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The Effect of Respondent Incentives on Panel Attrition in a Sequential Mixed-mode Design

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Understanding Society
THE UK HOUSEHOLD LONGITUDINAL STUDY

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Non-technical summary

In the last decade, fewer and fewer people are participating in surveys. In order to contain survey costs and at the same time increase participation, survey agencies are increasingly combining different methods to collect data; for example, studies may invite "technological-friendly" sample members to complete a questionnaire online, while other people are interviewed face-to-face.

This research compares two different protocols for collecting survey data. In one protocol participants are interviewed with a traditional face-to-face interview. In the other protocol, participants are first invited to complete the questionnaire online, and if they don't participate they are followed up with a visit from a face-to-face interviewer.

Sample members are invited to participate in the survey in one of these two different "modes" of data collection, for five waves, at 1 year interval. The allocation to one or the other mode is random. Previously, these two groups were mostly interviewed face-to-face.

This research assesses whether the lack of interviewer visit over multiple years discourages participation and whether giving higher monetary incentives to those offered the online interview first increases participation.

I find that one year after the introduction of the two different protocols, the proportion of people participating is lower among those invited to fill in the questionnaire online, than among those receiving a face-to-face interviewer visit. However, over time the difference disappears.

Also, over time, participation is higher in the group firstly invited to complete the survey online than in the group receiving an interviewer visit first, if (and only if) the online group is offered higher monetary incentives than sample members receiving an interviewer visit.

The Effect of Respondent Incentives on Panel Attrition in a Sequential Mixed-mode Design

Alessandra Gaia

Abstract

This paper evaluates the effect of switching an existing panel study from a unimode face-to-face design to a sequential mixed-mode design (web followed by face-to-face interviewing) on attrition. I use large-scale randomise experimental data from the Innovation Panel of *Understanding Society* While the introduction of a mixed-mode design increases panel attrition one wave after the mode switch (IP6), the effect is eroded at subsequent waves (IP7-IP9). The offer of higher incentives to sample members in the mixed-mode group cancels the negative effect of mixed-mode on attrition one wave after the mode switch (IP6) and leads to higher response over time (IP7-IP9).

Keywords: Panel attrition, individual-level non response, mixed-mode, web surveys.

JEL classifications: C81, C83

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The Effect of Respondent Incentives on Panel Attrition in a Sequential Mixed-mode Design

Alessandra Gaia

Introduction and research questions

In the last decade, in developed countries, response has been declining and panel surveys suffered from higher attrition rates (Couper, 2012). This is problematic because it leads to biased estimates if respondents differ from non-respondents in factors of interest for research purposes; also, non-response decreases the sample size available for analysis, and, in panel surveys, renders also the information collected at other waves less useful (Jäckle, Lynn, and Burton, 2015).

In a context of declining response rates, mixed-mode designs have increasingly been viewed as a solution to reduce survey costs and increase response for some subgroups of sample members (de Leeuw, 2005; Couper, 2012; Lynn, 2013; Jäckle *et al.*, 2015), with the potential to lower non-response bias, even though the overall response rate may be lower than in unimode designs.

Several studies found that mixed-mode designs with web as one of the modes of data collection do not lead to higher overall response rates than single mode designs without web (Griffin *et al.*, 2001; Jenssen, 2006; Lagerstrøm, 2008; Leesti, 2010; Martin and Lynn, 2011; Fong and Williams, 2011; Souren, 2012; Jäckle *et al.*, 2015; Klausch *et al.*, 2015); as an exception, Brown, Williams, and Goodman (2015) report higher response rates in a mixed-mode design with web and telephone interviewing, compared with a unimode telephone survey, but this evidence may be specific to the age group under study.

In terms of sample composition, the only two experimental studies which compared a mixed-mode design (with web) with a unimode face-to-face design in a longitudinal survey find no or minimal differences (Jäckle *et al.*, 2015; Bianchi *et al.*, 2016).

Monetary respondents incentives have been used to counterbalance the negative effect of mixed-mode design on response. Empirical evidence shows that monetary

incentives can increase response rates in panel surveys in all modes, including web, and that response rates increases as the incentive amount increases, but this happens at a declining rate (see Singer and Ye, 2013 for a review).

Experimental evidence has shown that if sample members in the mixed-mode group (web followed by face-to-face) receive, on average, approximately double the amount of monetary incentives than sample members in the face-to-face group, then mixed-mode does not lead to attrition one and two waves after the mode switch (Gaia, 2014; Bianchi, Biffignandi, and Lynn, 2016).

However, to the best of my knowledge, there is no empirical evidence on: a. the effects of mixed-mode (web followed by face-to-face) on attrition when sample members (in both groups) receive the same incentives; and b. the effect of mixed-mode on attrition by randomly allocated incentive groups. This research provides a novel contribution on these two aspects.

I use the same experimental design analysed by Jackle *et al.* (2015), Bianchi *et al.* (2016), and Gaia (2014) to address the following research questions:

1. What is the effect of a mixed-mode design (web and face-to-face) on panel attrition compared to a single mode design when both groups receive the same incentives?

