

The Effect of Incentives on Response Rates and Panel Attrition: Results of a Controlled Experiment

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Steadily declining response rates lead to an increased usage of incentives in all kind of surveys. As for mail surveys, much empirical evidence supporting the usage of unconditional incentives is available (Berk, Mathiowetz, Ward and White 1987; Church 1993). For face-to-face studies, however, fewer results are available, and even less often in experimental settings (Martin, Abreu and Winters 2001; Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999).

We conducted a three wave panel CAPI survey (N=600), where respondents were randomly assigned to three experimental groups: the first group received an unconditional incentive in form of a 10 € voucher, the second group was promised a 10 € voucher conditional upon participation, the third group was a control group that received no incentive. The allocation to a given experimental group was constant across the three waves and interviewers were kept blind to the experimental conditions.

This research adds to the methodological literature in several ways: firstly, we compared the effectiveness of prepaid and conditional monetary incentives in a face-to-face interview in cross-sectional and longitudinal perspective, and found that conditional incentives performed significantly better in retaining respondents till the third wave. Secondly, we controlled for accurateness of the interviewers' work on the field, and found evidence that improving selection and training of interviewers remains mandatory, since poor quality in the interviewer pool cannot be compensated by incentives.

Keywords: panel attrition, incentives, nonresponse, CAPI

Introduction: research question and its relevance

Concerns on declining response rates in all kind of survey are nowadays spread in all countries and Germany is surely no exception. Recent studies like the German general social survey ALLBUS could realise only less than 50% of the valid addresses in the last few editions (Blohm, Harkness, Klein and Scholz 2003; Haarmann, Scholz, Wasmer, Blohm and Harkness 2006). In the case of panel studies problems of low acceptance and lower cooperation are faced at every wave and decrease in cooperation affect cumulatively each wave.

In order to counteract this trend, it is becoming more common also in scientific surveys to offer incentives to the respondents. The positive effect of incentives in postal surveys has been solidly supported by several experiments and meta-analyses (for reviews, see Church 1993; Fox, Crask and Kim 1988; Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999; Yu and Cooper 1983). In particular, results are rather consistent about unconditional incentives being superior to conditional ones (Berk, Mathiowetz, Ward and White 1987; Church 1993; Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999) and about the positive

relationship between amount offered and effect size (Church 1993; Fox, Crask and Kim 1988; Yu and Cooper 1983).

Evidence is by far less compelling when we focus on interviewer-mediated surveys. It is often assumed that interviewers have a specific persuasive value, that their help lessens the burden of the survey, and these elements might outweigh the effect of incentives (Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999:218). If contact is made in person, an interviewer can rely on several cues and tailor the door-step interaction in order improve chances of gaining cooperation (Groves and Couper 1996).

A meta-analysis conducted by Singer et al. on interviewer-mediated interviews¹ showed (Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999) small but significant effects of incentives, even in low burden and face-to-face studies, but no significant difference between promised incentives and prepaid ones. The number of studies included was relatively small and no specific analysis on the set of face-to-face surveys could be run. Furthermore, one important issue could not be controlled for, that is whether interviewers are affected by incentives. As Singer puts it: "It is possible, for example, that interviewers expect respondents who have received an incentive to be more cooperative, and that they behave in such a way as to fulfil their expectations. Or, they may feel more confident about approaching an household that has received an incentive in the mail, and

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¹ The study included 39 experiments, two thirds of which with face-to-face interviews, the rest per telephone.

therefore be more effective in their interaction with the potential respondent” (Singer 2002:171). Another hypothesis about the effect of incentives on the interviewers was advanced by Creighton et al. in an analysis of incentive effects in longitudinal surveys (SIPP and SPD): “Possibly, interviewers in the incentive groups came to rely on the incentives to keep their overall nonresponse rates low, devoting less effort to their rotation 1 (nonincentive) households in the later waves” (Creighton, King and Martin 2001).

In order to exclude possible interviewer effects Willmack et al. ran an experimental study about the effect of a prepaid non-monetary incentive (a pinball pen) with face-to-face interviews in which interviewers were kept blind about the experimental assignment. The experimental group turned out to have a significantly higher response rate than the control group (Willmack, Schuman, Pennel and Lepowski 1995).

