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Increasing the value of an early bird incentive in a mixed-mode longitudinal survey

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Non-technical summary

In the last decades, several longitudinal studies have switched from a single interviewer-administered mode design to a sequential design that combines web and an interviewer-administered mode. One of the main reasons behind this change is the lower cost of the web mode compared to interviewer-administered data collection, which can potentially allow for cost savings. However, to maximise the cost savings, it is necessary to increase the number of panel members that complete their interviews online during the first part of the fieldwork – web-only – in order to reduce the interviewers' workload. This paper focuses on one intervention designed to maximise response during the web-only phase of the fieldwork: the early bird incentive (EBI), a type of incentive awarded upon response during a time-limited period. This type of incentive has become increasingly popular among survey researchers and practitioners as it can reduce fieldwork costs.

Previous research has shown the potential of EBIs to increase response rates while moderating survey costs. This paper extends these findings by analysing the effect of offering a higher EBI in a mixed-mode longitudinal study. The data used in the paper comes from an experiment embedded in wave 12 of *Understanding Society*, where households were allocated to two random groups, one being offered the usual £10 EBI and the other the higher EBI of £20. At the same time, the experiment covered two groups, one of panel members who had received the EBI previously and a second group of panel members that transitioned in wave 12 from a CAPI-only design to the web and were offered the EBI for the first time. Therefore, while the first group allowed us to test the effect of an increase in the value of an incentive, the second group allowed us to explore whether offering different EBI values would affect response rates amongst sample members not previously offered an EBI. We also explored the effects of the higher EBI on fieldwork efforts and sample composition.

The results show that an increase in the value of the EBI positively affects response rates during the period when the incentive is active. However, the higher value did not lead to higher response rates for panel members who were offered the EBI for the first time – those transitioning from CAPI to a web-first sequential mixed-mode design. The increase in the EBI also led to reduced fieldwork efforts (and therefore costs) during the CATI phase of the fieldwork.

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Abstract: This paper investigates the effect on response rates of changing the value of an early bird incentive (EBI) sent to respondents completing an online questionnaire during the first five weeks of fieldwork. The experiment analysed in this paper, which was embedded in wave 12 of *Understanding Society*, a longitudinal mixed-mode survey, tested two different values of the EBI, £10 and £20. The experiment covered two groups, one that had been administered a web-first design in previous waves and had been offered the EBI, and another that transitioned from a CAPI-only design to a web-first sequential mixed-mode design in wave 12 and was therefore offered the EBI for the first time. We also examined the effect of the higher incentives on fieldwork efforts and sample composition. We found that increasing the value of the incentive had a positive effect on response rates for panel members who had been offered the incentive previously.

Keywords: response maximisation, survey incentives, early bird incentives, push-to-web, sequential mixed-mode design.

JEL classification: C81, C83.

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Introduction

Time-limited conditional incentives, also called early bird incentives (EBI), are increasingly used in survey research to enhance response rates as well as prompt a faster response. Several studies have shown the ability of this type of incentive to increase response rates during the period they are active and shorten the time between the arrival of the survey invitation and the completion of the questionnaire. This ability to prompt a faster survey response can help curb fieldwork efforts, such as the number of calls made to contact a sample unit or the number of reminders sent, which consequently can reduce survey costs. This reduction in costs can be particularly notable in the case of sequential mixed-mode surveys in which a self-completion mode is followed-up with one or more interviewer-administered modes. This paper presents the results of an experiment embedded in wave 12 of *Understanding Society* to test the effect of changing the value of the EBI from £10 to £20 on response rates, fieldwork efforts and sample composition before extending the treatment to the rest of the sample.

In a longitudinal study that extends over time and where an incentive with a fixed nominal value is offered, the research team might face a decision regarding when and by how much to increase the value of the incentive. The first aim of this paper is to shed some light on a question that remains unanswered in the literature: What is the effect of increasing the value of an EBI in a longitudinal study? In addition, we also explore whether higher values of the EBI help increase the response rate for a subsample being offered an EBI for the first time.

In the experiment, households were randomly allocated to a control group, offered the usual £10 EBI, and a treatment group, which was offered an EBI of £20. In both cases, the reward was sent upon completing the individual questionnaire online in the first five weeks of the fieldwork. The effect of the higher incentive is evaluated in terms of a) individual response rates after the five-week web-only fieldwork phase and at the end of the fieldwork, b) the complete household response rate after the web-only phase, which is a proxy for savings in fieldwork efforts and costs, and c) sample composition. The results show that while the change in the incentive effectively raised response rates at the end of the web-only phase among those allocated to the web mode previously, this effect is not observed among those transitioning from CAPI-only to web-first for the first time.

In this paper, we first present the background of the research, and second, we detail the research questions. Then, in the third section, we offer a detailed description of the data, experimental design and analysis methods. Finally, we present the results and discuss their implications for the field.

Background

Survey incentives have proven to be one of the most effective interventions to increase response rates (Laurie & Lynn, 2009; Mercer et al., 2015; Singer & Ye, 2013; Toepoel, 2012). In recent years, a time-limited conditional incentive, also known as an early bird incentive (EBI), has attracted the interest of researchers and practitioners as a potentially cost-effective intervention, i.e. one for which the subsequent saving in field costs may outweigh the cost of the EBI (see Lynn, Thomson & Brook (1998) for an early exposition of this argument). The main objective of an EBI is to encourage response during the period that the incentive is active and, as a result, minimise fieldwork efforts, for instance, the number of reminders sent or calls in interviewer-administered surveys, which could reduce survey costs. Thus, this type of incentive focuses on reducing survey costs by prompting a faster response and cutting fieldwork efforts. The effectiveness of EBIs has been explored in several experiments covering different modes and designs. For example, several experiments have shown the convenience of using EBIs to improve response rates among low response propensity participants in telephone surveys (Fomby et al., 2017; McGonagle et al., 2022), improve response rates in postal surveys (LeClere & Amaya, 2012), and reduce interviewing efforts in face-to-face surveys (Brown & Calderwood, 2014). Also, in recent years, EBIs have been used to increase web survey response rates.