2. What is the effect of a mixed-mode design on panel attrition if higher levels of incentives are used to boost participation in the mixed-mode design?

3. Are there socio-demographic groups that are more likely to respond if allocated to a mixed-mode design than to a unimode design?

4. Can participation in mixed-mode be boosted using higher levels of incentives in the mixed-mode groups for some subgroups?

Data

I use data from an experiment implemented in the *Understanding Society* Innovation Panel waves 5 to 9.

Understanding Society: the UK Household Longitudinal Study (UKHLS) is a multidisciplinary study that focuses on a wide range of topics such as living arrangements, fertility, housing, economic activity, income, health, and political attitudes (Lynn, 2013). *Understanding Society* includes an Innovation Panel (IP). This is a separate sample used to test methodological innovations in longitudinal surveys, in general, and *Understanding Society*, in particular (Burton, 2013).

The Innovation Panel target population are adults (aged 16+) living in Great Britain. The study aim is to interview each adult member of the household and individuals are followed when they move to other parts of Great Britain.

The Innovation Panel mirrors *Understanding Society* in its design and it is a stratified, clustered, probability sample.

Sample members are interviewed every 12 months. At waves 1, 3 and 4 interviews were carried out face-to-face, while at wave 2 experimentation with a sequential mixed-mode design with face-to-face and telephone interviews was carried out (as reported in Lynn, 2013). From wave 5 onwards, a sequential mixed-mode design was introduced, including web, face-to-face, and telephone interviews. More details on the mixed-mode design in waves 5 to 9 is included in the next section.

The sample used for this analysis is restricted to all adults issued to wave 5, which is the wave when mixed-mode (with web) was first introduced.

New entrants at each subsequent survey wave (after wave 5) are excluded from the sample as they are expected to have different response propensities than original sample members, because the latter participated in multiple survey waves.

Similarly, also sample members from the wave 4 refreshment sample are excluded from this analysis because this group is expected to have a different response propensity than original sample members. Sample members from the wave 7

refreshment sample were issued only to face-to-face interviewing; thus, also this group is excluded from the analysis.

I consider a positive response (outcome variable) if the sample member provided a full interview (*versus* partial, proxy interview, non-response, non-contact, and not issued to wave).

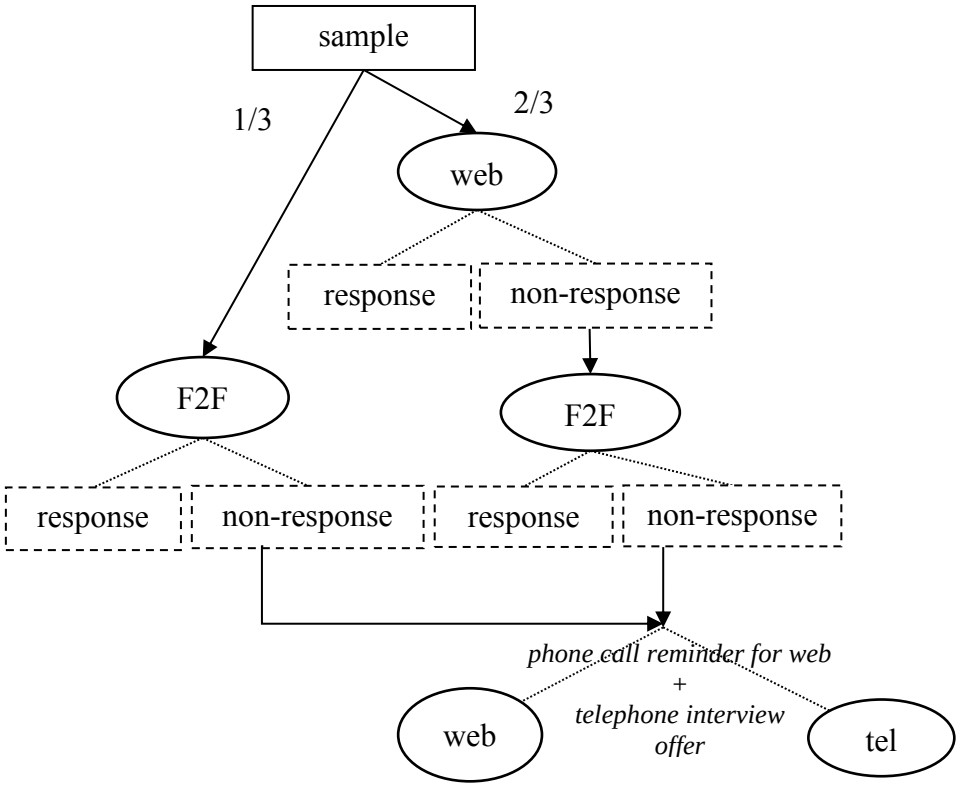
The decision to issue a household to wave depends on cooperation in previous waves: non responding households are not issued to the following wave if all eligible household members (a) have refused participation for two waves, or (b) are not successfully contacted for two waves, or (c) are not successfully contacted in one wave and refused participation in the following wave, or (d) refused participation in one wave and are not successfully contacted in the following wave. Thus, not being issued to wave is a form of panel attrition. For this reason, I consider individuals in "not issued to wave households" at waves 6 to 9 as "non-respondents".

