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SEPARATING REFUSAL BIAS AND NON-CONTACT BIAS: EVIDENCE FROM UK NATIONAL SURVEYS

Peter Lynn and Paul Clarke

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ABSTRACT

Refusal by sample units and failure to contact sample units can both contribute to survey non-response bias. However, the nature of the contribution can be rather different in the two cases. Extended field efforts, such as attempts to "convert" initial refusers and attempts to make contact with sample members who are not contacted after standard efforts, may reduce either or both components of non-response bias. In this article we examine data from a number of UK surveys on extended field efforts and the impact that they appear to have upon non-response bias and its components. Some consistent patterns are found. We also explore the sensitivity of such analyses to the operational definition of extended efforts. The findings provide some evidence of the relative roles of refusal conversion and repeated contact attempts in reducing non-response bias. The study also has implications for the development of appropriate field strategies to combat non-response bias.

NON-TECHNICAL SUMMARY

When a sample is selected for a social survey, great care is taken to ensure that it is representative and therefore capable of providing accurate estimates of the characteristics of the population as a whole. However, this is undermined by the fact that not all sample members will subsequently take part in the survey. In some cases, the selected person will refuse to be interviewed. In some cases, the survey organisation will fail to make contact with the selected household or person. In other cases, an interview will prove impossible due to language, illness, temporary absence or other reasons. Unfortunately, these people who do not take part in surveys are generally somewhat different from the people who *do* take part. Consequently, non-response can bias survey estimates. For this reason, survey researchers strive to achieve the highest possible response rates.

In recent years, researchers have become increasingly aware that the different types of non-response (non-contact, refusal, language, etc) are caused by very different factors. Thus, the bias resulting from having some sample members refuse to be interviewed might be very different from the bias resulting from failing to contact some sample members. This has implications for the *way* that survey organisations strive to achieve high response rates. To minimise bias, should they concentrate resources on trying to make contact with people who are rarely at home? Or on trying to persuade people who have initially refused an interview to change their mind? Are there particular *types* of people for whom they should go to greater lengths than others (to contact, to persuade, to provide translation, etc)?

To answer these practical questions, it is necessary to know something of the characteristics of sample members who may be interviewed as a result of "extended field efforts", such as attempts to "convert" initial refusers and attempts to make contact with sample members who are not contacted after standard efforts. This paper examines data from a number of UK surveys on the relationship between the survey responses of sample members and the efforts that were needed to achieve the interview. Some consistent patterns are found. We find, across a number of surveys, that the people who are most difficult to contact are relatively young, more likely to be in employment, less likely to own their own home and more likely to be non-white. Indeed, the more difficult to contact they are, the younger they are, on average. However, once contacted, employed people are no more reluctant than others to participate in a health survey or an income survey, though they are more reluctant than others to respond to an attitude survey. We find that women are more likely than men to be reluctant to take part in a health survey, but men are more likely than women to be reluctant to take part in an attitude survey.

On a health survey, we find that the people who are most difficult to contact are more likely to be regular smokers and heavy drinkers, but are less likely to be obese, to have high blood pressure or to have a longstanding illness. People who are reluctant to take part once contacted have similar characteristics to those who take part more readily.

On an income survey, we find that the people who are most difficult to contact get a higher proportion of their household income from employment and a lower proportion from state benefits and that they have relatively high housing costs. On the other hand, they are no more likely than others to have a savings account and do not have any more savings than others. The people who are reluctant to take part in the income survey have relatively low housing costs and relatively small amounts of savings.

On an attitude survey, we find very few differences between people who are interviewed readily and those who are either difficult to contact or reluctant to take part. The only notable difference is that the people who are most difficult to contact have slightly more libertarian views than others, on average.

The findings of this study should be of practical use to survey researchers as they provide some evidence of the relative roles of refusal conversion and repeated contact attempts in reducing non-response bias. The paper discusses some implications for the development of appropriate field strategies to combat non-response bias.

1. Introduction

It is well known that non-response can introduce bias to survey estimates. Furthermore, there is evidence that taking measures to maximise response rates can reduce this bias, though not eliminate it (Groves *et al*, 2002). This paper focuses upon that element of non-response bias that can potentially be removed by the use of resource-intensive response maximisation techniques. We will refer to this as bias reduction. Specifically, the aim is to estimate the magnitude of bias reduction and to investigate the separate impacts of refusal conversion attempts and attempts to make contact with hard-to-contact sample units. We are particularly interested in ways in which reluctant sample units (i.e. those for which a refusal conversion attempt is needed) may be similar or different to hard-to-contact units, and the implications this may have for field practice. We focus upon face-to-face interview surveys.

Lynn *et al* (2002) argue the importance of separating out the two major components of bias reduction due to extended interviewer efforts (refusal conversion and contacting the hard-to-contact) and present illustrative analyses. In this article, we extend that work in two ways. First, we present results from a number of surveys in order to provide evidence of the consistency of the patterns found. Second, we explore the sensitivity of the results to the definition of extended efforts.

In section 2 of this paper, we provide background information and summarise relevant findings from previous research. In section 3 we describe our own research and outline the important assumptions and definitions that underpin it. The following section presents the results of our analyses, which are then discussed in section 5. The discussion highlights ways in which our results are consistent with earlier research as well as ways in which our results provide extra information. Practical implications for fieldwork planning and management are drawn.

