Going Online with a Face-to-Face Household Panel: Initial Results from an Experiment on the *Understanding Society* Innovation Panel

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Non-Technical Summary

To date, face-to-face interviewing has been the primary mode of data collection for *Understanding Society*. At each wave, all households in the sample are approached in person and asked to participate in face-to-face interviews. From wave 3 onwards a small number of telephone interviews have been carried out during the final "mop-up" stage when a last push is made to interview people who are reluctant or unavailable to be interviewed in person. But no attempt has been made to collect the survey data without the aid of an interviewer.

In this paper we report the first findings from a programme of experimental work designed to inform decisions about whether and how the introduction of web interviewing could be of benefit to the survey. A randomised experiment was carried out in which one part of the sample was approached for face-to-face interviews in the usual way, while the other part were first invited to complete the survey online. In this second part of the sample, people who did not complete online after two weeks were then approached face-to-face.

We find that substantial numbers of households completed the survey online, offering the prospect of considerable cost savings. Also, it seems that the proportion responding online can be increased further if respondents are offered a monetary incentive. However, the overall proportion of households who participated was lower amongst that part of the sample that was first asked to complete the survey online. We have not been able to identify any subgroup of the sample for whom the online request increased their likelihood of participation. Additionally, missing answers are more common when sample members take part online.

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Abstract

To date, face-to-face interviewing has been the primary mode of data collection for *Understanding Society*. There may be advantages in instead collecting data online where possible. Primarily, this should bring a reduction in data collection costs. There are, however, concerns that response rates could fall if the request to participate is no longer made in person and that measurement could differ between modes. Wave 5 of the Innovation Panel incorporated an experimental design comparing a mixed mode design (web plus face-to-face follow-up) with a standard face-to-face design. This paper presents initial findings from the experiment, primarily with regard to participation rates.

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1. Introduction: Mixed-Mode Survey Data Collection

Considerable attention is being given to mixed mode survey data collection in which web is one of the modes. The incorporation of web into a mixed mode design has potential both to reduce survey costs and improve quality. Several UK government surveys are actively considering mixed mode approaches (Betts & Lound 2010) and a Europe-wide project is considering ways of incorporating web data collection into the European Labour Force Surveys (Blanke & Luiten 2012). Two of the world's most eminent survey methodologists, Bob Groves, ex-Director of the US Census Bureau, and Lars Lyberg, ex-Director of Methodology at Statistics Sweden, envisage a future for surveys which consists of "a multi-mode, multi-frame, multi-phase world" (Groves & Lyberg 2010, p.874). In their opinion, this will happen in part because of demand to reduce survey costs. In addition, mixed mode designs may enable increased data quality if the advantages of each mode are taken carefully into account.

However, experience of implementing mixed mode surveys is severely limited[1], especially in the context of academic or government longitudinal surveys. Aside from specialist and commercial applications, few major surveys in the UK have used mixed mode designs, and only in limited ways (Dex & Gumy, 2011).

The possibility of *Understanding Society* adopting a mixed mode design has been envisaged since the outset of the study and experimentation with a mixture of face-to-face and telephone interviewing was carried out at wave 2 of the *Understanding Society* Innovation Panel in 2009 (Lynn et al, 2010). It is now envisaged that *Understanding*

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[1] By 'mixed mode' we mean surveys that collect the *same* data from different respondents in different modes. This is distinct from the more common 'multiple mode' design, in which *different* data are collected in different modes, e.g. a self-completion during a FTF interview.

Society will adopt a mixed mode design with web as a primary mode of data collection, probably at wave 7. The risks and opportunities associated with a move to a mixed mode design involving web are reviewed by Couper (2012). Informed by that review, it has been agreed that the adoption of a mixed mode design should be conditional on identifying a design that meets three criteria, namely:

1) that the approach used leads to significant cost savings at least in the medium term;

2) that the approach used does not significantly raise overall attrition compared with using face-to-face interviewing only, and

3) that it maintains data quality comparable with face-to-face interviewing.

In order to help establish whether, and in what circumstances, these three criteria can be met, a programme of methodological testing is being implemented on the *Understanding Society* Innovation Panel. In this paper we report on the experimentation carried out at wave 5 of the panel, describing the design and the main findings. Findings with respect to attrition will of course not be known until future waves have been carried out, but we outline here findings regarding non-response at wave 5. We also discuss the extent of participation of whole households by web, as this is a main determinant of the cost savings that will accrue from including web in the design. With respect to data quality, we examine the completeness of responses provided by sample members. We anticipate that further analysis will explore some of these issues in more detail in due course.

2. Experimental Design

The sample for wave 5 of the Understanding Society Innovation Panel had two components:

- Original sample, for whom this was the 5th wave;
- Refreshment sample, for whom this was the 2nd wave.

Households in both samples were randomly assigned to one of two treatment groups:
- Face-to-face (one-third of each sample);
- Mixed mode (two-thirds of each sample).

The distribution of the issued sample of households across samples and mode treatments in summarized in Table 1. The randomization was implemented across sampling points, so that each sampling point contained a mix of households in each treatment group.

The face-to-face treatment involved standard *Understanding Society* procedures. Each adult sample member (aged 16 or over) was sent an advance letter with an unconditional incentive, after which interviewers called to attempt Computer-Assisted Personal Interviewing (CAPI) interviews. The value of the incentive (in both samples) was subject to experimental allocation. In each household one person was asked to complete the household grid and household questionnaire. All household members aged 16 or over were asked for an individual interview and to complete a self-completion questionnaire, which was randomly allocated to be either a Computer Assisted Self Interview (CASI) or a paper questionnaire booklet. Young people aged 10-15 were administered a paper self-completion questionnaire.

