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The original publication is available at www.springerlink.com:

http://dx.doi.org/10.1007/s10654-010-9434-8
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Postprint available at: Linköping University Electronic Press
http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-55054
Can incentives undermine intrinsic motivation to participate in epidemiologic surveys?

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Abstract

Response rates to surveys are decreasing. The purpose of this study was to evaluate the use of lottery tickets as incentives in an epidemiologic control group. A self-administered questionnaire was sent to parents in the municipality of Stockholm, Sweden, who were to be used as a control group in a study addressing stress in parents of children with cancer. A stratified random sample of 450 parents were randomized into three incentive groups: (a) no incentive; (b) a promised incentive of one lottery ticket to be received upon reply; (c) a promised incentive of one lottery ticket to be received upon reply and an additional lottery ticket upon reply within 1 week. The overall response rate across the three groups was 65.3%. The response rate was highest in the no incentive group (69.3%) and lowest in the one plus one lottery ticket group (62.0%). In a survival analysis, the difference between the two response curves was significant by the log-rank test (p=0.04), with the no incentive group having a shorter time to response than the incentive group. Our findings suggest that the use of lottery tickets as incentives to increase participation in a mail questionnaire among parents may be less valuable or even harmful. Incentives may undermine motivation in studies in which the intrinsic motivation of the respondents is already high.

Keywords: Data collection, incentives, participation, response rate, self-administered questionnaire, survey.
Introduction

A self-administered questionnaire is an inexpensive and convenient method for collecting self-reported data. Such questionnaires also have some advantages for the respondents; they can choose the time and place to complete the questionnaire in privacy. However, declining response rates are becoming a serious issue when using self-administered questionnaires and this may lead to non-response bias [1, 2]. Considerable efforts have been made to increase participation in self-administered questionnaires [3].

The use of incentives, which can be monetary or non-monetary, prepaid or promised, has been proposed as a method of increasing response rates. Prepaid cash incentives have been found to be most effective [4-6]. Prepaid incentives presumably function through inducing feelings of obligation to return the questionnaire, which makes this strategy less ethically attractive. Promised incentives have been found to have a positive effect in some studies and no effect in others [7]. As postal authorities often advise against sending cash by mail, an alternative approach to cash incentives is the use of lottery tickets. Some studies have found lottery tickets to have a positive influence on response rates [8, 9] other studies found no effect [10].

In epidemiologic studies, response rates are often higher among patients than among control groups [11]. Therefore, incentives are often used in control groups to compensate for the lower propensity to respond. In control groups, experiences of the effects of incentives differ [12-14].

The general purpose of this study was to evaluate the use of lottery tickets as incentives in an epidemiologic control group in a survey about stress.
Materials and methods

This study was conducted as a randomized experiment among controls for a study using a self-administered questionnaire that addressed stress in parents of children with cancer [15]. The study was approved by the Ethics Committee at Karolinska Institutet, Stockholm, Sweden.

Data collection

Inclusion criteria were being a parent of at least one child (aged between 2 months and 16 years) and residing in the municipality of Stockholm, Sweden. A stratified random sample of 225 male and 225 female parents was taken from the Swedish national register of personal addresses (SPAR, Statliga personadressregistret). The two strata were randomized separately into three subgroups each including 75 women and 75 men: (a) no incentive; (b) a promised incentive of one lottery ticket to be received upon reply; (c) a promised incentive of one lottery ticket to be received upon reply and an additional lottery ticket upon reply within 1 week. Scratch lottery tickets worth 10 Skr (at the time of data collection in March 2008 about US$1.6) were used, with the chance of a prize of up to 200 000 Skr (in March 2008 about US$33 180). A cover letter was sent with the questionnaire explaining that the purpose of the survey was to determine the levels of stress and burnout in parents in general, and among parents of children with cancer. The logo of the Children’s Cancer Foundation of Sweden was used on the cover letter and the letters were identical between the groups except for the information on the incentives. The initial invitations were posted on the same date in May 2005. A postage-paid self-addressed return envelope was provided together with a slip that recipients could return if they chose not to participate. Reminders were sent on three occasions at 1, 3 and 6 weeks after the initial invitation to those who had not returned the questionnaire or the non-participation slip. The reminders differed only
regarding the information on the incentives; the information for the two incentive groups was the same since the extra incentive for quick response was no longer valid.