Singer et al (Singer, van Hoewyk and Maher 2000) tried to disentangle interviewer effect and incentive effect in CATI surveys: in their experimental design one third of the sample was sent an advance letter and a 5\$ bill, but the assigned interviewers were kept blind to this condition; one third of the sample received a letter together with 5\$, and the last third received only a letter and interviewers were informed about the experimental condition of respondent assigned to the last two groups. The two groups receiving the 5\$ bill displayed higher response rates but no evidence was found that being aware of the experimental condition affected respondents’ cooperation (Singer 2002:171).

The available evidence leaves some questions unanswered: for one, whether conditional incentives could be equally effective in the frame of face-to-face interviews. We could for instance expect that promised incentives are more effective if respondents can trust that they will really receive them. Meeting personally the interviewer instead of having an anonymous interaction on the telephone, could increase trust in promised incentives and make them more effective.

There are also reasons to downsize the expectations about the persuasive effects of interviewers, though: the quality of the interviewer pool employed by survey research institutes should, for instance, be a point of concern: Fluctuation among interviewers is very high and level of experience and skills very heterogeneous, so that reliance on interviewers’ expertise and their capacity to tailor doorstep interaction effectively might be ill-founded.

Furthermore, little evidence is available on the effects of incentives for reducing panel attrition, especially in the long run. A remarkable exception to that are the analyses run by James (1997) and Mack et al. (1998) aimed at assessing the effects of monetary incentives on panel attrition in large longitudinal surveys like the Survey of Income and Program Participation (SIPP) and the Survey of Program Dynamics (SPD): An experiment on Wave 1 of the SIPP in 1996 showed that \$20 prepaid incentive improved response rates on Waves 1-3, but \$10 did not display any significant effects (James 1997). Mack et al. tested furthermore the cumulative response rates at Wave 6 and reported that, despite the fact that no further payments had been made, attrition in the \$20 group was still significantly lower than in the other two ex-

perimental groups (Mack, Huggins, Keathley and Sundukchi 1998). Jäckle and Lynn have recently published an extensive analysis of an experimental study on the effects of incentives in a longitudinal survey, but only postal and telephone interviews were included (Jäckle and Lynn 2007).

Our study contributes to a better understanding of the effects of incentives mainly in three ways; 1) we could test the effects of conditional and unconditional incentives in face-to-face surveys in an experimental context and interviewer being blind. 2) The effect of the two treatments is tested across three panel waves and in the case that incentives are offered at each wave. 3) We control our results for indicators of interviewers’ diligence, to test whether the use of incentives can compensate for interviewers’ lack of experience or motivation.

Data Description

The Mini-Panel Dataset

The Mini Panel (MP) is a three-wave panel study on partnership and family processes. It is called ‘Mini’ because it was conceived as a small pilot study for the large-scale German Family Panel scheduled to start in 2008. Nevertheless, it contains information on about 600 respondents and thus provides a valuable basis for family research. Interviews were conducted in six-month intervals (September - December 2005, March - June 2006, September 2006 - January 2007).

The target size of the MP was 600 respondents, 150 from each of four German cities: Bremen, Chemnitz, Mannheim, and Munich. These four cities were chosen because all field work was done by members of the PAIRFAM team, located in exactly these four cities.

The MP follows a cohort design with three age cohorts: 15-17, 25-27, and 35-37 years. For every cohort we targeted at least 200 respondents.

The Mini-Panel sample was based on population registers: Eligible were only German citizens who have their main domicile in one of the Mini-Panel cities. In each city we drew a sample of 450 addresses (150 per cohort): hence, the sample was stratified by city and cohort. The 150 addresses drawn per cohort and city were randomly assigned to two groups: About two thirds of them were issued at the beginning of the fieldwork, whereas the rest was kept as a reserve and issued only when response rates were dropping endangering the achievement of the targeted sample sized. After about two months on the field the reserve addresses of the two older cohorts had to be issued in all four cities and, due to particularly low response rates, also those of the youngest cohort in Munich had to be released. All in all 1,664 of the 1,800 available addresses were actually used.

