The effect of targeted incentives on response rates and representativeness

Evidence from the Next Steps Age 32 Survey

CLS working paper number 2024/4.

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How to cite this paper

Abstract

This paper analyses the effect on response rate and non-response bias of tailoring the level of monetary incentives offered to participants in a longitudinal study, depending on sample members' response propensity. Specifically, we test whether offering higher value incentives to prior wave non-respondents (and lower value incentives to prior wave respondents) would lead to overall higher response rates, better representativity and lower non-response bias, compared to offering to all sample members the same monetary incentive. In order to test these hypotheses, we use large-scale experimental data from the Next Steps Age 32 survey. Next Steps is a longitudinal cohort study, following the lives of approximately 16,000 participants born in 1989-90. We find that offering higher incentive to prior wave non-respondents did not significantly increase response. We also do not find support for targeted monetary incentives being particularly effective at boosting response amongst particular population subgroups. The use of targeted incentives has to date been relatively rare, particularly in the UK context, but in this study the approach was not found to be successful.

Keywords: Monetary incentives; Non-response bias; Targeted survey designs; Representativeness; Next Steps.

Introduction

Declining response rates may undermine survey data quality by reducing the sample size available for analysis, with implications for the precision of survey estimates. Also, if respondents and non-respondents differ in key concepts of interest for research, low survey participation may lead to non-response bias (Groves et al., 2009).

In the context of longitudinal studies, non-response is particularly problematic, as missing data at a specific survey wave limits the potential of the information collected at earlier and later time points. While statistical adjustments, such as multiple imputation or inverse probability weighting may be implemented post data collection

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with the aim of restoring sample representativeness, maximising respondents' participation remains vitally important for achieving a representative sample of the target population.

Furthermore, in longitudinal studies, non-response in a particular wave seems to break the respondent habit of participation in the study, and may ultimately lead to panel attrition (Lugtig, 2014). Hence, keeping panel members engaged with the study is of primary importance.

Monetary incentives are one tool that survey practitioners can employ to increase survey participation. It has long been recognised that the offer of monetary incentives will typically have a positive impact on response rates and the use of incentives is widespread, especially in the United States, though to a lesser extent in the United Kingdom. The impact of incentives is however not necessarily uniform and much evidence suggests that the effect of incentives can be greatest on sub-groups with lower propensity to respond (Zagorsky and Rhoton, 2008; Laurie, 2007). These findings could present a case for the use of differential incentive strategies which involve offering higher value incentives to those less likely to respond, which, if successful, would reduce non-response bias. Furthermore, under tight budget constraints which may limit the possibility to offer monetary incentives (or the same value incentive) to all sample members, targeting incentives (or higher value incentives) to sample members that are more likely to be responsive to them seems a cost-effective strategy. The provision of larger incentives to hard-to-reach respondents may also reduce the fieldwork effort required (e.g. number of calls necessary to complete cases) and ultimately reduce survey costs.

However, the evidence on the efficacy of targeted incentives is limited and mixed. In this research we provide novel empirical findings on the effect of higher value monetary incentives targeted to prior wave non-respondents, using experimental data from a large-scale cohort study in England: the Next Steps Age 32 survey.

Literature review

In the following we review evidence from the literature on the use of targeted incentives. First, we present survey methodological and economic literature which sets the theoretical basis for the use of targeted incentives. Second, we discuss the evidence on whether incentives have a differential effect on response rates, depending on sample members' characteristics or response behaviours and thus have an impact on reducing non-response bias. Third, we present examples on the use of targeted incentives in different contexts. Finally, we report results on studies which have adopted targeted incentives in an experimental setting.

Theoretical basis for the use of targeted monetary incentives

As per other survey design features, incentives might impact participation differently across different respondents' subgroups. This consideration is at the core of the *leverage saliency theory* which postulates that a single survey design attribute – in this context, the incentive level – can exercise different "leverage" on how different sample members make a decision as to whether to participate (Groves et al., 2000). Hence, monetary incentives may render survey participation more salient for sample members who value more highly the monetary reward, while may have a lower effect for those who have other motivations for survey participation (e. g. altruistic motives, interest in the survey topic, commitment or habit).

The recognition that different sample members may react differently to survey design features is the rationale behind the implementation of targeted survey designs. These are designs in which i) survey design features are varied between sample subgroups (with the aim to minimise survey error and optimise survey costs) and ii) these variations are planned in advance of fieldwork rather than during data collection (for a discussion see Lynn, 2017). Longitudinal studies provide an optimal setting for the implementation of targeted designs, thanks to the wealth of information available on sample members, from prior survey waves.

One form of targeted design is to offer different levels of incentives to different sample members subgroups in order to maximise response rates and representativeness. Based on the evidence that non-cooperative sample members tend to react more to monetary incentives than highly engaged respondents (Zagorsky and Rhoton, 2008; Laurie, 2007), several studies (e.g. the Panel Study of Income Dynamics, the Swiss Household Panel) have implemented tailored designs where higher incentives are offered to prior wave non-cooperative sample members.

Economic theory would suggest that the population subgroups which are most responsive to monetary incentives are those who value money the most (Felderer et al., 2017). Indeed, economic models of survey participation suggest that respondents may see incentives as a compensation for their time and effort (Philipsons, 1997). Hence, incentives of modest value may motivate low-income respondents who have a lower opportunity cost of time (Felderer et al., 2017). Other theories – e.g. the *social exchange theory* (Lipps, 2010) – stress that respondents do not perceive incentives as a payment for their time and effort in completing the survey but rather as a demonstration of trust that the respondent will answer the survey or as a symbolic sign of appreciation reciprocated by survey completion. However, it still seems reasonable to assume that the monetary contribution is more highly regarded by those who value money the most (hence sample members with lower income or those in poverty).

Targeting monetary incentives to specific subgroups of sample members might be cost-effective, as the cost of the higher incentives may be offset by the savings in fieldwork effort to recruit respondents that are hard to persuade to take part in the survey otherwise. Also, as incentives of higher value tend to have a greater impact on response (Singer et al., 1999; Börsch-Supana and Kriegerb, 2013; Laurie, 2007; Rodgers 2011, for a review Booker et al., 2011) and offering incentives of high value to all sample members may not be feasible under tight budget constraints, targeting higher value incentives to sample member with low response propensity could be a cost-effective strategy, if the incentives reduce the number of contact attempts and interviewer visits required (see Blohm and Koch 2013).

