Household Early Bird Incentives: Leveraging Family Influence to Improve Household Response Rates

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Abstract

The effects of incentives on survey participation have been found in previous research to be dependent on both the survey context and respondent characteristics. In this study, we report the results of an experiment in which we expand the source of leverage to include other members of the household to assess whether adding incentives for completion by all eligible members of a sampled household has a substantial and differential effect on survey participation. The experiment was conducted among six communities that participate in the Racial and Ethnic Approaches to Community Health Across the U.S. (REACH U.S.) Risk Factor Survey (RFS). Addresses were randomly assigned to one of the following groups prior to data collection: (1) control with no incentive, (2) a group that receives a $5 prepaid incentive, or (3) a group that receives the $5 prepaid incentive with a promised $20 payment if all eligible members of the household respond within 7 days of initial contact. We examine key survey performance rates including the interview completion rate to assess whether the household level incentive has any additional impact on the willingness to complete a survey.

Key Words: Incentives, REACH U.S., leverage-saliency, participation, address-based sampling, declining response rates

1. Introduction

Incentives to encourage respondents to take part in surveys have long been part of both initial and responsive survey designs (Singer, 2002; Axinn, Link, & Groves, 2011; Groves, Singer, & Corning, 2000). The timing, size, and nature of the incentives have not been found to be globally and consistently related to survey response propensity, although under some circumstances and for some populations, they are successful (Singer, Gebler, Raghunathan, Van Hoewyk, & McGonagle, 1999). Groves, Singer, and Corning (2000) developed a conceptual model they describe as a leverage-saliency theory of survey participation to reconcile these disparate findings. Groves et al. suggest that incentives as part of survey design interact with other aspects of the general design and characteristics of the respondents to influence the decision individuals make to respond to the survey request. Most incentive experiments and subsequent evaluations, however, assume that the incentive will act similarly across all subgroups in the respondent population and can be generalized beyond the design and target populations. There has been subsequent research that supports the leverage-saliency theory and finds that a nuanced approach to evaluating incentives is a more effective method for understanding both the conceptual and practical applications of research on survey incentives (Kropf & Blair, 2005; Ryu, Couper, & Marans, 2006; Trussell & Lavrakas, 2004).

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For this study, we use data from an experiment conducted in the context of a larger community-based survey of health risk behaviors for the Centers for Disease Control and Prevention (CDC) in 2011-2012 to test an aspect of the leverage-saliency theory. The experimental incentive we evaluate is both paid in advance with an additional incentive promised for ensuring all selected members of the household complete the interview within 7 days. In addition to assessing whether this is a successful strategy, we test whether the characteristics of the household may predispose household members to view the incentive differently. An incentive aimed at the household level capitalizes on the ability of members of households, who are likely to be members of a family, to influence the response propensities of others. There is no prior research to identify household characteristics that may increase the likelihood that members of the household will be more likely to respond when there are incentives in place to motivate all members. We suggest that households where the members are part of a single family will be more likely to respond collectively to the incentive.

Our analytic goals include:

(a) Do incentives for timely responses improve screener and interview completion rates overall and within the specified time frame?
(b) Do household characteristics modify response propensities for all members and members of households individually?
(c) Does the population responding to incentives differ substantially from other respondents on key health indicators?

2. Data and Methods

In this section, we describe the data source for this study and the embedded experiment we exploit to understand whether this type of incentive leverages different parts of the respondent population. We then describe our analytic strategy and the variables we use in our modeling endeavors.

2.1 REACH U.S. Risk Factor Survey Design

The data were collected from the Racial and Ethnic Approaches to Community Health Across the U.S. (REACH U.S.) Risk Factor Survey (RFS). The RFS is part of REACH U.S.'s multi-year, community-based health program, sponsored by CDC. The aim of REACH U.S. is the elimination of racial and ethnic health disparities in health priority areas that include breast and cervical cancer, cardiovascular disease, diabetes, adult immunizations, infant mortality, asthma, and hepatitis B. The racial and ethnic populations served by REACH U.S. include African Americans, American Indians/Alaska Natives, Hispanics/Latinos, Asian Americans, and Pacific Islanders.

