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The Nature and Causes of Attrition in the British Household Panel Survey

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NON-TECHNICAL SUMMARY

Why do people participate in surveys? More importantly, why do people participate in on-going studies where they are asked to complete a survey every year? When members of the public are drawn at random to participate in a survey, they cannot be replaced. Some respondents cannot be found by interviewers in the first place. The types of people who cannot be found or refuse to participate are not always random and the extent to which non-random non-participation occurs, the results of the study will be biased against such types of people. This research examines the patterns of survey response amongst a group of people initially participating in an on-going study. I find that people who live in accommodation that is particularly difficult to reach because of things like gated entry systems or shared entrances – such as flats in multi-flat buildings – along with people who are frequently not at home because they work long or odd hours are particularly unlikely to be found year on year when the interviewer calls. At the same time, respondents who are older tend to be more likely to refuse participation in the study even after having provided an interview in an earlier year. On the other hand, respondents with children, particularly young children, and respondents who are highly active socially and in their communities are significantly more likely to remain in the study. These findings are of importance to substantive social researchers in determining how to correct their models of social life using these data to account for the non-random nature of survey non-participation.

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ABSTRACT

Panel attrition is a process producing data absent from panel records due to survey non-participation or other data unavailability. I examine the nature and causes of attrition resulting from non-contact and survey refusal in the British Household Panel Study. Focusing on non-response transitions amongst Wave 1 respondents using discrete time transition models, I locate attrition at first non-response over the first 14 waves. Physical impediments to contact, less time spent at home and high likelihood of geographic mobility are predictive of subsequent non-contact. Refusals most often result from lack of interest in the survey and general low motivation to participate.

Keywords: Panel attrition; BHPS; survey non-response

JEL Codes: C42; C80

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Social science data sets with repeated observations on the same units are a highly valuable means of examining the processes of social change. Whether the empanelled units are organisations, cities, families or individual people – a time series of consistent measures on the same observational units allows researchers to track types of within-unit change and ultimately build models of its causes and consequences. Attrition is the process that leads to absence of data in the panel record as a result of survey non-response or other data unavailability. Survey non-participation can result from a survey organisation's failure to locate and contact sample members on the one hand and non-cooperation with a request to participate in the survey on the other. Using data from the British Household Panel Study (BHPS), I examine the nature and causes of attrition, both as a result of non-contact with sample members and of survey non-cooperation. I adopt a definition of attrition similar to others who have studied it. I find that factors indicative of physical impediments to contact, less time spent at home and high likelihood of geographic mobility are predictive of subsequent non-contact over the life of the panel. I also find the refusals could be viewed as resulting from lack of interest in the survey and general low motivation to participate. I begin by outlining what is meant by panel attrition while relating this concept to the general concept of survey non-participation. I then review the theoretical approaches to the causes of non-response and review findings from the panel attrition literature within this theoretical framework. I present the results of several models predicting the rate of attrition, establishing the similarity between the attrition process in the BHPS and general survey non-participation. I conclude by briefly discussing outstanding findings that could warrant further investigation.

1 Motivation

Attrition is a problem for panel studies for two reasons. As a panel sample decreases in size over its duration, the precision of estimates derived from that sample also decreases (Branden, Gritz and Pergamit 1995; Watson 2003). More importantly, attrition may not be random. Non-random attrition implies that the sample becomes unrepresentative as the panel ages and that outcomes of interest may be biased to the extent that the factors associated with attrition are related to them (Fitzgerald, Gottschalk and Moffitt 1998; Watson 2003). For these reasons, the present analysis of the covariates of attrition in the British Household Panel Study (BHPS) serves two related purposes. First, what factors explain the pattern of unit response in the study? Can established theories of survey participation account for the attrition process in the BHPS? The second motivation is derived from the method of accommodating biasing attrition in panel analysis. Observable factors associated with unit non-response that are not associated with a model's dependent

variable can be used as instruments in correcting for any selection bias due to non-random non-response (Lepkowski 1989; Lepkowski, Kalton and Kasprzyk 1989). These observables may also be used in weighting the resulting data to correct for the changing representativeness of the panel over time (Lepkowski, Kalton and Kasprzyk 1989). For these reasons, the second purpose of this study is to document the covariates of unit non-response so that substantive researchers can take into account the changing nature of the sample in producing their estimates.