Table 1: Allocation of households to experimental groups

| | Original Sample | | Refreshment sample | Total |
	Responded at wave 4	Did not respond at wave 4		
Face-to-face	321	43	168	532
Mixed modes	618	110	315	1043
Total	939	153	483	1575

Note: Numbers shown are the numbers of households issued to the field, based on information held prior to the start of field work. During the course of field work, additional (split) households were identified. In the Refreshment sample, only responding households from their first wave (wave 4 of the panel) were issued at wave 5.

The mixed mode treatment was as follows. Sample members aged 16 or over were sent a letter with the unconditional incentive, inviting them to take part by web. The letter (see appendix B) included the URL and a unique user ID, which was to be entered on the welcome screen. A version of the letter was additionally sent by email to all sample members for whom we had an email address. For people who had indicated at previous waves that they do not use the internet regularly for personal use, the letter mentioned that they would also have the opportunity to do the survey with an interviewer. Up to three email reminders were sent at 3-day intervals. Sample members who had not completed the web interview after two weeks were sent a reminder by post and interviewers started

visiting them to carry out CAPI interviews. The web survey remained open throughout the fieldwork period.

The first household member to log on to do the web survey was asked to complete the household grid, which collects information on who is currently living in the household. The web grid included an additional question to identify who is responsible for paying bills. The household questionnaire could be completed by either this person or their spouse/partner. For these sample members the household questionnaire was displayed first, then leading on to the individual questionnaire. (The household questionnaire is relatively short (around 10 minutes) and collects household-level information such as housing tenure, rent/mortgage payments, expenditure, utility bills, household consumer durables and some measures of material deprivation.) Once one partner had completed the household questionnaire, it would not appear for the other partner.

The youth survey was administered either on paper or by web, depending on the mode used by the parent(s). If the parent(s) had responded by web and we had their email address, an invitation was sent to the parent by email with a request to forward it to their child. If the parent had been interviewed in CAPI, the interviewer handed out the youth paper self-completion questionnaire. Otherwise a questionnaire was sent by post.

The web questionnaire was based on the CAPI one, with some adaptations, e.g. incorporating interviewer instructions into question wording, removing references to showcards, and making "help" screens more respondent-appropriate. The web survey was not suitable for completion using a small mobile device (e.g. smartphone). If a mobile device was used to access the log-on page, the respondent was automatically directed to a page requesting that they log on from a computer.

The mixed mode treatment also included two (crossed) experiments to test ways of increasing web response rates:
- Half the households were offered an additional conditional incentive: if all eligible household members completed the web survey within two weeks, they each received an additional £5. This was mentioned in the advance letters to all household members in this treatment group.
- Half the households were sent the advance letter and first email to arrive on a Friday. The other half were sent them to arrive on a Monday.

Subsequent to field work, a validation exercise was carried out to check the quality of enumeration data collected by web. A sub-sample of 200 households who completed the

grid by web were re-administered the grid by Computer-Assisted Telephone Interviewing (CATI). To avoid a tendency to confirm previous answers, interviewers did not have access to the information from the web grid. The CATI grid was asked with respect to the date at which the web grid was completed.

3. Cost Savings: Complete Household Response by Web

Significant cost savings are made when the need to send an interviewer to visit a household is avoided. This requires that the household responds completely by web (grid, household questionnaire and all individual questionnaires). Table 2 shows this proportion for each sample and each level of incentive. We see that:

- Nearly one in five (18.5%) of original sample households participated fully by web;
- Fully one-third (34.3%) of refreshment sample households participated fully by web;
- Higher unconditional incentive levels significantly and substantially increased the probability of participating fully by web for the refreshment sample.

Table 2: Proportion of Households Fully Responding by Web, by Sample and Unconditional Incentive

Proportion of households (n)	Original sample			Refreshment sample
	Total sample	Wave 4 respondent households	Wave 4 non-respondent households	Total sample
Total sample	18.5 (*728*)	21.0 (*618*)	4.5 (*110*)	34.3 (*315*)
£5	17.5 (*389*)	19.5 (*330*)	6.8 (*59*)	—
£10	21.2 (*311*)	24.7 (*263*)	2.1 (*48*)	23.0 (*87*)
£20	—	—	—	37.1 (*105*)
£30	—	—	—	42.9 (*111*)
P	0.21	0.11	0.22	0.00

Note: The analysis by value of the unconditional incentive excludes n=40 split-off households. *P*-values from Wald tests of the equality of mean completion rates between incentive groups, adjusted for sample design.

Furthermore, the mean number of interviewer visits per household is lower with the mixed modes treatment than with face-to-face, both in the original sample (2.9 *vs.* 3.7, *P* = 0.00) and in the refreshment sample (2.5 *vs.* 3.7, *P* = 0.00*).* It does not seem to be the case that we got only the 'easy' households by web: within the mixed mode sample there is no difference in the mean number of calls by interviewers in the previous wave, between households that completed all interviewing by web, and households that did not complete everything by web (3.2 *vs.* 3.5, *P* = 0.25) .