In web surveys, several experiments have shown that EBIs can effectively raise response rates. Some of these studies reported an increase in response rates for the group receiving the EBI limited to the time period in which the incentive was active, while the response rates at the conclusion of the fieldwork tended to be similar between those receiving the EBI and the control group. Two experiments in cross-sectional web surveys reached that conclusion. In the National Immunization Survey in the United States, which surveys a sample of households where underage children reside, an experiment tested the effect of adding an EBI in the form of a $10 gift card offered to those who completed the web survey in the first ten days of fieldwork, before the telephone stage began (Ward et al., 2014). The results showed that those offered the EBI responded earlier to the survey

than those receiving a $1 unconditional or no incentive. In a study of US high school principals, an experiment showed that a $50 EBI combined with a $50 conditional incentive was beneficial to increase the response rate during the time-limited period compared to the group being offered just a $50 conditional incentive (Coopersmith et al., 2016). Nevertheless, at the end of the fieldwork, there was no difference in the response rates of the two groups.

Some other experiments have tested the effect of EBIs in longitudinal studies with sequential mixed-mode designs, in which an interviewer-administered mode follows a web survey. In this type of design, the main objective of the EBI is to increase the response rate during the web-only phase in order to reduce the interviewers' workload at the following stage. In Next Steps, a cohort study that collects data on a sample of people born between 1989 and 1990 recruited in 2004 from secondary schools in England, the ability of an EBI to increase response during the web-only stage was tested. This stage was followed by CATI for nonrespondents, and subsequently by CAPI (Calderwood et al., 2022). The £20 EBI increased the response rate at the end of the web phase compared to the control group, which was offered a £10 conditional incentive. However, this effect did not translate into differences in response rates at the end of the fieldwork or in the sample composition between the control and treatment groups. In another study, at wave 8 of *Understanding Society*, when a portion of the sample was moved from a CAPI-only design to a web-first sequential mixed-mode design, the research team tested the effect of offering a £10 EBI in addition to the usual conditional or unconditional incentives to foster an earlier response to the questionnaire (Carpenter & Burton, 2018). This study employed a quasi-experimental design based on the random allocation of sample batches over months to organise the fieldwork. Thus, the first month of fieldwork served as a reference point, with the EBI being offered for the first time to the second-month sample. The response rate in the second monthly sample to the web survey was twice as high (36%) as in the first month (19%) when the EBI was not offered.

Other experiments have shown that EBIs can have a positive effect on response rates that extends beyond the end of the time-limited period. For instance, an experiment embedded in a survey of participants in a training programme for unemployed citizens in the United States showed the positive effect of offering a $50 EBI versus no incentive on the final response rate of the web survey, as well as speeding up response times (De Santis et al., 2016). Recently, in the recruitment of a booster sample of the German Internet Panel, the research team tested the effect of including

a €20 or €50 EBI, in addition to the €5 prepaid incentive offered to the control group, on response rate, sample composition and fieldwork costs (Friedel et al., 2022). The results showed the positive effect of the EBI on the response rate in the recruitment survey, which extended to the surveys conducted within the panel during the first year after joining the panel. Also, in wave 10 of the DAB panel study, a longitudinal survey that follows a sample of young adults in Switzerland, they tested adding a CHF 10 and CHF 20 early bird incentives to a CHF 10 uncondtional incentive. The experiment was restricted to those who took more than seven days to respond ("late respondents") and nonrespondents in the previous wave. The results showed a positive effect of the EBI during the time-period that the EBI was offered and at the end of the fieldwork among the panel members that took more time to respond in the previous wave (Möser et al., 2023).

The evidence listed in the previous paragraphs supports using EBIs to increase response rates in different contexts. In longitudinal studies, the experiments embedded in *Next Steps* or *Understanding Society* showed that the EBI helped boost response rates in the web survey sequential mixed-mode designs. However, there is a lack of evidence about whether changing the value of the EBI would help increase response rates further. The most closely related evidence comes from experiments that assessed changes in the value of incentives –conditional or unconditional– in longitudinal surveys.

The Health and Retirement Study (HRS) tested an increase in the value of the unconditional incentives from $20 to $30 or $50. The response rate was higher for the group receiving the $50 incentive, and this difference remained over the subsequent four waves (Rodgers, 2011). In the British Household Panel Survey, an experiment tested the effect of raising the adult incentive from £7 to £10 and the one for children from £4 to £5. These relatively small increases resulted in higher response rates, especially for the previous wave nonrespondents (Laurie, 2007). Likewise, an experiment from the Innovation Panel of *Understanding Society* tested different incentives – types and values – to increase the response rate of a subsample transitioning from a CAPI-only to a web-first sequential mixed-mode design (Gaia, 2017). The experimental design did not allow to infer that the change in the value was the sole cause of the increase in response rates, but panel members receiving the higher incentives had a higher response rate, similar to those of the CAPI-only subsample.

On the other hand, evidence on the optimal value of an EBI to incentivise the participation of those who are invited to complete the web survey for the first time is scarce. The only experiment to have tested the use of different EBI values was the German Internet Panel recruitment survey experiment, already mentioned above, which compared the use of €20 and €50 EBIs, offered in addition to an unconditional €5 incentive. No differences were found between the two groups on the main indicators studied (Friedel et al., 2022). Again, we only have available evidence from other longitudinal studies where different incentive –conditional and unconditional– values were tested.

