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The Impact of Alternative Incentives on Response and Retention in a Mixed-Mode Survey

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THE IMPACT OF ALTERNATIVE INCENTIVES ON RESPONSE AND RETENTION IN A MIXED-MODE SURVEY

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Abstract

We examine the influence of incentives on response, retention, drop-out, completeness and speed of response, consistency of response and respondent characteristics in a mixed-mode survey in which initial contact was via regular mail and respondents completed the survey online. We study four incentive groups: no incentive, prepaid incentive (\$2), low promised incentive (lottery, 10 @ \$25), and high promised incentive (lottery, 2 @ \$250). Prepaid incentives extract the highest response and retention rates compared to no incentive and both promised lottery incentives. Lotteries only increase response and retention rates when of high value. High-prize lotteries result in speedier response while low-prize lotteries decrease response consistency. Cost-effectiveness analysis indicates that the high-prize lottery incentive was most cost-effective per completed survey.

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1.0 INTRODUCTION

Internet-based surveys offer a number of advantages over traditional mail surveys, including lower cost of administration, shorter response time between sending the survey and obtaining completed responses, and electronic data capture. Web surveys are well-suited for situations in which e-mail addresses of the target population are readily available, such as surveys of members of an organization or club, students registered with an educational institution, or on-line panelists (Göriz 2004, Porter and Whitcomb 2003, Kaplowitz, Hadlock and Levine 2004, Birnholtz 2004, Heerwegh 2006). Because validated response incentives designed for traditional mail surveys are sometimes not implementable in web-based surveys (and may not perform well even when possible), researchers have devised alternative response incentives for web-based surveys (Armstrong 1975, Linsky 1975, Church 1993 and Porter and Whitcomb 2003).

A mixed-mode of administration approach combines methods of standard mail surveys and web surveys (Bosnjak and Tuten 2003, Umbach 2004, Heerwegh 2006). Birnholtz et al., 2004, for example, test the mixed-mode administration approach. They examine the effectiveness of three invitation (paper via traditional mail or email) and incentive (cash via traditional mail or gift certificate via amazon.com) combinations in web-based surveys on response.

Mixed-mode methods, however, may have much broader applications in survey research. Many survey-based research studies require samples drawn from general populations for which e-mail contact information is not readily available. In such contexts, administering a web-based survey may benefit from a mixed mode of administration in which potential respondents are contacted using traditional mailed letters of invitation but then complete the survey on-line. The traditional letter mode of invitation to participate allows the researcher to draw samples using well-validated sources of contact information that include a large cross-section of the general population; the web-administration captures many of the benefits of electronic administration noted above.

It is unclear, however, what types of response incentives are most effective for mixed-mode surveys. Although the form of contact is that of a standard mail survey, the mode of response is that of a web-based survey. The literature documents unambiguously the most effective response incentive for standard mailed surveys — prepaid unconditional payment (Armstrong 1975, Linsky 1975, Church 1993, Porter and Whitcomb 2003, Göriz 2004, Su, Shao, Fang 2008) — but it does not follow that it will

be the preferred method for a mixed-mode survey. There is currently no consensus on the best type of response incentive for web-based surveys (Görizt 2006).

The paper presents the results of a controlled experiment designed to test the effectiveness of four response incentives in a mixed-mode survey of a general community population. Incentives can be categorized as prepaid or promised, monetary or nonmonetary and conditional or unconditional (Bosnjak and Tuten 2003, Duestskens 2004, Heerwegh 2006, Görizt 2006). The four incentives tested are: (1) no incentive (control group); (2) prepaid unconditional cash; (3) promised low-prize conditional lottery (hereafter referred to as low lottery); (4) promised high-prize conditional lottery (hereafter referred to as high lottery). The primary outcomes we examine include: response rate, retention rate, drop-out rate, response completeness and speed of access to and completion of the online survey (response rate, retention rate and response completeness are defined in accord with Görizt 2006). We also examine the impact of the incentives on the types of individuals who respond (e.g., age, gender, socio-economic status) and on the quality of their responses (as measured by response consistency specific to an instrument included in the survey). Finally, we calculate the cost-effectiveness of the different incentives, measured as the incremental cost per incremental survey completed as a result of an incentive.

Results indicate that when using a mixed-mode of administration, the prepaid incentive has the greatest impact on response and retention, with the high lottery eliciting the next highest response and retention rates. The low lottery did not increase response or retention rates compared to no incentive. Because of the differing costs of the incentives, however, the high lottery is notably more cost-effective than the prepaid incentive.

2..0 BACKGROUND CONTEXT FOR THE SURVEY AND THE INCENTIVES

The test of response incentives was embedded within a health-economic survey administered in the Province of Ontario, Canada during the period October 2009 – November 2009. Because the survey was designed to solicit the views of the general public regarding certain questions related to health care funding, it was important to survey a diverse cross-section of the population. It was acknowledged from the beginning that, given the resources available, it would not be possible to obtain a formally representative sample of the Provincial population, but it was desirable to obtain a reasonable approximation to this.