Table 3 shows how the proportion of households responding fully by web varies across a number of sample subgroups. There is a strong indication that household internet access, the proportion of web users in the household and the proportion of household members for whom we have an email address are variables that might help to identify sample subgroups with a relatively high propensity to respond fully by web.

Additionally, the proportion likely to complete fully by web may increase over time. For example, Innovation Panel data over 5 annual waves shows an increase in the proportions who have broadband access, who are regular web users, and for whom we have email addresses. All in all, these findings appear to suggest worthwhile scope to make data collection cost savings.

4. Household Response Rates

The impact of mixed-mode data collection on response rates is a further crucial consideration. Table 4 compares the treatment groups in terms of household response rates. We see that the proportion of households participating does not differ significantly between treatments for either the original or refreshment sample, though in both cases the response rate is around three percentage points higher with face-to-face than with mixed modes. However, amongst previous-wave responding households in the original sample the mixed mode design results in fewer complete households (household questionnaire and *all* individual interviews completed: 55.7% *vs.* 63.9%, *P* = 0.02), and more refusals (14.1% *vs.* 8.7%, *P* = 0.05). In contrast for the refreshment sample, partially-responding households are less likely with the mixed mode design (15.9% *vs.* 25.0%, *P* = 0.01).

Table 3: Proportion of Households Fully Responding by Web, by Household Characteristics

Prob(complete HH by web)		Original sample (total) Predicted probability	*P*-value	Original sample (IP4 respondents) Predicted probability	*P*-value	Refreshment sample Predicted probability	*P*-value
HH internet:	No	7.2		5.4		22.4	
	Yes	20.4	*0.01*	22.9	*0.00*	34.9	*0.15*
Web users in HH:	None*	8.5		9.7		8.2	
	Some	19.1		22.2		35.6	
	All	26.9		28.2		42.9	
	Yes+missing	12.2	*0.00*	14.2	*0.00*	31.9	*0.00*
Number of eligible adults:	1	15.8		20.1		29.5	
	2	19.9		21.1		38.5	
	3+	23.6	*0.25*	24.2	*0.74*	24.6	*0.04*
Emails for HH members:	None	9.9		10.6		23.8	
	Some	14.9		16.5		29.6	
	All	25.9	*0.00*	28.8	*0.00*	44.2	*0.04*
N		676		587		305	

Notes: Predicted probabilities from logit model. Estimates adjusted for sampling design. Sample size for IP4 non-respondents too small for estimation. * includes no+missing; no+yes+missing

Table 4: Household Response Rates

	Original sample Total			IP4 responding			IP4 non-responding			Refreshment sample		
	F2F	MM	*P*	F2F	MM	*P*	F2F	MM	*P*	F2F	MM	*P*
HH response rate	78.0	74.3	*0.22*	84.1	81.1	*0.29*	32.6	36.4	*0.66*	85.1	81.9	*0.45*
Complete HHs	58.0	50.3	*0.02*	63.9	55.7	*0.02*	14.0	20.0	*0.43*	60.1	66.0	*0.26*
Partial HHs	20.1	24.0	*0.13*	20.2	25.4	*0.07*	18.6	16.4	*0.72*	25.0	15.9	*0.01*
Non-contact	6.9	5.8	*0.49*	5.6	2.9	*0.04*	16.3	21.8	*0.45*	5.4	6.7	*0.63*
Refusal	13.2	17.4	*0.13*	8.7	14.1	*0.05*	46.5	36.4	*0.22*	8.3	9.5	*0.68*
Other non-response	1.9	2.5	*0.59*	1.6	1.9	*0.68*	4.7	5.5	*0.84*	1.2	1.9	*0.56*
N	364	728		321	618		43	110		168	315	

Notes: F2F = face-to-face; MM = mixed modes; HH = household; *P* = *P*-values from Chi² tests adjusted for sample design. These notes apply also to tables 5 and 6.

5. Individual Response Rates

Table 5 shows individual response rates. The mixed mode design resulted in a smaller proportion of full interviews amongst IP4 respondents (75.8% *vs.* 82.8%, *P* = 0.04) and a smaller proportion of proxy interviews amongst IP4 non-respondents (9.4% *vs.* 20.2%, *P* = 0.00). The proportion of interviews of any form (full, proxy or partial) was lower with mixed modes for the original sample (63.9% *vs.* 72.1%, *P* = 0.01), but there was no difference for the refreshment sample. However, in the refreshment sample there is a suggestion that response rates with mixed modes might be higher than face-to-face with higher-value incentives but lower than face-to-face with lower value incentives, though the differences are not statistically significant (Table 6).

The overall conclusion on response rates at this stage therefore seems to be that, compared to face-to-face, this mixed mode design produces lower response rates for previous wave respondents, though there is no evidence of a difference in response rates either for previous wave non-respondents or for the refreshment sample.

Response to the youth questionnaire for 10 - 15 year-olds was significantly lower with the mixed mode design compared to face-to-face (49.0% *vs.* 76.8%, *P* = 0.00). In the mixed mode sample, very few young people responded by web: of all youth respondents in the mixed mode sample, 11% responded by web and 89% completed a paper questionnaire. The youth response rate did not differ between households in which all adults completed the web questionnaire and other mixed mode households, but the proportion who responded online did differ: in households where all adults participated by web, 6 out of 22 (27%) completed youth questionnaires were completed online, whereas in other mixed mode households, just 2 out of 50 (4%) youth questionnaires were completed online.