Ineligible sample members (deceased, out of scope, temporary sample members, and other ineligible) are excluded from the analysis at the wave when they are ineligible, for a total of: 36 observations in wave 6, 40 observations in wave 7, 36 in wave 8, and 22 in wave 9.

Experimental design

The analysis is based on an experiment introduced at wave 5. Households were randomly assigned to two experimental groups: 1/3 of the sample was assigned to the control group, which was a unimode face-to-face design (Jäckle *et al.*, 2015). While 2/3 were assigned to the treatment group, which was a mixed-mode design, that consisted in web with a face-to-face follow-up of non-respondents (Jäckle *et al.*, 2015) (see figure 1).

Figure 1: sequential mixed-mode design at waves 5 to 9



In waves 6-9, households issued to face-to-face at wave 5 were again issued to face-to-face, and the remaining households are again issued to mixed-mode, with only some exceptions: a small subgroup of households which were allocated to the "mixed-mode group" at waves 5 to 7 where switched to being allocated to the "face-to-face group" at waves 8 and 9. This change was made because it was observed that these household had a very low propensity to respond via the web (Al Baghal *et al.*, 2016). The index of very low web propensity for web was determined modelling web completion in waves 5 to 7 (Al Baghal *et al.*, 2016). This index was calculated also for sample members in the face-to-face group, but variables contributed differently to the construction of this index because sample members in the face-to-face group by design were invited less often to participate in the web survey.

Individuals in households with very low web propensity originally allocated to the mixed-mode group (64 in my sample) are included in the analysis sample with their original experimental allocation. In the analysis at wave 8 and 9, I use as an outcome for these sample members their outcome carried forward from wave 7 (e.g. non respondents at wave 7 are treated as non respondents at waves 8 and 9). In the analysis section, I will show that results hold if these cases are treated differently

(e.g.: very low web propensity for web cases excluded from the analysis at waves 8 and 9, or very low web propensity cases originally assigned to mixed-mode which were switched to the face-to-face design at waves 8 and 9 excluded from the analysis).

From wave 6 onwards, at the end of the field work a mop-up stage was added, and non-respondents in both groups were followed-up with an invitation to a telephone or a web interview. In order to analyse the effect on attrition of repeating the same mixed-mode design (i.e. unimode face-to-face *versus* sequential mixed-mode, with web followed by face-to-face) over five consecutive waves (i.e. waves 5 to 9), all sample members that participated in the mop-up phase are considered as non-respondents in each wave (for a total of: 12 respondents in wave 6, 21 in wave 7, 31 in wave 8, and 44 in wave 9).

Incentives

At wave 5, sample members were randomly allocated to two different incentive groups: a £5 incentive and a £10 incentive. All incentives were sent unconditionally in the advance letters addressed to each eligible sample member.

At wave 6 to 9, sample members in the face-to-face group received a £10 unconditional incentives, while in the mixed-mode group sample members were randomly allocated to three different incentive groups: a £10 unconditional incentive; a £10 unconditional incentive with a £20 bonus if all members of the household complete the survey by web in an allotted time, or a £30 unconditional incentive. Thus, two thirds of sample members in the mixed-mode group had the possibility of receiving/received a higher incentive (£10+£20 or £30) than the face-to-face group (where everyone receives a £10 incentive).

Table 1: Incentive groups in waves 5 to 9

	wave 5	waves 6 to 9
F2F	£5 or £10	£10
Mixed-mode	£5 or £10	£10
		£10+£20
		£30

For analysis purposes, I have allocated sample members not issued to wave 6 to 9 due to previous wave non-cooperation to the £10 incentive group (if they were in the face-to-face group) and randomly to the three experimental groups (£10, £10+20 and £30) if they were in the mixed-mode group.

Results

Table 2 shows the response rates by incentive group in the mixed-mode and in the face-to-face design.

Consistently with the findings of Jäckle and her colleagues (2015), in the first wave of the mode switch, I do not observe any statistically significant difference in the response rates between the mixed-mode group and the face-to-face group.

This overall result holds for any combination of incentive groups, i.e. (a) comparing respondents in the face-to-face and mixed-mode group receiving both £5 incentives, (b) both £10, (c) comparing respondents in the face-to-face group receiving £5 with respondents in the mixed-mode group receiving £10, and (d) the other way around (face-to-face £10 *versus* mixed-mode £5).

In order to answer research question 1, I compare response rates in the face-to-face and mixed-mode group when both groups receive the same level of incentives (£10). At wave 6, I observe a statistically significant (p-value=0.041) lower response rate in the mixed-mode group (52.3%) compared to the face-to-face group (61.0%). However, this effect is eroded over time, with no (statistically significant) effect at waves 7, 8, and 9.

