Singer, van Hoewyk, and Maher, 1998; Singer et al., 2000; Willimack, Schuman, Pennell, and Lepkowski, 1995; Yammarino, Skinner, and Childers, 1991; Zusman and Duby, 1987). The most commonly used prepaid incentive is the inclusion of $1 or $2 with the initial mailing of the survey, with some researchers using $5 (Singer et al., 2000) or $10 (Warriner et al., 1996) payments. Zusman and Duby (1987) found a substantial effect for a $1 prepayment with a postsecondary student sample of stopouts showing an increase in response rate of almost 19 percentage points.

The relationship between size of incentive and survey response is less clear. Some scholars have found that increasing the value of a prepaid incentive leads to higher response rates (Heberlein and Baumgartner, 1978; Hubbard and Little, 1988; James and Bolstein, 1990, 1992; Kropf, Scheib, and Blair, 1999), although the impact appears to taper off as the value of the incentive increases (Fox et al., 1988; Warriner et al., 1996). Others find that moving beyond a token amount has little or no impact on response rates (Jobber and Saunders, 1988, 1989).

Unlike the inclusion of prepaid incentives with surveys, promises of payment on survey completion do not appear to affect respondent behavior. Several studies have been conducted that compare the impact of both pre- and post-payment of incentives, with the general finding that promised payments for survey completion in the range of $5–$20 (Berk, Mathiowetz, Ward, and White, 1987; Berry and Kanouse, 1987; Singer et al., 2000) and $50 (James and Bolstein, 1992) have no statistically significant impact on response rates. The same holds for non-monetary postpaid incentives (Jobber, Mirza, and Wee, 1991). Church (1993), in his widely cited meta-analysis of 74 surveys that used incentives, found that rewards contingent on the return of the survey had no significant effect on response rates. While the studies cited above used telephone or mail surveys, a meta-analysis of 68 electronic surveys found that incentives actually slightly depressed response rates (Cook, Heath, and Thompson, 2000). The authors of that analysis do not describe whether the types of incentives used by the surveys under study were pre- or post-payments, but given the logistical difficulties of pre-payments in electronic surveys (Couper, 2000), it is likely that these incentives were post-payments.

The one exception in the literature is the work of Collins, Ellickson, Hays, and McCaffrey (2000). In their study of pre- and post-payments in the eighth wave of a decade-long longitudinal study, they found a significant positive effect for a promise of payment on survey completion. However, they indicate

this anomalous finding is probably the result of their sample. The respondents surveyed had participated in the study for many years and had developed a close relationship with the survey team. Thus, trust and a norm of reciprocity had already been established by the time of their study, and any promises of payment would be seen as much more credible than if the respondents had been contacted for the very first time.

Finally, some researchers have tested the effect of lottery post-payments in which the incentive is contingent on both completing the survey and the outcome of a drawing. Similar to the literature on simple post-payments, these researchers have found no effect for lottery incentives on response rates. (Golden, Anderson, and Sharpe, 1980; Hubbard and Little, 1988; Paolillo and Lorenzi, 1984; Warriner et al., 1996). In two studies (Hubbard and Little, 1988; Warriner et al., 1996) the prize was substantial: $200 cash.

The Use of Lottery Incentives in Institutional Research

Given a lack of theoretical and empirical support for the use of postpaid incentives in general and lottery incentives in particular, the extent of their use in institutional research is surprising. In spring 2000, we conducted a short Web survey asking institutional researchers about their use of lottery incentives. Members of seven regional institutional research listservs were notified of the survey, with 374 people responding.

Table 1 shows the number of surveys in which researchers used a lottery incentive during a typical academic year. Overall, about a third of the respondents administer at least one survey a year that uses a lottery incentive. About

TABLE 1. Number of Surveys Using a Lottery Incentive During a Typical Academic Year

	All Schools		Private		Public	
Number of Surveys with Prizes	N	%	N	%	N	%
0	222	64	53	50	164	69
1	75	22	33	31	41	17
2	31	9	15	14	16	7
3	11	3	2	2	9	4
4	5	1	1	1	4	2
5+	3	1	1	1	2	1
Total	347	100	105	100	236	100

Note: "All schools" column contains respondents who did not identify their school type.