2. Extended Efforts to Elicit Response

Survey organisations and survey clients often place emphasis upon achieving the highest possible response rate on a survey. This emphasis is based upon an assumption that improving the response rate will bring worthwhile gains in accuracy of estimation, beyond those simply due to the increase in sample size (which could be obtained more cheaply) - i.e. a reduction in non-response bias. Whether gains are “worthwhile” should ideally be assessed by comparing the cost of reduced accuracy of estimation (with a lower response rate) with the extra cost of field work (with a higher response rate). In practice, it is impossible to quantify the cost of reduced accuracy of estimation, as the estimates based upon data from a particular survey are typically large in number, wide-ranging, and not all identified in advance. It is especially difficult to identify all spheres of influence of the survey estimates (e.g. on policy decisions) and the marginal influence associated with marginal accuracy. Additionally, the extent and magnitude of the reduction in accuracy is not known in advance. In practice, decisions may be based on simple heuristics.

The extent of attempts to include hard-to-get respondents will depend on many factors, including the response rate goals of the survey. Most surveys employ certain standard minimum procedures to achieve response. These typically include rules about the number and timing of call attempts that must be made before a sample address can be classified as a non-contact, plus training in techniques to avoid a refusal. Depending upon progress toward the survey response rate goals, interviewers may make extended efforts, i.e. beyond this minimum, in order to improve the response rate. If interviewers are set their own response rate goals, explicitly or implicitly, then they may take the decision themselves to make extended efforts. More commonly, field staff may request the extended effort. Sometimes, this will happen after the interviewer has returned a case to the office as a non-respondent. Then, the case may be re-issued to a different interviewer (often a senior interviewer or supervisor) for a refusal conversion attempt or other extended effort. If telephone numbers of sample members are available, some or all of the attempts to convert or make contact may be carried out by telephone, with a subsequent interviewer visit once an appointment to interview has been made.

Other tactics, such as a letter to refusers from the study director, may also be employed.

The cost of extended interviewer efforts can be considerable. Yet, beyond satisfying the response rate demands of the client, what benefit does this expenditure achieve? Specifically, how does it affect the statistical accuracy of survey estimates? The answer will be a function of:

a) the proportion of the final responding sample that were non-respondents after the standard interviewer efforts; and

b) the extent of the difference (on variables relevant to the study) between those interviewed after standard efforts and those for whom extended efforts were necessary.

There is a considerable literature discussing the characteristics of sample members who respond only after extended efforts. Much research in this area has been based on comparisons of early and late responders to postal surveys. Common findings have been that the promptest responders are sample members for whom the survey topic is more salient and those who find form-filling easier (for a review and references, see Yammarino *et al*, 1991). In recent decades, a number of studies have examined the ease of eliciting response to telephone and face-to-face surveys. For telephone surveys, findings suggest that the ease of obtaining an interview (as measured by the total number of call attempts made) are related to lifestyle characteristics likely to be related to the probability of being at home when an interviewer calls. Topic saliency has not been shown to be relevant. Two recent studies have provided examples of circumstances in which extended efforts appear to make little or no difference to survey estimates. Keeter *et al* (2000) carried out a split-run experiment comparing a low-cost approach to field work (36.0% response rate) and a more rigorous approach (60.6%) and found few differences in substantive results; Curtin *et al* (2000) simulated the effects of reduced efforts and, again, found few effects on survey results.

The processes involved in achieving a survey response are rather different in the case of in-home face-to-face surveys (compared with postal or telephone surveys). Fitzgerald and Fuller (1982) recognised this as well as further recognising that reluctant respondents and difficult to reach respondents were likely to be rather different from one another. This latter point has been developed in the work of

Groves *et al* (1992) and Groves and Couper (1998, chapter 2). Demographic factors associated with propensity to be a non-contact and propensity to be a refusal are investigated in Foster (1998), based on 1991 data from five UK government surveys. Foster found that an increase in propensity to be a non-contact is associated with males, residents of flats (rather than houses), single-person households and households with a young and/or unmarried head. In contrast, an increase in propensity to refuse is associated with lack of academic qualifications, London residents, households with an older head and ethnic minorities. However, Foster makes no attempt to estimate impacts on survey estimates.

In this article we investigate the statistical contribution to survey estimates of interviews achieved only after extended efforts, across a range of variables and surveys. We separate this contribution into a component due to contacting difficult-to-contact sample members and a component due to converting initial refusals. This analysis is restricted to face-to-face in-home interview surveys.

3. Our Data

We use data from three large national social surveys carried out in the UK. These surveys were chosen because they differ in terms of subject matter, respondent burden, respondent selection criteria, response rates, and the extent to which they rely on extended efforts. For two of the three surveys, data is used from more than one survey year, resulting in six distinct data sets. In consequence, it is hoped that any patterns that are found to be consistent across the surveys are perhaps fairly robust to the nature of the surveys and may therefore extend to other face-to-face general population surveys. On the other hand, any between-survey differences in patterns may point towards the influence of some of the design and implementation features.

3.1 The Family Resources Survey (FRS)

The FRS is a CAPI survey with a sample size of around 24,000 responding households per annum. It is carried out jointly by the Office for National Statistics (ONS) and the *National Centre for Social Research* on behalf of the (UK)

Department of Social Security. Addresses are sampled with equal probability. Where possible, an interview is carried out with all adult household members present, though some proxy reporting is allowed. The interview mainly concerns income, living standards and related issues. Mean interview length is around 80 minutes. The data analysed here are from the 1997-98 FRS (Wilmot, 1999). The survey achieved a contact rate of 96.4% and a co-operation rate of 71.7%, resulting in an estimated overall response rate of 69.1%.