2 Identifying Attrition

In any panel study where people are the units of observation, attrition is the permanent loss of data for a sampled individual due to non-participation in the study (Lynn *et al*. 2005; Zabel 1998). By definition, attrition is an absorbing state, and in this way differs from non-response generally (Hawkes and Plewis 2006). Interim unit non-response – i.e., individuals dropping out for a single wave before returning again at some subsequent wave – is different from attrition as data for sample members continues after a gap. The causes of interim unit non-response may be different from attrition although distinguishing interim non-response from attrition is always time dependent leading to difficulty in analysis. Panels of finite length can clearly identify the point of attrition as no further data collection efforts are attempted even with interim unit non-response. Panels of indefinite length are burdened by the future behaviour of sample members as attrition cannot be distinguished from interim non-response without clear rules defining when non-response is attrition.

Survey organisations running a panel of indefinite length might clearly realise survey efficiencies when repeated non-responders – either by reason of non-contact or refusal – are not re-issued to field (Laurie, Smith and Scott 1999; Taris 2000; Watson 2003). For this reason, some indefinite length panels require that panel participants be dropped from subsequent interview attempts upon either the first or second instance of non-contact or non-cooperation (Fitzgerald, Gottschalk and Moffitt 1998; Hawkes and Plewis 2006; Lillard and Panis 1998; Stoop 2005). In this case, attrition is the first instance of non-response during the life of a panel for the panel participant. Other long running panel studies continue to attempt to locate respondents with whom contact has been lost or re-issue refusing respondents in an attempt to secure compliance at later waves (Jones, Koolman and Rice 2006; Laurie, Smith and Scott 1999; Watson 2003). Re-issuance of non-responders also may happen as a matter of course in household panels where some household members cooperate with the survey attempt while others continue to refuse. Attrition under these

circumstances occurs at the point of last response – noting that "last" response is a temporally slippery term[1].

The methods literature contains many examples of modelling attrition in panel surveys (e.g.,Behr, Bellgardt and Rendtel 2005; Branden, Gritz and Pergamit 1995; Fitzgerald, Gottschalk and Moffitt 1998; Hawkes and Plewis 2006; Jones, Koolman and Rice 2006; Lepkowski and Couper 2002; Lillard and Panis 1998; Watson 2003). The bulk of this work treats the first instance of unit non-response during the course of the panel as panel attrition whether the design of the survey generating the data actually drops such respondents from continued survey attempts[2]. By modelling the first instance of non-response, these studies favour data analysts requiring a balanced panel. This approach also makes modelling the attrition process tractable in that no right censoring can occur. Unit non-response, here, is an absorbing state by analytic definition, whether subsequent response occurs during the fieldwork period under investigation or not.

By agreed survey rules, all Original Sample Members (OSMs) of the BHPS are reissued for interviewing at each successful wave until a point of adamant refusal or long-term non-contact (Taylor *et al*. 2007). Long-term non-contact is defined by rule to be 4 failed interview attempts. Adamant refusal is judged on the description of the refusal from survey interviewers. In some instances, sample members who have not been contacted for more than 4 waves will return to a household in which a cooperating OSM resides. Also, an OSM who previously refused adamantly may still reside with a cooperating OSM and could decide to be interviewed. Since all re-interviews are attempted with all OSMs at each successive wave wherever they may live, some sample members organisationally defined as attritors may in fact return to the study for interviewing. For the purposes of this present study, I follow the example in the methods literature and treat attrition as the first instance of unit non-response and disregard any remaining data available for a given respondent.

3 Attrition and Non-Response Theory

Given that attrition is a special case of non-response occurring in panel surveys, the literature on survey participation sheds light on the underlying process. Groves and Couper (1998) advanced a general theory of non-response that was later translated for use in

[1] It should be noted that reasons other than attrition due to non-contact or refusal may result in no data for respondents. These might include a sample member's death or movement out of scope, abroad for example.