Table 5: Individual Response Rates (including eligible adults in non-respondent households)

| | Original sample | | | | | | | | | Refreshment sample | | |
| | Total | | | IP4 responding | | | IP4 non-responding | | | | | |
	F2F	MM	P	F2F	MM	P	F2F	MM	P	F2F	MM	P
Full interview	64.7	58.5	0.05	82.8	75.8	0.04	18.5	24.1	0.16	69.8	71.7	0.64
Proxy interview	7.3	4.4	0.00	2.6	2.0	0.50	20.2	9.4	0.00	5.5	1.9	0.00
Partial interview	0.1	1.0	0.02	0.0	1.2	0.01	0.0	0.5	0.34	0.0	1.3	0.03
Full, proxy or partial	72.1	63.9	0.01	85.5	79.0	0.06	38.8	34.0	0.30	75.3	74.9	0.93
Non-contact	7.1	5.8	0.40	3.4	2.9	0.65	18.0	13.1	0.20	5.7	7.1	0.60
Refusal	17.2	22.9	0.06	8.5	14.2	0.07	41.0	43.6	0.58	12.9	11.1	0.59
Other non-response	3.6	7.4	0.01	2.6	3.9	0.38	2.2	9.4	0.00	6.0	6.9	0.63
N	703	1439		495	934		178	406		348	594	

Table 6: Refreshment Sample Response Rates by Value of Unconditional Incentive

| | £10 incentive | | | £20 incentive | | | £30 incentive | | |
	F2F	MM	P	F2F	MM	P	F2F	MM	P
HH response rate	87.5	74.7	0.11	87.0	81.9	0.45	90.3	92.0	0.73
Complete HHs	57.5	52.9	0.66	61.1	68.6	0.40	64.5	77.7	0.10
Partial HHs	30.0	21.8	0.39	25.9	13.3	0.08	25.8	14.3	0.09
Non-contact	0.0	5.7	0.11	3.7	3.8	0.97	3.2	5.4	0.52
Refusal	12.5	18.4	0.38	9.3	12.4	0.59	3.2	0.9	0.27
Other unproductive	0.0	1.1	0.50	0.0	1.9	0.31	3.2	1.8	0.54
N	40	87		54	105		62	112	
Individual response rate									
Full interview	67.1	61.1	0.46	68.6	73.5	0.50	75.4	79.6	0.45
Proxy	5.9	2.5	0.23	7.4	0.0	0.00	4.0	3.1	0.69
Partial	0.0	0.6	0.47	0.0	1.5	0.19	0.0	1.8	0.13
Non-contact	5.9	7.6	0.73	2.5	5.6	0.32	5.6	6.2	0.84
Refusal	16.5	21.0	0.56	17.4	13.3	0.54	6.3	2.2	0.11
Other non-response	4.7	7.0	0.54	4.1	6.1	0.54	8.7	7.1	0.58
N	85	157		121	196		126	226	

6. Response Rates for Subgroups

Though there is no evidence that our mixed mode design increases response rates overall, there could be a positive effect for subgroups. To investigate this we developed multinomial logistic regression models in which we tested the effects of various household characteristics and the interactions of those characteristics with treatment. The dependent variable distinguished between four outcomes: complete household response, partial household response, refusal, other non-response. Results for the original sample are summarised in Table 7. We see that households with children are less likely to be fully responding and more likely to be partially responding with mixed modes. The same is true for households in which all adults are regular web users. For none of the household characteristics analysed does the mixed mode design affect the refusal rate.

For individual-level response we fitted a logit model predicting a full response (versus partial, proxy or non-response) using individual characteristics and the interactions of those characteristics with treatment. Results are summarised in Table 8. Joint tests suggest that respondent characteristics associated with higher response probabilities in face-to-face are also associated with higher response probabilities in mixed modes, with two exceptions:

- With face-to-face, the predicted response rate is 10 percentage points higher in rural than urban locations; in mixed modes the opposite is the case, as the predicted rate is 10 percentage points higher in urban locations;

- Respondents who said at IP4 they would definitely not respond to a web survey had the highest predicted response rates in the face-to-face treatment, while respondents who said they definitely would respond to a web survey had the highest rates in mixed modes.

So far, we have not identified any subgroup that was more likely to participate with the mixed mode treatment. But several groups were *less* likely to give an interview in the mixed mode treatment: men (-7.5% points), white (-7.9% points), in rural location (-22.8% points), web users (-9.0% points), those for whom we had an email (-7.6% points), age 21-30 (-20.4%) single with children (-26.9% points), couples with children (-12.0% points), 2+ unrelated adults with children (-25.6% points), individuals who said they would definitely not do survey by web (-19.9% points).