3.2 The Health Survey for England (HSE)

The HSE is an annual survey carried out by the *National Centre for Social Research* for the Department of Health in order to estimate the prevalence, nature and distribution of particular health conditions and associated risk factors. At each sampled household, persons aged 13 and over are interviewed in person, and proxy information is collected from a parent or guardian regarding children aged 2 to 12. Average interview length is around 60 minutes per household. After the interview(s), the respondents' height and weight are measured and a nurse then visits to take other measurements. We analyse HSE data from 1996 and 1997 (Prescott-Clarke and Primatesta, 1998a; 1998b). The survey achieved field contact rates of 97.6% and 97.5% respectively in these years, and interview co-operation rates of 73.5% and 69.4%, resulting in estimated overall field interview response rates of 71.7% and 67.7%.

3.3 The British Social Attitudes Survey (BSAS)

The BSAS is an annual study of public attitudes and opinions on a range of social and political topics. It is designed and carried out by the National Centre for Social Research with funding from various sources. Unlike the FRS and HSE, BSAS fieldwork is conducted during a limited period each spring, rather than continuously throughout the year. One person aged 18 or over is randomly selected at each address. We analyse data from the 1995, 1996 and 1998 BSAS (Lilley *et al*., 1997, 1998; Bromley *et al*., 2000). The survey achieved field contact rates (with the selected individual) of 97.9%, 97.7% and 98.2% respectively in these three years,

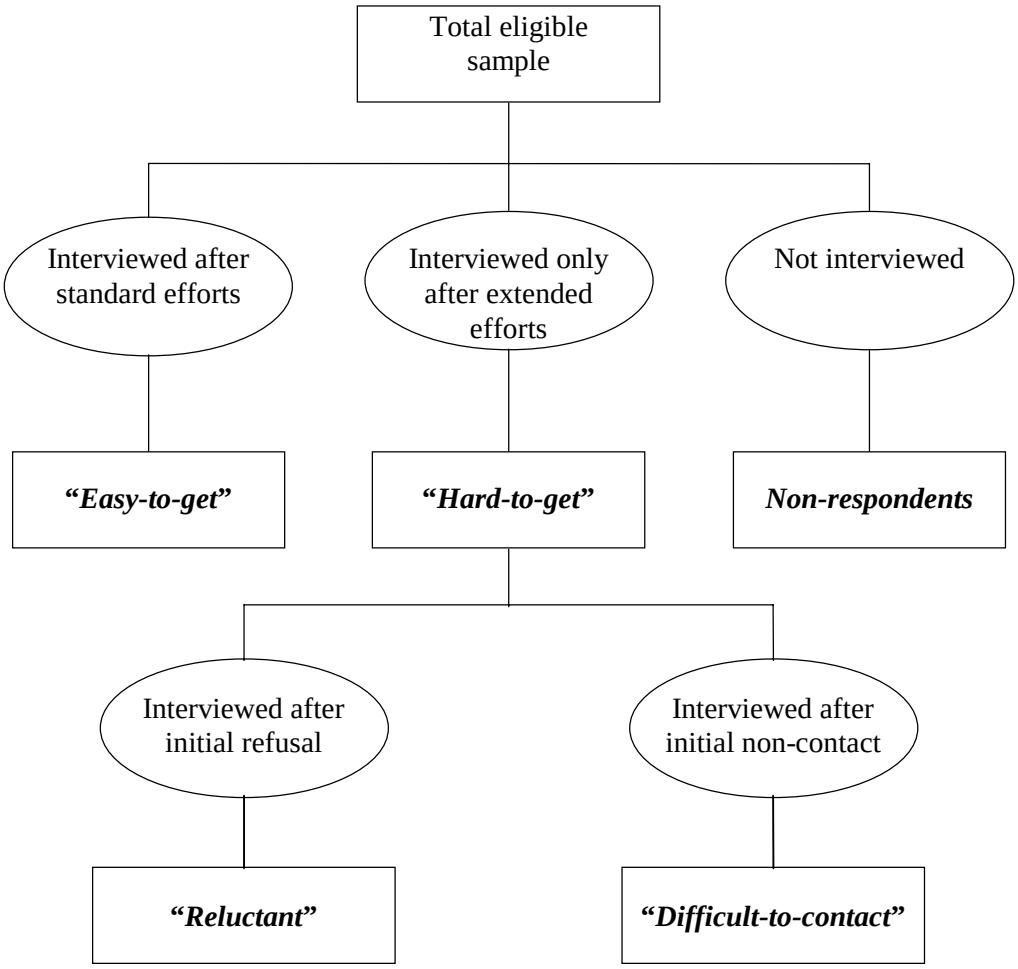
and co-operation rates of 70.7%, 69.8% and 60.0%, giving estimated overall response rates of 69.2%, 68.1% and 59.0%. For comparison with the other surveys, the proportion of households at which contact was achieved with any adult was 98.9%, 98.4% and 98.9% respectively. The annual responding sample size is between 3,500 and 4,000.

4. Estimates of Bias Reduction

For each data set, we subdivide responding households into those who were interviewed without the need for extended efforts on the part of the interviewer ("easy-to-get households") and those for whom extended efforts were needed ("hard-to-get households"). We further subdivide the hard-to-get households into "difficult to contact" and "reluctant". This categorisation is illustrated in figure 1.

Crucial to this categorisation is the definition of extended efforts. We have defined as "reluctant" all households where an initial refusal was recorded by the interviewer, but a successful refusal conversion attempt was made. Though other households, where an explicit refusal was not recorded, may have exhibited some reluctance, we consider the persuasion of such households to be part of the standard efforts expected of an interviewer. More problematic is the definition of "difficult to contact". We can arbitrarily define a household as hard-to-contact if the interviewer had to make *v* or more visits to the address in order to obtain the interview. However, it cannot be assumed that these households would not have been interviewed unless the survey organisation had taken the decision to make extended efforts. Even without the deliberate encouragement of extended efforts, some addresses would have received more than v visits, due to the way interviewers work on clustered samples. It is simply not possible to simulate accurately the likely effect of not making extended efforts. To test the sensitivity of our findings to the definition used of difficult to contact, we have replicated all analyses for v=6, v=8 and v=10. The resultant sample sizes falling into each of the categories of figure 1 are shown for each data set in Table 1.