TABLE 2. Types of Prizes Used in Surveys

Prize	Total (%)	Private (%)	Public (%)
Cash	22.1	21.6	22.9
Gift certificate—national	11.5	21.6	2.9
Gift certificate—local	23.0	29.4	17.1
Gift certificate—school	57.4	62.8	54.3
Travel prize	5.7	11.8	1.4
Electronics	5.7	7.8	4.3
Clothing	14.8	13.7	15.7
Other type of prize	25.4	17.7	31.4

half of the respondents at private institutions use lottery incentives at least once a year.

Researchers were asked what types of incentives they use. Table 2 lists the type of prizes offered. Monetary prizes tend to predominate, with respondents at private institutions more likely to list these as the incentives they use. The differences between private and public institutions seen in Tables 1 and 2 most likely stem from differential resources, with private institutions using monetary incentives and using them more often than their public counterparts. In addition, some state regulations may affect the ability of public institutions to use lottery incentives.

Researchers were also asked their opinion of the effect of lottery incentives on response rates. Table 3 lists the responses for all respondents, those not using incentives, and those reporting that they used a lottery incentive in at least one survey per year. Given the prevalent usage seen in Table 1, it is not surprising

TABLE 3. Perceived Impact of Lottery Incentives on Response Rates

	All Respondents		Researchers Not Using Incentives		Researchers Using Incentives	
	N	%	N	%	N	%
Greatly decrease response rates	0	0.0	0	0.0	0	0.0
Slightly decrease response rates	1	0.5	0	0.0	1	0.8
No effect at all on response rates	50	24.2	39	46.4	11	8.9
Somewhat increase response rates	141	68.1	41	48.8	100	81.3
Greatly increase response rates	15	7.3	4	4.8	10	8.9
Total	207	100	84	100	122	100

that 75% of respondents reported that they believed lottery incentives increase response rates. About 90% of respondents who indicated they use lottery incentives in their surveys believe incentives positively increase response rates; more than half of those who do *not* use incentives still believe in their efficacy.

In sum, although the literature on incentives and response rates shows that post-payment of incentives in general and lotteries in particular have no impact on survey response, use of such lottery incentives appears common in institutional research. The remainder of this article investigates whether lottery incentives are indeed effective when used with student surveys.

METHODOLOGY

The experiment was conducted in spring 2001, during a survey of non-applicant high school students. These prospective students had contacted the institution for information about the institution during the previous year, but did not apply for admission.

This survey was chosen for the lottery incentives experiment for two reasons. First, by surveying high school students rather than college students, we could vary the incentive offered without worrying about communication between members of different experimental groups. Such an experiment would be impossible to conduct on a single college campus, and using a group of colleges with varying incentives would confound school effects with incentive effects. Second, these students were expected to have little motivation to complete the survey, as they had not applied to this college. Research has shown that incentives have the largest effect when there are few reasons to participate (Singer, 2002, p. 165), so using this survey should maximize the impact that lottery incentives have on response rates.

Of approximately 13,000 prospects, 9,305 had provided enough information about their high school during the contact to allow the assignation of the appropriate College Entrance Examination Board code for their high school. Because it was essential that members of the control group did not discover that other students had been offered an incentive for response, students were grouped by high school for the experiment. The average number of students per high school was 2.64, with the number of students ranging from 1 to 93.

The high schools were first randomly divided into five groups: a control group and four incentive groups. By randomly selecting high schools rather than students, we ensured that students in the same high school were placed into the same experimental group and therefore would not discover via communication with friends that others in their high school had received a different incentive offer. Table 4 shows the number of high schools and number of students in each experimental group.