An experiment embedded in wave one of the Survey of Income and Program Participation (SIPP) in the US compared $20 and $10 unconditional incentives to the absence of incentives (James, 1997). The results showed that the $20 incentive increased the response rate and that this effect was upheld for the three waves covered in the paper, while the $10 incentive did not achieve a higher response rate. In 2014, another experiment compared the effect of $20 and $40 conditional incentives to no incentives, finding a significant difference between the $20 and $40 incentives (Westra et al., 2015). The experiment from the Innovation Panel of *Understanding Society* tested three incentives scheme for those transitioning from CAPI to a web-first sequential mixed-mode design: 1) a £30 unconditional incentive; 2) a combination of £10 unconditional plus £20 conditional incentives; 3) £10 conditional incentive. The £30 unconditional incentive and the combination of £10 unconditional plus £20 conditional incentives achieved a higher response rate in the period between waves 6 and 9 compared to those receiving the £10 conditional incentive (Gaia, 2017).

Research questions

The main objective of this experiment was to establish whether an increase in the EBI would boost the response rates at the web stage of the fieldwork. The experiment was embedded in a sequential mixed-mode survey, where a web-only fieldwork phase was followed by a telephone interview attempt for the nonrespondents. In this context, the increase of the value of the EBI sought to boost the response rate during the web-only period as a route to reduce the resources allocated to the interviewer-administered stage of the fieldwork and, consequently, reduce fieldwork costs. Thus, the first research question addresses the effect of the higher incentive on the response rates after the five-week web-only fieldwork and at the end of the CATI stage.

RQ1.1) Does the higher EBI increase response rates at the end of the five-week web-only phase of the fieldwork?

RQ1.2) Does the higher EBI increase response rates at the end of the fieldwork?

In addition, this increase in the value of the incentive occurred in a longitudinal study where most panel members had been invited to take part in the web mode before, while a smaller random subsample transitioned from a CAPI-only to a web-first design due to the covid-19 crisis. The covid-19 crisis caused the suspension of all face-to-face fieldwork in the United Kingdom during the implementation of the experiment. Therefore, a random subsample that had always been issued to CAPI was moved to a web and telephone sequential design with the rest of the sample. This situation allowed us to extend the experiment to the (previously) CAPI-only subsample and test the effect of the £10 and £20 EBIs when transitioning to a web-first design.

RQ 1.3) How does the increase in the value of the incentive affect those who had been offered the EBI before?

RQ 1.4) How do the different values of the incentive affect panel members transitioning from CAPI to a web and telephone sequential design who were offered the EBI for the first time?

We also analyse variation in response rates across sample subgroups to identify whether some panel members were more strongly affected by the incentive than others. This analysis differentiates between the subsample that received the increase in the incentive (previously web-first), and those receiving the incentive for the first time (previously CAPI-only).

RQ 1.5) Does any effect of the higher EBI incentive vary across sample subgroups?

In a household survey such as *Understanding Society*, where all adults – aged 16 and older – in the household are invited to respond to an individual questionnaire, a substantial reduction in fieldwork efforts occurs when all adults in a household complete their interviews online, so the household is not issued to CATI. Thus, we used the complete household response rate, which refers to households where all adult interviews were completed, as an indicator of the impact of the higher incentive on fieldwork efforts.

RQ 2) Does the higher EBI increase the complete household response rate at the end of the web-only phase?

Finally, the impact of the higher incentive could vary across sample subgroups, which could alter the composition of the final sample. The third research question examines the relationship between the change in the incentive amounts and sample composition.

RQ 3) Does the increase in the EBI affect sample composition?

Data and methods

The survey

The United Kingdom Household Longitudinal Study (UKHLS), *Understanding Society,* is a national probability survey started in 2009 that, at wave two, incorporated the former British Panel Household Survey (BHPS). The target population of *Understanding Society* includes individuals of all ages residing in the United Kingdom. Adult panel members aged 16 and over are invited to take the survey annually alongside other household members.

Understanding Society has evolved from a face-to-face design, with a few nonrespondent cases issued to the phone, to a web-first sequential mixed-mode design. Up to wave six, households were issued to CAPI, with just a few nonrespondents being contacted on the phone during a mop-up period at the end of the fieldwork. The web mode was offered for the first time in wave seven, but only to the wave six nonrespondents. From wave eight, an increasing proportion of panel members have been invited to complete the survey online, with those who do not respond online being issued to CAPI. From waves eight to eleven, before the covid-19 crisis, three fieldwork protocols coexisted in the survey: 1) a random subsample of households (20%) remained in a CAPI-only design ("ring-fenced CAPI"); 2) most of the rest of the households (70% of the total) had been moved to a web-first protocol (invitation to complete online, with CAPI follow-up); 3) households out of the ring-fenced CAPI subsample but with a low predicted probability to respond online (10% of the total) were allocated to a "CAPI-first" design (Lynn, 2017).

The incentives strategy in *Understanding Society* combines unconditional and conditional incentives offered based on previous participation, and the EBI offered to those completing the web questionnaire within the first five weeks of fieldwork. Table 1 summarises the incentive

strategy extant at the start of wave twelve of *Understanding Society*. Individuals who had responded at the previous wave received a £10 unconditional incentive, while those in responding households who had not completed the individual questionnaire or were new household entrants received the same amount upon completing the questionnaire. Panel members in households that had not participated at the previous wave received a £20 incentive conditional upon completing the individual questionnaire. The incentives were sent in the form of gift cards valid in some of the most popular retailers in the country. The unconditional incentive gift card was sent in the invitation letter, while the conditional and EBI were mailed after completing the questionnaire.