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We chose a mixed-mode of administration of the community survey for four principal reasons. First, a traditional mail survey was poorly suited for our questionnaire, which required that the participants complete the survey sequentially, never seeing the entire survey at once and that they not be able to go back and forth to change responses. A web-based survey could be designed to display questions one-at-a-time and not allow them to change responses. Second, we simultaneously administered the same survey to a convenience sample of university students for which web-based administration was the natural choice. Third, as noted already, web-based surveys can be less expensive (no printed, paper surveys; no return postal envelopes; no staff data entry), reduce data entry error, and reduce processing and data preparation time. These three factors all made web-based administration attractive. Full web-based administration suffered one big disadvantage, however: we did not have access to e-mail contact information for the general population, making it impossible to contact individuals electronically. A mixed-mode approach therefore allowed us to contact the general public while retaining the advantages of a web survey.

The survey itself consisted of three parts: (1) a set of 28 questions eliciting respondents' preferences regarding funding for health care; (2) a component that included a "values orientation" exercise developed by social psychologists to identify an individual's value orientation on the following scale: altruistic, cooperative, individualist, and competitive (Messick and McClintock 1968); and (3) a brief set of socio-economic and demographic questions.

The survey was mailed to a random sample of 3000 Ontario residents whose contact information (name, salutation, address and telephone number) was purchased from an independent, private market research company, InfoCanada, whose continuously updated information is drawn from telephone listings and various mailing lists.

The test of response incentives was embedded in the survey by randomly assigning each individual to receive one of the four different response incentives. The random assignment assures that any differences in response across the four incentive groups can be attributed to the response incentive. We describe the survey methods in more detail below.

3.0 CURRENT KNOWLEDGE REGARDING THE EFFECTIVENESS OF INCENTIVES

Response incentives have been studied extensively and are now conventionally used to improve response and retention rates (Edwards et al., 2002). In this section we briefly review evidence on incentives in both mail and web surveys.

Traditional Mail Surveys

Response incentives for traditional mail surveys have been studied over many years, and the general consensus in the literature is that prepaid monetary incentives have the highest positive effect on both response rates and retention rates (Armstrong 1975, Linsky 1975, Church 1993, Porter and Whitcomb 2003, Göritz 2004). In a meta-analysis of response in postal surveys, Edwards et al., 2002, for example, show that the odds of response are 2.02 times greater for a monetary incentive compared to no incentive and 1.71 times greater for a prepaid incentive compared to a promised incentive.

Web Surveys

The literature on use of response incentives in web surveys is smaller, still developing, focuses primarily on invitations by email contact only, and includes mixed findings so that no consensus currently exists on the best type of response incentive.

Prepaid Incentives

Similar to our study, Birnholtz (2004) utilizes a mixed-mode of administration to test the effect of three invitation and incentive combinations: paper invitation with cash incentive, paper invitation with gift certificate, and email invitation with gift certificate. His results are consistent with the findings on cash versus other incentives in mail surveys. Specifically, he finds that respondents who receive paper invitations with a cash incentive have higher response rates than those who receive an electronic gift certificate with either type of invitation. The author suggests that cash incentives have a higher net value to respondents since there are lower redemption costs. Bosnjak and Tuten (2003) explore four incentive groups: prepaid \$2 via PayPal, \$2 promised to be deposited upon completion via PayPal, promised lottery cash draw and a control group. They find that prepaid “electronic cash” incentives have no advantages with respect to response and retention rates over promised cash incentives or no incentive. The “electronic cash” was implemented by transferring money online to respondents using services, such as PayPal and Igain. The authors suggest that PayPal may not be familiar to many people, and as a result, they may not trust it. In addition, electronic cash is not tangible and requires effort (collection) to actually be useful to respondents.

Promised Incentives

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Overall the literature indicates that promised incentives in the form of lotteries are effective in increasing response rates for web-based surveys. Bosniak and Tuten (2003) found that the promised lottery cash draw increases both response and retention rate (compared to no incentive). They suggest that people now may have become socialized to associate such prize draws with web surveys. Duetskens et al., (2004) test three incentive groups, a voucher (electronic cash for one retailer only), promised incentives (lotteries) and donations to charitable organizations. They hypothesized that response rate would be highest for vouchers for the online store, followed by lotteries and then donations to a charitable organization. They find that the response rates for a voucher and a lottery are the same and that response time for the lottery was faster than for the voucher. They conclude that a lottery is the preferred incentive as it is the most efficient incentive design. Frickl, Bachtiger and Reips (2001) also find that lotteries help achieve a higher retention rate than a no-incentive control group. They suggest that announcing a lottery with prizes on the computer screen immediately before respondents begin an online survey dissuades them from dropping out. Heerwegh (2006) also finds that lotteries have a positive effect on the response rate, but not on the response speed. Porter and Whitcomb 2003, on the other hand, find that the differences in response rate between control and lottery groups are small.