Empirical evidence on the differential effect of monetary incentives by respondents' characteristics and response behaviour

One way to assess the effectiveness of targeted monetary incentives is to compare biases in sample composition in studies which have assigned incentives to one random treatment group and no incentives (or lower incentive amounts) to a control group. Since incentives are offered to a random subsample (and assuming that the randomisation process led to subsamples that are equal in key socio-demographic and survey response behaviour variables), significant differences in sample composition between incentivised and not incentivised subsamples should be interpreted as differential efficacy of incentives.

Some studies have shown that monetary incentives increase participation of typically underrepresented population subgroups, such as people of low income (Mack et al., 1998; Felderer et al., 2017) – including those eligible for free school meals in England (Knibbs et al., 2018) – sample members with low education (Singer et al. 2000), and ethnic minorities (in the US) – Mack et al., 1998. However, this evidence seems to be mixed. For example, Knibbs et al. (2018) do not find evidence for differences in responsiveness to incentives by ethnicity (white *versus* non-white) and Singer (2000) only found an effect on education, but not on other demographic characteristics.

Indeed, in a review of different studies, Singer et al. (1999) found three studies that support the indication that incentives increase participation among otherwise underrepresented sample members, five studies that find no effects on sample composition and one study that finds mixed results. Similarly, a review of the evidence from 10 experiments implemented in cross sectional and longitudinal surveys in Germany shows mixed results on the efficacy of incentives on reducing non-response bias (Proff et al. 2015, see also: Börsch-Supana and Kriegerb, 2013; Blohm and Koch, 2013; Felderer et al. 2018). Also, evidence from several longitudinal studies in the US, the UK and Switzerland find a lack of support for the

hypothesis of different responsiveness to incentives across population subgroups (LeClere et al., 2012; Suzer-Gurtekin et al., 2016; Jackle and Lynn, 2008; Lipps et al. 2022; Cabrera-Alvarez and Lynn, 2023).

With respect to offering incentives to sample members which are typically non cooperative, some evidence from longitudinal studies shows that prior wave non respondents react more positively to incentives than prior wave respondents (Laurie, 2007), while one more recent study (Booth et al., 2024) finds the opposite. However, it should be noted this mixed evidence might arise from differences in target populations, incentive amounts/increases, and maturity of the panel. Indeed, the experiment reported in Laurie (2007) was implemented on a longitudinal study of the general population (the British Household Panel Survey, Wave 14) and experiments with a minor increase in the incentives value (from 7£ to 10£). Conversely, Booth and colleagues (2024) focus on a specific population subgroup – a cohort of young people aged approximately 20 years old in the United Kingdom, i.e. the Millennium Cohort Study Covid-19 Wave 3 survey; in this case a £10 incentive was offered, for the first time in the history of the study[1].

The use of targeted monetary incentives in large scale studies

Targeted incentives have been implemented in the US context since the late 1990s (Nicolaas et al. 2019), while the adoption of such designs in the European and UK context is more recent. For example, in the US-based Survey on Programme Dynamics incentives ($40, unconditional) were offered only to households who did not participate in prior waves or showed reluctance to participate (Kay, Boggess, Selvavel, & McMahon, 2001). Similarly, in the 2003-2004 wave of the National Longitudinal Survey of Youth 1997, different levels of incentives ($35, $30, $25 or $20) were offered depending on sample members' participation over the prior three waves (Bureau of Labor Statistics, undated, as quoted in Lynn, 2017).

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[1] For a comparison of incentive amounts over time and country, please see Table 1 in the online supplement.

An example of the use of targeted incentives in Europe is the Swiss Household Panel where targeted incentives were adopted in the 2007 wave. Fifty Swiss Francs[2] were offered to households who refused participation in the prior survey wave, which lead to a significantly higher response rate amongst this group compared to that achieved by a "roughly similar" sample in the prior wave (Lipps, 2010: 87). However, as this study is observational rather than experimental, it doesn't allow for the determination of a causal link (Lipps, 2010).

In the UK context, targeted incentives have been adopted in a few longitudinal and cross-sectional surveys. For example, in *Understanding Society*: the UK household Longitudinal Study, from wave 6 (2014-15) to wave 12 (2020-21), sample members living in households where everyone refused participation at the prior wave (or where it was not possible to establish contact at the prior wave) were offered higher incentives (£20 *versus* £10) compared to prior wave respondents – or non-responding adults in partially productive households at the prior wave (e.g. see Carpenter 2021 for wave 12, and wave 6-11 technical reports for the prior waves). However, as this design was not implemented experimentally, it is not possible to assess whether the provision of higher incentives to some sample subgroups increased response rates compared to designs where incentives are equal for all sample members.

The first wave of the COVID Social Mobility and Opportunities Study (COSMO) – a new longitudinal study which recruited 16-year-olds through schools – sought to improve response and representation of those from disadvantaged backgrounds by offering higher value incentives (£20 versus £10) to students attending schools with a higher proportion of students receiving free school meals. For each young person invited, a parent or a guardian was also invited to take part where they were offered the same incentive as their child. The impact of the incentive was assessed using a regression discontinuity design (Anders et al., 2023). Authors found that the higher incentives seem to have led to higher response rates for young people, and

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[2] Equivalent to $53 accounting for inflation, Purchase Power Parity (measured in terms of national currency per US dollar) in 2022 (see Table 1).

increased participation of 'full households' where both a young person and their parent took part. Achieved sample representativity was assessed with data available for the population from the sampling frame, where the higher incentive group's representativity was slightly better than that of the lower incentive group.

Other UK-based examples of the use of targeted incentives include:

- the Skills and Employment Survey (2017) where sample members living in London were offered a £15 conditional incentive (*versus* £10 for all other sample members), to increase participation in this area (Glendinning et al., 2018).
- the Omnibus Survey of Pupils and their Parent/Carer waves 5 and 6 where an incentive was offered to school pupils eligible for free school meals (FSM) and their parents/carers, if both completed the survey (Ipsos Mori, 2019; Lindley et al., 2019), and
- Growing up in Scotland wave 9, when a pre-paid £15 incentive is sent to families which are under-represented in the study, e.g. teenage mothers, single parents, and sample members living in deprived areas (as reported in Nicolaas et al. 2019).