Figure 1: Categorisation of survey sample in terms of ease of obtaining interview



The proportion of the eligible sample classified as difficult to contact is between 14% and 19% with *v*=6, 5% to 9% with *v*=8 and between 2% and 5% with *v*=10. Thus, difficult to contact addresses can account for widely differing proportions of all hard-to-get households, depending on the definition used. For example, for FRS97, difficult to contact addresses can account for as many as 90% of all hard-to-get households (*v*=6) or as few as 64% (*v*=10). Overall, hard-to-get households account for between 4% (FRS97, *v*=10) and 25% (BSAS95, *v*=6) of responding households.

Table 1: Distributions of difficult-to-contact (3 definitions), reluctant and easy-to-get respondents for six surveys

	FRS 97	HSE 96	HSE 97	BSAS 95	BSAS 96	BSAS 98
	%	%	%	%	%	%
Difficult-to-contact defined as 6+ calls						
A. Difficult to contact	14.3	13.9	16.0	14.4	18.9	15.0
B. Reluctant	1.6	2.9	2.6	10.7	2.3	6.1
C. Hard-to-get (A+B)	15.8	16.9	18.6	25.1	21.3	21.0
D. Easy-to-get	84.2	83.1	81.3	74.9	78.7	79.0
E. All respondents (C+D)	100.0	100.0	100.0	100.0	100.0	100.0
Difficult-to-contact defined as 8+ calls						
A. Difficult to contact	6.1	5.4	6.1	6.9	9.1	7.3
B. Reluctant	1.6	2.9	2.7	10.7	2.3	6.1
C. Hard-to-get (A+B)	7.7	8.3	8.8	17.6	11.4	13.4
D. Easy-to-get	92.3	91.7	91.2	82.3	88.6	86.6
E. All respondents (C+D)	100.0	100.0	100.0	100.0	100.0	100.0
Difficult-to-contact defined as 10+ calls						
A. Difficult to contact	2.8	2.3	2.5	4.3	5.3	4.6
B. Reluctant	1.6	2.9	2.7	10.7	2.3	6.1
C. Hard-to-get (A+B)	4.4	5.3	5.2	15.0	7.6	10.6
D. Easy-to-get	95.6	94.7	94.8	85.0	92.4	89.4
E. All respondents (C+D)	100.0	100.0	100.0	100.0	100.0	100.0
Base (all respondents)	*11,675*	*16,442*	*8,582*	*3,623*	*3,613*	*3,050*

The prevalence of difficult to contact households is broadly similar across the surveys, as would be expected if interviewers' calling patterns and sample members' at home patterns were broadly similar. However, difficult to contact households appear slightly more prevalent in BSAS96 than the other five surveys. This may have been caused by less efficient calling strategies on that survey, due to heavy workloads on *National Centre* interviewers and field staff at that time. Good calling strategies require persistent calls at different times and different days of the week, preferably over multiple weeks, but interviewers' ability to do this may have been

constrained by the demands of other fieldwork. The prevalence of reluctant responding households is a little more variable over the surveys, ranging from less than 2% (FRS97) to nearly 11% (BSAS95). This may partly reflect differential success at obtaining co-operation, perhaps due to the effects of saliency or sponsorship (Groves and Couper, 1998, chapters 2 and 5) but may also partly reflect different refusal conversion strategies.

A limitation of our definition of hard-to-contact is that the data captured routinely on these surveys does not allow identification of interviewer visits made after contact was first established at the address. We have only a measure of the total number of interviewer visits to each address (TNC). This is not ideal as a measure of difficulty of contact, particularly because successful interviewer strategies involve leaving and returning on another occasion, in order to avoid prompting a refusal (Morton-Williams and Young 1987; Morton-Williams 1993; Groves and Couper 1998). Thus, TNC is influenced by reluctance as well as ease of contact. If a non-trivial number of calls are required after household contact to complete the interview process, the correlation between TNC and the number of calls required for household may be reduced. To investigate this, we undertook a special data capture exercise on BSAS98. This involved adding to the data set an indicator of the number of visits made prior to household contact. (This exercise was restricted to one survey due to its cost.) We therefore draw particular attention to our analysis of the BSAS98 data and discuss similarities and differences with the other data sets.

Table 2 shows the proportions of responding households (BSAS98) who would be classified as “difficult to contact” using three alternative measures and three alternative cut-off points for each. The final column repeats the relevant proportions from table 1, for comparison. The other two columns show proportions based, respectively, on the number of visits needed to make contact with the household and the total number of visits needed to make contact with the selected person. The extent to which TNC may mislead as a measure of difficulty in contacting households is obvious. For example, of the 4.6% of households for which 10 or more calls were needed (classified as difficult to contact in the third panel of table 1), less than half required 10 or more calls to make contact with the

household – the remainder required extra calls subsequent to contact being established.

Table 2: Difficulty of contact and total number of calls (BSAS98)

	Proportion of households requiring *v* or more calls until …		
	… first contact with household	… first contact with respondent	… final outcome
v	%	%	%
6	9.1	12.1	15.0
8	3.8	5.0	7.3
10	2.0	2.4	4.6
n	*3,050*	*3,050*	*3,050*

5. Results

In Table 3 we present estimates for a set of five socio-demographic variables that were collected in a consistent manner across all six surveys. Estimates are presented separately for difficult to contact and reluctant households, as well as for hard-to-get households as a whole, for easy-to-get households and for all responding households. Table 4 presents estimates in a similar form for five key survey variables for HSE96 and HSE97. Table 5 presents estimates for six key survey variables for the FRS, while Table 6 similarly presents estimates for the three years of the BSAS, for three key attitude scores.