The MP is monotonic in design: Cooperation in the previous wave was requisite to be eligible for further waves. Thus, we have only respondents who participated either in all three waves, in waves one and two, or only in wave one.

The Mini-Panel team in Mannheim developed guidelines for conducting fieldwork, whereas a local field manager in

each of the four cities was responsible for coordinating activities on-site according to the agreed procedures. Each team selected and trained its own interviewer staff.

According to the AAPOR definition RR6, net of the high number of invalid addresses, a response rate of 0.46 was reached in the first wave. This is a very good result for Germany in general (see for instance Haarmann, Scholz, Wasmer, Blohm and Harkness 2006) and particularly for a study with a young target group and conducted only in urban areas.

In the following two waves, conditional response rates of 0.75 and 0.8554 respectively were reached (see Table 1). These rates are 5-10 percent points lower than normally achieved in the German Socio-Economic panel (SOEP), which we tend to attribute to the questionnaire burden and to the very short intervals between waves (six months instead of twelve).

Experimental Design

The Mini-Panel being a pilot study, we were particularly interested in testing different strategies to increase the survey response. All sample members were randomly assigned to three experimental groups: The first group received an unconditional incentive in the form of a 10 € voucher together with the advance letter, the second group was promised a 10 € voucher upon completion of the interview, while the third group was a control group and received only an advance letter. The allocation to a given experimental group was kept constant across waves. We adopted a single-blind design: Interviewers were not aware of the experimental condition of the interviewee (Willimack, Schuman, Pennel and Lepowski 1995). We furthermore took care to send out the advance letters at different time points, according to the progress made by each interviewer. This was done to avoid letting too much time elapse between the receipt of the advance letters and the first contact with the interviewer, and to prevent respondents from forgetting that they had received unconditional incentives.

The effect of monetary incentives in face-to-face studies

Following the literature findings, incentives (both pre-paid and ex post) can be expected to have a modest but significant positive effect on response rates. As a general rule, we would tend to expect that the effect of incentives decreases across waves: if panel attrition tends to select out less motivated respondents, those that continue to participate do so out of sheer interest and are less responsive to incentives.² Hence the effects of incentives on response rates should decline (Arzheimer and Klein 1999; Jäckle and Lynn 2007).

In the case of Mini-Panel though, we do not necessarily expect to confirm this finding: it has in fact been noticed that incentives are more effective in the case of low baseline-response rates and less effective if response without boosters is already high (Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999:224). The Mini-Panel turned out to have a very satisfying response rate in the first wave and a slightly

below average ones in the following two: under these conditions incentives are unlikely to make a large difference in the first wave, but might help to reduce attrition.

A further reason to expect non-decreasing effects of incentives across waves is that the design of Mini-Panel was rather burdensome and “Increasing the burden of the interview - defined as either a long interview or some additional task imposed on the respondent beyond the interview itself, or a combination of the two - increases the difference in response rates between an incentive and a zero-incentive condition” (Singer, Hoewyk, Gebler, Raghunathan and McGonagle 1999:223-224). Being the burden particularly high in the second wave, incentives might turn out to be particularly effective in retaining respondents after this wave.

The difference between the effects of conditional and unconditional incentives can be expected to be not significant across all waves. Diekmann and Jann attribute the difference in the effect of incentive mode to different scripts being activated, a strict rationality in case of promised versus a norm of reciprocity invoked by an unconditional incentive (Diekmann and Jann 2001). We assume, instead, that mistrust in promised incentives plays a role too, by decreasing the effects of promised incentives compared to the prepaid ones. Since panel surveys imply repeated interactions with the respondents, we expect that in our study promised incentives eventually appear as certain as the prepaid ones. Thus, the effects of conditional and unconditional incentives are supposed to converge across the three waves.

In order to examine the effects of incentive, we ran separate logit regression models on respondent's cooperation in the first wave, on cooperation in wave two and three conditional to participation in the previous one, and on cooperation in the study until the end, i.e. for all three waves. We have therefore information about the conditional attrition from one wave to the next one and about the cumulative attrition across all three waves. In all our calculations we decided to concentrate only on the effects of incentives on cooperation rates, hence we excluded from the analyses all cases we lost to the follow-up because the respondent could not be contacted.