Targeted monetary incentives applied in an experimental setting

In some cases, survey designs using targeted incentives have been implemented experimentally, to evaluate their efficacy. In the US context, in the 2006 Survey of Recent College Graduates, sample members expected to have a low response propensity were experimentally assigned to either receiving or not receiving a prepaid incentive for survey participation then later in the fieldwork period, incentives were offered to sample member who had not participated yet. Targeted incentives led to a substantial increase in survey participation (Zukerberg, Hall, & Henly, 2007, as quoted in Lynn 2017).

In waves 8 and 9 of the Census Bureau's Survey on Income and Programme Participation, households who did not participate at the prior wave were either

assigned to receive $40, $20 or no incentive (Abreu and Winters, 1999; Martin et al. 2001). The authors found that offering incentives (*versus* no incentive) to prior wave non-respondents increased response, but larger incentive amounts ($40 *versus* $20[3]) did not have a significant effect.

Similar results emerged from the US based National Longitudinal Survey of Women. Sample members who previously refused to participate, were offered either a $20 conditional incentive, a $40 conditional incentive or no incentive[4]. Incentives again lead to higher rates of participation and higher levels of data quality (in terms of item completion) but no reduction in survey costs (Zagorsky and Rhoton, 2008).

Targeted incentives were also found to be effective in the 2014 Child Development Supplement to the U.S. Panel Study of Income Dynamics (Fomby, Sastry and McGonagle, 2017). Specifically, a random subsample of hard-to-reach families – i.e. those whose predicted probability of non-response fell in the top quartile of the distribution – were offered a time-limited $50 incentive[5] conditional on the primary caregiver completing a 75-min interview and eligible children participating in a 30 min interview, over the three-weeks U.S. winter holiday period. The incentive led to a significant increase in completed interviews over the time-limited period and did not lower final response rates (after the time-limited incentive was withdrawn). Within the hard-to-reach group, the incentive was most effective in achieving cooperation from those who had the highest non-response predicted probabilities. However, as the experiment was implemented on a specific demographic (primary caregivers), it remains unclear to what extent these results are generalisable to different population subgroups and the seasonal effect of implementing the approach during the Christmas holiday period may have also played an important role.

Table A1, in the online supplement, shows a summary of the incentive amounts offered by study. To facilitate comparison, these amounts are adjusted for inflation, exchange rate and Purchase Power Parity.

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[3] This corresponds to $75 and $37 in 2022, once adjusted for inflation (see Table 1).
[4] This corresponds to $64 and $32 in 2022, once adjusted for inflation (see Table 1).
[5] This equals to $64 in 2022, once adjusted for inflation (see Table 1).

Limitations and gaps in the literature on targeted monetary incentives

The presented literature has several limitations. First, most studies have applied targeted incentives in a non-experimental setting; hence, it is not possible to evaluate their effectiveness (as opposed to designs where incentives are allocated equally across sample members).

Second, based on the experimental studies comparing designs with targeted incentives against designs without targeted incentives, it is hard to understand to which extent the results are generalisable to different contexts: these studies are all embedded in the US-context, are limited to specific subpopulations, and, in the case analysed by Fomby, Sastry and McGonagle (2017), also to a specific timeframe. To the best of our knowledge there have been no experimental applications of a targeted incentive approach in a large-scale study in the UK.

Third, while the few available experimental studies find support for the efficacy of targeted incentive designs, those studies always compare offering *versus* not offering monetary incentives to a target group (usually, expected to be under-represented in the study). The comparison is therefore between a survey design where an overall significantly higher budget is allocated to incentives *versus* designs in which a lower overall budget is allocated to incentives. Other things being equal — i.e. in absence of variation (across the two designs) in fieldwork effort/costs to contact respondents and gauge their participation — it does not seem surprising that designs providing on average significantly higher incentives would lead to higher overall response rates.

In summary, while these experimental studies can provide valuable information about whether incentives can be effective at boosting response amongst particular subgroups they do not allow us to understand whether a fixed incentive budget is most effectively used by allocating incentives equally across all sample members or whether it could be more effective to offer higher incentives to certain sub-groups and to fund this by reducing the incentive offered to the remaining groups. To the

best of our knowledge, this latter research question has not been yet analysed in the literature.

Research questions

In this study we use experimental data from the Next Steps Age 32 survey to compare a targeted incentive approach where prior wave non-respondents are offered a higher value incentive which is funded by offering a lower value incentive to prior wave respondents, with a non-targeted approach in which all respondents are offered the same value incentive. We answer the following research questions:

RQ1: Does the targeted incentive approach – with higher value monetary incentives for prior wave non-respondents and lower incentives for prior wave participants – lead to overall higher response rates[6] than a non-targeted approach where all participants are offered an equal incentive?

We hypothesize that offering lower incentives to engaged prior wave respondents would have little impact on response rates within this group, while offering higher incentives to prior wave non-respondents could substantially boost participation. We hypothesise that by boosting participation amongst prior wave non-respondents without reducing participation amongst prior wave respondents the overall response rate will be increased relative to the non-targeted approach.

It is reasonable to assume that monetary incentives can only be effective in boosting participation if the offer of the incentive is received which requires some level of contact to be established with sample members. In the event that participants cannot be contacted or cannot be traced after having moved then the offer of the incentive is unlikely to be received and so will inevitably have no effect. As such our second

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[6] Response rates are calculated adopting the "Response Rate 2" as defined in the standard definitions of the American Association for Public Opinion Research (AAPOR, 2023). This is the number of interviews (complete or partial) divided by interviews (complete or partial) plus non-interviews (refusal, non-contact, other non-interview) and cases of unknown eligibility.

question focuses on the cooperation rate[7], so that we can explore the impact of the targeted incentive, conditional on the offer of the incentive being received:

RQ2: Does the targeted incentive approach – with higher value monetary incentives for prior wave non-respondents and lower incentives for prior wave participants – lead to overall higher cooperation rate than a non-targeted approach where all participants are offered an equal incentive?