The evidence is mixed with respect to the effect of different sizes of lottery prizes. Frickl, Bachtiger and Reips (2001), find that response rates between lottery prizes of different sizes are similar, but Su, Shao and Fang (2008) find that the response rates can be strongly affected by the magnitude of the cash draw, and Göritz (2004) argues that little is gained by choosing to raffle higher denominations of money. Duetskens (2004) argues that smaller lottery cash draws that allow for a higher chance of winning are most successful in increasing response rates. But this seems to suggest that the chances of winning may be as important a variable as is the size of the prizes. Our study seeks to add to this growing body of evidence on the effectiveness of lotteries.

4. METHODS

4.1 Survey Administration

As noted, our mixed-mode, community-based survey was conducted between October 2009 and November 2009 in the Province of Ontario, Canada. Invitation letters and administration procedures were designed and carried out using best practices for increasing response rate, for mail and web surveys (Edwards et al., 2002, Dillman 2007). Invitation letters were personalized with name, address and salutation and postage was hand-affixed using first class stamps rather than business

machine or stamp machine tape. The letters were printed on University affiliated, Department of Economics letterhead and the study website address for responding was explicitly university-based, lending legitimacy of origin. Finally, the letters were sent under the signature of the Principal Investigator, and his signature was printed in blue to give the appearance of a real signature.

The letter of invitation explained the substantive topic of research, invited respondents to participate in the study (with a response deadline), and provided both an individual 7-digit ID Code (i.e., H61130A) and a simple McMaster University web-address by which to respond. Potential respondents were invited to visit our online welcome page, enter their first name and ID Code to gain access and then complete the survey online.

The 7-digit ID codes were designed to restrict random access and prevent accidental use of another valid ID Code. Upon entering a valid ID Code, participants were automatically directed to the start of the survey, which was programmed in LimeSurvey and was housed on a University server. LimeSurvey programming automatically recorded the time respondents first visited the welcome page and entered their ID code, any subsequent visits, and the completion time. None of this programming was apparent to respondents – they saw only the welcome page requesting their ID Code and then the survey. Once a survey was completed, respondents were prevented from completing the survey again and were informed of this upon subsequent attempt.

Letters were mailed on October 6, 2009. Response was tracked and a second, follow-up letter was mailed three weeks later, on October 26, 2009. Follow-up letters were shortened slightly and were business posted, rather than hand-stamped. They contained the same website address and ID Code as the first letter. Returned non-deliverables were tracked in a central database until January 26, 2010 – two months after the second letter was sent.

4.2 Response Incentives

Respondents were randomly assigned to one of four response incentives. All invitation letters were identical except for the minor wording differences noted below associated with each response incentive.

1. **No incentive.** Respondents were provided no response incentive. This group serves as the control group for the test.
2. **Prepaid Cash Incentive.** Common, prepaid incentives were on the order of \$1 or \$2 included in the first mailing of a survey (Porter and Whitcomb 2003). For the prepaid cash

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incentive we enclosed \$2 with the letter of invitation, indicating that it was a token of our appreciation for their completion of the survey, but that the \$2 was theirs to keep whether or not they responded. The payment was in the form of a \$2 coin inserted into a small coin envelope lined with heavy cardstock in an effort to disguise the coin during mailing. It would have been preferable to use paper currency rather than a coin, but the lowest Canadian dollar bill denomination is \$5 and that would have been too expensive given the sample size. It took approximately one business day to stuff the coins.

3. **Two Promised Conditional Lottery Incentives.** Because there is currently no consensus regarding the effectiveness of lotteries with many small prizes versus lotteries with few large prizes, we tested two types of conditional lotteries.

a. *Low Lottery Cash Draw:* 10 prizes of \$25. The letter of invitation included the following statement: “As a token of our appreciation for your participation in this important study, upon your completion of the survey we will enter your name in a draw to win one of ten prizes of \$25. Your odds of winning will depend on the number of people who complete the survey but will not be less than 1 in 10.”

b. *High Lottery Cash Draw:* 2 prizes of \$250. The statement in the letter of invitation was identical to that noted above except, “. . . enter your name in a draw to win one of two prizes of \$250. Your odds of winning will depend on the number of people who complete the survey but will not be less than 1 in 50.”

While we could not state the precise odds a priori, we felt that providing the lowest odds of winning could improve response rates by informing respondents that they had a decent chance of winning (had it been necessary because of an unexpectedly large response rate, we were prepared to increase the number of prizes to ensure that the odds indeed were not less than those stated in the letter).