Table 1. Incentive strategy at wave 12 of *Understanding Society*

Previous wave household outcome:	**Responding household**		**Non-responding household**
Previous wave adult interview outcome:	**Responding adult and rising 16**	**Non-responding adult and new entrants**	**Non-responding adult, rising 16 and new entrants**
Unconditional incentive	£10	None	None
Incentive **conditional** on completing individual questionnaire	None	£10	£20
Early-bird incentive conditional on completing web questionnaire during first 5 weeks of fieldwork (web-first protocol only)	£10	£10	£10

Experimental design

In order to manage the fieldwork, the sample of *Understanding Society* is divided randomly into 24 monthly samples. The higher EBI experiment was fielded in six monthly samples of wave 12, covering April to September 2020. The fieldwork of the experiment started right after the beginning of the covid-19 crisis in the United Kingdom when all face-to-face fieldwork was suspended, and *Understanding Society* adopted a web and telephone sequential mixed-mode design (Burton et al., 2020). The covid-19 crisis had two main implications for the experiment. First, since all sample members were moved to a web and telephone sequential design, the experiment, designed for a web-first protocol and therefore expected to exclude the CAPI-only subsample, was expanded to cover the full sample. This change presented the opportunity to learn about two different groups: for the (previously) web-first subsample, we tested the effect of an

increase in the value of the EBI, which had been offered in the previous waves; for those allocated to CAPI-only in earlier waves we tested the effect of offering two *different values* of the EBI in the wave they transitioned to a web-first design. Second, the social and economic consequences of covid-19 and the general lockdown during the fieldwork of the experiment may have affected how panel members reacted to the higher incentive and the survey request.

Table 2. Summary of the experimental design

	Control	Higher Early Bird Incentive
Early bird incentive (EBI)	£10	£20
N households	1,670	1,627
N adults	3,156	3,077

The experimental design is presented in Table 2. Panel members from households randomly allocated to the control group were offered the usual £10 EBI, whilst those in the higher EBI group were offered a £20 EBI. Survey respondents had to complete the web questionnaire before the five-week deadline to receive the gift card in their mailbox. Both experimental groups received, in addition to the EBI, the unconditional or conditional incentive based on their previous wave participation (see Table 1). The invitation letter and emails that panel members received at the beginning of the fieldwork included a reference to the values and deadline of the EBI (Figure 1).

Control
If you're able to complete your interview online by [DATE] we will send you an extra £10 gift card as a thank you for completing your survey early.
Higher EBI
If more people like you are able to complete the survey online, we can save money which we can then use to improve the survey experience for all of our participants. So, if you're able to complete your interview online by [DATE] we will send you an extra £20 gift card as a thank you for completing your survey early.

Figure 1. Text excerpts from the invitation letter and email referred to the value of the early bird incentive.

Methods and variables

The analysis we present in this paper focuses on two groups: panel members in the mixed-mode web-first protocol before wave 12 and those transitioning from the CAPI-only "ring-fenced" sample[1] to a web-first design for the first time due to the covid-19 pandemic. The first group, those previously in a web-first protocol, provide evidence of the effect of increasing the value of the EBI, whereas the second group – those switching to the web – help understand the impact of giving higher or lower values of the incentive in the context of a mode transition.

Research questions RQ1.1 and RQ1.2 address the effect of the change in the value of the incentive on the response rates after the five-week web-only phase and at the end of the fieldwork. Two logistic regression models were fitted with a response indicator as the dependent variable and the experimental allocation flag as the independent variable. The research question RQ1.3 and RQ1.4 explore the effect of the change in the value of the incentive differentiating between the (previously) allocated to a web-first protocol and those (previously) part of the "ring-fenced" CAPI-only subsample. Logistic regression models were fitted in each subsample to determine the effect of the different incentive values. All analyses reported in this paper have been weighted to account for the unequal selection probabilities and the allocation of the experiment to six monthly samples.

The research question RQ1.5 explores the effect of the treatment across the groups defined by a set of moderators. These heterogeneous effects are presented for the (previously) web-first and the (previously) CAPI-only "ring-fenced" sample. Two sets of logistic regressions were fitted to compute the heterogeneous effects. First, we fitted two simple logistic regression models for each moderator, one using response after the web-only phase as the dependent variable and another using response at the end of the fieldwork. These models included an interaction term between the experimental allocation flag and the moderator. Second, we fitted a set of multivariate models, including all the moderators and the interaction terms with the experimental allocation flag. The reason for producing these sets of models – simple and multivariate – is due to the level of

[1] The CAPI "ring-fenced" subsample was randomly selected before wave eight. The rest of the panel was allocated to either the web-first and CAPI-first protocols based on predicted household web response propensities. The balance between these two groups has evolved with an increasing number of households transitioning from the CAPI-first to the web-first protocol. In order to include in the analysis a CAPI "ring-fenced" sample comparable to the previously web-first group, a selection was made applying the same cut-point used to differentiate the low web propensity (CAPI-first) subsample.

missingness in some of the moderators and the effect that excluding a part of the sample could have on the estimates of some heterogeneous effects. The estimates from the simple models are found in the results section, and the effect estimates from the multivariate models are presented in appendix 1.