As for RQ1, also for RQ2, we hypothesize that offering lower incentives to engaged prior wave respondents would have little impact on their co-operation rate, while offering higher incentives to prior wave non-respondents could substantially increase cooperation, leading to an overall higher cooperation rate in the targeted (versus non-targeted) approach.

Furthermore, targeted incentives may be used not only to increase overall response rates but also to reduce non-response bias by increasing participation for subgroups of sample members, which might be otherwise underrepresented. Hence, our third and fourth research questions are:

RQ3: Are there some subgroups of sample members that are particularly responsive to the targeted incentive strategy?

RQ4: What is the effect on sample representativeness/non-response bias of the targeted incentive approach (i.e. offering higher monetary incentives to prior wave non-respondents and lower incentives to prior wave respondents) compared to the non-targeted approach where all participants are offered the same incentive?

We hypothesise that the targeted approach will boost participation amongst prior wave non-respondents and that by doing so non-response bias will be reduced.

Besides improvements in response rates and representativity, another potential benefit of targeted monetary incentives is the potential cost savings derived from more efficient allocation of the incentives budget. Cost savings may also be realized

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[7] Cooperation rates are calculated adopting the "Cooperation Rate 2" as defined in the standard definitions of AAPOR (2023). This is the number of interviews (complete or partial) divided by interviews (complete or partial) plus refusal and other non-interview.

in targeted incentive designs through savings in fieldwork effort; indeed, targeting incentives to prior wave non-respondents may facilitate early recruitment of less engaged sample members, saving the costs of numerous interviewer calls and visits to achieve cooperation. Furthermore, in the context of a sequential web-first mixed-mode design, offering higher incentives to prior wave non-respondents may have the potential to encourage participation by web, which yields lower per-interview costs compared to face-to-face. We assess these aspects through our remaining research questions:

RQ5: Is the targeted incentive approach overall less expensive – in terms of incentive amounts paid to respondents – than the non-targeted incentive approach? Does the targeted design lead to a lower incentive payment per interview achieved than the non-targeted approach?

RQ6: Does the targeted design lead to lower fieldwork effort being required (number of face-to-face calls for achieved interview) than the non-targeted incentive approach?

RQ7: Does the targeted design lead to a higher share of interviews conducted online (*versus* face-to-face) than the non-targeted approach? We expect the targeted approach to lead to a higher number of interviews overall (with the number of prior wave respondents being interviewed being constant across the two designs and the number of interviews from prior wave non-respondents being higher in the targeted design). We hypothesise that the targeted design will be more cost effective (lower per interview cost) than the non-targeted design: this is because in both designs we expect most interviews to be conducted on prior wave respondents, and in the targeted design, the cost-saving from the lower amount of incentives paid to prior wave respondents would more than offset the higher costs of incentives offered to prior wave non-respondents. Furthermore, we hypothesize that the targeted approach will lead to lower fieldwork effort being required (number of calls per case) as sample members with lower cooperation propensity will be encouraged to participate promptly. As such we also expect to achieve a higher share of web interviews in the targeted approach.

Data

Next Steps cohort data

Next Steps is a longitudinal study following approximately 16,000 participants in England, born in 1989-90. The study began in 2004, when participants were aged 14, and it was known as the Longitudinal Study of Young People in England (LSYPE). The target population was young people who were in Year 9 in English state and independent schools and pupil referral units in February 2004. After the first wave of data collection, participants were interviewed yearly until age 20 (wave 7, in 2010), and then again at age 25 in 2015 (wave 8) and at age 32 in 2023 (wave 9). Waves 1 to 7 were run by the Department for Education. During this period, only participants who took part in the prior wave were issued in the following survey wave. The study was then paused for five years until the Age 25 Survey in 2015 when the study was re-launched by the Centre for Longitudinal Studies, University College London. During the Age 25 Survey efforts were made to trace and contact everyone who ever took part in the study (Centre for Longitudinal Studies, University College London, 2017; Calderwood et al., 2021). At the Age 32 survey, the issued sample was comprised of all cases who have ever participated in the study with the exception of those who have permanently withdrawn, those known to have died, those regarded as permanently untraced and those in prison or on probation.

Age 32 survey fieldwork was carried out in four main batches, and the incentive experiment analysed in this study was implemented in the first. The issued sample for the Age 32 Survey was stratified by three variables to allocate the issued sample to batches: 1) when the cohort member has last taken part (wave 8, wave 7 or waves 1-6), 2) region of residence (South, London, North, and Midlands), and 3) sex. These stratification variables were based on analysis of the Age 25 data (the most recent prior sweep of data collection), which indicated that they were the most significant predictors of cooperation/refusal rates. A stratified random sub-sample

consisting of 25% of all cases to be issued (n=3,113) was selected for issue to the first batch of fieldwork in which the incentive experiment was conducted.[8]

The survey used a sequential mixed mode approach where sample members were first invited to complete the survey online. After a three week online only period interviewers started attempting contact with sample members, either by telephone or by face-to-face (for unproductive sample members at the prior wave or sample members who did not provide a telephone number). In addition to offering face-to-face interviews, interviewers were also able to offer self-completion of the survey either on a device (small tablet) handed over to them by interviewers and collected at a later agreed time, video interviews (using Microsoft Teams) and, in exceptional circumstances a telephone interview. The web-survey also remained open during the interviewer-lead fieldwork period.

Topics covered included family and relationships, housing, employment and income, education, health and wellbeing, identity and attitudes, childhood, and other life events. The median survey duration online (or on a tablet provided by interviewers) was 55 minutes, and 88 minutes for in-person interviews[9]. In addition to the main questionnaire, sample members were invited to fill in a self-completion module and a cognitive assessment; to provide a saliva sample for DNA extraction, consent to data linkage, and to consent to contact their live-in partner to ask them to consent to linkage of their administrative records[10].

The use of incentives in the Next Steps cohort

Next Steps cohort members have been offered incentives for survey participation since the study inception. Incentives amounts and conditions have varied over time.

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[8] 3,206 cases were initially assigned to wave 1, however a small share of cases (3%, n=93) was reallocated to the mainstage data collection due to difficulties in assigning interviewers to some areas. The final sample issued to the soft launch was composed of 3,113 cohort members.

[9] These timings take into account time spent on the interview screen at the beginning/end of the interviews, without these the timings are approximately 5 minutes shorter each.