[2] Jones et al., (2006) and Hawkes and Plewis (2006) also model non-response at each subsequent wave regardless of continued participation up to the non-responding wave.

modelling panel attrition by Lepkowski and Couper (2002). The original formulation divided the survey process into first making contact with sample members and then inducing cooperation with the survey request. In applying this approach to panel studies, Lepkowski and Couper's reformulation divided making contact with sample members into the problem of first locating or tracking respondents and secondly contacting respondents conditional on location. Non-response is really the product of these separate processes, tracing failure, failure to contact and survey non-cooperation – all of which may operate independent of one another (Nicoletti and Peracchi 2005). The literature on panel attrition, however, rarely differentiates amongst these processes, focusing instead on the general absence of data regardless of the processes generating it.

3.1 Locating and Contacting Respondents

Non-contact is the result of failure to either locate sample members or to make communicative contact with sample members given that they have been located. Locating respondents is a simple matter of ensuring that contact details exist, including name, address and any other information through which communication might be established, that the survey organisation holds these details and that they are accurate for sample members. Locating respondents in a cross-sectional survey is fairly straightforward as the relevant information is often implied in the sampling procedure. In longitudinal or panel studies, locating the same sample members over time depends largely on the likelihood of respondent geographic mobility, their willingness to be found given a move and the survey organisation's efforts in tracking sample members over time. Additionally, aspects of survey design can influence this process significantly. For example, the length of the study, length of time between contact, tracing procedures, following rules, and amount of stable contact information gathered can be associated with the likelihood of a move occurring during the study period or with the likelihood of positively locating a sample member given a move. The characteristics of sample members and their households may also indicate the likelihood of moving home or being found despite moving home. The likelihood of geographic mobility, itself, depends, in part, on the degree of household stability and community attachment – both can be indicated by characteristics of the respondent and/or their household (Groves and Couper 1998; Lepkowski and Couper 2002; Stoop 2005).

Assuming a panel sample member is located – and in the same location as at previous waves – making contact is relatively straightforward since the sample member had been contacted in the past. A sample member's contactability is the likelihood for them to be in productive communicative interaction with the interviewer at any point during the interviewing period (Groves and Couper 1998). Failure to make contact with a located

sample member can occur, however, for generally one of three reasons. First, contactability depends on respondent's patterns of being physically present at the place where contact is to be attempted (e.g., home, office, somewhere else). Next, any physical impediments to making contact with respondents affects their contactability. Locked or shared entrances to apartment buildings, vicious dogs, caller identification equipment are some examples of physical impediments associated with inability to make contact with a respondent in their household. Finally, contact depends on the survey organisation's effort in making contact. The effect of these sorts of factors should be lessened in the household panel case because a survey was conducted at the respondent's residence in the past. Since these factors will have once been accommodated, further interviewing can be conducted in light of the knowledge of at-home patterns, physical impediments and the amount of effort and the time at which previous contact was made.

3.2 Survey Cooperation

Groves and Couper (1998) elaborate extensively on the ability of interviewers to induce survey cooperation in respondents. Much of their theoretical approach rests on social-psychological processes that under-gird the decision to comply with the survey request. They outline four heuristic principles that may be operative in a respondent's reasoning. First, the *consistency* principle suggests that one should be more willing to comply with requests for behaviours that are consistent with a position to which the are committed – e.g., once the interviewer has their foot in the door, a sample member is more likely to comply with the survey request. Next, the *scarcity* principle suggests that compliance is more likely if compliance might secure a scarce opportunity – e.g., "This is your chance to tell us what you think". *Social validation* is the third principle and it implies that compliance depends on whether one perceives whether similar others would also comply. An example if this type of reasoning might run something like "Those who are kind are helpful, I think I'm a kind person so therefore I will be helpful in this instance". Obviously, such thinking is not as explicit in the face of the survey request but is instead a taken for granted thought pattern. Finally, the *liking* principle might be operative if compliance is most likely when the requester is liked – "I like this nice lady at the door, so I think I would enjoy speaking with her." Liking another can depend, in part, on similarity of dress, attitude, the use of praising and compliments (Groves and Couper 1998).