The survey instrument was adapted from the College Board's Admitted Student

TABLE 4. Survey Experiment Groups

Group	No. of High Schools	No. of Students	Mean Number of Students per School
Control (no incentive)	706	1,983	2.9
Incentive—$50	706	1,712	2.5
Incentive—$100	706	1,960	2.8
Incentive—$150	706	1,784	2.6
Incentive—$200	705	1,866	2.7
Total	3,529	9,305	2.7

Questionnaire and comprised six topics: importance of college characteristics, characteristic ratings for the university, role of financial aid in the application process, images of the university, number of applications mailed, and demographic information.

The survey administration consisted of an initial e-mail notification with an embedded survey link, and each group was administered the same survey. Although students were asked to enter their e-mail address during the survey, the sample groups were given links to five separate Web sites to ensure we could track differences between groups. The four incentive groups were informed that if they responded to the survey they would be entered into a drawing for a $50, $100, $150, or $200 gift certificate to the online retailer Amazon.com, depending on the experimental condition. The e-mails sent to each group were identical except for those sent to the incentive groups, which included this additional passage about the lottery incentive:

> Because we realize your time is valuable, when you complete the survey you will be entered into a drawing for a $__ gift certificate from Amazon.com. The drawing will be held within six weeks and you will be notified of the outcome via email.

Following Schaefer and Dillman (1998), the initial e-mail was followed 3 days later with a reminder e-mail to nonrespondents, with a final reminder to nonrespondents 5 days after the first reminder. Each reminder included details about the particular incentive for each group.

RESULTS

In all analyses we examined the control and experimental groups to investigate three main questions:

- Do all five groups (the control and four levels of incentive) differ from one another?
- Does each incentive level individually differ from the control group?

- Do respondents offered any sort of incentive differ from those not offered an incentive?

The first question tests whether increasing levels of incentives have a differential impact; in other words, do response rates increase as the amount of the incentive increases? This is a common view of incentives and their impact on response rates: more is better (Bolstein, 1990, 1992; Heberlein and Baumgartner, 1978; Hubbard and Little, 1988; James and Kropf et al., 1999).

The second question tests if only some of the incentives have an impact. For example, there may be a nonlinear relationship between response rates and incentives amounts, as some researchers have found when looking at prepaid incentives (Fox et al., 1988; Warriner et al., 1996). Small amounts may have little impact because the respondent does not feel they adequately justify his or her expenditure of time. Large amounts, however, may have little impact because respondents are skeptical they will receive the prize given the large value. Alternatively, large amounts may be viewed as compensation rather than as a token benefit, thus transforming the relationship from one of reciprocity to an economic one. As a result, small amounts would invoke a norm of reciprocity and increase the probability of responding, while large amounts would invoke an economic relationship and not affect the probability of responding.

The third question tests the overall impact of offering an incentive. Some research has indicated that there may not be much of a difference in response rates between the $50 group and the $200 group (Jobber and Saunders, 1988, 1989), and depending on the data, testing for differences between all five groups could result in a null finding. Yet, testing the control vs. all of the incentive groups might detect a positive impact, so this third hypothesis is simply another way to check the data.

Table 5 shows the response rates for the initial e-mail and the response rates at the close of the experiment. Rates are shown for all five groups, for the four incentive groups combined, and for the entire sample. Overall, 15.2% of the

TABLE 5. Initial and Final Response Rates by Incentive Group

Group	After 1st E-Mail (%)	After 3rd E-Mail (%)
Control (no incentive)	4.6	13.9
Incentive—$50	5.4	15.0
Incentive—$100	5.3	16.2
Incentive—$150	6.0	15.6
Incentive—$200	5.8	15.4
All incentive groups	5.6	15.6
Total sample	5.4	15.2

sample responded to the survey. Differences between the control group and incentive groups were quite small. Almost 14% of the control group responded, while overall 15.6% of respondents in the incentive groups participated in the survey.

A series of chi-square tests were conducted to test for differences in response rates. We examine response rates both following the initial e-mail requesting survey participation as well as at the end of survey administration, given previous research that indicates the impact of incentives may vary with the number of contacts (James and Bolstein, 1990). As seen in Table 6, only one significant finding emerged: at the conclusion of the survey, the response rate for those offered the $100 incentive (16.2%) was significantly greater than the response rate for the control group (13.9%), χ^2 (1) = 3.93, $p = 0.047$. This finding may imply that the relationship between incentive amount and survey response is nonlinear; however, given our large sample size combined with the marginal p value, as well as the weak substantive impact of a 2.3% increase in response rate, the strength of support these data give for a nonlinear effect is limited.