[10] This latter consent request was implemented only in the first stage of fieldwork and discontinued thereafter.

In wave 1 (at age 13/14) all cohort members were offered a £5 high street voucher conditional on survey participation, while at wave 2 and 3 the £5 voucher was unconditional on survey participation and at wave 4 the voucher amount increased to £8. From wave 5 to wave 7, incentives were offered to web respondents only – this shift coincided with the switch from face-to-face to a mixed mode design (with web followed by telephone and face to face interviewing) (Department of Education, 2011). In wave 8, i.e. the Age 25 survey, respondents received an "early bird" £20 incentive conditional on completing the survey online during the first three weeks of fieldwork, and a £10 conditional incentive after that period (Calderwood et al.,2023).

Experimental design

The incentive experiment analysed in this study was implemented in the first batch of fieldwork of the Age 32 Survey. The "early bird" incentive approach used in the previous wave in which a higher incentive was offered for web completion within the first three weeks was maintained: however, the incentive levels also varied experimentally, depending on prior wave participation.

Specifically, 50% of sample members were randomly assigned to a targeted incentive group, and 50% to a non-targeted incentive group. Stratification was implemented during experimental allocation in order to control for the random variability on observed characteristics between the experimental and the control group. Stratification variables were the same as those used when allocating the sample to batches (participation history, region of residence, and sex).

In the targeted incentive group, prior wave respondents were offered a £15 conditional incentive while prior wave non-respondents were offered a £25 conditional incentive. In the non-targeted group, sample members were offered a £20 incentive regardless of prior wave participation. In addition, all sample members who completed the survey online within the first three weeks of fieldwork received an additional £10 "early bird" conditional incentive. Table 1 shows incentive levels by experimental groups. Cohort members were also sent an additional £5 if they provided a saliva sample (see Table 1).

The sample adopted for this analysis excludes ineligibles – hence, it also excludes sample members who complete the web survey from abroad (i.e. "productive ineligibles"). This research is based on Next Steps Age 32 data and waves 1-8 (University College London, UCL Institute of Education, Centre for Longitudinal Studies, 2023).

Table 1: Incentive levels by experimental group

	n	Incentive amounts	
		"Early-bird" incentive + standard incentive (£)	Standard incentive (£)
Not-targeted	1,521	30	20
Targeted approach	1,512		
Prior wave respondents	904	25	15
Prior wave non-respondents	608	35	25
Total	3,033		

Note: "Early-bird" incentive is offered to respondents who participate in the survey online within the first three weeks. Standard incentive is offered thereafter. The table includes only eligible cases.

Methods

Response outcomes are categorised as follows: i. full interview, ii. partial interview, iii. refusal (includes office refusal, refusal by cohort member, agreed to compete the survey online but no further contact/refusal, refusal by other/unknown person, contact made but refused to give information about household/names, etc.), iv. non-contact, v. uncertain eligibility (includes untraced cohort members, address inaccessible, unable to locate address), vi. ineligible (includes cohort member deceased, moved abroad, etc.), vii. other non-interview (includes broken appointment, ill at home during survey period, hospitalised, language difficulties). In

terms of sample selection, respondents who are known to be ineligible at Age 32 are excluded from the analysis.

First, we explore any differences between experimental and control group by socio-demographic characteristics using a series of chi-square tests. We compare sex, ethnicity and parental socio-economic status National Statistic's Socio-economic Classification (NS-SEC) for the main parents, measured at baseline (wave 1)[11] and find no significant difference across subgroups.

To answer our first research question (i.e. the effect of targeted incentives on overall response rates), we present the percentage of respondents by participation at Age 25 and by experimental group, and use a series of chi square tests to evaluate the effectiveness of the targeted design. To answer our second research question (i.e. the effect of targeted incentives on cooperation rates), we report the cooperation rate by experimental group and evaluate the targeted and non-targeted groups using a series of chi-square tests.

In order to answer our third research question (i.e. the effect on sample representativeness/non-response bias of offering different incentive levels) we adopt logistic regression models predicting response at the Age 32 survey, by targeted/non-targeted incentive group and interact the allocation to the targeted incentive group with the individual characteristics, such as sex, ethnic group (white/non-white), and parental socio-economic status to take into account any difference by population subgroup in the effectiveness of the targeted designs on response and cooperation rates. The socio-demographic variables adopted in this analysis are those measured at baseline (wave 1). For missing data at wave 1, we use the Next Observation Carried Backward (NOCB) imputation method, i.e. we imputed data from subsequent survey waves (Sethia et al., 2023).

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[11] For the few sample members with missing information on ethnicity and parental socio-economic status, information from subsequent waves is imputed. We opted for using wave 1 as baseline and imputing information from subsequent waves because of the survey design of the Next Steps study, which entails that, after wave 1, non-respondents (in each wave) were not invited to participate at subsequent waves, until Age 25, when efforts were in place to engage every sample member who initially took part.

To answer research question four, we will report the distribution of sex, ethnicity, and parental socio-economic status in the issued sample, and among respondents in the targeted and non-targeted subsamples. We will test for significant differences across the targeted *versus* non-targeted groups using a chi-square test.

To answer research question five, we will multiply the number of respondents by the value of the conditional monetary incentives offered to them and will then compute the percentage variation in cost across the two designs. We will also divide the total incentive costs of the targeted and non-targeted designs by the number of achieved interviews in each design.

To answer research question six, we will compute the average number of call records per case (e.g. face-to-face visits, phone calls to cohort member or stable contact, etc.) and use a t-test to assess whether the average number of calls to achieve an interview is significantly different across the two designs. Finally, to answer research question seven, we will calculate the share of interviews by mode of data collection (web versus face-to-face) and use a chi-square test to estimate any statistical difference across the two designs.

Results

Our first research question investigates whether the targeted incentive approach leads to overall higher response rates than the non-targeted approach. Overall, after the web only fieldwork period (i.e. the first three weeks of fieldwork), response rates are not different in the targeted (39.8%) *versus* non targeted approach (40.1%) (see Table 2). The response rate amongst prior wave respondents – who were offered £15 in the targeted incentive group and £20 in the non-targeted group – was slightly lower in the targeted incentive group compared to the non-targeted incentive group (56.8% *versus* 58.1%); however, the difference was not statistically significant. The response rate among prior wave non-respondents – who were offered £25 in the targeted incentive group and £20 in the non-targeted group – was slightly higher in the targeted incentive group (14.6%) compared to the non-targeted group (13.4%); however, again the difference was not statistically significant.