Thus, I conclude that while the introduction of the mixed-mode design has a negative effect on attrition one wave after the mode switch (wave 6), this effect erodes over time, and the change to mixed-mode doesn't have any effect on attrition from two waves after the mode switch onwards (waves 7 to 9).

In order to answer research question 2, I compare the effect of a mixed-mode design on panel attrition when higher levels of incentives are used to boost participation in the mixed-mode design. One wave after the mode switch (wave 6), no (statistically significant) difference is observed in response rates when the mixed-mode group receive higher incentives than the mixed-mode group.

Conversely, at waves 7, 8, and 9, when sample members in the mixed-mode group receive higher incentives (either a £10 unconditional incentive and a £20 bonus or £30 incentives) than the face-to-face group (£10), response rates are higher in the mixed-mode group. Differences are large and statistically significant.

As discussed in the design section, some (64) cases with a very low propensity to participate in the survey by web were reallocated to the face-to-face treatment at waves 7 and 8 (Al Baghal, 2016). Very low web propensity for web was determined modelling web completion in waves 5 to 7 (Al Baghal *et al.*, 2016) – for more details, see the data section.

In a sensitivity analysis (see appendix) I find that results hold when low web propensity cases are treated differently (i.e. at waves 8 and 9 cases with a very low propensity for web are excluded from the analysis, regardless of which treatment they were originally assigned; at waves 8 and 9 cases with a very low propensity for web which were originally assigned to a mixed-mode design are excluded from the analysis).

Table 2: Individual response rate (in %) by incentive group

Wave	Incentive		Response rate (%)		Difference (MM-F2F, %)	P-value	N
	F2F	MM	F2F	MM			
5	£5 or £10		65.4	60.5	-4.9	0.124	2118
	£5		*65.4*	*58.2*	*-7.2*	*0.086*	*1,151*
	£10		*65.5*	*63.4*	*-2.1*	*0.623*	*964*
	£5	*£10*	*65.4*	*63.4*	*-2.0*	*0.571*	*1,021*
	£10	*£5*	*65.5*	*58.2*	*-7.4*	*0.100*	*1,094*
6	£10	**£10**	61.0	**52.3**	**-8.7**	**0.041**	**1,156**
		£10+20		62.4	1.4	0.684	1,179
		£30		65.4	4.4	0.228	1,197
7	£10	£10	46.9	43.2	-3.7	0.321	1,165
		£10+20		**55.0**	**8.2**	**0.038**	**1,171**
		£30		**56.8**	**10.1**	**0.010**	**1,194**
8	£10	£10	40.8	44.0	3.3	0.373	1,165
		£10+20		**52.9**	**12.1**	**0.002**	**1,175**
		£30		**57.6**	**16.8**	**0.000**	**1,199**
9	£10	£10	36.3	41.7	5.4	0.121	1,169
		£10+20		**49.1**	**12.8**	**0.001**	**1,181**
		£30		**53.6**	**17.3**	**0.000**	**1,206**

P-values from Pearson χ^2 tests, corrected for the survey design (strata and cluster).

In order to answer research question 3, I compare response rates by socio-demographic group[1], to see whether there is any group that is more likely to respond

[1] Socio-demographic groups are defined using information from all pre-treatment waves (i.e. waves 1 to 4).

if approached with a mixed-mode design as opposed to a face-to-face design, when both groups receive the same monetary incentive (table 3).

While some subgroups of sample members (e.g. adults aged 61-70, females, respondents of non-white ethnicity) are significantly less likely, in some waves, to compete the survey if allocated to a mixed-mode design than in a single mode design, the pattern is not consistent across waves.

Similarly, some subgroups of sample members (e.g. employed and self-employed sample members; sample members living in a multi-adult household with no children) are significantly more likely to respond if approached with a mixed-mode design than a single mode design at specific survey waves, but the effect is not consistent across all waves.

Thus, I conclude that a general pattern is not evident, and there is limited potential to predict participation for multiple waves by sample members' subgroups.

In order to answer research question 4, I compare response rates in the face-to-face group with the mixed-mode group, when this latter group receives higher incentives (£10+20 or £30) than the face-to-face group.

Some subgroups of sample members (i.e. females, sample members of white ethnicity, and sample members living in a rural area) are consistently more likely to participate in the survey if approached with a mixed-mode design if they receive higher levels of incentives (£10+20 or £30) as opposed to the face-to-face group, from waves 7 onwards.

Sample members that are "in work" (either employed or self-employed) are never less likely to participate if approached with a mixed-mode design, regardless of the level of incentives received; also, in this socio-demographic group, sample members receiving higher incentives from waves 8 onwards have a higher propensity to participate in the survey.

Besides these subgroups, no clear pattern emerges.