Table 7: Predicted Probability of Household Response Outcome – Original Sample

Pr(complete HH) (%)	F2F	Mixed modes	Difference	*P*-value	*P*-value (joint test)
Rural	59.4	48.9	-10.5	0.16	
Urban	59.1	53.1	-6.0	0.09	0.55
No HH internet	59.0	53.5	-5.5	0.44	
HH internet	59.2	51.5	-7.7	0.07	0.79
No emails known	57.7	54.0	-3.7	0.53	
Some emails known	57.8	46.5	-11.3	0.08	
All emails known	62.0	54.5	-7.5	0.21	0.66
Single, no children	71.7	71.9	0.2	0.98	
Single, children	76.8	34.2	-42.6	0.00	
Couple, no children	59.0	55.0	-4.0	0.52	
Couple, children	49.5	39.4	-10.1	0.13	
2+ unrelated adults, no children	40.5	48.0	7.5	0.36	
2+ unrelated, children	63.4	14.5	-48.9	0.00	0.00
No web users, incl. some unknown*	49.9	40.8	-9.1	0.19	
Some web users	73.4	67.2	-6.2	0.50	
All web users	78.4	65.7	-12.7	0.02	
Some unknown, all others web users*	19.3	32.7	13.4	0.04	0.03
Pr(partial HH)					
Rural	23.8	24.0	0.2	0.97	
Urban	18.8	23.0	4.2	0.14	0.50
No HH internet	12.2	21.3	9.1	0.15	
HH internet	21.9	23.5	1.6	0.62	0.32
No emails known	14.0	18.4	4.5	0.32	
Some emails known	27.9	29.7	1.8	0.72	
All emails known	16.1	21.1	5.0	0.22	0.88
Single, no children	10.0	2.3	-7.7	0.18	
Single, children	0.0	24.1	24.1	0.00	
Couple, no children	22.2	29.1	6.9	0.21	
Couple, children	21.6	29.7	8.2	0.19	
2+ unrelated adults, no children	29.6	26.9	-2.8	0.66	
2+ unrelated, children	15.0	40.7	25.6	0.01	0.01
No web users, incl. some unknown*	27.7	30.1	2.4	0.73	
Some web users	10.0	10.5	0.5	0.92	
All web users	7.6	18.3	10.6	0.01	
Some unknown, all others web users*	34.8	31.8	-3.0	0.64	0.24

Table 7 Continued/….

Pr(refusal HH)					
Rural	11.4	21.0	9.6	*0.12*	
Urban	12.5	14.8	2.4	*0.43*	*0.29*
No HH internet	13.5	14.0	0.4	*0.95*	
HH internet	11.9	17.2	5.3	*0.17*	*0.59*
No emails known	12.2	16.8	4.6	*0.36*	
Some emails known	10.6	19.7	9.1	*0.09*	
All emails known	14.6	13.2	-1.4	*0.80*	*0.46*
Single, no children	12.6	18.1	5.5	*0.42*	
Single, children	14.0	31.0	17.0	*0.17*	
Couple, no children	9.5	13.1	3.6	*0.36*	
Couple, children	18.6	17.6	-0.9	*0.90*	
2+ unrelated adults, no children	15.4	13.3	-2.1	*0.70*	
2+ unrelated, children	7.5	25.5	18.0	*0.05*	*0.16*
No web users, incl. some unknown*	16.1	20.2	4.2	*0.48*	
Some web users	12.5	12.9	0.3	*0.96*	
All web users	5.7	11.0	5.2	*0.17*	
Some unknown, all others web users*	20.1	21.0	0.9	*0.90*	*0.90*

Notes: Multinomial logit model, including treatment, household characteristics and interactions between characteristics and treatment as predictors. Probabilities predicted using the –margins– command in Stata version 12. *P*-values from Wald tests adjusted for sample design.

* "unknown" refers to individuals within the household for whom the web use variable is missing due to item or unit non-response.

Table 8: Predicted Response Probabilities – Original Sample, IP4 respondents (%)

Pr(full interview)	F2F	Mixed modes	Difference	P-value	P-value (joint test)
Female	83.2	76.1	-7.1	0.08	
Male	82.9	75.5	-7.5	0.04	0.92
Non-white	64.0	69.2	5.2	0.64	
White	84.3	76.4	-7.9	0.02	0.25
Not in work	84.8	75.3	-9.5	0.05	
In work	82.0	76.2	-5.8	0.11	0.48
Rural	91.0	68.3	-22.8	0.00	
Urban	81.2	78.1	-3.1	0.38	0.00
Not web user	76.5	75.2	-1.3	0.84	
Web user	85.1	76.1	-9.0	0.01	0.27
No email given	77.4	72.5	-4.9	0.38	
Email given	85.6	78.0	-7.6	0.04	0.67
Age 16-20	63.1	71.9	8.8	0.50	
Age 21-30	73.0	52.7	-20.4	0.04	
Age 31-40	80.9	74.4	-6.4	0.44	
Age 41-50	82.8	76.2	-6.6	0.20	
Age 51-60	90.3	80.7	-9.7	0.06	
Age 61-70	89.6	85.6	-4.0	0.50	
Age 71+	85.3	78.4	-6.8	0.45	0.79
Single	80.6	81.2	0.7	0.91	
Single, kids	89.6	62.7	-26.9	0.00	
Couple	85.2	83.2	-2.0	0.72	
Couple, kids	82.1	70.1	-12.0	0.04	
2+ unrelated adults	79.5	78.0	-1.5	0.85	
2+ unrelated, kids	84.4	58.7	-25.6	0.01	0.10
Web: no	91.3	71.4	-19.9	0.00	
Web: maybe	76.4	77.0	0.6	0.89	
Web: yes	79.2	78.6	-0.6	0.92	0.01

Notes: *N*=1413. Predicted probability of giving a full interview, based on a logit model including the allocated mode, characteristics of the sample members, and interactions between the mode and characteristics as predictors. Predicted probabilities calculated using the command –margins– in Stata (version 12). P-values from Wald tests adjusted for sample design.