4.3 Outcome Measures

The primary outcome measures were response rate, retention rate, drop-out rate, and cost-per-completed survey. In addition, we also examined the effect of response incentives on response completeness, speed of response, consistency or response and respondent characteristics. The outcomes are defined as follows.

Response rate is the number of people who access the first page of the online survey (our “welcome page”) divided by the number of all eligible respondents. We define eligible respondents as all those to whom we mailed a deliverable invitation¹.

Retention rate is the number of respondents who complete the survey study divided by the number of all eligible respondents.

Drop-out rate is the proportion of respondents who do not complete the survey.

Response Completeness is the percentage of answered questions within the survey among all respondents. Respondents who answered all 61 questions have 100% response completeness.

Response Speed is the number of days it takes a respondent to begin and/or complete the survey. We describe speed in three ways. Our first measure of speed is *day begin*, which is the exact day during which the survey was begun (days 0-56); the second measure of speed is *day finish*, which is the exact day during which the respondent finished the survey (days 0-56); and the last measure of speed is *days to complete*, which is the number of days it took (from *day begin* to *day finish*) to complete the survey.

Values Orientation: In the survey we measure respondents’ *values orientation* using the technique developed by Messick and McClintock (1968). A series of 24 questions is presented asking respondents to choose between two options that divide money between themselves and one “other” individual with whom they are hypothetically matched. The values orientation technique allows for determination of whether participants display “cooperative”, “altruistic”, “individualistic” or “competitive” behaviour, when dividing money.

Response Consistency: Within the *values orientation* measure, we can determine how consistently respondents display “cooperative” or “individualistic” behavior. A measure of consistency is calculated, ranging from 0.0 (not at all consistent) to 1.0 (fully consistent).² We use this measure as an indication of consistency of response.

¹ Note: this includes individuals who may not have access to a computer and the internet, although we have no way of identifying these individuals and must assume they are eligible to respond.

² The *values orientation* decomposed game technique calculates a vector for each subject, with direction indicating *values orientation*, and length indicating consistent of that classified orientation. The consistency measure is calculated by dividing

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Respondent Characteristics: In the demographics section of the survey, we measure date of birth (age), gender, marital status, employment, household income, home ownership, self-assessed health status and health sector employment. We only have data on these characteristics for the 277 respondents who completed the survey because the demographics section was placed at the end of the survey.

4.4 Data Analysis

We compare each incentive group to the no incentive control group and conduct specific, paired comparisons between various incentive types to evaluate the effects of each incentive on response, retention and drop-out rates. We do so by way of direct comparisons and we report odds ratios. For our other two outcome measures, response completeness and speed, we conduct two-group mean comparison tests. We test the number of questions answered across incentive groups as well as speed of accessing the survey. We test for differences in characteristics by employing mean comparison tests. We utilize a contained measure of values orientation as a measure for consistency. Data were analyzed using both Stata (v10) and PASW (v18, formerly SPSS) statistical software packages.

5. RESULTS

5.1 Overall Response, Retention and Drop-out Rates

Of the 3000 invitation letters mailed, 6.2% (187/3000) were returned by the Post Office as undeliverable, making these individuals ineligible to participate in the survey (Table 1). We remove them from the analysis, leaving a final sample size of 2813. Almost all of these non-deliverables were due to residents having moved. Similar proportions of letters were returned within each of the incentive groups ($\chi^2 = 2.45$, $df=3$, $p=0.484$).

the length of a subject's vector by maximum length. Over the 24 decisions, a fully individualistic subject would, for example, keep the maximum possible \$20.00 for themselves and give \$0.00 to the "other". This subject would have a consistency measure of 1.0. A subject who, for example, displays fully cooperative behavior over all 24 decisions would give themselves a payment of \$14.10 and an identical \$14.10 payment to the other, also resulting in a consistency score of 1.0. But another subject making several inconsistent/uncooperative decisions might, for example, also give themselves only \$5.00 and the other an identical amount of \$5.00 and thus be classified as "cooperative" but would only have a consistency measure of 0.35.

As indicated in Table 1, 405 individuals responded and 277 completed the entire survey, leaving 128 who dropped out after starting the survey. These figures correspond to a response rate of 14.4%, a retention rate of 9.8% and a drop-out rate of 31.6%. Response rates differ between incentive groups ($\chi^2 = 75.53$, $df=3$, $p=0.000$); retention rates differ between incentive groups ($\chi^2 = 72.68$, $df=3$, $p=0.000$); and drop-out rates differ between incentive groups ($\chi^2 = 8.06$, $df=3$, $p=0.045$).

5.2 Tests of the Effectiveness of the Response Incentives

5.2.1 Response

Compared to no incentive, the odds of response are 3 times greater when respondents receive the prepaid incentive and 1.76 times greater when respondents are given the high lottery. The odds of response for respondents given the low lottery do not differ from those given no incentive.