Other aspects of the survey and the survey process itself can affect propensity to cooperate with the survey request. These might include the thematic coverage of the survey, the nature of the sponsoring organisation, characteristics of the sample member themselves and situational factors including whatever the respondent is doing at the time

the interviewer calls on the household. Some respondents may affect a fairly complex decision making calculus incorporating cost-benefit analysis, compliance with principles of social exchange or authority demands along with the decision making heuristics outlined above. Expert interviewers can tailor the participation request by raising or lowering the saliency of various factors depending on the verbal and non-verbal cues given by respondents (Groves and Couper 1998; Groves, Singer and Corning 2000).

Groves and Couper (1998) further elaborate upon the rationale for the effects of various respondent and/or household demographic characteristics on non-response. Here they draw on what might be called endowed characteristics of respondents which affect their response propensity. They argue that individuals who are social isolates are less likely to respond than those who are socially integrated into their communities, regardless of interviewer tailoring. Feelings of social isolation suggest that such respondents are not governed by the norm of civic duty or feelings of cohesion with larger society (Groves, Singer and Corning 2000). Those with a greater normative disposition are most likely to participate in surveys irrespective of any incentive structure that might otherwise alter the cost-benefit balance of participating (Groves, Singer and Corning 2000). Moreover, social isolates tend to have a lower sense of social obligation to others and hence when a stranger requests participation in a survey, feelings of obligation to participate are not operative resulting in lower levels of participation (Groves and Couper 1998). This perspective has been used to explain survey non-response among ethnic minority groups, through the hypothesis of encroaching infirmities on explaining lower participation among the elderly, and as a reason for gender related non-response (Groves 1990; Groves and Couper 1998).

3.3 Findings in the Literature

Groves and Couper (1998) hypothesise that various demographic variables are indirect measures of social psychological constructs, rather than direct causal influences on participation including age, sex, household structure, relationship status, employment status, etc…. At the same time age and other known demographic characteristics can proxy other respondent characteristics, such as health or geographic mobility, which cannot be ascertained directly when modelling response propensity.

3.3.1 Age. For household surveys, older respondents should be easier to locate and contact in their home because they tend to have a lower chance of moving home and to spend more time in their home than others (Stoop 2005). Younger panel members are more difficult to locate because moving home is more frequent – e.g., moving away to university – while once located are more difficult to contact because they tend to live in

dwelling units where contact is more difficult – such as multi-unit flats – and to spend more time out of the home (Stoop 2005). A large body of empirical investigation finds that both the elderly and the young are more likely to not be contacted (Behr, Bellgardt and Rendtel 2005; Branden, Gritz and Pergamit 1995; Cannell *et al*. 1987; Cheesbrough 1993; DeMaio 1985; Dohrenwend and Dohrenwend 1968; Foster 1998; Foster and Bushnell 1994; Goyder 1987; Groves 1989; Groves and Couper 1998; Hawkins 1975; Lillard and Panis 1998; Lynn and Clarke 2002; Stoop 2005; Watson 2003).

Concerning survey cooperation, some argue that the elderly are more likely to maintain norms of civic duty which suggests greater likelihood of survey cooperation (Dillman 2000; Groves and Couper 1998; Groves, Singer and Corning 2000). At the same time, younger sample members might be less likely to cooperate because norms of social obligation might be less strongly felt (Groves and Couper 1998; Stoop 2005). The problem of encroaching infirmities – the increasing chance of finding older sample members with health problems – suggests a greater likelihood of situational refusal amongst the elderly (Groves, Singer and Corning 2000; Jones, Koolman and Rice 2006). Research suggests, however, that the elderly are more likely to refuse the survey request than younger sample members (Brehm 1993 ; Cheesbrough 1993; Foster and Bushnell 1994; Goyder 1987; Groves and Couper 1998; Hawkins 1975; Lepkowski and Couper 2002). Once health is controlled, however, Jones *et al.* (2006) find no effect of age suggesting that age effects on non-response are largely a matter of contactability rather than cooperativeness.