7. Increasing Web Take-Up

In Table 9 we summarise the results of the two experiments with design features that might increase web take-up. The conditional incentive increased the proportion of households fully responding by web from 15.5% to 22.8% in the original sample, and from 17.7% to 25.8% amongst previous wave responding households. Although not shown in the table, the effect may have been stronger amongst households in which sample members received the £10 unconditional incentive (16.7% *vs.* 25.8%; *P* = 0.05) than amongst households in which sample members received the £5 unconditional incentive (14.6% *vs.* 20.4%; *P* = 0.11). For all samples the proportion of fully responding households was higher if the web invitation was received on a Friday rather than a Monday, but none of these differences reached statistical significance at the 0.05 level. That was also true for the subset of households who received the invitation by email (result not shown).

Table 9: Effects of Web Bonus and Day of Mailing on Proportion of Households Who Completed All Interviewing by Web

	Original sample									Refreshment sample		
	Total			IP4 responding			IP4 non-responding					
	%	*P*	*N*	%	*P*	*N*	%	*P*	*N*	%	*P*	*N*
No bonus	15.5	.	348	17.7	.	294	3.7	.	54	35.5	.	152
Bonus	22.8	*0.01*	351	25.8	*0.01*	298	5.7	*0.65*	53	34.9	*0.90*	152
Monday	18.2	.	347	21.0	.	291	3.6	.	56	34.7	.	150
Friday	20.2	*0.48*	352	22.6	*0.61*	301	5.9	*0.57*	51	35.7	*0.83*	154

Notes: % = proportion of households fully responding by web. *P* from Chi^2 tests adjusted for sample design. Analysis excludes *N*=68 split-off households.

8. Measurement and Data Quality

IP5 was not designed to assess mode effects on measurement. But we can assess treatment effects. In this section, we look at item missing data rates. We compare two

metrics between treatments. The first is an overall item non-response rate[2]. The second is the proportion of employed respondents who do not provide a value of their last gross pay. This is an important item as it is central to the derivation of income measures and is known to be prone to relatively high item non-response rates.

Mean item non-response rates are low with small differences between treatments (Table 10). However the item non-response rate for last gross pay is significantly higher with mixed modes than face-to-face in both the original sample (17.7% *vs.* 10.0%; *P* = 0.02) and the refreshment sample (18.0% *vs.* 8.0%; *P* = 0.03).

Table 10: Item Non-Response Rates by Sample and Treatment

	Original sample			Refreshment sample		
	F2F	MM	*P*	F2F	MM	*P*
Mean Item non-response (%)	0.23	0.32	*0.01*	0.19	0.27	*0.02*
N	459	859		243	437	
Gross pay Item non-response (%)	10.0	17.7	*0.02*	8.0	18.0	*0.03*
N	229	412		112	206	

Note: *P*: *P*-values from Wald tests of means adjusted for sample design.

9. Summary and Discussion

Our preliminary conclusion, based on the findings reported here, is that a mixed mode design along the lines of the one tested at IP5 has potential to deliver real cost savings. However, avoiding damage to long-term participation rates and maintaining data quality may prove more challenging. We now discuss the issues of cost savings, participation rates and data quality in turn.

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[2] This is the proportion of 1,091 items to which the respondent answered "don't know" or "refused". The base includes items for which the respondent may not have been eligible, as ineligible codes have not yet been set in the unedited data upon which these analyses are based. We must assume that the proportion of respondents eligible for each question does not differ between the two treatment groups. Given the random allocation of respondents to mode treatments, this assumption should hold. Some question modules have had to be excluded from this analysis, including those that in the face-to-face treatment were experimentally asked in either CASI or paper self-completion.

Costs. As nearly one in five of the original sample households responded entirely by web, accounting for one in four of all fully-responding households, the potential for cost savings is great. Most of these households did not require any interviewer visit. Moreover, our findings hint that even higher web completion rates may be possible if respondents are offered higher-value monetary incentives and that the proportion of households who respond fully by web would further increase if all were offered the conditional bonus for completing online.

Participation Rates. Our mixed mode design resulted in a smaller proportion of households fully responding, a smaller proportion of previously-cooperative individuals responding, and more refusals. We have been unable to identify any sample subgroup for which either the household or individual response rate was higher with the mixed mode design. This does not bode well. However, some glimmers of hope emerge. Amongst the refreshment sample, the individual response rate was no lower with mixed modes than with face-to-face interviewing. This may be an effect of the higher incentive levels offered to that sample, so there appears to be scope for further refining the incentive offer.

Data Quality. We find higher levels of non-substantive responses ("don't know"s and refusals) with the mixed mode design. For gross pay, the difference in levels was substantial and significant for both the original and refreshment samples. For overall mean level of item non-response, the difference reached significance only for the original sample. These differences are disturbing, particularly given the importance of income components to the construction of household income measures on *Understanding Society*. We have more work to do, however, in analysing other aspects of data quality.

We are actively seeking ways to meet the criteria set out in section 1 above with respect to attrition rates and data quality. The solutions, if they exist, may include restricting the request for web participation to certain sample subgroups, introducing additional incentives or other measures to encourage participation, and introducing additional devices to encourage complete response. We have therefore designed IP6, which takes place in Spring 2013, to provide further evidence on such design variants. The key features of the design of IP6 are set out in section 10 below.

10. Design of Innovation Panel Wave 6

The main value of wave 6 of the Innovation Panel (IP6) will be in testing the impact of mixed modes on attrition over two waves. For this purpose the IP5 design will be repeated, with the third of households issued to face-to-face in IP5 again issued to face-to-face, and the other two thirds of households issued to mixed modes.