In addition to examining the effect of incentives on response rates, we also tested whether our experimental conditions had any affect on the quality of survey response. It is possible that an incentive might not change the probability that an individual will respond to a survey, but it might cause respondents to spend more time answering the survey (James and Bolstein, 1990; Singer et al., 1998, 2000; Willimack et al., 1995). One way to test this hypothesis is to test item nonresponse between the experimental groups. If this were happening, we would expect lower item nonresponse for respondents in the incentive groups, as respondents who wish to breeze through the survey would be more likely to leave questions unanswered.

For each respondent, we calculated the number of survey items completed in each of the first five sections separately and these scores served as dependent

TABLE 6. Hypotheses and Tests for Differences in Response Rates

	Dependent Variable: Response Rate					
	After 1st E-Mail			After 3rd E-Mail		
Hypothesis	χ^2	df	$p <$	χ^2	df	$p <$
Control ≠ $50 ≠ $100 ≠ $150 ≠ $200	4.27	4	.371	4.30	4	.367
Control ≠ $50	1.26	1	.262	0.97	1	.324
Control ≠ $100	1.03	1	.310	3.93	1	.047
Control ≠ $150	3.45	1	.063	2.15	1	.142
Control ≠ $200	2.97	1	.085	1.74	1	.187
Control ≠ all incentive groups combined	3.17	1	.075	3.36	1	.067

measures in a series of one-way ANOVAs. For the demographic variables, we recorded whether or not respondents supplied the requested information and used the resultant binary data (0 = did not supply; 1 = supplied) in a series of chi-square tests.

In the series of one-way ANOVAs, we examined if (a) the number of survey items completed, or (b) the mean responses given varied across the survey conditions. As in the earlier analyses, we tested the three main research questions outlined above.

Table 7 shows the results of the analyses conducted using the number of survey items completed or response/nonresponse as dependent measures. Significant effects of lottery incentives were only found for the importance of college characteristics and the number of college applications. We found no significant findings for the number of items completed for: the importance of characteristics, financial aid, or images of the institution, or the provision of demographic information.

With the exception of the $150 incentive, the mean number of items completed by each level of incentive was found to differ from the control group in the characteristics ratings section of the survey. Specifically, respondents in the $50, $100, and $200 incentive groups completed more items than did respondents in the control group, with means of 16.8, 16.8, 16.9, and 16.3 (out of 17 items), respectively. Additionally, a significant effect of the overall impact of offering incentives was found for the number of characteristics ratings completed, with respondents offered incentives completing significantly more items (mean = 16.75) than the control (mean = 16.29). These findings suggest that the use of incentives may have caused respondents to complete a greater number of items specific to the university offering the reward, while more general survey questions were completed at a rate that was identical to respondents not offered an incentive. However, the substantive difference is quite small: about 0.5 items.

Analysis of the number of college applications found that respondents in the $200 incentive group applied to significantly more schools (mean = 5.6) than the control (mean = 5.0). This finding can be interpreted two ways. The first interpretation posits that the possibility of a large reward caused respondents in the largest incentive category to complete the survey more thoroughly. The second and more plausible interpretation is that this finding is simply spurious. Using the .05 error level in multiple tests, we would expect to have significant results when there is actually no relationship (Type I error) in 5 out of 100 tests. If the first interpretation were true, then we would have expected the analyses to reveal a larger number of significant findings.