3.3.2 Household Structure. The nature and extent of relationships in the household can affect the likelihood of locating and/or contacting panel members. Single person households are more difficult to contact because there is a greater chance of finding the home empty when the interviewer calls (Brown and Bishop 1982; Couper 1991; Foster 1998; Foster and Bushnell 1994; Foster *et al*. 1993; Goyder 1987; Groves and Couper 1998; Jones, Koolman and Rice 2006; Kemsley 1976; Kordos 1994; Lyberg and Lyberg 1991; Nicoletti and Peracchi 2002; Wilcox 1977). The presence of children signals greater community integration – that is, less social isolation – implying locating and contacting sampled households with children in them is easier than single person households or households without any children in them at all (Groves and Couper 1998). Indeed, the presence of children and their ages is associated with lower levels of attrition in the NLSY (Branden, Gritz and Pergamit 1995), PSID, SIPP and the ECHP (Watson 2003; Zabel 1998).

Aside from the size and composition of households, the nature of the relationships amongst household members can indicate survey cooperation. Married couples tend to be

more residentially stable (Lepkowski and Couper 2002) and, indeed, the married tend to have lower non-response in the PSID (Fitzgerald, Gottschalk and Moffitt 1998; Lillard and Panis 1998) and the ECHP (Behr, Bellgardt and Rendtel 2005; Watson 2003). Single – those never married – are more likely to refuse survey participation more generally (Fitzgerald, Gottschalk and Moffitt 1998; Foster 1998; Foster and Bushnell 1994; Goyder 1987; Lillard and Panis 1998; Nathan 1999; Nicoletti and Peracchi 2002). Those marrying young are more likely to attrite in the NLSY (Branden, Gritz and Pergamit 1995), although early marriage may signal higher geographic mobility which itself is associated with lower contactability. Similarly, those who are separated tend to be more likely to non-respond in the PSID (Lillard and Panis 1998) although transitioning out of marriage predicts attrition in the PSID as well (Fitzgerald, Gottschalk and Moffitt 1998). Behr et. al (2005) find that the widowed are less likely to attrite than married – this is most likely a masked age effect. Jones *et. al*, (2006) however find no effect of marital status.

***3.3.3 Gender*.** Research suggests that women are less likely to be non-responders than men and that fewer women are lost in panel studies than men (Brehm 1993 ; Foster 1998; Goyder 1987; Lepkowski and Couper 2002; Lynn *et al*. 1994). Women's higher contactability in household surveys may be due to a greater likelihood of caring for children in the home – the presence of whom signal greater contactability generally as noted above. Also men have traditionally worked outside the home and hence are less likely to be found at home for interviewing (Groves 1990).

Some evidence suggests that men are less likely to cooperate with survey requests in cross-sectional surveys than women (Lindström 1983; Smith 1983). Groves (1990) suggests this results from gender roles in mixed sex households. Women tend to manage the relationship between the household and the outside world. That is, women tend to be responsible for answering the telephone or front door when someone calls upon the house (Groves and Couper 1998). For these reasons, women may be more amenable to interacting with people outside the household, be in the position to answer a request for being surveyed and hence would be the person most likely to grant the survey request (Groves 1990; Groves and Couper 1998). Nevertheless, most studies tend to find no real gender effect in cooperativeness itself (Goyder 1987; Groves and Couper 1998; Stoop 2005).

Within the panel context, although few studies distinguish between cooperation and contact, there is evidence that men tend to attrite more frequently then women. Lepkowski and Couper (2002) find that women are more likely to cooperate in the ACL and NES.

Similarly, men are more likely to attrite in the NCDS (Hawkes and Plewis 2006) and the ECHP (Behr, Bellgardt and Rendtel 2005). However, once education, employment, child care responsibilities and other factors are controlled, Watson (2003) finds no effect of gender on non-response in the ECHP at all.