On the main *Understanding Society* survey, we are likely to issue to web only households with a high probability of completing by web – and for whom the web request is unlikely to reduce their overall participation propensity. And depending on the results of the enumeration grid validation, we might issue to web only households with a low probability of experiencing changes in household composition, e.g. single person households, or couples without independent children or other unrelated adults. However, rather than replicate such a targeted approach, at IP6 we will issue to web the whole of the mixed modes treatment group (two-thirds of the IP sample) as this will allow us to look at attrition and other effects for all subgroups.

We will add a 'mop-up' stage at the end of standard fieldwork. Households who are not completed, and not adamant refusals, at the end of the standard fieldwork period will be contacted again. This includes non-responding individuals in partially responding households. The nature of the mop-up contact will be different for the two designs:

- In the mixed-mode group, sample members will receive a phone call. The telephone interviewer will remind the sample member that they can participate on the web, but will also be able to administer the IP6 interview by CATI. Cases for whom we do not have a phone number will not be contacted again at the mop-up stage.

- The face-to-face group will be offered a web interview. We will send individuals a letter with the URL. Those for whom we have email addresses will also be sent the same information by email. A couple of days later, a telephone interviewer will contact all those for whom we have phone numbers to remind them of the web questionnaire, or to administer a CATI interview if possible.

Incentives

The IP5 findings suggest that there may be a trade-off between field cost savings from using the web, and increasing incentives to increase web response rates:

- Results suggest that the conditional web bonus incentivised cooperative households to use the web rather than face-to-face, but did not incentivise uncooperative households to respond. However, the conditional bonus was only £5 per person and may be more effective if of a higher value.
- The results from the refreshment sample suggest that response rates were similar with mixed modes and face-to-face when a higher unconditional incentive (£30) per person was offered. We do not know whether this effect would also hold for the original sample (who were only offered £5 or £10).

To further test the use of incentives to boost the take-up of web, the mixed-mode group will therefore be allocated to three treatments at IP6. These will be crossed with the IP5 incentive groups. One group includes a conditional incentive which is paid to each adult in the household when there is a whole-household completion on the web, by a specific date.

     a. Group 1 - £10 unconditional incentive for each eligible adult
     b. Group 2 - £10 unconditional incentive for each eligible adult and £20 conditional incentive on full household completion by web within two weeks
     c. Group 3 - £30 unconditional incentive for each eligible adult

Item non-response

The IP5 findings suggest that item non-response rates (including don't knows and refusals) may be substantially higher with web than CAPI for some items. At IP6 we will experiment with ways of reducing these.

The mixed-mode group will be allocated to three treatments, which take effect only in the case that the sample member responds by web. For six important survey items where at IP5 item non-response rates were higher with mixed modes than face-to-face[3]:
- Group 1 – control group. When a respondent skips a question, the question re-appears but with the "Don't Know" and "Refuse" options appearing. There is a message on-screen asking the respondent to select an option to move on. (This was the standard approach at IP5)

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[3] The six survey items were gross pay, amount received in interest or dividends, net profit in the last annual accounts for self-employed respondents, basic hourly pay rate, UK county of birth and whether the respondent's marital status had changed within a cohabiting relationship.

- Group 2 – reactive prompt. As above, but the message will stress to the respondent the importance of answering the question and assure them of the confidentiality of their responses.
- Group 3 – final round-up. At the end of the individual interview, if at least one of the six key question has item non-response, a screen will appear thanking the respondent for their participation, noting that they did not answer n key questions ($1 \leq n \leq 6$), emphasising the importance of these questions, letting them know that these are the last questions and asking whether they could complete them before finishing.

Youth self-completion

There was very low response to the youth self-completion at IP5; particularly on-line, but also when mailed. At IP6 rather than emailing parents with a link and log-on code for their child, we will post a paper self-completion to the parents with a letter asking them to pass it on to their (named) child. The paper self-completion will have the identifier already written in and in the case of households with more than one child aged 10-15, the first name will also be written on the questionnaire. The mailing will include a postage-free addressed return envelope.

Emails and letters will be sent to the parents of non-responding youths after two weeks to remind them to ask their child to complete and return their self-completion questionnaire. A second reminder email/letter, with another copy of the questionnaire(s) will be sent two weeks later.

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Appendix A: Who Responds by Web?

We summarise here (Table 11) two logit models predicting the probability of completing a web interview in the mixed mode treatment group. The first is based on all sample individuals and the second is based only on respondents. The probability of doing a web interview is higher for:

- respondents in work, compared to out of work,
- web users, compared to non-web users,
- respondents for whom we had an email address,
- 41-50 and 51-60 year olds (and lowest among 21-30 year olds),
- household types without children,
- individuals who said they might or definitely would complete a web survey.

Table 11: Which Types of People Respond by Web?