To compare opinions of the survey groups on the importance of college characteristics in the application process and the characteristic rating section of the survey, we conducted a series of one-way ANOVAs using the mean response to each item as the dependent measure. Of the 204 tests conducted (34 survey

TABLE 7. Hypotheses and Tests for Differences in Item Nonresponse

Section	Number of Items	Control ≠ $50 ≠ $100 ≠ $150 ≠ $200	Control ≠ $50	Control ≠ $100	Control ≠ $150	Control ≠ $200	Control ≠ All Incentive Groups Combined
Importance of characteristics	17	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Characteristic ratings	17	$F(4, 1397) = 3.96$, $p = .003$	$F(1, 526) = 5.02$, $p = .026$	$F(1, 584) = 7.37$, $p = .007$	n.s.	$F(1, 555) = 8.49$, $p = .004$	$F(1, 1400) = 9.97$, $p = .002$
Financial aid	2	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Images of institution	20	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Number of applications	12 max.	n.s.	n.s.	n.s.	n.s.	$F(1, 555) = 4.05$, $p = .045$	n.s.
Gender	1	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Race/ethnicity	1	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
SAT	2	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
HS GPA	1	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

items times 6 comparisons), only 6 (2.9%) were found to be significant. Because the number of significant effects was about what we might expect to find erroneously (at $p < .05$), we concluded that these (significant) findings were spurious.

In sum, the offer of a $100 gift certificate in a drawing increased the response rate by 2 percentage points, but there were no other significant differences between the control and incentive groups. Given the very large sample size and p value (only .047), this is a weak finding, especially in terms of the substantive effect. In addition, it does not appear that offering larger amounts of incentives has a positive impact on response. There was some evidence that members of the incentive groups spent more time on the survey, as indicated by a slightly smaller item nonresponse rate. Again, the substantive differences were small.

LIMITATIONS

The chief limitation to our study is that the survey population is still not a college student population. It is possible that students' receptiveness to lottery incentives may change from their senior year in high school to when they enter college. The burden of paying for college may change price sensitivity among some students. In addition, some of the high school students in our sample may not resemble the typical college student. Randomizing experimental groups on a campus is one of the chief difficulties in doing research on different methods of survey administration, and while our research design might be the next best methodology, it is not a replacement for such an approach.

The overall response rate for the survey may also pose a problem. With such a low response rate, one could argue that interest in the survey was apparently so low that no incentive could have made a substantively large impact on response rates. Alternatively, the opposite argument could also be made: it is in low-interest surveys where incentives should make a difference and should be effective, as respondents have few other reasons to participate. If respondents are very interested in a survey because of its salience and thus are likely to respond, incentives may not have much of an impact beyond this interest.

It is also possible that given the amount of spam and unwanted solicitation that are sent via e-mail, we might have had more success with a paper survey. With a paper survey, the lottery offer might have been more believable. We believe this had a minimal impact on our study, as our e-mail addresses contained "institution.edu," sending a signal that we were members of a higher education institution and thus increasing our credibility. The Web survey location was also clearly located within the school domain.

The impact of the odds of winning a lottery is a further limiting factor for the study. In this study respondents were not informed of the odds of winning, nor could they estimate the odds of winning, as they had no idea how many other people had received an invitation to participate. For the typical enrolled

student survey, respondents would have a rough idea of their odds of winning given the size of the student body and the number of prizes offered. Thus a lottery incentive might have more of an effect, as respondents would be better able to estimate the expected value of the incentive. Little, if any, research has been conducted on the impact of odds on the relationship between lottery incentives and response rates, so this can only be a speculation as to what might have occurred if we had been able to conduct our analysis on a college student population.

CONCLUSION

Although the literature on incentives and response rates shows that post-payment of incentives in general and lotteries in particular have little or no impact on survey response, use of such lottery incentives appears common in institutional research. Our research is in line with previous research on the general population showing the minimal effect of postpaid incentives. Using a control group and four experimental groups, we tested the impact of offering a prize for survey participation in a national Web survey in which respondents had little reason to participate. By using high school students from around the country, we were able to test the impact of incentives on a population very similar to the typical college student population. And by using a survey in which respondents had little reason to participate, we had a situation where incentives should have had a large effect.