Table 2 Survey response rate by experimental group

| | Response rate | | | |
	Targeted %	Non targeted %	*n*	*P*
Early web completion				
Prior wave				
respondent	56.8	58.1	1,811	0.560
non-respondent	14.6	13.4	1,220	0.533
Total	39.8	40.1	3,031	0.876
After face-to-face				
Prior wave				
respondent	69.7	72.6	1,811	0.180
non-respondent	26.8	25.2	1,220	0.512
Total	52.5	53.5	3,031	0.578

Note: P-values from Pearson Chi Squared test for the equality of the means. In the fixed (non-targeted incentive group) all sample members are offered a £20 conditional incentive; in the targeted incentive group, prior wave respondents are offered a £15 conditional incentive and prior wave non-respondents a £25 conditional incentive; all sample members are offered an additional £10 incentive conditional on survey completion by web in the first three weeks of fieldwork.

When we analyse response after the face-to-face fieldwork period, we observe a similar trend. Overall, response rates are not significantly different between the targeted and the non-targeted incentive groups (52.5% *versus* 53.5%). Among prior wave respondents, the response rate was slightly lower in the targeted incentive group than in the non-targeted group though the difference was not statistically significant (69.7% *versus* 72.6%). While prior wave non respondents participated at a slightly higher rate in the targeted group than in the non-targeted incentive group (26.8% *versus* 25.2%), though again, the difference was not statistically significant.

Our second research question investigates whether the targeted incentive approach leads to overall higher cooperation rate than the non-targeted approach. Incentives can only be effective if the request for survey participation and the complementary incentive offer reaches sample members. If the survey request does not reach sample members (for example because it is not possible to contact them or to trace them once they have moved) then monetary incentives cannot boost survey participation. As such it is important to understand the effect of incentives on participation, conditional on successful contact – i.e. the co-operation rate which we compute as the number of successful interviews (complete or partial) as a proportion of those (eligible and) contacted (complete or partial interviews, refusals and other non-interview).

As shown in Table 3, cooperation rates (after the face-to-face fieldwork period) are similar across the targeted/non-targeted incentives protocols (59.2% *versus* 60.3%). Among prior wave respondents, the cooperation rate was slightly lower in the targeted than in the non-targeted incentive group (74.5% *versus* 76.6%), however the difference does not reach statistical significance. With respect to prior wave non-respondents, the co-operation rate was slightly higher in the targeted incentive group than the non-targeted group (32.9% *versus* 31.1%) but again the difference was not statistically significant.

Table 3 Survey cooperation rate by experimental group

| | Cooperation rate | | | |
| | Targeted | Non targeted | | |
	%	%	*n*	*P*
After face-to-face				
Prior wave				
respondent	74.5	76.6	1,676	0.308
non-respondent	32.9	31.1	950	0.570
Total	59.2	60.3	2,626	0.567

Note: P-values from adjusted Wald test for the equality of the means. In the fixed (non-targeted incentive group) all sample members are offered a £20 conditional incentive; in the targeted incentive group, prior wave respondents are offered a £15 conditional incentive and prior wave non-respondents a £25 conditional incentive; all sample members are offered an additional £10 incentive conditional on survey completion by web in the first three weeks of fieldwork.

To answer research question three (i.e. identify whether any subgroups are more/less responsive to the incentive strategy) we estimate logistic regression models, regressing the experimental group allocation (targeted/non-targeted) on response at the end of fieldwork and interact the experimental group allocation with socio-demographic characteristics (i.e. sex, ethnicity and parental socio-economic status). The analysis is conducted separately for prior wave respondents and non-respondents. Table 4 presents four models: Model 1 shows the un-adjusted effect of targeted monetary incentives on response after face-to-face fieldwork for prior wave respondents; Model 2 adds the interaction effects between the allocation to the experimental groups and socio-demographic characteristics. Models 3 and 4, repeat the same analysis of Models 1 and 2, focusing on prior wave-non respondents.

Among prior wave respondents, we observe that the odds of participating in the survey are lower in the targeted incentive design (0.870), however this result does not reach statistical significance at standard levels (P=0.180). When including

covariates in the models and their interaction with the incentive experiment allocation (Model 2), we observe that that none of the interactions between socio-demographic characteristics and experimental allocation are significantly associated with response. Hence, the targeted approach did not significantly influence response among any of the subgroups analysed.

With respect to prior wave non-respondents, we observe that the odds of participating in the survey are 1.1 higher in the targeted incentive design as opposed to the non-targeted design; however, the result does not reach statistical significance at standard levels (P=0.512). Among prior wave non-respondents, none of the interactions between the targeted incentive design and socio-demographic variables is significantly associated with response; this signals no impact of the targeted approach on response among any of the socio-demographic groups under analysis.

Results are consistent with evidence after the web early bird period where we also find that when allocated to the targeted design, prior-wave respondents seem to show a lower propensity to participate (Odds Ratio: 0.946, P=0.560) while prior wave non-respondents seem to have a higher propensity to participate (Odds Ratio: 1.108, P=0.533) (results available in the online supplement, Table A2). While this latter result seems encouraging for gauging participation from less cooperative sample members in the early stages of fieldwork the increase in participation is not statistically significant at standard levels (nor is the decrease in response among prior wave respondents).

Table 4 Logistic regression models on response after the face-to-face phase by respondent characteristics

	Prior wave respondent		Prior wave non respondent	
	Odds Ratio			
	(1)	(2)	(3)	(4)
Targeted incentive	0.870	0.731	1.089	1.058
	(0.090)	(0.195)	(0.142)	(0.353)
Male sex		0.733*		0.705
		(0.113)		(0.136)
White ethnicity		1.599**		1.018
		(0.258)		(0.207)
Parental socio-economic status (Ref: high)				
Intermediate		0.704		0.666
		(0.158)		(0.187)
Low		0.557***		0.713
		(0.097)		(0.153)
Interactions				
Male sex*targeted incentive		0.985		1.219
		(0.211)		(0.332)
White ethnicity*targeted incentive		1.019		1.045
		(0.229)		(0.298)
Parental socio-economic status (Ref: high)				
Intermediate*targeted incentive		1.198		1.183
		(0.365)		(0.460)
Low*targeted incentive		1.272		0.726
		(0.311)		(0.219)
Constant	2.643***	3.185***	0.336***	0.534***
	(0.197)	(0.605)	(0.031)	(0.129)
N	1,811	1,777	1,220	1,144

Notes: $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$. Standard error in parenthesis.