In the analyses, we used a set of variables that might moderate the relationship between the change in the incentive value and the propensity to respond to the survey. In other words, we expected that some sample subgroups reacted differently to the incentives. These moderators lie in three groups: demographic characteristics, internet use measures, and variables about past participation in the study. We tested the effect of the incentive across the groups defined by gender and age since these variables have been shown to moderate the relationship between higher incentives and response (Laurie, 2007), which is also the case for ethnic background, personal income and education level (Mack et al., 1998). Regarding Internet use, we hypothesise that panel members more familiar with the Internet and smartphones would be more prone to react positively after being offered a higher EBI since completing the web survey requires less effort compared to those less skilled. Finally, we also included an indicator of the previous wave household and individual response as well as a variable that flag the regular respondents to the survey, i.e. those responding to at least two-in-three waves.

The second research question examines the effect of a higher early-bird incentive on household response rates (RQ2). The main objective of the EBI in a sequential mixed-mode design that combines web and an interviewer-administered mode is to boost participation during the web-only fieldwork period, so a lower number of households is issued to the interviewers, reducing survey costs. However, in a household survey such as *Understanding Society*, where all adults in the household are invited to participate, fieldwork efforts are mainly reduced when all adults respond to the survey during the web-only fieldwork period. Therefore, to address this research question, we tested the difference between the control and treatment conditions with respect to the complete household response rate that measures the proportion of households where all eligible adults completed their interviews in addition to the household questionnaire.

Finally, the sample of respondents was compared across the experimental groups for a set of wave 12 target variables (RQ3) to evaluate the impact of increasing the value of the incentive on the

sample composition. This analysis included a mix of demographic, attitudinal and health-related variables.

Results

Table 3 presents the individual response rates for the control and treatment groups. Overall, the increase in the value of the EBI had a positive effect on the response rates. The response rate after the five-week web-only period (RQ1.1) was 4.8 p.p. higher for the group receiving the higher incentive, while at the end of the fieldwork – after the CATI interviewing (RQ1.2), the difference eroded to 2.7 p.p. and was nonsignificant.

The incentive effect at the end of the web-only period was more prominent among the panel members allocated to the web-first protocol in the previous waves (RQ1.3) compared to those transitioning from a CAPI design (RQ1.4). In the former group, the (previously) web-first, the higher incentive boosted the response rate by 5.8 p.p., from 59.5% to 65.3%. In contrast, the control and treatment conditions exhibited similar response rates among the (previously) CAPI-only group, 58.9% and 59.1%, respectively. At the end of the fieldwork, the higher incentive group exhibited larger response rates than the control condition for the web-first (2.7 p.p.) and CAPI-only (2.8 p.p.), but these differences were nonsignificant.

Table 3. Individual response rates after the web-only period and at the end of the fieldwork for the full sample, and by last wave fieldwork protocol

	Response during web-only phase			Final response			
	Control	Higher EBI	Dif.	Control	Higher EBI	Dif.	N
All sample	59.4	64.2	4.8**	75.9	78.6	2.7	6,233
	(1.4)	(1.3)	(1.8)	(1.2)	(1.1)	(1.6)	
Last wave fieldwork protocol							
Web-first	59.5	65.3	5.8**	76.0	78.8	2.7	5,144
	(1.5)	(1.4)	(2.0)	(1.3)	(1.2)	(1.8)	
CAPI-only (high web propensity)	58.9	59.1	0.2	75.0	77.8	2.8	1,088
	(3.0)	(3.3)	(4.4)	(2.8)	(2.7)	(3.9)	

Sig. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4 presents the effects of the higher EBI for a set of sample subgroups (RQ1.5). These effects are presented for the (previously) web-first and CAPI-only "ring-fenced" subsamples. Among the (previously) web-first group, most of the differences observed occurred after the web-only period.

At that time, the increase in the value of the incentive had a more pronounced effect among males, younger panel members (16-44 years old), those without a university degree, ethnic minorities, and those on lower incomes. Regarding technology use, panel members who do not use the Internet on a daily basis and smartphone users were more likely to respond after receiving the higher EBI. Then, regular respondents, those who took part in at least two-thirds of the waves they were invited to, reacted better to the higher EBI as well as the previous wave nonrespondents from households where other members responded to the survey and the previous wave respondents. At the end of the fieldwork, only those with an ethnic minority background showed a significantly higher response propensity after receiving the increase in the EBI. A positive effect of the higher EBI among the CAPI-only group was only observed for those aged 30-44 after the web-only period and, at the end of the fieldwork, for the panel members from an ethnic minority background. In some cases, although the effect sizes were above the average, the relatively smaller sample size of the CAPI-only subgroup does not allow us to conclude that the higher incentive had an effect on response rates. For instance, people not using the Internet daily who were offered the higher EBI exhibited a response rate 13.1 p.p. higher than the control group at the end of the web phase; however, this difference was not significant.

Table 4. Heterogeneous effects of higher EBI on early response and on overall response

	Previously web-first			Previously CAPI-only		
	Web phase	**Final**	**N**	**Web phase**	**Final**	**N**
Gender						
Male	0.083**	0.043	2,404	0.002	0.046	515
	(0.025)	(0.024)		(0.052)	(0.051)	
Female	0.035	0.013	2,738	-0.002	0.006	573
	(0.022)	(0.020)		(0.050)	(0.040)	
Age groups						
16-29	0.122**	0.044	1,048	-0.088	-0.054	151
	(0.042)	(0.041)		(0.106)	(0.103)	
30-44	0.094*	0.045	1,027	0.192*	0.147	238
	(0.041)	(0.037)		(0.086)	(0.086)	
45-64	0.019	0.007	1,766	-0.076	0.006	366
	(0.030)	(0.025)		(0.066)	(0.053)	
65+	0.042	0.026	1,300	0.033	0.020	332
	(0.032)	(0.025)		(0.061)	(0.045)	