Although the prizes ranged in size from $50 to $200, the response rates for the five groups were very similar, ranging from 13.9% to 16.2%. Two of these response rates differed significantly: students in the group promised to be entered into a drawing for a $100 gift certificate had a response rate 2.3 percentage points higher than the control group. Although this difference was significant, in terms of substantive results, the offer of a $100 gift certificate had a minimal impact.

Assuming this result is not a spurious finding, it raises the question of how researchers should select the prizes to be offered for survey participation. Our results indicate that more is not better: increasing the size of the prize did not result in a linear increase in response rates. Researchers are thus faced with a quandary. If the prize is not valuable enough, the prize will not affect response rates. If the prize is too valuable, it also will not affect response rates. It is likely, then, that resources might be spent on prizes that in turn will not affect the survey response rate.

In addition, our research raises the serious question of effectiveness and resource allocation. Given limited resources, should we be spending time and money on awarding prizes or on efforts proven to increase response rates, such as Dillman's (2000) method of personalized, multiple contacts? It is tempting

to offer large prizes in a survey, because to individuals unfamiliar with survey research methodology, it appears as if strong efforts have been made to increase response rates. A few large prizes may also be cheaper than including $1 or $2 pre-payments with all surveys. Less striking efforts such as a second or third mailing or a personalized letter salutation may be less appealing, but offer more certain benefits.

Lottery incentives may also be popular because the inclusion of money with a survey may appear "unseemly" or cause resentment among college students, most of whom are paying (or whose parents are paying) substantial amounts of money to attend college. Offering a prize circumvents these concerns. Given the null findings of this study and previous research concerning the effect of prizes on survey response, one approach that researchers may adopt in the future is the inclusion of a promise of a small charitable contribution with a survey. However, several scholars have studied how offers of contributions to charity affect response rates, concluding that promised charitable contributions have no effect on respondent behavior (Furse and Stewart, 1982; Hubbard and Little, 1988; Warriner et al., 1996).

A final concern is the extent to which paying students to participate in survey research may create expectation effects that will negatively affect future surveys. The current research indicates that this is a non-issue (Singer et al., 1998, 1999, 2000). However, these studies tested the impact of incentives on subsequent survey response after a 6-month or 12-month period. It is less clear if using incentives in multiple surveys of the same population over several years, which is rapidly becoming the norm at many institutions, would also have a minimal impact on survey response rates.

As response rates to student surveys continue to decline, educational researchers will increasingly have to weight survey responses using administrative data about respondents and nonrespondents (e.g., Dey, 1997; Zanutto and Zaslavsky, 2002). Yet statistical adjustments of our survey data cannot completely correct for a low response rate; we must also focus more of our efforts on collecting reliable data. Only by using methods confirmed by experimental testing can we understand what works and be assured of maximizing the return on our survey research expenditures.

REFERENCES

Adams, L., and Gale, D. (1982). Solving the quandary between questionnaire length and response rate in educational research. *Res. Higher Educ.* **17:** 231–240.

Berk, M. L., Mathiowetz, N. A., Ward, E. P., and White, A. A. (1987). The effect of prepaid and promised incentives: Results of a controlled experiment. *J. Off. Stat.* **3:** 449–457.

Berry, S. H., and Kanouse, D. E. (1987). Physician response to a mailed survey: An experiment in timing of payment. *Public Opin. Q.* **51:** 102–114.