5.1 Demographic Characteristics

Some remarkably consistent patterns can be observed over the six surveys in terms of differences between persons in reluctant, difficult to contact, hard-to-get and easy-to-get households (Table 3). On all six surveys, respondents in hard-to-get households are considerably younger, on average, than those in easy-to-get households. The mean age of those in hard-to-get households ranges between 40 and 45, while the mean age of those in easy-to-get households is between 47 and

Table 3: Demographic characteristics for easy-to-get and hard-to-get households (six surveys)

Estimate (standard error)	$\frac{x_{H1}}{n_{H1}}$	$\frac{x_{H2}}{n_{H2}}$	$\frac{x_H}{n_H}=\frac{(x_{H1}+x_{H2})}{(n_{H1}+n_{H2})}$	$\frac{x_E}{n_E}$	$\frac{x_A}{n_A}=\frac{(x_H+x_E)}{(n_H+n_E)}$	
	Difficult to contact (6+ calls)	Reluctant (temporary refusal)	Hard-to-get households	Easy-to-get households	All responding households	Non-response bias[#]
HSE 96						
Male (%)	46.7 (1.04)	40.5 (2.24)	45.7 (0.95)	45.5 (0.43)	45.5 (0.39)	-
Age (mean)	39.4 (0.32)	46.5 (0.85)	40.7 (0.31)	47.9 (0.16)	46.7 (0.14)	1.2
Owner-occupier (%)	66.8 (0.98)	74.1 (2.00)	68.1 (0.89)	72.8 (0.38)	72.0 (0.35)	0.8
Employed (ILO definition) (%)	66.6 (0.99)	47.7 (2.28)	63.3 (0.92)	50.9 (0.43)	53.0 (0.39)	-2.1
White (%)	92.0 (0.57)	90.9 (1.31)	91.8 (0.52)	94.1 (0.20)	93.7 (0.19)	0.4
HSE 97						
Male (%)	46.1 (1.34)	40.6 (3.29)	45.3 (1.24)	45.5 (0.60)	45.4 (0.54)	-
Age (mean)	39.5 (0.42)	45.4 (1.17)	40.3 (0.40)	47.6 (0.22)	46.3 (0.20)	1.3
Owner-occupier (%)	68.7 (1.25)	72.8 (2.98)	69.2 (1.15)	72.3 (0.54)	71.8 (0.49)	0.5
Employed (ILO definition) (%)	66.0 (1.28)	55.8 (3.33)	64.6 (1.20)	52.0 (0.60)	54.4 (0.54)	-2.4
White (%)	91.8 (0.74)	90.2 (1.99)	91.6 (0.70)	94.8 (0.27)	94.2 (0.25)	0.6
FRS 97						
Male (%)	48.8 (0.70)	47.2 (2.11)	48.7 (0.67)	46.7 (0.28)	47.0 (0.26)	-0.3
Age (mean)	43.7 (0.23)	49.1 (0.78)	44.2 (0.23)	48.1 (0.10)	47.5 (0.09)	0.6
Owner-occupier (%)	64.5 (1.17)	71.7 (3.33)	65.2 (1.11)	65.7 (0.48)	65.6 (0.44)	-
Employed (ILO definition) (%)	65.1 (0.67)	57.4 (2.09)	64.3 (0.64)	55.8 (0.28)	57.1 (0.26)	-1.3
White (%)	91.3 (0.40)	95.2 (0.91)	91.7 (0.37)	95.0 (0.12)	94.5 (0.12)	0.5

Table 3 continued

BSAS 95						
Male (%)	46.5 (2.19)	48.3 (2.54)	47.3 (1.66)	45.5 (0.96)	45.9 (0.83)	-
Age (mean)	41.3 (0.70)	46.7 (0.96)	43.6 (0.58)	47.3 (0.35)	46.4 (0.30)	0.9
Owner-occupier (%)	68.7 (2.03)	68.7 (2.35)	68.7 (1.54)	68.5 (0.89)	68.6 (0.77)	-
Employed (ILO definition) (%)	65.9 (2.08)	50.6 (2.54)	59.4 (1.63)	49.2 (0.96)	51.8 (0.83)	-2.6
White (%)	95.2 (0.93)	92.4 (1.34)	94.0 (0.79)	95.3 (0.41)	95.0 (0.36)	-
Adults in household (mean)	2.66 (0.06)	2.82 (0.07)	2.73 (0.04)	2.84 (0.03)	2.81 (0.02)	0.03
BSAS 96						
Male (%)	47.6 (1.91)	56.9 (5.42)	48.6 (1.80)	44.9 (0.93)	45.7 (0.83)	-
Age (mean)	41.3 (0.64)	48.4 (1.90)	42.1 (0.61)	47.7 (0.34)	46.5 (0.30)	1.2
Owner-occupier (%)	69.7 (1.76)	56.9 (5.42)	68.2 (1.68)	70.3 (0.86)	69.8 (0.76)	-
Employed (ILO definition) (%)	69.1 (1.77)	60.0 (5.36)	68.1 (1.68)	50.6 (0.94)	54.3 (0.83)	-3.7
White (%)	92.2 (1.02)	95.0 (2.39)	92.5 (0.95)	94.7 (0.42)	94.3 (0.39)	0.4
Adults in household (mean)	2.55 (0.05)	2.51 (0.13)	2.55 (0.05)	2.71 (0.02)	2.67 (0.02)	0.04
BSAS 98						
Male (%)	48.9 (3.12)	37.5 (3.60)	44.2 (2.37)	45.3 (0.98)	45.2 (0.90)	-
Age (mean)	44.0 (1.02)	47.3 (1.41)	45.3 (0.84)	47.2 (0.35)	46.9 (0.33)	0.3
Owner-occupier (%)	75.7 (2.68)	66.4 (3.51)	71.9 (2.15)	72.5 (0.87)	72.4 (0.81)	-
Employed (ILO definition) (%)	71.2 (2.82)	59.4 (3.65)	66.3 (2.26)	54.9 (0.97)	56.5 (0.90)	-1.6
White (%)	93.6 (1.52)	90.7 (2.16)	92.4 (1.26)	94.4 (0.45)	94.1 (0.43)	-