Table 3: Difference in response rates by incentive group and sociodemographic characteristic

Category	Wave	mixed-mode Incentive group	Difference (MM-F2F, %)	P-value	N
Age: 16-20	6	£10	-11.6	0.245	110
		£10+20	2.5	0.790	108
		£30	10.5	0.416	103
	7	£10	-5.0	0.573	111
		£10+20	-0.3	0.972	110
		£30	11.6	0.354	103
	8	£10	11.0	0.236	111
		£10+20	11.0	0.256	111
		£30	4.8	0.701	105
	9	£10	11.4	0.208	113
		£10+20	**20.3**	**0.035**	**112**
		£30	13.8	0.173	106
Age: 21-30	6	£10	-9.7	0.347	131
		£10+20	3.3	0.681	147
		£30	9.3	0.339	145
	7	£10	8.0	0.390	133
		£10+20	**20.3**	**0.010**	**144**
		£30	14.9	0.102	143
	8	£10	1.0	0.922	131
		£10+20	**16.8**	**0.035**	**141**
		£30	20.1	0.052	145
	9	£10	1.1	0.906	135
		£10+20	11.8	0.121	150
		£30	12.3	0.180	149
Age: 31-40	6	£10	-5.4	0.568	158
		£10+20	13.8	0.088	163
		£30	0.0	0.998	151
	7	£10	-2.4	0.791	160
		£10+20	**19.7**	**0.021**	**159**
		£30	12.1	0.185	148
	8	£10	0.2	0.981	161
		£10+20	7.3	0.437	164
		£30	9.8	0.269	151
	9	£10	2.2	0.794	162
		£10+20	9.4	0.284	163
		£30	8.9	0.307	152
Age: 41-50	6	£10	-13.5	0.073	226

		£10+20	1.4	0.847	249
		£30	-2.3	0.745	230
		£10	-6.5	0.365	230
	7	£10+20	5.8	0.490	252
		£30	6.6	0.445	233
		£10	3.5	0.671	230
	8	£10+20	9.7	0.187	252
		£30	10.9	0.163	233
		£10	3.9	0.607	230
	9	£10+20	11.1	0.158	251
		£30	11.4	0.093	233
		£10	0.5	0.950	196
	6	£10+20	-2.4	0.756	202
		£30	2.1	0.764	216
		£10	6.2	0.472	195
	7	£10+20	7.6	0.352	200
		£30	7.3	0.291	215
Age 51-60		£10	7.3	0.399	196
	8	£10+20	16.4	0.061	201
		£30	**24.7**	**0.002**	**217**
		£10	**20.1**	**0.016**	**196**
	9	£10+20	17.1	0.058	201
		£30	**26.8**	**0.002**	**214**
		£10	-12.2	0.147	172
	6	£10+20	-3.8	0.683	157
		£30	2.5	0.746	186
		£10	**-14.9**	**0.044**	**169**
	7	£10+20	4.5	0.545	155
		£30	7.3	0.372	186
Age 61-70		£10	-0.5	0.958	171
	8	£10+20	14.8	0.124	156
		£30	**22.6**	**0.009**	**185**
		£10	-1.1	0.901	167
	9	£10+20	17.5	0.079	152
		£30	**23.8**	**0.007**	**183**
		£10	-1.4	0.861	163
	6	£10+20	5.1	0.541	153
		£30	15.3	0.121	166
		£10	1.5	0.863	167
Age 71+	7	£10+20	14.5	0.085	151
		£30	**18.0**	**0.030**	**166**
	8	£10	10.1	0.188	165

		£10+20	**20.6**	**0.015**	**150**
		£30	**24.9**	**0.001**	**163**
		£10	9.9	0.167	166
	9	**£10+20**	**17.4**	**0.047**	**152**
		£30	**25.3**	**0.000**	**169**
		£10	-4.7	0.364	528
	6	£10+20	-2.9	0.518	543
		£30	4.3	0.315	561
		£10	-1.5	0.750	533
	7	£10+20	5.2	0.261	537
Male		£30	5.7	0.197	558
		£10	7.7	0.105	536
	8	**£10+20**	**10.8**	**0.019**	**543**
		£30	**17.0**	**0.001**	**564**
		£10	7.4	0.080	536
	9	**£10+20**	**10.4**	**0.014**	**542**
		£30	**17.0**	**0.000**	**567**
		£10	**-12.4**	**0.007**	**611**
	6	£10+20	4.5	0.261	611
		£30	4.0	0.327	620
		£10	-6.0	0.151	610
	7	**£10+20**	**9.6**	**0.035**	**607**
Female		**£30**	**13.4**	**0.004**	**618**
		£10	-0.5	0.904	606
	8	**£10+20**	**12.7**	**0.009**	**606**
		£30	**15.7**	**0.001**	**616**
		£10	3.7	0.348	609
	9	**£10+20**	**14.8**	**0.001**	**609**
		£30	**17.1**	**0.000**	**619**
		£10	**-8.4**	**0.027**	**924**
	6	£10+20	-0.1	0.984	931
		£30	4.1	0.216	948
		£10	-2.1	0.590	929
	7	**£10+20**	**10.8**	**0.008**	**924**
Ethnicity: White		**£30**	**9.4**	**0.031**	**944**
		£10	3.8	0.299	929
	8	**£10+20**	**13.7**	**0.001**	**930**
		£30	**17.3**	**0.000**	**950**
		£10	6.6	0.056	928
	9	**£10+20**	**13.5**	**0.001**	**927**
		£30	**20.1**	**0.000**	**950**
Ethnicity: not white	6	**£10**	**-28.7**	**0.009**	**77**
		£10+20	-9.6	0.352	89