Boser, J. (1990). Surveying alumni by mail: Effect of booklet/folder questionnaire format and style of type on response rate. *Res. Higher Educ.* **31:** 149–159.
Bradburn, N. M. (1992). Presidential address: A response to the non-response problem. *Public Opin. Q.* **56:** 391–398.
Church, A. (1993). Estimating the effect of incentives on mail survey response rates: a meta-analysis. *Public Opin. Q.* **57:** 62–79.
Collins, R. L., Ellickson, P. L., Hays, R. D., and McCaffrey, D. F. (2000). Effects of incentive size and timing on response rates to a follow-up of a longitudinal mailed survey. *Eval. Rev.* **24:** 347–363.
Cook, C., Heath, F., and Thompson, R. L. (2000). A meta-analysis of response rates in web- or Internet-based surveys. *Educ. Psychol. Meas.* **60:** 821–836.
Cote, L., Grinnell, R., and Tompkins, L. (1986). Increasing response rates to mail surveys: The impact of adherence to Dillman-like procedures and techniques. *Rev. Higher Educ.* **9:** 229–242.
Couper, M. (2000). Web surveys: A review of issues and approaches. *Public Opin. Q.* **64:** 464–494.
De Leeuw, E., and Heer, W. (2002). Trends in household survey nonresponse: A longitudinal and international comparison. In: Groves, R. M., Dillman, D. A., Eltinge, J. L., and Little, R. J. A. (eds.), *Survey Nonresponse*, John Wiley & Sons, New York, pp. 41–54.
Dey, E. (1997). Working with low survey response rates: The efficacy of weighting adjustments. *Res. Higher Educ.* **38:** 215–227.
Dillman, D. A. (2000). *Mail and Internet Surveys: The Tailored Design Method*, John Wiley & Sons, New York.
Dillman, D. A., Eltinge, J. L., Groves, R. M., and Little, R. J. A. (2002). Survey nonresponse in design, data collection, and analysis. In: Groves, R. M., Dillman, D. A., Eltinge, J. L., and Little, R. J. A. (eds.), *Survey Nonresponse*, John Wiley & Sons, New York, pp. 3–26.
Dillman, D. A., Singer, E., Clark, J. R., and Treat, J. B. (1996). Effects of benefits appeals, mandatory appeals, and variations in statements of confidentiality on completion rates for census questionnaires. *Public Opin. Q.* **60:** 376–389.
Fox, R. J., Crask, M. R., and Kim, J. (1988). Mail survey response rate: A meta-analysis of selected techniques for inducing response. *Public Opin. Q.* **52:** 467–491.
Furse, D. H., and Stewart, D. W. (1982). Monetary incentives versus promised contribution to charity: New evidence on mail survey response. *J. Mark. Res.* **19:** 375–380.
Golden, L. L., Anderson, W. T., and Sharpe, L. K. (1980). The effects of salutation, monetary incentive, and degree of urbanization on mail questionnaire response rate, speed and quality. In: Monroe, K. B. (ed.), *Advances in Consumer Research*, Association for Consumer Research, Ann Arbor, MI.
Grosset, J. (1995). The biasing effects of bad addresses on information gathered by mail surveys. *J. Appl. Res. Commun. Coll.* **2:** 179–191.
Groves, R., Cialdini, R., and Couper, M. (1992). Understanding the decision to participate in a survey. *Public Opin. Q.* **56:** 475–495.
Heberlein, T. A., and Baumgartner, R. (1978). Factors effecting response rates to mailed questionnaires: A quantitative analysis of the published literature. *Am. Sociol. Rev.* **43:** 447–462.
Henderson-King, D., and Kaleta, A. (2000). Learning about social diversity: The undergraduate experience and intergroup tolerance. *J. Higher Educ.* **71:** 142–164.
Hopkins, K. D., and Gullickson, A. R. (1992). Response rates in survey research: A meta-analysis of the effects of monetary gratuities. *J. Exp. Educ.* **61:** 52–62.
Hubbard, R., and Little, E. L. (1988). Promised contributions to charity and mail survey responses: Replication with extension. *Public Opin. Q.* **52:** 223–230.

James, J., and Bolstein, R. (1990). The effect of monetary incentives and follow-up mailings on the response rate and response quality in mail surveys. *Public Opin. Q.* **54:** 346–361.

James, J., and Bolstein, R. (1992). Large monetary incentives and their effect on mail survey response rates. *Public Opin. Q.* **56:** 442–453.

Jobber, D., Mirza, H., and Wee, K. H. (1991). Incentives and response rates to cross-national business surveys: A logit model analysis. *J. Int. Bus. Stud.* **22:** 711–721.

Jobber, D., and Saunders, J. (1988). Modelling the effects of prepaid monetary incentives on mail survey response. *J. Oper. Res. Soc.* **39:** 365–372.