As targeted incentives are expected to have an effect on survey participation only on respondents who are successfully contacted, we then exclude "non-contacted" cases from the analysis and regress the allocation to the incentive groups on survey cooperation, respectively for prior-wave respondents and non-respondents. Similarly to the analysis on survey response, also for cooperation, we observe that the allocation to the targeted design has a negative effect on participation among prior wave respondents (who are offered a lower incentive in the targeted design than in the non-targeted design); however, the effect does not reach statistical significance at standard levels (Odds ratio: 0.890, P=0.308). With respect to prior-wave non-respondents (who are offered more in the targeted design than in the non-targeted design), we observe a positive effect (Odds ratio: 1.082) not significant at standard statistical levels (P=0.570) (Models 1 and 3, Table 5). With respect to the interaction between socio-demographic characteristics and the targeted incentive design, we find no differences in the effect on survey cooperation of the incentive design (targeted/non-targeted) by socio-demographic group after the face-to-face phase (Models 2 and 4 Table 5).

Table 5 Logistic regression models on cooperation after the face-to-face phase by respondent characteristics

	Prior wave respondent		Prior wave non respondent	
	Odds Ratio			
	(1)	(2)	(3)	(4)
Targeted incentive	0.890	0.902	1.082	1.106
	(0.101)	(0.268)	(0.151)	(0.405)
Male sex		0.759		0.704
		(0.128)		(0.147)
White ethnicity		1.428*		0.990
		(0.253)		(0.220)
Parental socio-economic status (Ref: high)				
Intermediate		0.712		0.717
		(0.174)		(0.216)
Low		0.571**		0.672
		(0.109)		(0.157)
Interactions				
Male sex*targeted incentive		0.821		1.182
		(0.192)		(0.346)
White ethnicity*targeted incentive		1.050		1.125
		(0.260)		(0.344)
Parental socio-economic status (Ref: high)				
Intermediate*targeted incentive		1.002		0.954
		(0.334)		(0.402)
Low*targeted incentive		1.091		0.661
		(0.295)		(0.215)
Constant	3.274***	4.100***	0.452***	0.750
	(0.267)	(0.857)	(0.045)	(0.197)
N	1,676	1,644	950	891

Notes: $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$. Standard error in parenthesis.

To answer research question four (i.e. whether the targeted incentives successfully reduce non-response bias), we compare the distribution of socio-demographic variables in the issued sample, and among respondents in the targeted *versus* non-targeted groups (Table 6). Results from the chi-square tests show no significant difference between the two approaches with reference to sample composition in terms of sex, ethnicity, and parental socio-economic status. The comparison of the distributions and confidence intervals of the issued sample with the sample obtained in the targeted and the non-targeted design signals an overrepresentation of females, white respondents, and respondents with high parental socio-economic status. Overall, neither of the two approaches seems clearly preferable in terms of the impact on bias.

Table 6: Issued sample and sample composition, after face-to-face

| | Issued sample | | Sample composition, after face-to-face | | | | |
| | | | Targeted | | Not-targeted | | |
	%	95% C.I.	%	95% C.I.	%	95% C.I.	P-value
Male	49.4	[47.6-51.2]	43.8	[40.3-47.3]	44.2	[40.8-47.7]	0.974
Female	50.6	[48.8-52.4]	56.2	[52.7-59.7]	55.8	[52.3-59.2]	
White	66.6	[64.9-68.3]	70.4	[67.2-73.7]	70.4	[67.2-73.5]	0.728
Non-white	33.4	[31.7-35.1]	29.6	[26.3-32.8]	29.6	[26.5-32.8]	
Higher SES	36.2	[34.4-37.9]	40.7	[37.3-44.2]	42.0	[38.5-45.4]	0.625
Intermediate SES	18.8	[17.4-20.2]	20.2	[17.4-23.0]	17.7	[15.1-20.4]	0.213
Lower SES	45.0	[43.2-46.8]	39.1	[35.6-42.5]	40.3	[36.9-43.7]	0.612

Note: P-from chi-square test comparing the targeted versus not-targeted approaches.

To answer research question five, we compare the incentive costs of the two approaches by multiplying the number of respondents in each experimental group by the incentive they were offered (accounting also for the "early bird" incentive). The targeted approach was 12.5% less expensive than the non-targeted approach (Table 7). As the number of interviews varies across the two designs, we calculated the average incentive costs per interview, which is approximately £27.5 in the non-targeted design and approximately £24.6 in the targeted design. Hence, in terms of incentive payment the targeted approach appears to be cost-effective. This calculation however does not include the cost of implementing the more complex targeted incentive design (e.g. dispatching incentives of different levels, tailoring survey invitation materials, interviewer training).

Furthermore, with respect to research question six, no differences are found in the number of calls required to reach the final outcome in the targeted *versus* not targeted group, as confirmed by a t-test. This result suggests little differences in fieldwork efforts across the two designs. Finally, answering research question seven, we notice that the share of web interviews is similar across the two experimental groups: 88.2% of respondents in the targeted design participated online versus 87.9% in the non-targeted design (P-value=0.894).

Table 7: Costs and fieldwork efforts comparisons by targeted versus non-targeted experimental group

	Targeted	Non-targeted
Overall incentive budget	-12.5%	
Incentive cost per interview	£24.6	£27.5
Average calls per case	5.7	5.7
Share of web interviews	88.2%	87.9%

Discussion and conclusions

We use novel experimental data from the Next Steps cohort study to test whether offering higher value incentives to prior wave non-respondents (and lower value incentives to prior wave respondents) leads to overall higher response rates and cooperation rates, compared to offering to all sample members the same monetary incentive. Contrary to our hypothesis, we find that the targeted incentive approach does not lead to significantly higher response or cooperation rates. Results from regression analysis suggest that, in the targeted incentive approach, prior wave respondents seem to be less likely to participate, while the increase in participation among prior wave non-respondents seem to be less pronounced, although these differences do not reach statistical significance. We also test whether the targeted approach would lead to higher cooperation/response within specific population subgroups but find no significant interaction between population subgroup and the offer of a targeted incentive approach, either amongst prior wave respondents or prior wave non-respondents. Also, we do not see a clear indication that the targeted design would improve sample representativeness. Finally, the targeted design was less expensive than the non-targeted design; no significant differences were found in terms fieldwork effort (i.e. calls per case) nor in the share of web interviews.