Table 3 and Chart 1 show the results of the regression models: On the bottom part of Table 3 we also added information on the pairwise comparisons of the three incentive groups by showing if the differences are statistically significant.

The baseline response rate in the first wave was comparably high so it is not surprising that incentive did not add to the respondents' motivation and no significant differences among incentive treatments was found. In wave two we find that conditional incentives lead to a higher response rate compared to both other groups.

The emergence of a significant effect of incentives in the second wave could be interpreted as a result of the unexpected demands of the first wave³: The rather high burden

² This would be also consistent with the theory of leverage and salience (Groves, Singer and Corning 2000).

³ In the first wave all respondents who declared to have an intimate relationship were asked to fill in an additional PAPI and we

Table 1: Case outcome Wave 1 - Wave 3 (column percentage in parentheses)

	Wave 1	Wave 2	Wave 3
Response - complete interview	663 (39.84)	498 (75.00)	426 (85.54)
Response - incomplete interview	0 (0.00)	0 (0.00)	1 (0.20)
Lost interviews	6 (0.36)	0 (0.00)	0 (0.00)
Refusals	571 (34.31)	131 (19.73)	53 (10.64)
Temporarily not interviewable (sick, away due to work...)	0 (0.00)	5 (0.75)	0 (0.00)
Not interviewable (language problems, handicap...)	28 (1.68)	0 (0.00)	0 (0.00)
No Contact (valid address)	139 (10.10)	15 (2.26)	13 (2.61)
No Contact (invalid address)	223 (13.40)	10 (1.51)	1 (0.20)
Out of sample or moved to a non-Mini-Panel city	5 (0.30)	5 (0.75)	4 (0.80)
Total	1,664 (100.00)	664 (100.00)	498 (100.00)

Table 2: Case Allocation for the Incentive Experiment (by Cohort)

	C1: 1988-90	C2: 1978-80	C3: 1968-70	Total
No Incentive	142	192	192	526
Conditional Incentive	173	187	202	562
Unconditional Incentive	149	221	206	576
Total	464	600	600	1,664

Table 3: Logit on Co-operation for incentive groups across waves

	Wave 1	Wave 2	Wave 3	Wave 1 → Wave 3
No Incentive	-0.043 (0.139)	-0.022 (0.232)	-0.939* (0.375)	-0.224 (0.150)
Conditional Incentive	0.056 (0.137)	0.459+ (0.243)	-0.197 (0.399)	0.205 (0.143)
Constant	0.074 (0.096)	1.156 (0.161)	2.506 (0.300)	-0.669 (0.101)
N	1247	623	475	1247
Chi ²	0.50	4.93	7.73	8.33
Pseudo-R2	0.00	0.01	0.02	0.01
No Inc. vs. Cond. Inc.	ns.	+	*	**
No Inc. vs Uncond. Inc.	ns.	ns.	*	ns.
Cond. Inc. vs. Uncond. Inc.	ns.	+	ns.	ns.

Note: Numbers are logit coefficients, with the according standard deviations in parentheses. Reference category is unconditional incentive. + : $p < 0.1$, * : $p < 0.05$, ** : $p < 0.01$

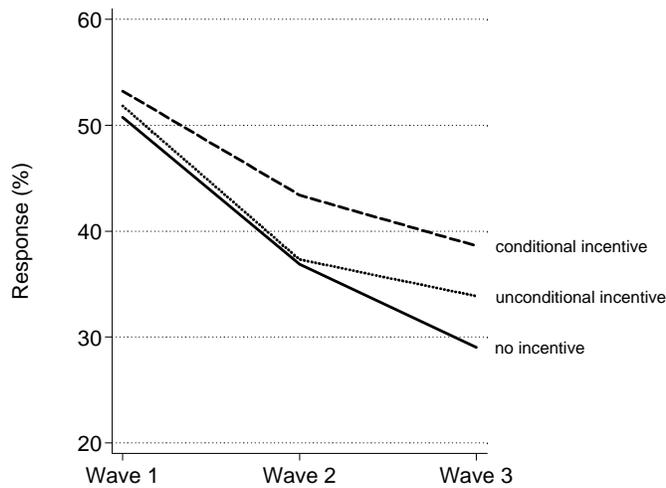


Figure 1. Response Rate by incentive group across waves

could decrease the willingness to participate again, a negative effect we could partly correct for by offering incentives.