Education						
No degree	0.061**	0.026	3,591	0.010	0.052	703
	(0.024)	(0.020)		(0.050)	(0.045)	
Degree	0.052	0.027	1,301	-0.016	-0.013	347
	(0.032)	(0.025)		(0.064)	(0.049)	
Ethnic background						
Ethnic minority	0.122*	0.115*	801	0.203	0.218*	130
	(0.056)	(0.055)		(0.123)	(0.096)	
White British	0.047*	0.012	4,236	-0.024	0.000	927
	(0.021)	(0.019)		(0.047)	(0.042)	
Individual income						
Q1	0.123***	0.046	1,245	-0.058	0.043	236
	(0.036)	(0.032)		(0.082)	(0.071)	
Q2	0.098**	0.053	1,170	0.068	0.035	249
	(0.034)	(0.030)		(0.075)	(0.065)	
Q3	-0.018	-0.003	1,264	0.030	0.080	278
	(0.033)	(0.030)		(0.070)	(0.055)	
Q4	0.032	0.008	1,245	-0.010	-0.004	288
	(0.032)	(0.025)		(0.068)	(0.059)	
Uses Internet daily						
No	0.084*	0.036	897	0.131	0.126	150
	(0.042)	(0.038)		(0.089)	(0.085)	
Yes	0.056*	0.023	3,921	-0.004	0.031	873
	(0.022)	(0.018)		(0.045)	(0.038)	
Smartphone						
No	0.033	0.006	532	0.050	-0.012	108
	(0.053)	(0.045)		(0.116)	(0.079)	
Yes	0.066**	0.026	4,166	0.003	0.031	891
	(0.020)	(0.017)		(0.046)	(0.039)	
Response pattern						
Irregular respondent	0.031	0.003	961	0.035	0.014	161
	(0.033)	(0.037)		(0.065)	(0.071)	
Regular respondent	0.053**	0.019	4,184	-0.015	0.014	927
	(0.019)	(0.014)		(0.041)	(0.031)	
Last wave response						
Respondent	0.056**	0.023	4,144	-0.006	0.016	874
	(0.019)	(0.014)		(0.043)	(0.031)	
Nonrespondent (responding household)	0.096*	0.084	560	-0.100	-0.072	119
	(0.039)	(0.046)		(0.082)	(0.089)	
Nonrespondent (nonresponding household)	0.010	-0.034	441	-0.027	0.055	95
	(0.054)	(0.067)		(0.127)	(0.171)	

Sig. * $p < .05$, ** $p < .01$, *** $p < .001$. Note: Web refers to the panel members responding online in the first 5 weeks of the fieldwork, excluding those who responded online after the beginning of the CATI phase of the fieldwork. These estimates are marginal effects expressed as proportions from a set of logistic regression models run for the previously web-first and CAPI-only, each including a moderator, the experimental allocation variable and the interaction term.

The positive effect of the higher EBI on response during the web-only fieldwork could translate into a reduction in the cases issued to the interviewers (RQ2). However, in *Understanding Society*, all resident adults in the household are invited to participate; therefore, a substantive reduction in fieldwork efforts requires increasing the number of households where all members respond to the survey during the web-only period. This would reduce the number of households to be contacted by interviewers. Table 5 presents the complete household response for the control and higher EBI groups. The higher EBI increased the complete household response rate by 5.0 p.p., from 46.4% to 51.4%. This difference was slightly larger among the previous web-first group (5.2 p.p.) compared to the CAPI-only group (4.5 p.p.), which was nonsignificant.

Table 5. Complete household response rate by previous wave fieldwork protocol

	Control	Higher EBI	Dif.	N
All households	46.4	51.4	5.0*	3297
	(1.4)	(1.4)	(1.9)	
Previous wave fieldwork protocol				
Web-first	46.9	52.1	5.2*	2698
	(1.6)	(1.5)	(2.1)	
CAPI-only (high web propensity)	43.8	48.3	4.5	599
	(3.2)	(3.4)	(4.5)	

Sig. * $p < .05$, ** $p < .01$, *** $p < .001$. The base for the calculations is households issued to wave 12 fieldwork (quarters 2 and 3) – weighted estimates. These estimates are predicted from a logistic regression model that included the last wave fieldwork protocol and the interaction term with the experimental allocation. The CAPI ring-fenced sample in these models excludes the low-web propensity group, using the same definition that was used to separate the web-first from the CAPI-first web protocols, and is therefore comparable to the web-first group.

Regarding sample composition, Table 6 presents a set of demographic, economic and health variables by experimental group (RQ3). The results provide no evidence that the increase in the EBI altered the composition of the sample for the variables included in the analysis.