[#] *This is an estimate of the (marginal) bias that would have been present in the survey estimate had extended efforts not been made. It is estimated as* $\left(\frac{x_E}{n_E}\right)-\left(\frac{x_A}{n_A}\right)$, *but only for variables where* $\left(\frac{x_E}{n_E}\right)-\left(\frac{x_H}{n_H}\right)$, *is significantly different from zero (P<0.05).*

48. Persons in hard-to-get households are also more likely to be in employment: the proportion employed ranges from 59% to 68% in hard-to-get households and from 49% to 56% in easy-to-get households. There are fewer whites in the hard-to-get households for all six surveys, though this difference only reaches statistical significance on four surveys. There are no differences in terms of the gender distribution. On two surveys, hard-to-get households are less likely to be owner-occupiers, while this proportion does not vary between easy-to-get and hard-to-get households for the other four surveys. For BSAS95 and BSAS96 a smaller mean number of adults per household is observed amongst hard-to-get households.

Furthermore, the differences between easy and hard-to-get households in terms of age and employment status can be seen to be mainly due to the difficult-to-contact being both younger and more likely to be employed than others. On the other hand, it is the reluctant respondents, rather than the difficult-to-contact, who are less likely than easy-to-get respondents to be white. The relationship as regards housing tenure is less clear. For two of the six surveys, the difficult-to-contact are less likely than the easy-to-get to be owner-occupiers, while for two others it is the reluctant respondents who are less likely to be owner-occupiers.

5.2 Health Measures

It is striking that in both years all five estimates are significantly altered by the inclusion of the households for whom extended interviewer efforts were necessary (final column of Table 4). Furthermore, the direction and broad magnitude of the bias reduction for these variables is similar in both years. Crudely, persons in households for whom extended interviewer efforts are necessary are more likely than those in easy-to-get households to be regular smokers and heavy drinkers, are less likely to have a long-standing illness and are likely to have lower blood pressure and body mass index (BMI).

Furthermore, it is the persons in difficult to contact households who are most distinct from the easy-to-get households in terms of these measures. For all five estimates in both years the reluctant respondents are more similar to those in easy-to-get households than are those in difficult to contact households. The association between these health indicators (smoking, drinking, absence of LSI, low blood

pressure, low BMI) and the demographic characteristics of persons in difficult to contact households (younger, more likely to be in employment) are perhaps obvious.

5.3 Financial Measures

Table 5 shows estimates for six important variables from the FRS – two related to income, two related to savings, one related to expenditure and one related to employment. Four of the six measures are significantly altered by the inclusion of the households for whom extended interviewer efforts were necessary, the exceptions being the two measures related to savings. However, three of these four measures are moderately strongly correlated with one another. Persons in hard-to-get households work more hours per week, on average, than those in easy-to-get households and they also belong to households which obtain a larger proportion of their household income from employment and a smaller proportion from state benefits. Hard-to-get households also have higher housing costs than easy-to-get households, on average.

For all four of the measures on which easy-to-get and hard-to-get households differ significantly, it is the difficult to contact households that cause this difference. The reluctant respondents have similar characteristics to the easy-to-get households.

5.4 Attitude Measures

There are few, and small, differences in attitude scores between persons in easy-to-get households and those in difficult-to-get households (Table 6). One variable shows a difference for two of the three years of BSAS data examined, but even those differences are small. For this variable, a score on a libertarian-authoritarian scale, persons in difficult to contact households score significantly lower than those in easy-to-get households in both years, while reluctant respondents do not score significantly differently from the easy-to-get.

Table 4: Survey estimates for easy-to-get and hard-to-get households (HSE)

Estimate (standard error)	$\frac{x_{H1}}{n_{H1}}$	$\frac{x_{H2}}{n_{H2}}$	$\frac{x_H}{n_H}=\frac{(x_{H1}+x_{H2})}{(n_{H1}+n_{H2})}$	$\frac{x_E}{n_E}$	$\frac{x_A}{n_A}=\frac{(x_H+x_E)}{(n_H+n_E)}$	
	Difficult to contact (6+ calls)	Reluctant (temporary refusal)	Hard-to-get households	Easy-to-get households	All responding households	Non-response bias[#]
HSE 96						
Regular smokers* (%)	28.8 (0.95)	24.5 (1.96)	28.1 (0.85)	23.9 (0.36)	24.6 (0.34)	-0.7
Body mass index (mean)	25.3 (0.12)	25.9 (0.28)	25.4 (0.11)	26.0 (0.05)	25.9 (0.04)	0.1
Systolic blood pressure (mean)	132.1 (0.40)	138.1 (1.19)	133.0 (0.39)	136.6 (0.19)	136.1 (0.17)	0.5
Longstanding illness (%)	35.9 (1.00)	41.9 (2.25)	37.0 (0.92)	43.9 (0.42)	42.8 (0.39)	1.1
Heavy drinkers* (%)	20.7 (0.85)	18.3 (1.76)	20.2 (0.76)	16.9 (0.32)	17.5 (0.30)	-0.6
HSE 97						
Regular smokers* (%)	29.7 (1.23)	29.5 (3.05)	29.7 (1.14)	22.9 (0.50)	24.1 (0.46)	-1.2
Body mass index (mean)	25.8 (0.13)	26.8 (0.40)	25.9 (0.12)	26.4 (0.06)	26.3 (0.05)	0.1
Systolic blood pressure (mean)	131.3 (0.50)	136.8 (1.73)	131.9 (0.49)	135.7 (0.25)	135.1 (0.23)	0.6
Longstanding illness (%)	37.6 (1.31	40.8 (3.30)	38.0 (1.21)	45.9 (0.60)	44.4 (0.54)	1.5
Heavy drinkers* (%)	20.8 (1.09)	14.3 (2.34)	19.9 (1.00)	17.1 (0.45)	17.6 (0.41)	-0.5

