The Impact of Lottery Incentives on Student Survey Response Rates

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Abstract

Lottery incentives are widely used by institutional researchers despite a lack of research documenting their effectiveness. A controlled experiment tested the effects of lottery incentives using a prospective college applicant web survey, with emails sent to over 9,000 high school students. The impact of the level of lottery incentive on response rates, time to response, and response bias is discussed.

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Introduction

Student survey data have grown increasingly important for institutions of higher education. But as the use of student and alumni data have increased, response rates to surveys have been falling nationally (Dey, 1997; Smith, 1995; Steeh, 1981). Survey fatigue is commonly cited, as public opinion polls have become more popular with the media and telemarketers use surveys for data mining research. 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 non-response. Second and third mailings, for example, must be 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 colleagues, lottery incentives appear to be a popular method for increasing response rates in institutional research surveys. A lottery incentive is a reward offered to survey recipients for responding to a survey, in which every recipient who responds is entered into a drawing (similar to a lottery) for one or more prizes.

In addition, the growing use of electronic surveys may be leading to an increased use of lottery incentives in survey research. Unlike mailed surveys, it is impossible to include incentives such as a dollar bill with an email survey or email notice about a web survey (Couper, 2000). Incentives paid upon completion are possible with electronic surveys, however, as these can always be mailed to respondents. With the growing use of web surveys the need to understand the efficacy of lottery incentives has increased.

While lottery incentives appear to be a popular and perhaps growing method for increasing response rates, the research literature on lottery incentives indicates they have little or no impact on survey response. 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 surveys of the general population.

Educational researchers have investigated the impact of questionnaire format (Boser, 1990), survey length (Adams & Gale, 1982), bad addresses (Grosset, 1995) and multiple follow-ups (Cote et al., 1986; Smith & Bers, 1987) on student and former student survey response, but no research has been conducted studying the impact of lottery incentives on response rates. The lack of research in this area is not surprising. To truly test the effectiveness of incentives, 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 the survey (e.g., across years) does not work, as other factors may affect response rates besides a change in survey administration. A similar rationale holds for surveys across institutions within a university system.

Yet such an experimental situation 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.

We circumvent this problem by conducting a controlled experiment on high school students who have contacted an admissions office at a small, liberal arts college for information about applying. Since this college draws students from across the nation, we can split the survey into groups without worrying about communication between groups. And 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 compared with 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 the probable increase in their use as researchers begin moving from paper to electronic surveys. The paper 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 time to response. We also examine item non-response differences between the experimental groups.

Literature review

Incentives are theorized to affect response rates by affecting how the respondent views the costs and benefits of the survey process. Social exchange theory proponents argue that by providing general, diffuse, or "token" benefits to potential respondents, researchers can convince potential respondents "that in the long run the anticipated benefits of responding outweigh the anticipated costs," (Dillman et al, 1996, p. 378). Such benefits can include small amounts of money (usually in the $1-$5 range), 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 et al., 1996).

Economic exchange theory, on the other hand, posits that respondents will fill out and return surveys in exchange for specific monetary compensation, rather than a broader, more diffuse benefit. Dillman (2000, pp.14-15) argues that economic exchange simply does not work with surveys. As evidence he cites survey research that promised payment to respondents upon completion, and which found no increase in response rates using this method.

If Dillman were correct, then we would expect lottery incentives to have no effect on response rates. The issue here is that the payment of the incentive after the survey has been returned turns the survey process into an economic transaction rather than a social one. 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 (Groves et al., 1996) arises because the token incentives are viewed as a gift rather than compensation for effort.

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 multiplied by the probability that the respondent will be selected a winner in the lottery. The implication is that larger lottery incentives might 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.

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 recipient receives the incentive: either with

the survey (known as pre-payment) or after the survey has been completed and returned (post-payment).

Numerous studies have been conducted studying the impact of pre-paid incentives on survey response, and the results indicate that their use almost invariably increases response rates (e.g., Church, 1993; Singer et al., 1999; Willimack et al., 1995; Zusman and Duby, 1987). Less certain is the impact of post-paid incentives. Several experimental studies have been conducted that compare the impact of pre- and post-payment of incentives, with the general finding that post-payments have no statistically significant impact on response rates (Church, 1993; James & Bolstein, 1992; Singer at al., 2000). Other researchers have tested the effect of lottery post-payments, in which the incentive is not guaranteed but is instead dependent upon the outcome of a drawing. These researchers have found no effect for lottery incentives (Warriner et al., 1996).

The use of lottery incentives in institutional research

Given a lack of theoretical and empirical support for the use of lottery incentives in surveys, 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 (California, Mid-America, Northeast, Pacific Northwest, Rocky Mountain, Southern, Upper Midwest) were notified of the survey, with 374 people responding. Respondents were asked several questions about the surveys they conduct, and whether their institution was public or private.

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, with about half of the respondents at private institutions using lottery incentives at least once a year.

Researchers were also asked what types of incentives they use. Table 2 lists the type of prize. Monetary prizes (either cash or gift certificates) 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.