Table 6. Sample composition by experimental group

	Control	Higher EBI	
Gender			*χ2 (1)= 1.183*
Male	44.9	46.1	*F (1.00, 697.00)= 1.214*
Female	55.1	53.9	*p = 0.271*
Age			*χ2 (3)= 3.119*
16-29	13.9	13.4	*F (2.84, 1980.45)= 0.376*
30-44	14.5	15.6	*p = 0.76*
45-64	37.4	38.0	
65+	34.2	33.0	
Ethnic background recoded			*χ2 (4)= 4.598*
White British	89.2	88.3	*F (2.89, 2015.22)= 0.264*
Black	1.2	1.4	*p = 0.845*
Asian	4.5	4.2	
Other white, mixed, and others	4.9	5.6	
Missing	0.2	0.4	
Marital status			*χ2 (4)= 3.886*
Single	24.3	24.7	*F (3.78, 2636.16)= 0.359*
Married or civil partnership	56.9	55.6	*p = 0.827*
Separated or divorced	10.4	11.7	
Widowed	6.5	6.2	
Missing	1.9	1.9	
Children			*χ2 (1)= 1.163*
No	82.9	83.9	*F (1.00, 697.00)= 0.342*
Yes	17.1	16.1	*p = 0.559*
Urban or rural area, derived			*χ2 (1)= 0.342*
Urban area	76.9	76.3	*F (1.00, 697.00)= 0.078*
Rural area	23.1	23.7	*p = 0.78*
Highest qualification			*χ2 (5)= 4.796*
Degree	29.4	29.3	*F (4.79, 3335.86)= 0.328*
Other higher	12.8	14.0	*p = 0.889*
A level etc	21.2	19.8	
GCSE etc	20.3	20.4	
Other or no qual	15.5	15.4	
Missing	0.9	1.1	
Long-standing illness or disability			*χ2 (2)= 2.250*
Yes	36.4	38.1	*F (1.66, 1155.68)= 0.588*
No	63.3	61.7	*p = 0.525*
Missing	0.2	0.2	
General health			*χ2 (5)= 9.918*
Excellent	8.5	9.4	*F (4.78, 3334.05)= 0.650*

Very good	35.4	33.2	*p = 0.654*
Good	35.5	35.8	
Fair	14.7	16.4	
Poor	5.6	5.0	
Missing	0.4	0.3	
Benefit recipient			*χ2 (2)= 13.023*
Benefits recipient	26.7	27.9	*F (1.95, 1356.18)= 3.021*
No benefits	71.9	71.5	*p = 0.051*
Missing	1.4	0.6	
N	2,349	2,390	

Discussion

Higher values of the EBI boosted the response rates at the end of the web-only fieldwork for the panel members who had received an EBI in previous waves and therefore perceived the change in the value as an increase. The positive impact of increasing the value of an incentive in a longitudinal study has been observed in other studies (Gaia, 2017; Laurie, 2007; Rodgers, 2011). In those experiments, the increase in the response rates was achieved by relatively small increases in the value of the incentive, from £7 to £10 (Laurie, 2007) or after a somewhat substantial increase in the amount offered, from $20 to $50 (Rodgers, 2011). While the former case suggests that even symbolic changes in the value of the incentive can achieve an increase in the response rates, the latter indicates that a substantive rise is required to observe a difference. In our case, the experiment does not allow us to determine the optimal value of the EBI that would maximise the effect on the response rate, but we find that increasing the value by £10 positively affects the response rates. The 5.8 p.p. increase in the response rate observed at the end of the web-only period faded to 2.7 p.p. at the end of the fieldwork and became nonsignificant, meaning that we cannot claim that the increased EBI had a positive effect on the final survey response rate. Another implication of this finding, in line with Calderwood and her colleagues (2022), is that there is no negative effect caused by the withdrawal of the incentive after the first five weeks of fieldwork; although the difference in response rates between the higher EBI and control groups eroded, it was still positive at the end of the fieldwork.

In contrast, the random subsample offered an EBI for the first time as they transitioned from CAPI to a web and telephone sequential design reacted equally to the two values of the EBI. These results

are similar to those reported by Friedel and colleagues (2022), who found no differences between two different incentive amounts – €20 and €50 – in a recruitment survey of the German Internet Panel. However, they found that offering the EBI was beneficial for the response rates of the recruitment and panel surveys compared to the absence of EBI. Another experiment in the Survey of Income and Program Participation pointed in the opposite direction: while a $20 conditional incentive increased the response rates compared to no incentive, a $10 incentive did not have an effect (James, 1997). These differences reinforce the idea that has been examined in cross-sectional surveys that the relationship between the value of the incentive and the ability to raise response rates is nonlinear and other factors, such as the mode, can moderate the effect (Mercer et al., 2015).

Hence the results show that when the higher EBI was perceived as an increase in the value of a pre-existing incentive, it boosted response rates, at least during the time-limited period when the EBI was active. In contrast, it had a null effect when offered to those transitioning to the web for the first time. Although the design of this experiment does not allow us to determine when it is better to invest the resources to raise response rates, this finding suggests that offering subsequent increases in the incentives might have more positive results on balancing data quality and survey costs than providing a higher incentive since the beginning of the fieldwork. More experimental research is needed to assess this hypothesis.

We also looked at the change in response rates across some groups formed by a set of moderators. As expected, significant differences were observed among the (previously) web-first group that had received the EBI. Interestingly, some groups exhibiting an above-average reaction to the higher EBI are less likely to participate and more prone to drop from the study. For instance, younger panel members (16-44), those on a lower income, or with an ethnic minority background exhibited higher response rates at the end of the web-only period and, in the case of the ethnic minority panel members, this effect was substantial and endured until the end of the fieldwork. Also, previous wave nonrespondents from responding households and regular respondents increased their response rates after being offered the EBI. For the (previously) CAPI-only subsample that was offered the EBI for the first time, the panel members aged 30-44 exhibited an increase in the response rate at the end of the web-only fieldwork after being offered the higher EBI, while those with an ethnic minority background showed a considerably higher response rate at the end of the fieldwork.

The second research question explored whether an increase in response rates due to the higher EBI could beneficially impact fieldwork efforts. There is a mechanism that connects an increase in individual response rates due to a higher EBI with a reduction in fieldwork efforts. In the context of a sequential mixed-mode survey, higher participation rates at the first, self-completion, phase of fieldwork will result in less fieldwork effort being necessary at the second, interviewer-administered phase. As interviewer administration is considerably more costly than self-completion, a net reduction in data collection costs is possible even if additional costs, such as those of incentives, are incurred at the first stage. In the case of a household survey where all adult members in the household are invited to participate, the reduction in fieldwork efforts at the interviewer-administered stage will be particularly substantial if a larger number of households complete the survey during the web-only period. In that situation, interviewers will have fewer households to contact. The results show that the complete household response rate increased for the higher EBI group, meaning that the telephone interviewers indeed had fewer households to contact. This finding is consistent with, but expands upon, previous research which showed that using EBIs could reduce fieldwork efforts or positively impact survey costs (Calderwood et al., 2022; McGonagle et al., 2022), by suggesting that increasing the value of the EBI could further reduce the necessary fieldwork efforts.