		£30	-11.4	0.252	98
	7	£10	-15.8	0.215	77
		£10+20	-19.2	0.196	89
		£30	7.0	0.495	98
	8	£10	0.0	1.000	76
		£10+20	**2.3**	**0.889**	**88**
		£30	**14.2**	**0.193**	**97**
	9	£10	7.8	0.565	77
		£10+20	**5.5**	**0.722**	**89**
		£30	**2.2**	**0.823**	**99**
Employment: in work	6	£10	-8.4	0.094	579
		£10+20	0.0	1.000	612
		£30	1.3	0.766	583
	7	£10	1.4	0.777	578
		£10+20	**11.1**	**0.028**	**605**
		£30	10.9	0.056	580
	8	£10	6.5	0.246	582
		£10+20	**14.4**	**0.003**	**613**
		£30	**18.9**	**0.000**	**587**
	9	**£10**	**11.1**	**0.033**	**583**
		£10+20	**16.5**	**0.001**	**609**
		£30	**23.2**	**0.000**	**584**
Employment: not in work	6	£10	-10.1	0.055	437
		£10+20	-2.3	0.676	432
		£30	6.5	0.296	477
	7	£10	-6.3	0.248	442
		£10+20	3.3	0.568	431
		£30	9.3	0.108	477
	8	£10	2.4	0.620	439
		£10+20	9.8	0.099	430
		£30	**17.0**	**0.006**	**475**
	9	£10	4.7	0.343	439
		£10+20	8.4	0.122	433
		£30	**15.2**	**0.004**	**482**
Rural	6	£10	-13.8	0.102	266
		£10+20	0.4	0.956	272
		£30	4.7	0.543	286
	7	£10	2.8	0.664	273
		£10+20	**21.2**	**0.002**	**272**
		£30	**17.9**	**0.022**	**289**
	8	£10	1.5	0.827	272
		£10+20	**17.4**	**0.023**	**272**

		£30	**20.7**	**0.017**	**286**
	9	£10	3.7	0.539	272
		£10+20	**18.4**	**0.012**	**273**
		£30	**20.6**	**0.015**	**288**
Urban	6	£10	-7.2	0.141	873
		£10+20	1.1	0.781	882
		£30	3.8	0.337	895
	7	£10	-5.9	0.184	870
		£10+20	3.2	0.475	872
		£30	7.1	0.132	887
	8	£10	4.0	0.348	870
		£10+20	**10.0**	**0.020**	**877**
		£30	**14.8**	**0.004**	**894**
	9	£10	6.1	0.147	873
		£10+20	**10.9**	**0.013**	**878**
		£30	**15.7**	**0.000**	**898**
Household type: one adult household, no child(ren)	6	**£10**	**-28.8**	**0.000**	**146**
		£10+20	-13.7	0.077	141
		£30	-7.9	0.208	143
	7	£10	-11.6	0.122	152
		£10+20	8.4	0.343	142
		£30	8.4	0.320	145
	8	£10	0.0	1.000	152
		£10+20	11.7	0.175	144
		£30	13.9	0.132	145
	9	£10	8.8	0.226	151
		£10+20	**17.2**	**0.051**	**143**
		£30	**19.2**	**0.047**	**146**
Household type: one adult household + child(ren)	6	£10	-17.5	0.274	60
		£10+20	19.8	0.146	69
		£30	-14.0	0.484	51
	7	£10	-18.7	0.128	60
		£10+20	14.8	0.284	69
		£30	-21.5	0.200	51
	8	£10	-12.9	0.471	60
		£10+20	-2.8	0.852	69
		£30	-21.7	0.241	51
	9	£10	-9.6	0.558	60
		£10+20	14.8	0.362	69
		£30	-21.5	0.208	51
Household type: couple, no child(ren)	6	£10	2.6	0.701	333
		£10+20	5.1	0.459	336