Researchers were also asked their opinion of the effect of lottery incentives on response rates. Table lists the responses for all respondents, and only those reporting that they used a lottery incentive in at least one survey per year. Given the prevalent usage seen in Table 1, not surprisingly 75% of respondents reported that they believed lottery incentives increase response rates, with the vast majority indicating that they 'somewhat' rather than 'greatly' increase response rates. About 90% of respondents who indicated they use lottery incentives in their surveys believe incentives positively increase response rates, while over 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 little or no impact on survey response, use of such lottery incentives appears common in institutional research. The remainder of the paper investigates whether lottery incentives are indeed effective when used with student surveys.

Research design

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. Of about 13,000 prospects, 9,305 had provided enough information about their high school during the contact to allow the assignation of the appropriate CEEB 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 school codes were randomly divided into five groups: a control group and four incentive groups. The high schools codes were then used to assign students to an experimental group. This 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 administration consisted of an initial email notification with an embedded survey link, and each group was administered the same survey. Although students were asked to enter their email address during the survey, the sample groups were given links to five separate websites to ensure we could track differences between groups. The four randomly selected 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 Amazon.com, depending on the group. The emails were identical except for the incentive group emails, which included this 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.

The initial email was followed three days later with a reminder email to non-respondents, with a final reminder to non-respondents five days after the first reminder. Each reminder included details about the incentive for each group.

Results

In all analyses we examined the control and experimental groups to test 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 an incentive differ from those not offered and incentive?

The first question tests if increasing levels of incentives have a differential impact, in other words, do response rates increase as the amount of the incentive increases? This is the most common view of incentives and their impact on response rates: more is better.

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. Small amounts may have little impact because the respondent does not feel they are adequate to justify his or her expenditure of time. Large amounts, on the other hand, 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 a token benefit, thus transforming the relationship between one of reciprocity to an economic one.

The third question simply tests the overall impact of offering an incentive. There may not be much of a difference in response rates between the $50 group and the $200 group, and depending on the data, ANOVA testing for differences between all five groups could result in a null finding. Yet an ANOVA testing the control versus all 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 email 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 sample responded to the survey. Differences between the control group and incentive groups were quite small. Almost 14 percent of the control group responded, while overall 15.6% of respondents in the incentive groups participated in the survey.

To test for differences in response rates both following the initial email requesting survey participation, as well as at the end of survey administration, a series of chi-square tests were conducted. 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 non-linear, as it is clear from the response rates and the statistical tests that "more" is <u>not</u> better: response rates did not increase as the amount of the incentive increased. 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 non-linear effect may be suspect.

In addition to examining the effect of incentives on response rates, we also tested whether our experimental conditions had any effect 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. One way to test this hypothesis is to test item non-response between the experimental groups. If this is happening, we would expect lower item non-response for respondents in the incentive groups.

Our survey was adapted from the College Board's Admitted Student Questionnaire Plus and was comprised of six topics:

- Importance of college characteristics
- Characteristics ratings for the university
- Role of financial aid in the application process
- Images of the university;
- Number of applications mailed
- Demographic information

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 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 (1) the number of survey items completed, or (2) the mean responses given varied across the survey conditions. As in 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/non-response 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 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 (m = 16.75) than the control (m = 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 .5 items.

Analysis of the number of college applications found that respondents in the $200 incentive group applied to significantly more schools (m = 5.6) than the control (m = 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 - 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 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 $p < 0.05$), 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, 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 non-response 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 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 be effective, as respondents have few other reasons to participate. If respondents are very interested in a survey because of its content and thus are likely to respond, incentives may not have much of an impact beyond this interest.

It is also possible that given amount of the amount of spam and unwanted solicitation that are sent via email, 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 emails contained "institution.edu," sending a signal that we were members of a higher education institution (and thus increasing our credibility). The survey was also clearly located in the university domain.

The impact of the odds of winning a lottery is a further limiting factor for the study. In this study respondents could not estimate the odds of winning, as they had no idea how many other people had received an invitation to participate. For typical 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 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 minimal effect of post-paid incentives. This raises a 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?

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

Number of surveys with prizes	All schools		Private		Public	
	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%

Table 2. Types of Prizes Used

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%

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%

Table 4. Survey Experiment Groups

Group	N of High schools	N 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

Table 5. Initial and Final Response Rates by Incentive Group

Group	After 1st email	After 3rd email
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%

Table 6. Hypotheses and Tests for Differences in Response Rates

	Dependent variable: response rate					
	After 1st email			After 3rd email		
Hypothesis	c^2	*df*	*p*<	c^2	*df*	*p*<
Control ? $50 ? $100 ? $150 ? $200	4.27	4	0.371	4.30	4	0.367
Control ? $50	1.26	1	0.262	0.97	1	0.324
Control ? $100	1.03	1	0.310	**3.93**	**1**	**0.047**
Control ? $150	3.45	1	0.063	2.15	1	0.142
Control ? $200	2.97	1	0.085	1.74	1	0.187
Control ? all incentive groups combined	3.17	1	0.075	3.36	1	0.067

Table 7. Hypotheses and Tests for Differences in Item Non-Response

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.