In 2007, CDC established cooperative agreements with a number of community organizations to help develop and implement innovative strategies to reduce health disparities in their areas. In 2009, NORC at the University of Chicago (NORC) began conducting the RFS in 28 of these REACH U.S. communities on behalf of CDC. In its current form, the RFS occurs in annual phases and contains questions about health, chronic diseases, diet, exercise, preventive services, and adult immunizations. The RFS assists the REACH U.S. community organizations by monitoring the progress and achievements in their health priority areas.

Due to the specific populations targeted and the added requirements of geography, racial/ethnic density, and language barriers, NORC uses sample and survey designs customized by community. To allow for this flexibility, the RFS primarily employed a multi-mode address based sampling design (ABS). The ABS frame was enhanced with vendor-provided flags, which identify addresses with residents that are likely members of the priority race/ethnicity and age/gender populations. The design also incorporated previously identified eligible addresses, surname lists, congregation lists, telephone number lists, and 911-emergency lists. These additional lists allow for the identification of eligible households for interview.

Samples of addresses were drawn in each of the 28 REACH U.S. communities. A telephone number for the sampled address was identified where possible and contacted through a computer-assisted telephone interview system (CATI). Addresses that could not be matched to telephone numbers were sent a self-administered questionnaire (SAQ) booklet. One community included both CATI and in-person data collection, but not SAQ. Three communities also combined all three modes of data collection. Finally, in one community, NORC conducted only computer-assisted in-person (CAPI) or face-to-face interviews because other modes of data collection previously proved to be less productive there.

Two REACH U.S. RFS instruments are used for data collection: a Household Screening Interview and a Household Member Interview. The screening interview determines which members of the households are eligible for participation. A maximum of two members per household can be selected. Once the eligible members are selected, the Household Member Interview is conducted. Both instruments were programmed into the computer-assisted interviewing system. For the mailed SAQ survey, the screening interview was modified into written question forms so that household screening data could be extracted from the completed SAQ.

2.2 "Early Bird" Experimental Design

In 2011-2012, the "Early Bird" experiment was conducted in 6 of the 28 communities that participated in the RFS. These communities were unique because their sampling frames were enhanced with households selected from lists of "previously known eligible" sample. This sample included households that had been contacted in previous years of data collection and were identified as having at least one adult household member eligible for the study. In the second year of data collection NORC began to contact households that had participated in previous years in an effort to increase sample efficiency and achieve production targets. The housing unit rather than the individuals in the household are the target for this recontact. In the third year of data collection, this portion of the sample had declining response rates. This may have been due to the secular trend of declining response rates overall or may have been due to a growing reluctance to participate among these populations more generally (Groves & Heeringa, 2006).

To address these potential reasons for decline in an efficient manner it was not adequate to offer these households standard incentives. Additional information was needed about the effectiveness of the incentive amount, the method of offering, and the characteristics of the households that responded. The experiment was conducted as follows:

Within each community, households from the list of "previously known eligible" sample were randomly divided into three experimental conditions (See Figure 1). All households

were sent an advance letter acknowledging their past participation in the survey along with a request to participate again. An example of this wording is shown below:

> "Your household has once again been chosen to represent [LOCALITY] in the REACH U.S. Survey! Thank you for your previous participation."

The advance letters were sent in a 6x9 inch envelope that included the CDC logo in the return address and a first class postage stamp.

"Early Bird" Experimental Conditions

Control Group (N=1192)*	Experimental Group 1 (N=1327)	Experimental Group 2 (N=1274)
• Advance Letter • No Incentive	• Advance Letter • $5 Prepaid Incentive	• Advance Letter • $5 Prepaid Incentive • Promise of additional $20 if all selected household members complete within 7 days

*N refers to the number of household sample lines assigned to the experimental group

Figure 1: Experimental Conditions

The control group households received the advance letter with no monetary incentive. Households in Experimental Group 1 also received an advance letter. In addition to this, a $5 prepaid incentive was included to thank them in advance for their participation. Finally, households in Experimental Group 2, like Group 1, received the advance letter and a $5 prepaid incentive. However, these cases were also promised an additional $20 if all eligible and selected household members completed the survey by a specific date (a.k.a. "early bird special"). The date specified was 7 days from the date the household would first be attempted by telephone. To accommodate this incentive experiment, NORC telephone interviewers had introductory and answering machine scripts that include the end date for the additional early bird incentive amount.