		£30	**11.6**	**0.078**	**355**
	7	£10	0.4	0.944	333
		£10+20	12.0	0.122	332
		£30	**16.0**	**0.021**	**359**
	8	£10	7.0	0.201	335
		£10+20	**18.7**	**0.013**	**335**
		£30	**30.2**	**0.000**	**358**
	9	£10	6.9	0.260	331
		£10+20	**16.9**	**0.031**	**331**
		£30	**26.6**	**0.000**	**357**
Household type: couple + child(ren)	6	£10	-9.8	0.288	247
		£10+20	-1.0	0.900	246
		£30	0.5	0.946	267
	7	£10	-7.5	0.397	246
		£10+20	10.0	0.242	244
		£30	10.1	0.233	263
	8	£10	-0.4	0.960	248
		£10+20	7.8	0.402	246
		£30	9.8	0.291	266
	9	£10	7.2	0.416	248
		£10+20	**9.2**	**0.294**	**246**
		£30	**16.3**	**0.057**	**267**
Household type: 2+unrelated adults household, no child(ren)	6	£10	-9.9	0.163	211
		£10+20	8.1	0.294	234
		£30	7.1	0.288	234
	7	£10	12.0	0.094	211
		£10+20	13.8	0.098	230
		£30	10.8	0.145	230
	8	**£10**	**15.9**	**0.032**	**209**
		£10+20	**23.7**	**0.012**	**228**
		£30	**23.6**	**0.020**	**230**
	9	£10	12.5	0.056	212
		£10+20	**18.3**	**0.022**	**232**
		£30	17.8	0.059	233
Household type: adults household +child(ren)	6	£10	-9.2	0.469	142
		£10+20	-11.1	0.486	128
		£30	0.8	0.943	131
	7	£10	-14.8	0.193	141
		£10+20	-19.3	0.205	127
		£30	-2.5	0.856	128
	8	£10	-8.6	0.434	138
		£10+20	-8.2	0.534	127

	£30	-6.7	0.617	130
	£10	-7.4	0.496	143
9	£10+20	-3.7	0.744	130
	£30	-1.3	0.903	132

P values from Pearson χ^2 tests, corrected for the survey design (strata and cluster). Bold signals a p-value≤0.50.

Conclusions and discussion

This research brings forward previous evidence from the literature by analysing the effect of mixed-mode on attrition, disentangling the effect by incentive groups.

One wave after the mode switch (wave 6) sample members in the mixed-mode group have a lower propensity to participate in the study (unless they receive higher incentives than the face-to-face group); this is consistent with the evidence at wave 5, documented by Jäckle *et al.* (2015), which finds lower response rate in the mixed-mode group compared to the face-to-face group (keeping incentives fixed across groups), and also consistent with the literature showing that mixed-mode designs do not increase overall response rates.

The negative effect of mixed-mode on panel attrition erodes over time, with no significant differences between the mixed-mode and face-to-face group from wave 7 onwards. However, the interpretation of this result is unclear: on one hand, this may signal that after two survey waves, sample members adapt to being offered a web interview first instead of receiving an interviewer visit; on the other hand, the lower attrition in the mixed-mode group may be determined by the interviewer discontinuity caused by a change in fieldwork agency.

Indeed, one caveat of this work (and other researches using this experimental data to analyse response) is that a change of survey agency from wave 7 (which implied a change of most face-to-face interviewers) may have affected more negatively response in the "face-to-face group", than in the group firstly approached by web.

Thus, I expect that the resulting interviewer discontinuity have affected negatively response rates, with a higher effect for the face-to-face group than the mixed-mode

group. Further research may replicate this finding in an experimental setting in the absence of survey agency discontinuity.

No coherent pattern is found analysing sample members by their socio-demographic characteristics. This evidence signals that there are no socio-demographic groups for which the mixed-mode treatment is lowering/increasing response for several waves; similarly, there are no socio-demographic groups for which response in all waves can be increased by offering higher level of monetary incentives, compared to the face-to-face group.

Nevertheless, overall, higher incentives can be used to counterbalance the effect of mixed-mode on response, and survey practitioners may want to use part of the cost-savings due to the adoption of mixed-mode design to increase incentives.

References

Al Baghal, Tarek, Annette Jäckle, Jonathan Burton, and Peter Lynn. 2016. Understanding Society The UK Household Longitudinal Study Innovation Panel, Waves 1-8, User Manual. Institute for Social and Economic Research.

Bianchi, A., S. Biffignandi, and P. Lynn. 2016. Web-CAPI sequential mixed-mode design in a longitudinal survey: effects on participation rates, sample composition and costs. Understanding Society Working Paper Series

Brown, M., J. Williams, and A. Goodman. 2015. "The impact of using the web in a mixed-mode follow-up of a longitudinal birth cohort study: Evidence from the National Child Development Study" paper presented at the 6th Conference of the European Survey Research Association, Reykjavik, Iceland, 13th-17th July 2015.

Burton, J. (eds). 2013. Understanding Society Innovation Panel Wave 4: Results from methodological experiments. Understanding Society Working Paper Series

Curtin, Richard, Eleanor Singer, and Stanley Presser. 2007. Incentives in random digit dial telephone surveys: A replication and extension. *Journal of Official Statistics* 23 (1): 91–105.

de Leeuw, E. D. 2005. To mix or not to mix data collection modes in surveys. *Journal of Official Statistics*, 21(5):233-255.

Fong, B., and J. Williams. 2011. "British crime survey: feasibility of boosting police force area (PFA) sample sizes using supplementary recontact surveys." Report for the Home Office, TNS-BMRB, London.