The last research question examined whether differential effects of the increase in the EBI changed the final composition of the sample. We did not observe differences between the experimental groups for a set of ten variables, including demographics, health and economic measures.

The generalisation of the experiment's results needs to consider various limitations. First, interpretation must consider the specificities of the survey context. The experiment was embedded in wave 12 of a household panel and the EBI was offered along another conditional or unconditional incentive. These aspects of the context could have affected the results. Second, for those transitioning from CAPI to a web and telephone sequential design, we tested the effect of offering two different values of the EBI, but we did not include the comparison of the £10 and £20 incentives to the absence of EBI. Other evidence referenced in this paper points out the general positive effect of EBIs on response rates in longitudinal surveys. Finally, fieldwork coincided with the covid-19 lockdown in the United Kingdom, which could have affected the reaction of panel members to the EBI.

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Appendix 1. Heterogeneous effects tables

This appendix contains the replication of the heterogeneous effects tables included in the body of the paper (**Error! Reference source not found.**) using the multivariate models. The tables in the results section present the uncontrolled heterogeneous effects derived from simple logistic regression models, while these include the heterogeneous effects controlled by the rest of the moderators. The simple and multivariate models led to similar estimations of the heterogeneous effects. The few differences observed might be due to the effect of the control variables in the multivariate models or to the sample selection derived from the cases excluded from the analysis due to missing information for one or more moderators.

Table 7. Heterogeneous effects of the higher EBI by moderators for last wave web-first and CAPI-only subsamples.

	Previously web-first			Previously CAPI-only		N
	Web phase	**Final**	**N**	**Web phase**	**Final**	
Gender						
Male	0.082***	0.036	2,091	0.017	0.054	453
	(0.023)	(0.019)		(0.048)	(0.039)	
Female	0.044*	0.012	2,498	0.007	0.003	526
	(0.019)	(0.015)		(0.045)	(0.033)	
Age groups						
16-29	0.150***	0.059	835	-0.007	0.066	124
	(0.039)	(0.033)		(0.097)	(0.066)	
30-44	0.082*	0.029	947	0.219**	0.165*	217
	(0.040)	(0.029)		(0.072)	(0.067)	
45-64	0.023	0.006	1,655	-0.074	-0.010	339
	(0.026)	(0.019)		(0.061)	(0.047)	
65+	0.050	0.020	1,152	0.007	-0.025	299
	(0.029)	(0.021)		(0.058)	(0.038)	
Education						
No degree	0.066***	0.026	3,335	0.009	0.037	646
	(0.020)	(0.016)		(0.046)	(0.036)	
Degree	0.050	0.016	1,254	-0.003	-0.002	333
	(0.029)	(0.019)		(0.056)	(0.041)	
Ethnic background						
Ethnic minority	0.149**	0.122**	704	0.247*	0.228**	122
	(0.053)	(0.044)		(0.102)	(0.075)	
White British	0.047**	0.008	3,885	-0.015	0.005	857
	(0.018)	(0.014)		(0.040)	(0.031)	

Individual income						
Q1	0.141***	0.060*	1,145	-0.077	0.029	222
	(0.032)	(0.025)		(0.066)	(0.050)	
Q2	0.099***	0.039	1,074	0.088	0.051	224
	(0.029)	(0.024)		(0.069)	(0.046)	
Q3	-0.014	-0.007	1,193	0.060	0.066	258
	(0.031)	(0.024)		(0.063)	(0.049)	
Q4	0.025	0.000	1,177	-0.033	-0.025	275
	(0.030)	(0.021)		(0.065)	(0.051)	
Uses Internet daily						
No	0.114**	0.037	771	0.135	0.073	130
	(0.038)	(0.033)		(0.081)	(0.068)	
Yes	0.052**	0.021	3,818	-0.006	0.021	849
	(0.018)	(0.014)		(0.040)	(0.031)	
Smartphone						
No	0.034	0.006	526	0.050	-0.012	108
	(0.047)	(0.039)		(0.104)	(0.066)	
Yes	0.066***	0.026	4,063	0.008	0.034	871
	(0.017)	(0.013)		(0.039)	(0.031)	
Response pattern						
Irregular respondent	0.026	-0.027	600	0.063	0.020	91
	(0.039)	(0.041)		(0.090)	(0.092)	
Regular respondent	0.058**	0.020	3,989	-0.013	0.001	888
	(0.018)	(0.013)		(0.039)	(0.030)	
Last wave response						
Respondent	0.061***	0.024	3,964	-0.008	-0.001	844
	(0.018)	(0.013)		(0.040)	(0.029)	
Nonrespondent (responding household)	0.065	0.058	292	-0.103	-0.005	50
	(0.051)	(0.057)		(0.117)	(0.119)	
Nonrespondent (nonresponding household)	0.035	-0.045	333	-0.024	0.035	85
	(0.057)	(0.062)		(0.111)	(0.121)	

Sig. * $p < .05$, ** $p < .01$, *** $p < .001$. These estimates are marginal effects expressed as proportions predicted from a logistic regression model that included all the moderators and the interaction terms with the experimental allocation variable.