Among the incentive groups, the odds of response are greater for the prepaid incentive group than either the low lottery incentive (OR = 2.79) or the high lottery incentive (OR = 1.75). The odds of response are greater for the high lottery than for the low lottery incentive (OR = 1.59).

Table 2 presents the results for response rates, retention rates and dropout rates. The top portion of the table compares each incentive group to the no-incentive group; the bottom portion compares the incentive groups against each other. All results are reported in terms of odds ratios.

5.2.2 Retention

Compared to the no-incentive group, prepaid incentives increase the odds of a respondent completing the survey by almost 3.5 times; and the high lottery increases the odds by almost 2 times. The odds of retaining respondents who are given the low lottery do not differ from those who are given no incentive.

The odds of retaining a respondent given the prepaid incentive are 3.51 times greater than for a respondent given the low lottery, and 1.74 times greater than for a respondent given the high lottery. The odds of retaining a respondent who receives the high lottery are 2.02 times those of retaining a respondent who receives the low lottery.

5.2.3 Drop-Out

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Most of the comparisons for drop-out rate are not statistically significant, indicating that the different response incentives did not have a large impact on drop-out rates. The one exception is low lottery: the odds of dropping out are 2 times greater for participants who received the low lottery than for those who received either the prepaid incentive (OR: 0.47) or the high lottery (OR: 0.51).

5.2.4 Cost-per-completed Survey

In Table 3, we provide information concerning the cost effectiveness of the different incentives. There were two basic types of costs: the costs of mailing letters, which includes supplies, printing and postage, and the costs of the incentives. The mailing costs were identical for all four incentive groups: 750 respondents in each group received two letters at an estimated cost of \$0.80 per letter, which equals \$1200 per group. Incentive costs differed across the four groups. Incentive costs were zero for the no-incentive group. The costs of the prepaid incentives were \$1500: 750 potential respondents received a \$2 prepaid incentive. Incentive costs for the low lottery were \$250: 10 prizes of \$25 were awarded. And incentive costs for the high lottery were \$500: 2 prizes of \$250 were awarded. The number of respondents was 40, 122, 39 and 76 respectively, leading to average costs per completed survey of \$30.00 for the no incentive group, \$22.13 for the prepaid incentive group, \$37.18 for the low lottery group and \$22.37 for the high lottery group. The cost-per-completed survey was nearly identical for the prepaid and high lottery.

This, however, is not the relevant cost for determining the economic attractiveness of the different incentives. To assess the economic attractiveness, we want to know the incremental cost-effectiveness: how much extra did an incentive cost per additional completed survey for each of the incentive designs (Drummond et al., 2005) . For each incentive we therefore compare the additional costs compared to no incentive and the additional completed surveys compared to no incentive:

$$\text{Cost-effectiveness} = \frac{(\text{totalcost}_{\text{incentive}} - \text{totalcost}_{\text{noincentive}})}{(\text{completed}_{\text{incentive}} - \text{completed}_{\text{noincentive}})}$$

For example, the additional cost of the prepaid incentive was \$1500 (\$2700-\$1200) and the number of additional completed surveys was 82 (122-40), implying that the additional cost per additional completed survey is \$18.29. The analogous figures for low lottery and high lottery are -\$250 and \$13.89. (The negative sign for the low lottery reflects the fact that we spent more money and obtained fewer completed surveys.) By this cost-effectiveness criterion — the criterion that should be used to obtain the most completed surveys for a given budget —the high lottery is the preferred incentive scheme. We should note that these calculations ignore the labour costs of stuffing the prepaid incentive in envelopes and of making the lottery draws and sending out the lottery prizes.

However, these labour costs were substantially higher for the prepaid incentives, so these estimates are conservative and including such costs would make the high lottery incentive even more economically attractive relative to the prepaid incentive.

5.2.5 Response Completeness

The number of completed questions among the 405 respondents differs significantly across incentive groups. On average, respondents given the low lottery who began the survey completed 35.5 questions out of 61 (58%). This differs significantly from the respondents given the prepaid incentive (46 questions or 75%, $p=0.007$) and the high lottery (44.3 questions or 73%, $p=0.042$). These differences are due primarily to the higher retention rates for the prepaid group and the high-lottery group.

When examining the number of completed questions among the 128 respondents who dropped out, we find no statistically significant differences between incentive groups. A majority, 66%, of these drop-outs did not answer any of the 61 questions. The remaining respondents completed between 1 and 37 questions, with an average of 2.9 (4.75%) questions completed.

5.2.6 Speed of Response

The survey was active for 56 days. Respondents were permitted to login an unrestricted number of times and complete the survey at any point within these 56 days. With one exception we find no statistically significant effects on any of our three measures of speed. The exception is that the measure day begin differs between the no incentive control group and the high lottery incentive group. Respondents given the high lottery incentive began the survey, on average, 4 days earlier than those given no incentive (15.2 vs. 19.4 days, $p= 0.049$).