2.2.1 Analytic Goals and Strategy

We conduct three sets of analyses to assess whether the "early bird" incentive was effective in improving overall survey efficiency by improving the completion rates to the screener instrument and the main questionnaire. First, we examine comparative completion rates for both the household screener instrument and the member questionnaire overall and within 7 days of receipt. We compare all three experimental groups in an attempt to understand whether the money alone was adequate to improve rates or whether the additional bonus for early household completion was necessary. Second, we build logistic regression models for screener and individual interview completion overall and within 7 days to test the conceptual leverage models. We include interaction terms between the experimental conditions and a variety of household level characteristics to assess whether the prepaid incentive or the experimental early bird incentive improve household screener completion or individual interview completion

rates. In our final analysis, we assess the impact of adding the population recruited through the early bird incentive on key survey estimates.

Table 1 includes the variables used in the analyses. We use both operational and questionnaire data to evaluate the performance of the incentives. The household variables are limited because, although data from more than one member per household is collected, little additional information is gathered about the household. Additionally, for those households who do not complete the screener, we have only sample information and operational data. We use a variable that measures whether all members are of the same ethnicity/race and whether there is a person over 65 in the household. These variables are used as proxies for whether the household is likely a family household.

Table 1: Variable List

Dependent Variables	**Definition**
Screener Completion	Completion of the initial household screening interview
Screener Completion within 7 Days	Completion of the initial household screening interview within 7 days of initial contact attempt
Member Completion	Completion of the main risk factor survey by each selected household member
Member Completion within 7 Days	Completion of the main risk factor survey by each selected household member within 7 days of initial contact attempt
Full Household Completion	All selected household members completed the main risk factor survey
Independent Variables	**Definition**
Incentive Group	Experimental treatment
Vendor Language Flag	Vendor-provided flag to indicate likely racial or ethnic group
Address Type	Vendor-provided flag to indicate rental vs. ownership status
Total Refusals	Number of refusals in call history
Call Count	Number of call attempts in call history
All Same Race	All household members are members of same racial or ethnic group
Single Household Member	Only one household member
Language	Language of Interview
Over 65	At least one household member is 65 years old or older
Health Behaviors	**Definition**
Obesity	BMI ≥30 derived from self-reported height and weight
Smoking status	Current smoker
Cervical Cancer Screening	Received a pap smear in the last 3 years (females only)

3. Results

We present our analyses in three parts. First, we examine whether the incentives had an impact on the screener and interview completion rates for households and members. The second step is to test whether the leverage model is supported in this population for the household based time-limited incentive. Finally, we examine whether the incentives had impact on the calculation of key survey statistics.

3.1 Completion Rates

Table 2 includes overall and within 7 days completion rates for the screener and main questionnaires for households and individual members. The screener questionnaire is

only administered for the entire household to establish eligibility for the main questionnaire, thus, we calculate the screener completion rate for the household only.
It is clear from Table 2 that the early bird incentive improves completion rates over both the control and the $5 prepaid incentive. Completion rates by the end of the data collection period for the screener and main interview for households and individuals who received the early bird incentive are 11-15 percentage points higher than those receiving no incentive and are 4-8 percentage points higher than those who received the prepaid incentive of $5. The "early bird" portion of the incentive was even more effective in that the difference between the control and early bird rates was comparatively higher for each of the completion rates. For instance, the difference between the overall household interview completion rates for the two groups is 13% and for the within 7 days completion rate is 17.1%. Similarly, the portion of the incentive that rewarded households for getting all eligible members to participate worked well. The comparative gains in the proportion of members who completed the interview when they received the early bird incentive relative to the control and the prepaid $5 group showed the largest improvement.

Table 2: Completion Rates

	Control (N=1192)*	**$5 Dollar Only (N=1327)**	**"Early Bird" (N=1274)**
Household Screener Completion Rate	36.7%	43.9%	47.2%
Household Screener Completion Rate within 7 days	16.9%	24.2%	28.9%
Household Interview Completion Rate	43.0%	49.1%	56.0%
Household Interview Completion Rate within 7 Days	14.3%	21.0%	32.4%
Member Interview Completion Rate	50.9%	57.9%	65.1%
Member Interview Completion Rate within 7 Days	17.6%	25.0%	36.7%

*N refers to the number of household sample lines assigned to the experimental group.