* Regular smokers are defined as respondents who report smoking more than 5 cigarettes per day on average; heavy drinkers are defined as those who report drinking more than 21 units of alcohol per week on average.

[#] See footnote to table 3.

Table 5: Survey estimates for easy-to-get and hard-to-get households (FRS 97)

Estimate † (standard error)	$\frac{x_{H1}}{n_{H1}}$	$\frac{x_{H2}}{n_{H2}}$	$\frac{x_H}{n_H}=\frac{(x_{H1}+x_{H2})}{(n_{H1}+n_{H2})}$	$\frac{x_E}{n_E}$	$\frac{x_A}{n_A}=\frac{(x_H+x_E)}{(n_H+n_E)}$	
	Difficult to contact (6+ calls)	Reluctant (temporary refusal)	Hard-to-get households	Easy-to-get households	All responding households	Non-response bias[#]
Proportion of household income from employment	59.0 (1.06)	42.6 (3.24)	57.5 (1.02)	42.6 (0.45)	44.9 (0.41)	-2.3
Proportion of household income from state benefits	24.3 (0.89)	36.9 (3.00)	25.5 (0.86)	36.3 (0.40)	34.6 (0.36)	1.7
Total household savings (£)	1991 (141)	1574 (280)	1950 (130)	2046 (65)	2030 (59)	-
Housing costs (£ per week)	51.20 (1.19)	36.58 (2.18)	49.75 (1.10)	42.37 (0.44)	43.54 (0.41)	-1.17
Has a savings account (%)	92.5 (0.65)	90.8 (2.14)	92.3 (0.62)	91.4 (0.28)	91.6 (0.26)	-
Hours worked per week	40.2 (0.27)	39.6 (0.94)	40.2 (0.26)	39.2 (0.12)	39.3 (0.11)	-0.1

† All estimates in this table are means unless otherwise stated

[#] See footnote to table 3.

Table 6: Survey estimates for easy-to-get and hard-to-get households (BSAS)

Estimate (standard error)	$\frac{x_{H1}}{n_{H1}}$	$\frac{x_{H2}}{n_{H2}}$	$\frac{x_H}{n_H}=\frac{(x_{H1}+x_{H2})}{(n_{H1}+n_{H2})}$	$\frac{x_E}{n_E}$	$\frac{x_A}{n_A}=\frac{(x_H+x_E)}{(n_H+n_E)}$	
	Difficult to contact (6+ calls)	Reluctant (temporary refusal)	Hard-to-get households	Easy-to-get households	All responding households	Non-response bias[#]
BSAS 95						
Libertarian-authoritarian scale (mean score)	68.22 (0.84)	69.70 (1.05)	68.81 (0.66)	68.37 (0.34)	68.46 (0.30)	-
Left-right scale (mean score)	34.26 (1.00)	32.58 (1.26)	33.59 (0.78)	34.02 (0.39)	33.92 (0.35)	-
Welfarist scale (mean score)	47.36 (0.90)	50.56 (1.12)	48.65 (0.71)	47.81 (0.37)	47.99 (0.33)	-
BSAS 96						
Libertarian-authoritarian scale (mean score)	65.97 (0.77)	70.85 (2.04)	66.48 (0.72)	68.13 (0.32)	67.83 (0.29)	0.30
Left-right scale (mean score)	34.28 (0.76)	33.25 (2.59)	34.18 (0.73)	34.98 (0.37)	34.83 (0.33)	
Welfarist scale (mean score)	48.23 (0.84)	48.49 (2.72)	48.26 (0.80)	48.13 (0.36)	48.15 (0.33)	-
BSAS 98						
Libertarian-authoritarian scale (mean score)	68.11 (1.18)	68.99 (1.76)	68.39 (0.98)	71.11 (0.36)	70.80 (0.34)	0.31
Left-right scale (mean score)	37.39 (1.43)	40.15 (2.24)	38.27 (1.21)	37.09 (0.38)	37.23 (0.36)	-
Welfarist scale (mean score)	50.22 (1.19)	53.62 (1.87)	51.30 (1.01)	52.30 (0.35)	52.19 (0.33)	-

[#] See footnote to table 3.

5.5 Sensitivity Analysis

The analyses presented in tables 3 to 6 were replicated with alternative measures of difficulty of contact, namely 8+ and 10+ interviewer visits. The results are not presented here in full for reasons of space.

In summary, most of the broad patterns remain unaltered. In some cases, the differences between the difficult to contact and the easy-to-get become smaller as the definition of difficult to contact is made more restrictive, but nearly all of the differences that were significant with a definition of 6+ visits remain significant (and in the same direction) with a definition of 10+ visits. For example, this is true for all six surveys for the proportion currently in employment.