5.2.7 Consistency of Response

We find some differences in the consistency of response to the values orientation questions across the incentive groups. Respondents who received no incentive have the highest consistency scores, on average (0.81); consistency was equal for those given a prepaid incentive (0.76) and high lottery (0.77); and it was lowest for those given the low lottery (0.64). Consistency scores do not differ significantly between the no incentive, high lottery, and prepaid incentive groups. Consistency does differ significantly, however, between the low lottery group and all others collectively (0.77 v 0.64,

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F=9.412, P=0.002), and between the low-lottery and each of the other groups: low lottery vs. no incentive group (0.81 v 0.64, F=8.520, P=0.005); low lottery vs. high lottery group (0.77 v 0.64, F=6.289, P=0.014), and low lottery vs. prepaid incentive group (0.76 v 0.64, F=5.764, P=0.018).

5.2.8 Respondent Characteristics

We tested for differences in respondent characteristics across incentive groups and find no statistically significant differences with respect to gender, marital status, employment, housing ownership, education, household income, health status and health sector employment. The only characteristic for which there was a significant difference in age. The average age of respondents is 51 years old. Respondents given no incentive tended to be older on average (58.3, p=0.000) than those given the prepaid incentive (48.7, p=0.000) or the high lottery incentive (50.6, p=0.003).

Participants can be classified as having “cooperative” (63.9%), “individualistic” (26.0%), “altruistic” (6.5%) or “competitive” (1.1%) values. There were no significant differences across incentive groups with respect to values orientation, though there was a trend in which respondents who received no incentive were on average slightly more cooperative (70%) and less altruistic (2.5%) than others, and; those who received the low lottery were slightly more individualistic (28.2%) than others.

5. DISCUSSION AND CONCLUSION

The effects we observe across the incentive types in this mixed-mode survey are generally consistent with the broader literature on incentives. The finding that a prepaid incentive is most effective for increasing response and retention rate is consistent with the evidence from traditional mail surveys. The finding that the high lottery was also effective – even if not quite as effective as the prepaid payment – is consistent with the findings from the literature on web surveys. Both clearly dominated no incentive and, in this instance, a low lottery. Our prepaid incentive was quite modest (\$2), which suggests that the effectiveness of prepaid incentives may derive not so much from the value of the money provided as from the fact that any money at all is provided. It may also be that prepaid cash incentives work well in part because they have a high net value to the respondent since there are close to no redemption costs associated with collecting the money (Birnholtz et al., 2004).

Quite apart from the different administrative and logistical requirements, our findings suggest that a prepaid incentive and a high lottery are best suited to different contexts. The prepaid incentive was most effective in garnering high response and retention rates. This implies that it should be the

incentive of choice when a high response rate per se is desired and costs are not a tight constraint. For example, when attempting to obtain as many responses as possible from a fixed, known, targeted group of individuals, such as members of a club or some similarly defined population. In contrast, the high lottery is better suited to situations in which the researcher wants to obtain as many responses as possible given a fixed budget. If the prepaid incentive is more effective, the high lottery is more cost-effective, or efficient.

The literature is mixed with respect to the question of whether high lotteries are more effective than low lotteries (Su, Shao and Fang 2008, Grritz 2004 and Deutskens et al., 2004). Our results are consistent with high lotteries being more effective but they do not provide a clean, head-to-head test of low and high lotteries. The cleanest test of this would compare two lotteries that had the same expected value to respondents. In our case, however, the high lottery has a higher expected value (approximately \$5.00) than the low lottery (approximately \$2.50). Hence, it is perhaps not surprising that the high lottery was more effective than the low lottery. It was surprising, however, that the low lottery did no better than the no incentive group.

Our results with respect to speed of response are not entirely consistent with the literature, though the evidence in the literature tends to display mixed effects. We find that the high lottery elicits faster response and completion times than the no-incentive control group, but that it did no better than the low lottery and the prepaid incentive (neither of which differed from control). While Shao and Fang (2008) find that increasing the amount of the material incentive can increase speed of response, and Bosnjak and Tuten (2003) find that the speed of response is lowest for a prepaid incentive, our prepaid group did not differ from the control. Heerwegh (2006) finds that lotteries do not increase response speed. We also find that the prepaid incentive has no effect on speed of response. We also do not find that females tend to respond earlier (Grritz and Stieger 2009).

The finding that age is the only difference between incentive groups with respect to the characteristics of respondents is good news. The age difference between the no-incentive group and the incentives is not surprising. Older respondents might be expected to have a lower price of their time.

We are unaware of previous attempts to look at a possible impact of incentive on consistency of responses, which is one aspect of quality. Consistency of response, as measured by consistency of response to our values orientation questions, was lowest among those offered the low lottery incentive and highest among the unpaid control group. The latter is as might be expected since those among the no incentive group who complete the survey are highly self-motivated.