One result we cannot account for is that the difference between the groups without incentives and that with unconditional incentives is not statistically significant. We have no explanation for the lower performance of the unconditional incentives.

In wave three the group without incentives achieves a significantly lower response rate compared to both incentive groups. No significant difference was detected between conditional and unconditional incentives in this case. We suspect that the burden of the second wave, being even higher than in the first wave⁴, ended up turning off more respondents, preventing us from achieving a better base-line response rate. In this situation incentives resulted useful to minimise the negative effects of a burdensome wave. Furthermore, in the third wave we find support for our hypothesis about the decreasing differences between the conditional and unconditional incentives across waves.

The fourth model, which analyses the cumulative response rates across all three waves, shows that using no incentive leads to the highest attrition, whereas conditional incentives yield the highest response rate. The difference between these groups is statistically significant at a 0.01%-level. The response rate for the unconditional incentive group is not statistically different from either of the other groups, i.e. its performance lies somewhere in the middle.

The role of the interviewer

Being directly in charge of field management, we could soon realise that not all our interviewers were either equally skilled or motivated: Some interviewers obviously underestimated the job and ended up throwing in the towel rather quickly. Their success rates were also very uneven: in the first wave a few interviewers did not realise any interviews, whereas some had a response rate well above 50%. Furthermore, frequency of contacts with the field supervisors,

promptness in returning contact protocols to allow us sending rapidly conditional incentives, and precision documenting the work done were also varying a lot among interviewers.

We assumed that those interviewers who did not strive for making a good impression on their supervisors might appear careless on the job too. Our hypothesis was that lower diligence might affect the success chances of our interviewers. Hence we wondered whether offering incentives to the respondents can compensate for interviewers' lower accuracy and whether the positive effects of the incentives were equally strong for all interviewers or an interaction effect might be detectable.

In order to evaluate this hypothesis we needed a rating of the interviewers that was defined independently from their success rates and was based on rather objective information, so that the ratings of the four local field supervisors could be compared. After reviewing the instruction given to the interviewers and we chose seven indicators of accuracy:

1. regularity of contact with the field supervisor (Likert scale)
2. precision and completeness of field documentation (Likert scale)
3. degree of compliance to the rules and code of conduct we set for them⁵ (Likert scale)

asked them for permission to contact their partners to interview them too. Moreover we collected telephone numbers of up to 6 people generated within the respondent's social network, in order to interview them as part of a validation study.

⁴ The multi-Actor design was extended to the anchors' parents and children. Furthermore a retrospective questionnaire in form of a Life-History-Calendar was used in order to collect data about mobility, intimate relationships, education and work history from the age of 14.

⁵ Particularly, we checked whether they stuck to the rules on call backs, e.g. whether they made attempts on weekends and in the evening too.

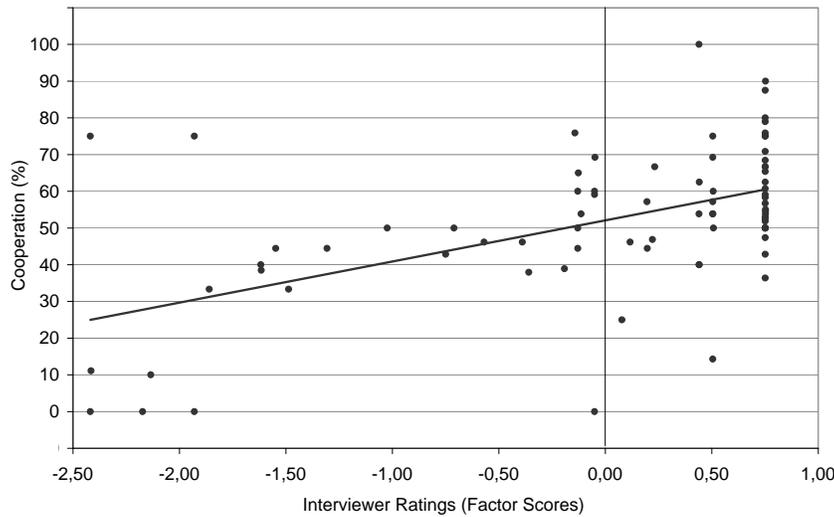


Figure 2. Cooperation Rate and Predicted Cooperation Rate by Interviewer Rating

Table 4: Logit on Co-operation for incentive groups and interviewer rating across waves