3.2 Leverage Models

From the previous table, it is clear that the "early bird" incentive is very successful in raising completion rates across the board. It is incrementally more successful than the prepaid $5 and substantially speeds the rate at which interviews are completed hence lowering the cost of data collection. The second research question we posed is whether this incentive is more or less effective in different types of households. Tables 3 and 4 contain the results of the logistic regressions predicting household screener completion rates and member interview completion rates.

Table 3 contains four models for the household screener. As this particular analysis focuses only on the household completion of the screener and does not necessarily include those households that go on to complete the interview, we only have data from the operational portion of the data collection, not the questionnaire data. We include information about the incentive, sample information about the potential language of

interview and whether the home is rented, and the number of refusals and dials. In the second model for each outcome, we include an interaction between the incentive and whether the household is flagged as Spanish speaking by the sample vendor. Our assumption is that they may be immigrant households and are likely to be larger and more likely to be responsive to a household level incentive.

In multivariate models, the "early bird" incentive is a significant predictor of overall and with 7 days household screener completion rates. In models without interactions, the odds that an "early bird" household will complete the screener is 60% higher than control households and 81% higher for those who complete within 7 days. Despite bivariate differences in the rates, the multivariate models suggest that the $5 advance incentive is not significantly different than offering no incentive. The other covariates have the expected effects with those households flagged as Spanish speaking and the number of refusals depressing the probability of screener completion and the number of dials increasing the likelihood of completion in most of the models.

Our first test of the leverage model of incentives shows no effect for overall screener completion and an anomalous finding for the within 7 days screener completion rate. For the overall rate, the introduction of an interaction between the Spanish language flag and the incentives is not significant although it does moderate the size of the main effect of the incentive. For the 7 day rate, the interaction effect for the $5 advance is significant and large and eliminates the main effect of being in a household that has been flagged as Spanish speaking. This is not intuitive given that the main effect of the $5 advance incentive was not significant in the model without interactions. Given the behavior of the coefficients, it is likely an artifact of the sample distribution in which a disproportion number of households flagged as Spanish speakers are in the $5 advance incentive group.

Table 3: Screener Models

	Household Screener Completion (N=2739)		**Household Screener Completion in 7 days (N=1161)**	
	Without Interactions	With Interactions	Without Interactions	With Interactions
$5 Only	1.35	1.03	1.45	1.14
Early Bird	**1.60	**1.31	**1.81	**1.33
Spanish language *	**0.78	**0.88	1.11	1.04
Household living in rented unit	1.21	1.21	**0.61	**0.61
Number of Screener Refusals	**0.85	**0.85	0.87	**0.86
Number of Interview Dials	**1.03	**1.03	**0.97	0.97
$5 Only * Spanish		1.42		**2.45
Early Bird * Spanish		2.14		2.46

Logistic regression. All models include dummy variables for community.

Odds ratios reported. For interactions, odds ratios calculated with other variables held at "0".

*Flag provided by vendor to indicate likely Spanish-speaking household.

**= $p \leq .05$.

Table 4 contains the results of the overall and within 7 days member interview completion rates. Similar to the analysis for screener completion rate, the interview completion rates are strongly and significantly affected by being in the "early bird" incentive group. In non-interaction models, the early bird incentive increases the likelihood a household will ever complete the interview by 75% and these households are

2.71 times more likely to complete within 7 days. These effects are slightly attenuated by the introduction of the interaction effects but remain large and significant. The prepaid $5 incentive is again not significantly different than no incentive at all. The only other variable with a substantial effect on cooperation is whether the household is a single member household. Single member households are almost 5 times as likely to complete the interview and 2.35 times more likely to complete it within the 7 day window.

The leverage concept is marginally supported by the interaction models. Single member households who receive the early bird and prepaid $5 incentives are significantly more likely to ever complete the interview than those who received nothing as are persons who received the early bird and live in households where everyone is of the same race as the household head. The main effect of the prepaid $5 is not significant and, thus, the interaction effect is of more limited value. The main and interaction effects of the early bird incentive for overall member completion rates are, however, quite substantial. There are no significant interactions for the within 7 days completion rates.