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Finally, although our sample was not formally representative of the Provincial population, a comparison of the characteristics of our respondents against the 2006 census reveals that the mixed-mode approach elicited a pool of respondents that is broadly similar to the general Ontario population with respect to income, home ownership, employment status, marital status and health sector employment. Our sample differs slightly from the Ontario population with respect to age, gender and education, in the following ways: a) we have fewer younger people, leading to a slightly higher mean age; b) we have a lower proportion of females, and; c) we have a higher proportion of university educated respondents. We provide a summary of the characteristics of our sample in Table 4. These variations affect participants in all four incentive groups equally. The higher mean age in our sample likely derives primarily from the fact that the original sampling frame is based largely on residential telephone listings. Younger people may tend to have cell phones, not residential “land lines” and our original sampling frame may have been somewhat biased towards older people. Our pool of completed respondents includes a higher proportion of males (60%) than is present in the general population. We also have a higher proportion of educated people than proportionally exists in Ontario. Both of these patterns are consistent with the findings of Dillman (2009), who indicates that educated males tend to respond more to online surveys than do females or less educated people.

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Tables

TABLE 1
Summary of Results for Primary Outcomes

	<i>Incentive Group</i>				Total
	No Incentive	Prepaid Incentive (\$2)	Low Lottery (10x\$25)	High Lottery (2x\$250)	
Letters Mailed	750	750	750	750	3000
Undeliverable	45	45	56	41	187
Deliverable	705	705	694	709	2813
Response Rate %	9.1 (n=64)	23.5 (n=166)	9.9 (n=69)	15 (n=106)	14.4 (n=405)
Retention Rate %	5.7 (n=40)	17.3 (n=122)	5.6 (n=39)	10.7 (n=76)	9.8 (n=277)
Drop-Out Rate %	37.5 (n=24)	26.5 (n=44)	43.5 (n=30)	28.3 (n=30)	31.6 (n=128)

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Table 2: Effect of Incentive on Response, Retention and Drop-out

	Response	Retention	Drop-Out
<i>Comparison with NO Incentive</i>			
Prepaid Incentive (\$2)	3.08 (2.25, 4.23; p=0.000)	3.48 (2.38, 5.09; p=0.000)	0.60 (0.32, 1.11; p=0.102)
Low Lottery (10x\$25)	1.11 (0.77, 1.58; p=0.582)	0.99 (0.63, 1.56; p=0.965)	1.28 (0.64, 2.58; p=0.485)
High Lottery (2x\$250)	1.76 (1.26, 2.45; p=0.000)	1.99 (1.34, 2.98; p=0.000)	0.66 (0.34, 1.28; p=0.213)
<i>Incentive vs. Incentive</i>			
Prepaid (\$2) vs. Low Lottery (10x\$25)	2.79 (2.05, 3.79; p=0.000)	3.51 (2.39, 5.16; p=0.000)	0.47 (0.26, 0.85; p=0.011)
Prepaid (\$2) vs. High Lottery (2x\$250)	1.75 (1.34, 2.29; p=0.000)	1.74 (1.28, 2.37; p=0.000)	0.91 (0.53, 1.58; p=0.746)
High Lottery (2x\$250) vs. Low Lottery (10x\$25)	1.59 (1.15, 2.20; p=0.004)	2.02 (1.35, 3.02; p=0.000)	0.51 (0.27, 0.98; p=0.039)

Note: Each cell lists: Odds Ratio (95% Confidence Interval; p-value)

Table 3: The Effect of Costs on Incentives

<i>1) Average Costs of One Completed Survey</i>	No Incentive	Prepaid Incentive (\$2)	Low Lottery (10 x \$25)	High Lottery (2 x \$250)
Mailing Costs (750 letters @ 2 mailings @ \$0.80 per letter) =	\$1200	\$1200	\$1200	\$1200
Cost of Incentive	none	\$2 x 750 = \$1500	10 x \$25 = \$250	2 x \$250 = \$500
Total Costs	\$1200	\$2700	\$1450	\$1700
Number of Completed Surveys	40	122	39	76
Average Cost per Completed Survey (Total Costs / Number of Completed Surveys)	\$30.00	\$22.13	\$37.18	\$22.37
<i>2) Incremental cost per single response using incentives</i>				
Additional costs	Baseline	\$1500	\$250	\$500
Additional Responses (n)	n/a	82	-1	36
Cost per additional response (Additional Responses / Additional Costs)	n/a	\$18.29	Dominated by No Incentive	\$13.89