	W1	W2	W3
No Incentive	-0.053 (0.140)	-0.032 (0.234)	-0.928* (0.378)
Conditional Incentive	0.089 (0.139)	0.441* (0.245)	-0.193 (0.399)
Interviewer Rating (Wave 1)	0.381** (0.078)		
Interviewer Rating (Wave 2)		0.359** (0.134)	
Interviewer Rating (Wave 3)			0.042 (0.173)
Constant	-0.017 (0.099)	1.139 (0.162)	2.498 (0.302)
N	1247	623	475
Chi ²	25.65	11.82	7.79
R2	0.01	0.02	0.02
No Inc. vs. Cond. Inc.	ns.	+	ns.
No Inc. vs Uncond. Inc.	ns.	ns.	+
Cond. Inc. vs. Uncond. Inc.	ns.	+	ns.

Note: Numbers are logit coefficients, with the according standard deviations in parentheses. + : $p < 0.1$, * : $p < 0.05$, ** : $p < 0.01$ (Reference category: Unconditional incentives)

4. satisfaction with the amount of time and energy interviewers invested in fieldwork (Likert scale)
5. whether they neglected addresses for which no telephone number could be found (0/1)
6. whether they ceased working for us without completing their work (0/1)

All variables have been factor-analysed⁶ and returned one single factor. The factor scores obtained were saved and the resulting variable was used for further analyses.

The variable obtained, which summarized the interviewer ratings in the first Mini-Panel Wave, was fairly negatively skewed, with fewer interviewers performing poorly. The Pearson's correlation coefficients of this variable with

the interviewers' achieved cooperation rates was quite high ($r=0.53$), suggesting that the general impression of accuracy we rated and the interviewer success chances in the field were strongly correlated.⁷ Figure 1 illustrates the correlation between interviewer rating and the success rates. The chart also

⁶ As a method of extraction we used principal axis factoring and selected the number of factors according to the size of the eigenvalues (>1). The extracted factor reproduces 67% of the variance of the original items.

⁷ We have also run multivariate models controlling for gender and cohort of the respondents, and for gender match between interviewer and interviewee: in all cases the effect of interviewer rating remains significant and positive.