The evidence presented here should not discourage further attempts at targeting incentives: further experimentation is needed to identify whether there are other population subgroups that might be more responsive to targeted incentive approaches; in this respect, longitudinal surveys offer an ideal setting for testing differential effectiveness of incentives due to the availability of information on panel members from prior survey waves. Further research may also consider how to ideally allocate the overall budget for incentives across the targeted and non-targeted designs.

This research has some limitations. First, we acknowledge that the implementation of this experiment in a specific survey wave of a cohort study does not allow us to evaluate the effectiveness of incentives for maximising response among other age groups/cohorts, nor across multiple countries, nor at different levels of maturity of the

panel. Also, it is worth noting that incentives are a valid aid for refusal conversion, while they are not effective for other types of non-response, such as, for example, when non-response is due to non-contact of a sample member who moved. Furthermore, survey designs which include incentives targeted to non-cooperative sample members are applicable only to longitudinal studies, where information about participation at prior survey waves is available.

Finally, besides the effectiveness of varying incentive levels by population subgroups, survey practitioners need to consider the ethical aspect of this design, considering whether offering different level of monetary incentives to respondents who complete the same survey violates expectations of equity. Nicolaas and colleagues (2019) argue that the use of targeted incentives appears to be fair if conceptualised within the motivations that persuade sample members to take part in surveys. Survey participation may be driven by altruist motives but also by individualistic reasons, like self-interest (e.g. importance of the study for the respondent/those close to them) or survey specific factors (sense of obligation towards the survey sponsor, relevance of the study). In this context, it does not seem unfair to compensate hard-to-persuade respondents who may not attach similar value to motivations who may persuade others or for whom participation may come at greater costs, as equity does not necessarily imply equality of treatment.

Another concern is the potential detrimental effect on response or attrition that may arise if respondents become aware of being offered lower incentives compared to other sample members. While awareness of unequal treatment is unlikely to occur in general population studies, it may arise when survey sample members belong to the same institutions (e.g. school, workplace, etc.). On this respect, empirical evidence is reassuring: Singer et al. (1999) notice that while most respondents perceive targeted incentives as unfair, this consideration does not affect subsequent survey participation.

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Table A1: Incentive amounts adjusted for inflation, exchange rates, and Purchase Power Parities

Reference	survey	survey year	incentive amount	adjusted for inflation, 2022	adjusted for PPP US dollars, 2022
Laurie et al., 2007	British Household Panel Survey (wave 14)	2004	£7; 10	£11; £15	$17; $24
Booth et al., 2024	Millennium Cohort Study	2021	£10	£11	$17
Kay et al., 2001	Survey on Programme Dynamics	1999-2000	$40	$69	n. a.
Bureau of Labor Statistics, undated	National Longitudinal Survey of Youth 1997	1997-98	$35; $30; $25; $20	$63; $54; $45; $36	n. a.
Lipps, 2010	Swiss Household Panel	2007	50 CHF	52 CHF	$53
Carpenter, 2021	Understanding Society: the UK Household Longitudinal Study 6-12	2014-21	£20; £10	2014: £24; £12 2021: £22; £11	2014: $37; $19 2021: $33; $17
Andres et al., 2023	COVID Social Mobility and Opportunities Study (COSMO)	2023*	£20; £10	£20; £10	$31; $15
Glendinning et al., 2018	Skills and Employment Survey	2017-18	£10	£11	$18
Ipsos Mori, 2019; Lindley et al., 2019	Omnibus Survey of Pupils and their Parent/Carer (waves 5 & 6)	2018-19	£10	£11	$17
Nicolaas et al. 2019	Growing up in Scotland wave 9	2017-18	£15	£17	$26
Abreu and Winters, 1999; Martin et al., 2001	Survey on Income and Programme Participation (waves 8 & 9)	1996	$40; $20	$75; $37	n. a.
Zagorsky and Rhoton, 2008	National Longitudinal Survey of Women	2003	$40; $20	$64; $32	n. a.
Fomby, Sastry and McGonagle, 2017	Child Development Panel Study of Income Dynamics	2014	$50	$62	n. a.

*Sources: (OECD, 2024a, 2024b). Notes: PPP refers to Purchasing Power Parities; when the survey duration covers two consecutive years the average CPI was adopted. *CPI and PPP refer to 2022 due to data being unavailable for 2023.*

Table A2: Logistic regression models on response after the early bird period by respondent characteristics

	Prior wave respondent		Prior wave non respondent	
	Odds Ratio			
	(1)	(2)	(3)	(4)
Targeted incentive	0.946	0.962	1.108	1.363
	(0.090)	(0.235)	(0.183)	(0.555)
Male sex		0.560***		0.525**
		(0.079)		(0.129)
White ethnicity		1.930***		0.848
		(0.290)		(0.293)
Parental socio-economic status (Ref: high)				
Intermediate		0.740		0.681
		(0.148)		(0.246)
Low		0.706*		0.738
		(0.110)		(0.201)
Interactions				
Male sex*targeted incentive		1.038		0.848
		(0.205)		(0.293)
White ethnicity*targeted incentive		0.852		1.474
		(0.181)		(0.543)
Parental socio-economic status (Ref: high)				
Intermediate*targeted incentive		1.111		0.606
		(0.306)		(0.304)
Low*targeted Incentive		1.127		0.480
		(0.252)		(0.182)
Constant	1.387***	1.427*	0.155***	0.283***
	(0.093)	(0.242)	(0.018)	(0.084)
N	1,811	1,777	1,220	1,144

*Notes: p < 0.05 ** p < 0.01 *** p < 0.001. Standard error in parenthesis.*