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TABLE 4
Sample Description

	<i>Incentive Group</i>			
	No Incentive Total N=40	Prepaid Incentive (\$2) N=122	Low Lottery (10x\$25) N=39	High Lottery (2x\$250) N=76
N=277				
Mean Age (sd)	58.4 (12.6)	48.7 (14.3)	52.5 (13.6)	50.6 (13.4)
51.1 (14.0)				
Gender				
<i>Female</i>	13 (33%)	55 (45%)	13 (33%)	31 (41%)
112 (40%)				
<i>Male</i>	26 (65%)	65 (53%)	26 (67%)	45 (59%)
162 (58%)				
<i>Prefer not to respond</i>	1 (2%)	2 (2%)	0 -	0 -
3 (2%)				
<i>Total</i>	40	122	39	76
277				
Education				
<i>>Secondary School</i>	2 (5%)	6 (5%)	1 (3%)	0 -
9 (3%)				
<i>Secondary School</i>	8 (20%)	24 (19%)	6 (15%)	10 (13%)
48 (17%)				
<i>Post-secondary</i>	11 (27%)	36 (30%)	12 (31%)	30 (40%)
89 (32%)				
<i>graduate</i>				
<i>(College, apprenticeship,</i>				
<i>trade diploma or certificate)</i>				
<i>University graduate</i>	19 (48%)	50 (41%)	20 (51%)	32 (42%)
121 (44%)				
<i>Prefer not to respond</i>	0 -	6 (5%)	0 -	4 (5%)
10 (4%)				
<i>Total</i>	40	122	39	76
277				

Health Status

<i>Excellent</i>	8 (20%)	26 (21%)	8 (20%)	13 (17%)
55 (20%)				
<i>Very Good</i>	16 (40%)	49 (40%)	14 (36%)	34 (45%)
113 (41%)				
<i>Good</i>	15 (38%)	37 (31%)	10 (26%)	23 (30%)
85 (31%)				
<i>Fair</i>	1 (2%)	4 (3%)	5 (13%)	5 (7%)
15 (5%)				
<i>Poor</i>	0 -	6 (5%)	2 (5%)	1 (1%)
9 (3%)				
<i>Prefer not to respond</i>	0 -	0 -	0 -	0 -
0 -				
<i>Total</i>	40	122	39	76
277				

Marital Status

<i>Single</i>	0 -	14 (12%)	3 (8%)	11 (14%)
28 (10%)				
<i>Married</i>	30 (75%)	89 (73%)	32 (82%)	56 (74%)
207 (75%)				
<i>Divorced</i>	8 (20%)	15 (12%)	3 (8%)	3 (4%)
29 (10%)				
<i>Widowed</i>	2 (5%)	1 (1%)	1 (2%)	2 (3%)
6 (2%)				
<i>Prefer not to respond</i>	0 -	3 (2%)	0 -	4 (5%)
7 (3%)				
<i>Total</i>	40	122	39	76
277				

Employment Status

<i>Part-time</i>	4 (10%)	14 (12%)	4 (10%)	12 (16%)
34 (12%)				
<i>Full-time</i>	20 (50%)	72 (59%)	24 (62%)	40 (53%)
156 (56%)				
<i>Not employed</i>	1 (3%)	9 (7%)	2 (5%)	6 (8%)
18 (7%)				
<i>Retired</i>	14 (34%)	20 (16%)	9 (23%)	17 (22%)
60 (22%)				
<i>Prefer not to respond</i>	1 (3%)	7 (6%)	0 -	1 (1%)
9 (3%)				

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<i>Total</i>	40	122	39	76
277				

Home Ownership

<i>Own</i>	38 (95%)	93 (76%)	31(79%)	64 (85%)
226 (81%)				
<i>Rent</i>	2 (5%)	17 (14%)	7 (18%)	4 (5%)
30 (11%)				
<i>Other</i>	0 -	4 (3%)	0 -	4 (5%)
8 (3%)				
<i>Prefer not to respond</i>	0 -	8 (7%)	1 (3%)	4 (5%)
13 (5%)				
<i>Total</i>	40	122	39	76
277				

Household Income

<i>No income</i>				
<i>>\$20,000</i>	1 (3%)	6 (5%)	3 (8%)	3 (4%)
13 (5%)				
<i>\$20,000-\$49,000</i>	8 (20%)	19 (16%)	2 (5%)	9 (12%)
38 (14%)				
<i>\$50,000-\$99,000</i>	15 (37%)	41 (33%)	18 (46%)	30 (39%)
104 (37%)				
<i>\$100,000 or ></i>	8 (20%)	34 (28%)	5 (13%)	10 (13%)
57 (21%)				
<i>Prefer not to respond</i>	8 (20%)	22 (18%)	11 (28%)	24 (32%)
65 (23%)				
<i>Total</i>	40	122	39	76
277				

Health Sector Employment

<i>Yes</i>	8 (20%)	25 (20%)	6 (15%)	17 (22%)
56 (21%)				
<i>No</i>	31 (77%)	95 (78%)	33 (85%)	58 (77%)
217 (78%)				
<i>Prefer not to respond</i>	1 (3%)	2 (2%)	0 -	1 (1%)
4 (1%)				
<i>Total</i>	40	122	39	7