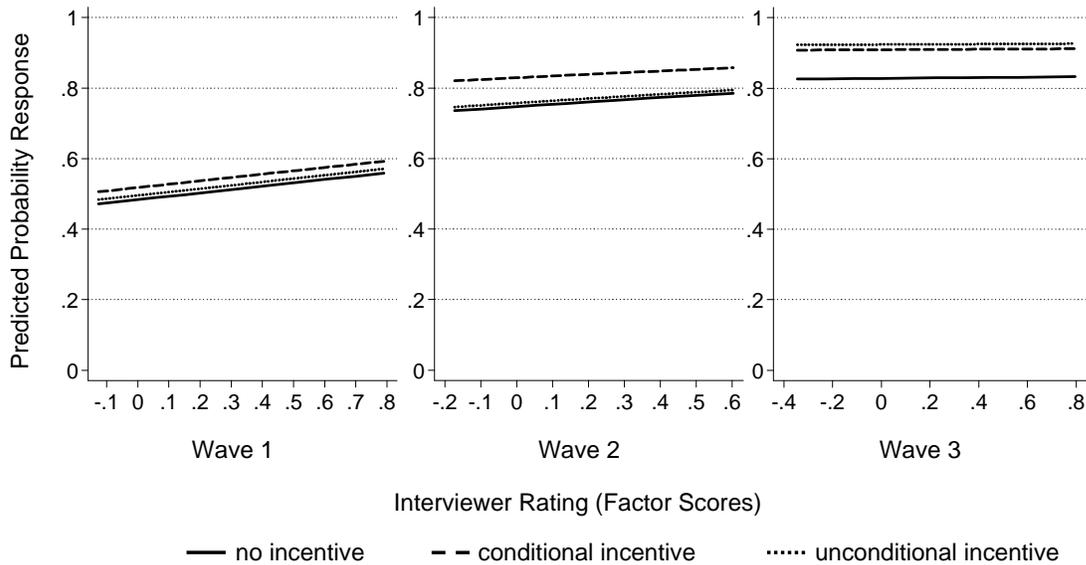


Figure 3. Predicted Probability of Response by Interviewer Rating across waves

clearly shows the degree of skewness in the interviewer ratings.

Considering that incentives are more likely to display an effect when response rates are low, we wondered whether between interviewers' skills and incentives actually an interaction exists. Very diligent interviewers obtained on average extremely high cooperation rates⁸, so that we do not expect incentives to be able to improve these results even further. In the case of the less conscientious interviewers, whose cooperation rates were generally low, two scenarios are possible: on the one hand, being their baseline low there is a larger margin for incentives to elicit an effect; on the other hand, their less accurate working style could spoil the effects of incentives by eroding the seriousness of the research.

In order to check whether the effects of incentives change for different interviewers we decided to re-run our logistic regressions adding the interviewer rating factor score. The results are shown in Table 4.

All in all our analyses offer no support for the hypothesis that the effect of incentives varies according to interviewer skills: adding the interviewer ratings to the model did not affect either the coefficients or their significance. This is also confirmed by the predicted probability of response displayed in Chart 3.⁹

The comparison of the results of the conditional cooperation rates in each wave reveals that in the first and second wave, higher interviewer rating leads to a higher response rate, but this effect disappears in the third wave. This can be explained by the decreasing variance of the interviewer performance across waves: because we went on working only with the better interviewers, the interviewer pool became more and more homogeneous in later waves.

From an investigative point of view, interviewer selection made us loose information about the effect of bad inter-

viewers on response rates, especially in interaction with the incentive groups. Considering, though, that methodological research was not the primary goal of the study, we needed to pursue high response rates and, hence, we had to select out interviewers with poor performances.

It would have been interesting, analogously to the previous model, to analyse attrition across all three panel waves, incorporating the effects of interviewers' rating for all waves. Unfortunately, we were confronted with several difficulties, which we could not solve. Firstly, non-respondents of the first and second wave had not been re-issued in the following waves: hence they had no interviewer assigned and had therefore missing values in the variables regarding interviewer ratings. For this reason they could not be analysed in any regression models covering all three waves and including interviewer rates. Secondly, due to their separate construction by waves, interviewer ratings referring to different waves cannot be directly compared: changes in the factor scores do not represent necessarily improved or worsened performances, but rather a change in the positioning within the pool. Thirdly, interviewer continuity, which is often considered a precious asset to reduce panel attrition (Hill and Willis 2001; Laurie, Smith and Scott 1999), is inextricably intertwined with the rating variables, since only interviewers with good records were kept in the pool for further waves.

⁸ Interviewer allocation was independent from the experimental design. An analysis of the association between interviewer and experimental groups returned, despite the high number of cases, a non significant Chi-squared index ($p=.267$).

⁹ A model with interaction terms was also tested and it confirmed that the effects of interviewer accuracy are merely additive effects.

Conclusions

The experiment implemented in the Mini-Panel showed no significant effects of incentives in the first wave, where the response rates were overall good beyond expectations, probably thanks to our topic, family dynamics and relationships, which was discussed a lot in the media too as a consequence of the worrying demographic trend in Germany.

Across the three waves, as the burden of our design started showing its negative effects, we had less good re-interview rates, and incentives started displaying a significant effect. Particularly after the second wave, which without doubt was the most burdensome, the group without incentives performed significantly worse than both incentive groups.

At the end of the three waves the experimental setting with conditional incentive delivered the best results, retaining almost 10 percent points more of the people contacted in the first wave and some 5 percent points more than the group with unconditional incentives.

We found no support for our hypothesis that diligent and neglectful interviewers could profit at different rates from incentive: the effect of incentives appears to be a genuine additive effect, and all interviewers profit equally from their use.

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