**Measurements**

The questionnaire consisted of five pages, with questions on background (e.g. age, education, perceived economic strain), and three scales assessing subjective perceptions of stress, burnout and strain: the Perceived Stress Scale (PSS) [16], the Shirom–Melamed Burnout Questionnaire (SMBQ) [17] and the Swedish Demand-Control-Support Questionnaire (DCSQ) [18].

**Data analysis**

The response rate was defined as the proportion responding with corresponding 95% confidence intervals. The chi-squared test for homogeneity was used to compare two proportions and a *p*-value of less than 0.05 (two-sided) was considered significant. The number of days until response was used as the time to event in a survival analysis. Kaplan–Meier curves are presented to illustrate the time to response and the difference between two curves was tested by the log-rank test. The assumption of proportional hazards was checked by correlating the corresponding set of scaled Schoenfeld residuals with the function of time as proposed by Grambsch and Therneau [19]. The two incentive groups were combined into one group in the survival analysis, since the offer of incentive was identical after the first 7 days.

**Results**

**Response rate**

The overall response rate across the three groups was 65.3% (95% CI 60.7–69.7). The response rate was highest in the no incentive group and lowest in the one plus one lottery ticket group.
The difference was greatest after 3 days ($\chi^2=22.23$, 1 df, $p<0.001$, one or two lottery tickets compared with no incentive).

The difference between the experimental groups was larger among men than women. The number of refusers (persons returning the non-participation slip) and the number of non-respondents (persons neither returning the questionnaire nor the non-participation slip) were higher in the incentive groups compared with the no incentive group. The response rate was highest in the no incentive group throughout the data collection period (Figure 1).

The final response rate was 69.3% (95% CI 61.3–76.6) in the no incentive group, and 63.3% (95% CI 57.6–68.8) in the combined incentive group. In a survival analysis, the difference between the two response curves was significant by the log-rank test ($p=0.04$), with the no incentive group having a shorter time to response than the incentive group (Figure 2). Moreover, the two groups reached a plateau after 30 days, after which very few additional responses were received. Only 5% of responses in the no incentive group and 3% of responses in the incentive groups were received after 30 days.

Discussion

The discussion regarding the usefulness of incentives has often focused on cost-effectiveness. However, the results of this study raise the question of whether incentives can even harm response rates in some surveys.
Although incentives have been shown to increase response rates in many surveys, a number of studies have reported no significant improvement [3]. Taking a closer look at these studies, it appears that several epidemiologic surveys actually report non-significant negative results [7, 13, 20, 21]. Indeed, even prepaid cash incentives, which are usually successful, have been reported to have a negative effect on response rates among patients [14]. The question has been raised of whether factors influencing the respondent in a negative way are activated when incentives are offered in health-related surveys [9, 14, 20]. Blomberg and Sandell reported that participants’ views of incentives differ considerably in consumer research and in health-related research [20]. What may be an acceptable manipulation in consumer research may be found disrespectful and unworthy in health-related research. Other authors suggest that monetary incentives may insult or annoy respondents, that respondents may find incentives to be an inappropriate expenditure of funds directed towards research, and that participants view incentives with the suspicion of an ulterior motive of the research [12, 14, 22]. Robertson et al found negative reactions among general practitioners [9].