Gaia, A. 2014. "Does a mixed-mode design increase panel attrition? Evidence from the UKHLS Innovation Panel" paper presented at the Internet Survey Methodology Workshop, Bolzano, December 2014.

Griffin, D., Fischer, D., and M. Morgan. 2001. "Testing an internet response option for the American Community Survey. Paper presented at the annual conference of the American Association for Public Opinion Research Montreal." Quebec, Canada, May 17–20.

Jäckle, A., P. Lynn, and J. Burton. 2015. "Going online with a face-to-face Household panel: effects of a mixed-mode design on item and unit non-response." *Survey Research Methods* 9(1): 57–70.

Janik, F., and S. Kohaut. 2012. "Why don't they answer? Unit non-response in the IAB establishment panel." *Quality and Quantity* 46(3): 917–934.

Janssen, B. 2006. "Web data collection in a mixed-mode approach: An experiment." Paper presented at the European Conference on Quality in Official Statistics (Q2006), Cardiff, April 24-26.

Juster, F. Thomas, and Richard Suzman. 1995. An overview of the Health and Retirement Study. *Journal of Human Resources* 30 (5): S7–S56.

Klausch, T., Hox, J., and B. Schouten. 2015. "Selection error in single- and Mixed-mode surveys of the Dutch general population." *Journal of the Royal Statistical Society, Series A* 178(4): 945-961

Lagerstrøm, B. 2008. "Cost efficiency in a mixed-mode survey – Evidence from the Norwegian Rent Market Survey." Paper presented at the 19th International Workshop on Household Survey Nonresponse, Ljubljana, September 15.

Leesti, T. 2010. “Canadian Labour Force Survey Internet Data Collection Pilot Test.” Paper presented at the Fifth Workshop on Labour Force Survey Methodology, Paris, April 15-16.

Lynn, P. 2013. “Alternative sequential mixed-mode designs: Effects on attrition rates, attrition bias, and costs.” *Journal of Survey Statistics and Methodology* 1:183–205.

Martin, P., and P. Lynn. 2011. “The effects of mixed-mode survey designs on simple and complex analyses.” ISER Working Paper Series: 2011–28.

Merkle, Daniel, Murray Edelman, Kathy Dykeman, and Chris Brogan. 1998. An experimental study of ways to increase exit poll response rates and reduce survey error. Paper presented at the Annual Conference of the American Association of Public Opinion Research, 14–17 May, St. Louis, MO.

Singer, Eleanor, and Cong Ye. 2013. “The use and effects of incentives in surveys” *The ANNALS of the American Academy of Political and Social Science*, 645, (1): 113-141.

Souren, M. 2012. “Multi-Mode Surveys at Statistics Netherlands: implications, experiences and open Issues.” Paper presented at Opening Conference of the European Statistical System

Appendix

Table 2b: Excluding low propensity for web (in both the face-to-face and mixed-mode group)

Wave	Incentive		Response rate (%)		Difference (MM-F2F, %)	P-value	N
	F2F	MM	F2F	MM			
6	£10	£10	59.1	50.0	-9.1	0.043	1,097
		£10+20		60.8	1.7	0.622	1,122
		£30		63.6	4.5	0.229	1,135
7	£10	£10	44.3	40.5	-3.8	0.335	1,106
		£10+20		**53.1**	**8.8**	**0.025**	**1,114**
		£30		**55.4**	**11.1**	**0.005**	**1,132**
8	£10	£10	38.9	41.4	2.4	0.533	1,108
		£10+20		**50.9**	**12.0**	**0.001**	**1,120**
		£30		**56.1**	**17.1**	**0.000**	**1,139**
9	£10	£10	34.1	38.9	4.8	0.202	1,110
		£10+20		**46.9**	**12.8**	**0.000**	**1,124**
		£30		**51.9**	**17.8**	**0.000**	**1,144**

Table 2c: Excluding low propensity for web in the mixed-mode group only

Wave	Incentive		Response rate (%)		Difference (MM-F2F, %)	P-value	N
	F2F	MM	F2F	MM			
6	£10	**£10**	61.0	**50.0**	**-11.0**	**0.013**	**1,135**
		£10+20		60.8	-0.2	0.954	1,160
		£30		63.6	2.6	0.475	1,173
7	£10	£10	46.9	40.5	-6.4	0.100	1,144
		£10+20		**53.1**	**6.3**	**0.112**	**1,152**
		£30		**55.4**	**8.5**	**0.030**	**1,170**
8	£10	£10	40.8	41.4	0.6	0.876	1,144
		£10+20		**50.9**	**10.1**	**0.007**	**1,156**
		£30		**56.1**	**15.3**	**0.001**	**1,175**
9	£10	£10	36.3	38.9	2.7	0.460	1,148
		£10+20		**46.9**	**10.7**	**0.003**	**1,162**
		£30		**51.9**	**15.6**	**0.000**	**1,182**