For some measures the difference between the difficult to contact and the easy-to-get actually increases as the definition of difficult to contact is made more restrictive. A notable example is age (table 7).

We can conclude that the relationships identified above, and therefore the implications of the analyses presented in this paper, are not highly sensitive to the way that contact difficulty has been defined.

Table 7: Relationship between mean age of respondent and difficulty of contact

	Mean age (years)				
Survey	10+ calls	8+ calls	6+ calls	<6 calls*	All respondents
HSE96	37.7	39.0	39.4	47.9	46.7
HSE97	38.9	40.8	39.5	47.6	46.3
FRS97	43.3	43.8	43.7	48.1	47.5
BSAS95	39.5	40.4	41.3	47.3	46.4
BSAS96	39.3	40.6	41.3	47.7	46.5
BSAS98	42.5	43.3	44.0	47.2	46.9

*Reluctant respondents (category B in table 1) have been excluded.

6. Conclusions

A number of important conclusions can be drawn from the analyses. In terms of demographic variables, our findings are very much in line with previous research, which has found that non-respondents or hard-to-get respondents tend to be younger than others, more likely to be in employment, and more likely to be in smaller households (Cheng, 1998; Foster, 1997, 1998; Groves and Couper, 1998; Lin and Schaeffer, 1995).

Additionally, we have been able to separate out the components of this difference that are due to reluctance and difficulty of contact. We have found, for example, that the difference between hard-to-get and easy-to-get respondents in terms of age is almost entirely due to difficult to contact respondents: they are younger, on average, than the easy-to-get, while reluctant respondents are not significantly different from easy-to-get respondents in terms of mean age. The same is true of employment status: difficult to contact respondents are much more likely than easy-to-get respondents to be in employment, while reluctant respondents are no more likely than easy-to-get respondents to be in employment (for five out of the six surveys). On the other hand, both reluctance and difficulty of contact contribute to differences between easy-to-get and hard-to-get respondents in terms of ethnic group. And in terms of gender, the difficult to contact are not notably different in profile from the easy-to-get, whereas the reluctant *are* different (for four out of the six surveys).

The patterns that we have observed in terms of demographic variables are mostly quite consistent across the six data sets analysed. As the data cover three different survey series on very different topics and four different years, this lends some extra strength to the findings. If anything, the findings regarding reluctance are slightly less consistent than those regarding difficulty of contact. This is to be expected, as there is no direct reason why the topic and nature of the survey should affect ease of contact, while these factors do indeed affect reluctance. The findings thus appear to demonstrate that at least to some degree, willingness to co-operate with surveys depends upon the nature of the survey. For example, the data suggest that women are more likely to be reluctant to take part in a health survey, men are more likely to be reluctant to take part in an attitudes survey and both are equally

likely to be reluctant to take part in a survey about finances. Owner-occupiers are more likely than others to be reluctant to take part in a survey about finances, but – if anything – less likely than others to be reluctant to take part in an attitudes survey.

Furthermore, we have been able to examine a number of survey-specific measures. We find that the differences between easy-to-get and hard-to-get respondents in terms of demographic variables, which are quite consistent across the surveys, manifest themselves in rather different ways for different sorts of survey measures. Despite differences in gender, age, employment status, household size and ethnic group, the distributions of responses to attitude questions are very similar for the two groups. The same is not true for health measures. The hard-to-get are more healthy (lower BMI, lower blood pressure, less likely to have a long-term illness) but exhibit less healthy behaviour (more likely to be regular smokers or heavy drinkers). In terms of finances, the hard-to-get have a very different distribution of income sources to the easy-to-get and have significantly higher housing costs.

A clear message is that extended field efforts appear justified in terms of bias reduction, though the effects may be smaller for surveys of attitudes than for surveys of health or finances. By implication, the effects will tend to be greatest for surveys on topics related to employment status or age and, to a lesser extent, ethnic group. However, the analysis has been necessarily restricted to survey respondents. It seems highly probable that residual biases remain, even after extended efforts have been made.

These findings have practical implications for survey organisations and survey clients. An important point to note is that it is generally much easier (though nevertheless costly and time-consuming) to reduce the level of survey non-contacts to an absolute minimum than it is to do the same for refusals. The six surveys examined here ultimately achieved an average contact rate of 97.6%, compared with an average co-operation rate of 69.2%. As we have identified significant bias reduction due to contacting those who are difficult to contact, extended efforts to minimise non-contacts would seem fully justified. The efforts made on these six surveys, while perhaps beyond “standard” efforts, were by no means excessive in terms of cost or resource implications. The residual non-contacts are few enough in number to suggest that any remaining bias cannot be large.

The situation regarding reluctant sample members is rather different, however. Relatively small proportions of the samples were classified as reluctant in our analysis, while quite large sample proportions were ultimately classified as refusals. It is thus difficult to extrapolate from the characteristics of the reluctant respondents in our analysis to the characteristics of the remaining "refusals". It is also very difficult to substantially reduce the proportions of refusals in surveys, beyond the level achieved by well-designed surveys carried out by highly skilled interviewers, except by very expensive means such as the use of monetary payments to respondents (Singer, 2002; Singer *et al*, 1999). The benefits of further reducing the level of survey refusals therefore remain somewhat less tangible than the benefits of reducing the level of non-contacts. Refusal conversion on the surveys examined appeared to affect the estimates of financial variables (reluctant respondents had lower housing costs and fewer savings) but there were no systematic differences in terms of health or attitude variables.

The main question left unanswered is therefore that of the likely residual bias due to refusals. We suggest that further research should be able to extend our knowledge in this area. In particular, opportunities should be grasped to study non-response thoroughly in the case of surveys where informative auxiliary information is available (which is not the case with the six surveys studied here).

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