Jobber, D., and Saunders, J. (1989). The prediction of industrial mail-survey response rates. *J. Oper. Res. Soc.* **40:** 839–847.

Jones, J. (1996). The effects of non-response on statistical inference. *J. Health Soc. Policy* **8:** 49–62.

Kahn, J. K., and Nauta, M. N. (2001). Social-cognitive predictors of first-year persistence: The importance of proximal assessment. *Res. Higher Educ.* **42:** 633–652.

Kropf, M. E., Scheib, J., and Blair, J. (1999). *The Effect of Alternative Incentives on Cooperation and Refusal Conversion in a Telephone Survey*, Survey Research Center, University of Maryland, College Park.

Paolillo, J., and Lorenzi, P. (1984). Monetary incentives and mail questionnaire response rates. *J. Adver.* **13:** 46–48.

Pike, G. R. (2000). The influence of fraternity or sorority membership on students' college experiences and cognitive development. *Res. Higher Educ.* **41:** 117–139.

Powers, D. E., and Alderman, D. L. (1982). Feedback as an incentive for responding to a mail questionnaire. *Res. Higher Educ.* **17:** 207–211.

Schaefer, D. R., and Dillman, D. A. (1998). Development of a standard e-mail methodology: Results of an experiment. *Public Opin. Q.* **62:** 378–397.

Schiltz, M. (1988). Professional standards for survey research. *Res. Higher Educ.* **28:** 67–75.

Singer, E. (2002). The use of incentives to reduce nonresponse in household surveys. In: Groves, R. M., Dillman, D. A., Eltinge, J. L., and Little, R. J. A. (eds.), *Survey Nonresponse*, John Wiley & Sons, New York, pp. 163–178.

Singer, E., Groves, R. M., and Corning, A. D. (1999). Differential incentives: Beliefs about practices, perceptions of equity, and effects on survey participation. *Public Opin. Q.* **63:** 251–260.

Singer, E., van Hoewyk, J., and Maher, M. P. (1998). Does the payment of incentives create expectation effects? *Public Opin. Q.* **62:** 152–164.

Singer, E., van Hoewyk, J., and Maher, M. (2000). Experiments with incentives in telephone surveys. *Public Opin. Q.* **64:** 171–188.

Smith, K., and Bers, T. (1987). Improving alumni survey response rates: An experiment and cost-benefit analysis. *Res. Higher Educ.* **27:** 218–225.

Smith, T. (1995). Trends in nonresponse rates. *Int. J. Pub. Opin. Res.* **7:** 157–171.

Steeh, C. G. (1981). Trends in nonresponse rates, 1952–1979. *Public Opin. Q.* **45:** 40–57.

Umbach, P. D., and Porter, S. R. (2002). How do academic departments impact student satisfaction? Understanding the contextual effects of departments. *Res. Higher Educ.* **23:** 209–233.

Warriner, K., Goyder, J., Gjertsen, H., Hohner, P., and McSpurren, K. (1996). Charities, no; Lotteries, no; Cash, yes: Main effects and interactions in a Canadian incentives experiment. *Public Opin. Q.* **60:** 542–562.

Willimack, D., Schuman, H., Pennell, B., and Lepkowski, J. (1995). Effects of a prepaid

nonmonetary incentive on response rates and response quality in a face-to-face survey. *Public Opin. Q.* **59:** 78–92.
Yammarino, F. J., Skinner, S. J., and Childers, T. L. (1991). Understanding mail survey response behavior: A meta-analysis. *Public Opin. Q.* **55:** 613–639.
Zanutto, E., and Zaslavsky, A. (2002). Using administrative records to impute for nonresponse. In: Groves, R. M., Dillman, D. A., Eltinge, J. L., and Little, R. J. A. (eds.), *Survey Nonresponse*, John Wiley & Sons, New York, pp. 403–416.
Zusman, B. J., and Duby, P. (1987). An evaluation of the use of monetary incentives in postsecondary survey research. *J. Res. Dev. Edu.* **20(4):** 73–78.

Received March 20, 2002.