Pr(web interview)	Mixed mode sample (all issued)			Mixed mode sample (respondents)		
	Predicted probability	Std. Err.	*P*-value	Predicted probability	Std. Err.	*P*-value
Female	0.339	0.023		0.443	0.030	
Male	0.334	0.027	*0.806*	0.446	0.032	*0.916*
Non-white	0.251	0.049		0.385	0.070	
White	0.344	0.024	*0.087*	0.448	0.029	*0.380*
Not in work	0.290	0.028		0.390	0.035	
In work	0.363	0.028	*0.040*	0.476	0.032	*0.028*
Rural	0.301	0.035		0.427	0.051	
Urban	0.350	0.028	*0.292*	0.450	0.033	*0.713*
Web user: no	0.225	0.036		0.309	0.047	
yes	0.366	0.025	*0.001*	0.483	0.030	*0.001*
No email given	0.224	0.027		0.321	0.036	
Email given	0.383	0.028	*0.000*	0.495	0.034	*0.000*
Age: 16-20	0.328	0.064		0.425	0.087	
21-30	0.193	0.037		0.331	0.062	
31-40	0.301	0.042		0.401	0.050	
41-50	0.389	0.039		0.501	0.046	
51-60	0.389	0.042		0.477	0.045	
61-70	0.379	0.055		0.457	0.054	
71+	0.310	0.054	*0.003*	0.410	0.065	*0.252*
Single, no children	0.272	0.040		0.334	0.046	
Single, children	0.188	0.053		0.302	0.081	
Couple, no children	0.434	0.033		0.509	0.037	
Couple, children	0.296	0.040		0.414	0.049	
2+ unrelated adults	0.360	0.044		0.479	0.055	
2+ unrelated, children	0.254	0.066	*0.002*	0.433	0.097	*0.018*
Web: no	0.199	0.037		0.288	0.045	
maybe	0.340	0.028		0.444	0.036	
yes	0.422	0.030	*0.000*	0.551	0.037	*0.000*
N	923			700		

Notes: Average predicted probabilities of doing the web interview were estimated using the –margins– command in Stata 12. P-values are from Wald tests of the effect of each variable on the probability of giving a web interview, adjusted for sample design..

Appendix B: Advance Letter Inviting Web Participation (Version for Previous Wave Respondents)

«Serial_number»«ChkL»/«FF_personno»«FF_PID»

«Title» «resp_name»
«FF_Address1»
«FF_Address2»
«FF_Address3»
«FF_Address4»
«FF_Address5»
«FF_PostCode»

«Date»

Dear «resp_name»,

We're grateful for your help with *Understanding Society* last year. [Almost everyone like you responded to the survey last year.] {if ff_persuasionw5=2 | 3} The value of the information you have given us increases each time we interview you, because it enables researchers to look at how things change, and how they stay the same, over time. In *Understanding Society* we want to get the views and opinions from people of all ages and backgrounds to enable us to represent the diverse nature of the UK population.

[Just like last year, an interviewer will be in touch with you soon to arrange a convenient time for an interview that should last approximately 30 minutes to an hour, depending on your circumstances. The interviewer will be carrying an identification card with their photograph and NatCen's logo. Your participation is completely voluntary and we really hope you will be able to take part again.] {if ff_gridmodew5=1}

[This year you are able to complete your interview on-line at a time most convenient for you. To access the interview, please go to https://my.understandingsociety.org.uk/survey and enter the User ID below. This questionnaire should be accessed using a computer, rather than a mobile device.

User ID: XXX

Your participation is completely voluntary and we really hope you will be able to take part again.] {if ff_gridmodew5=3}. [**If all members of your household complete their on-line questionnaire by March 7th, we will send each of you an additional £5 voucher**] {if ff_invitew5=1 | 3}. [If you are unable to complete your questionnaire on-line, an interviewer will be in touch with you to arrange a convenient time for an interview that should last approximately 30 minutes to an hour, depending on your circumstances. The interviewer will be carrying an identification card with their photograph and NatCen's logo.] {if ff_webuser=0}

As a small thank you, a [£5] {if ff_incentw5=1 | 4 | 5 | 7 | 9} / [£10] {if ff_incentw5=2 | 3 | 6 | 8 | 10} / [£20] {if ff_incentw5=11} / [£30] {if ff_incentw5=12} gift voucher is enclosed.

If there are children aged 10-15 in your household, we hope they will be willing to complete a short questionnaire about their hobbies, friends, school life and hopes for the future. Each child will receive a Post Office voucher as a thank you for completing the questionnaire.

[A topic which many researchers are interested in these days is energy use. During the interview this year we would like to collect a reading of your [gas meter] {if ff_metersw5=1} / [electricity meter] {if ff_metersw5=2} / [gas and electricity meters] {if ff_metersw5=3}. If you have a car, we would also like to collect the mileage displayed on the odometer. This will mean that if we're able to interview you again next year, and collect the same readings, we will be able to tell you how much energy you've used. [You might find it convenient to take a

note of this information before the interviewer calls, with the date on which you took the readings.] {ff_gridmodew5=1} Of course, you do not have to give us this information if you do not want to.] {if ff_metersw5=1 | 2 | 3}

If you have any questions at all about *Understanding Society* and your involvement in it, please contact us using the number below. Do also check our special participants' website where you can read some early findings, post comments, send us a message or just find out more information about *Understanding Society*: **www.understandingsociety.org.uk/participants**.

[Your responses to the survey last year suggest that you are a helpful person.] {if ff_persuasionw5=1 | 3} Once again, we hope you will be able to take part in the study this year. It can only be a success with the help of people like you.

Yours faithfully,

Nick Buck
…………………………..
Professor Nick Buck
Director, *Understanding Society*
Institute for Social and Economic Research
University of Essex

This study is being conducted in accordance with the Data Protection Act. This means your personal details will be kept strictly confidential and you and your household will not be identifiable from the data.