Table 4: Interview Completion Rates

	Member Interview Completion		**Member Interview Completion in 7 days**	
	Without interactions	With Interactions	Without interactions	With Interactions
$5 Only	1.33	0.85	1.53	1.01
Early Bird	**1.75	**1.69	**2.71	**1.80
Spanish language *	0.81	1.01	0.53	1.22
Haitian language	0.61	0.78	**0.36	**0.42
Members all the same ethnic/race group	0.96	1.01	0.91	0.93
Household has single member	**4.88	**2.31	**2.35	**1.48
At least 1 person in HH over age 65	0.88	0.95	1.05	1.09
$5 Only*same ethnic/race		**1.23		1.64
Early Bird*same ethnic/race		1.73		3.16
$5 Only*single member HH		**1.47		2.60
Early Bird*single member HH		**4.50		5.27
$5 Only*one over 65		2.32		1.13
Early Bird*one over 65		1.88		1.71

Logistic regression. All models include dummy variables for community.
Odds ratios reported. For interactions, odds ratios calculated with other variables held at "0".
*Flag provided by vendor to indicate likely Spanish-speaking and Haitian-speaking households.
**= $p \leq .05$.

Given the robust nature of the early bird incentive, it is important to understand whether the incentive has reduced non-response bias in a substantial way. The question is whether new populations have been drawn in by the incentives. Axinn et al. (2011) suggest that responsive survey designs which remedy non-response may alter our understanding of key health trends.

3.3 Key Survey Statistics

In the final part of the analysis, we examine the differences in a variety of survey rates by experimental group. Table 5 contains the results of this analysis. For the three measures of health behavior and health risk factors presented here, there are no significant differences between the experimental groups. The estimates for obesity rates, current

smoking rates, and cervical cancer screening rates for the two incentive and the control groups all lay within 95% confidence intervals. This suggests that there is little difference between those persons who respond with no incentive and those who respond when provided a substantial incentive. This is further evidence that, at least for this incentive, the leverage theory of incentives is not supported. There is no subpopulation variability, as exhibited in key survey rates, in whether subpopulations respond to incentives.

Table 5: Health Behavior Rates

Incentive Group	Self-Reported Obesity			Current Smokers			Cervical Cancer Screening (Females)		
	%	LCL	UCL	%	LCL	UCL	%	LCL	UCL
Control	38.90%	32.80%	44.90%	20.70%	14.90%	26.60%	77.00%	68.60%	85.40%
$5 Only	38.80%	34.00%	43.50%	15.50%	11.30%	19.70%	74.40%	67.80%	81.00%
Early Bird	37.90%	33.50%	42.40%	17.10%	13.10%	21.10%	74.90%	68.70%	81.00%

4. Summary and Conclusions

This experiment compared respondents who received different types of incentives to those who received none at all. The "early bird" experiment, which provided households with a prepaid incentive and an additional $20 if all eligible members completed within 7 days of receiving the request, proved to be quite successful in improving both screening and interview completion rates. The "early bird" was much more successful than the $5 prepaid incentive. These findings were robust in multivariate models. The incentive appeared to work similarly among all population subgroups and was not affected by household characteristics. This suggests that this type of incentive may not be as nuanced as others in its effect on response propensities. Individuals in households with single members were much more likely to ever respond given they received the "early bird" incentive although no more likely to respond in 7 days than the multiple member households who received the "early bird" incentive. Descriptive analyses of health behaviors and characteristics suggest that respondents in the experimental groups were no different than those in the control groups suggesting that, in this case, a responsive design would not impact basic estimates.

4.1 Limitations

Analyses of subgroups are quite limited by the nature of the data available from the sample control files. There may be other substantial characteristics of households that have an impact on how family leverage may be used to get everyone to complete the screening and interview instruments. A limited number of health variables were analyzed also due to sample size constraints. There may be more variability than expected in outcomes by experimental group. The communities in which the experiment was conducted were part of a population already deemed eligible. This may have artificially improved both screening and interview rates as well as attenuated the impact of the experiment to motivate respondents. Additionally, because REACH U.S. focuses on minority populations, this may limit the generalizability of these findings and may account for the lack of support for the conceptual model of leverage. These incentives are likely to work differently in a general population survey.

4.2 Recommendations

The operational feasibility of an "early bird" incentive with family leverage will depend on survey design. The cost implications of providing the incentive for single person households, given they are more likely to respond but contribute fewer interviews to the total number of completed interviews, may need to be assessed. The "early bird" incentive model will likely be most efficient in surveys that have short data collection timelines targeted at multi-person households.

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