Several models on survey participation have been suggested [23, 24]. Although such models have expanded our knowledge on how to increase response rates in many surveys, they do not seem able to offer an explanation for the lower response rate sometimes seen among people receiving an incentive. Some authors have suggested that methods to improve response rates may work differently in health-related studies compared with other types of surveys [21, 25]. Hypothetically, such a difference may be related to the initial motivation to participate. Since health and health-care issues are relevant to many people, health-related surveys may have the advantage of high interest and willingness to contribute to medical research. To understand this, we may go to the theoretical framework of self-determination, which distinguishes between different types of motivation [26]. According to this theory, the increasing degree of motivation
ranges from amotivation via controlled extrinsic motivation to autonomous extrinsic motivation and intrinsic motivation. An amotivated person sees no value in the task or activity he/she is asked to perform, or does not feel competent enough to perform the task. A person with controlled extrinsic motivation complies with the request solely, for example, to get an external reward or to avoid embarrassment. An autonomous extrinsically motivated person, on the other hand, sees the value for society or for him-/herself, whereas an intrinsically motivated person finds the task itself enjoyable and interesting. Intrinsic and extrinsic motivation have been widely studied in organisational practices [27]. In these fields of research, incentives have been found to have an unwanted effect by undermining intrinsic motivation, and thus in effect decreasing the probability of the target behaviour [28]. To our knowledge, self-determination theory has not been applied to survey research. However, if these theories are applicable in this field, incentives should be less useful or even counterproductive in increasing participation in surveys with high autonomous extrinsic or intrinsic motivation. Considering the high participation in the non-incentive group in the present study, we may suppose that autonomous extrinsic or intrinsic motivation might have been high initially among the parents. The fact that the logo of the Children’s Cancer Foundation of Sweden was used might also have contributed to a high motivation, since this is one of the most popular organizations for private donations and charity contributions in the country.

The limitations of the present study include the fact that, although fairly large as a control group in childhood cancer research, the sample is quite small in an experimental context. The randomization was done within the two strata (men and women) because men usually have lower response rates than women. Because the age range among parents is homogeneous in aspects of survey response, we did not stratify by age. We find it unlikely that the randomization would cause large differences regarding age or other demographic variables although no data are
available on the comparability of the randomized groups. In addition, these findings were obtained from parents of underage children and may not apply to other populations.

Previous reports have been inconsistent on the advantage of using incentives to enhance the response rate in epidemiological surveys. Our findings suggest that the use of lottery tickets as incentives to increase participation in a mail questionnaire among parents may be less valuable or even harmful. A possible explanation might be that incentives undermine motivation in studies in which the intrinsic motivation of the respondents is high. As motivation was not assessed in this study, this could be an interesting challenge for future research.

**Funding**

This work was supported by the Children’s Cancer Foundation of Sweden [RKT05/006].

**Acknowledgements**

The authors gratefully acknowledge the time and energy contributed by the participating parents – with or without incentives.
References


**Figure 1** Day by day cumulative response rate for the three experimental groups.

**Figure 2** Kaplan-Meier curve of time to response.
Figure 1
Incentive, non-response = 0.367
No incentive, non-response = 0.307

Figure 2
Table 1 Response rate, refusers and non-respondents by incentive group (N=450)

<table>
<thead>
<tr>
<th></th>
<th>No incentive (N=150)</th>
<th>One lottery ticket (N=150)</th>
<th>One plus one lottery ticket a (N=150)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
<td>% (95% CI)</td>
</tr>
<tr>
<td>Response within 3 days</td>
<td>34.0 (26.5–42.2)</td>
<td>8.0 (4.2–13.6)</td>
<td>20.7 (14.5–28.0)</td>
</tr>
<tr>
<td>Response within 7 days</td>
<td>55.3 (47.0–63.4)</td>
<td>48.0 (39.8–56.3)</td>
<td>49.3 (41.1–57.6)</td>
</tr>
<tr>
<td>Final response rate</td>
<td>69.3 (61.3–76.6)</td>
<td>64.7 (56.4–72.3)</td>
<td>62.0 (53.7–69.8)</td>
</tr>
<tr>
<td>Men</td>
<td>66.7 (54.8–77.1)</td>
<td>62.7 (50.7–73.6)</td>
<td>54.6 (42.8–66.2)</td>
</tr>
<tr>
<td>Women</td>
<td>72.0 (60.4–81.8)</td>
<td>66.7 (54.8–77.1)</td>
<td>69.3 (57.6–79.5)</td>
</tr>
<tr>
<td>Refusers b</td>
<td>9.3 (5.2–15.2)</td>
<td>10.0 (5.7–16.0)</td>
<td>11.3 (6.7–17.5)</td>
</tr>
<tr>
<td>Non-respondents c</td>
<td>21.3 (15.1–28.8)</td>
<td>25.3 (18.6–33.1)</td>
<td>26.7 (19.8–34.5)</td>
</tr>
</tbody>
</table>

aTwo lottery tickets if response received within 7 days of invitation.

bRecipients returning the non-participation slip.

cRecipients returning neither the questionnaire nor the non-participation slip.