***3.3.4 Labour Market Activity*.** Household contactability depends on both the amount of time spent at home but also patterns of when household members are present in the home. In addition to the presence of children, patterns of being at home can be affected by employment commitments outside the home. Sample members who are employed outside the home are simply less likely to be found at home for interviewing. Anyone employed greater than full-time would be acutely susceptible to non-contact when contact is only attempted at the respondent's home. Thus the presence and amount of work commitments outside the home tend to predict non-contact generally and in panel surveys in particular (Branden, Gritz and Pergamit 1995; Cheesbrough 1993; Dunkelberg and Day 1973; Foster and Bushnell 1994; Goyder 1987; Groves and Couper 1998; Lynn and Clarke 2002). Simple employment outside the home, either as an employee or self-employed, seems to be associated with lower levels of non-response in the NLSY (Branden, Gritz and Pergamit 1995), the PSID and the SIPP (Zabel 1998). Those out of the labour market including sample members in full-time education, those retired or engaged in family care are less likely than employed to non-respond in the ECHP (Behr, Bellgardt and Rendtel 2005; Watson 2003). Job instability is also implicated in greater non-contactability in the NCDS (Hawkes and Plewis 2006) and NLSY (Branden, Gritz and Pergamit 1995), although Jones *et al* (2006) found no effect of unemployment.

3.3.5 Housing, Mobility and Neighbourhood Attachment. Aspects of both the housing unit itself along with the attachment people have to it and its surrounding neighbourhood are strong indicators of contactability in both cross-sectional and in panel studies. Neighbourhood attachment is largely indicative of likely future geographic mobility, which itself is a strong predictor of non-response (Goyder 1987; Lepkowski and Couper 2002). For this reason, measures of neighbourhood attachment may be strong predictors of subsequent non-response in panel studies.

Regarding the nature of the housing unit itself, Groves and Couper (1998) show that the mere presence of any physical impediment to accessing respondents is associated with lower contact rates. They find that sampled households residing in structures with any physical impediment to contact have non-contact rates nearly 3.5 times higher than sampled households without any physical impediments (1998, pp. 89; see also Lynn 2003).

Housing tenure can suggest the stability of sampled households and hence contact is easier to maintain with households which own their home. Zabel (1998) finds home owners less likely to attrite than renters in both the PSID and SIPP. Lepkowski and Couper (2002) find that renters are less likely to respond at the second waves of both the ACL and the NES. Similarly, Watson (2003) finds renters more likely to attrite in ECHP.

Lepkowski and Couper (2002) specifically examine the effects of community attachment and social integration. Indicators included frequency of talking on the telephone, visiting friends and attending meetings outside the home as well as satisfaction with one's home and whether the respondent provided care for someone outside the home. They find that respondents with greater intensity on each of these measures tended to be easier to locate. Further, they found that talking on the telephone, attending meetings outside the home and caring for a friend or relative outside the home predicted survey cooperation.

3.3.6 Physical Health. Locating and contacting respondents can be affected by poor health. The onset of long-term health conditions, for example, can dampen contactablity to the extent such conditions remove respondents from their homes in pursuit of care (Groves and Couper 1998; Jones, Koolman and Rice 2006). At the same time, transient health conditions or the onset of long-term conditions can affect the willingness of respondents to cooperate with the survey request when they are found at home (Groves and Couper 1998). Oddly, few studies of attrition actually incorporate measures of respondent's prior health in determining response propensities. Lepkowksi and Couper (2002) find that those less satisfied with their health in the ACL are more likely to become non-responders. Regarding the relationship between physical health and non-response in panel surveys, Jones *et. al.* (2006) found that relative to those self-reporting good or excellent health, those reporting less than good health in Wave 1 of the BHPS become less likely to respond at later waves of the study. They also find that the presence of functional limitations predicts eventual non-response but that self-reported disability surprisingly is unrelated to survey cooperation. They do not model these health effects dynamically, however, so poor initial health predicts eventual non-response rather than the onset of poor health. Considering that they find no age effect, one might assume that health status measured at Wave 1 is actually masking age related attrition.

3.3.7 Socio-Economic Status including income and education. Groves and Couper (1998) argue that socio-economic status (SES) has either a direct negative or curvilinear effect on survey cooperation. Their perspective assumes governments conduct or sponsor surveys. They argue that the underlying mechanism accounting for the relationship

between SES and survey cooperation is respondent's attitude towards the government as operative in a system of social exchange. They reason that higher SES groups feel they are continuously tapped for resources and hence owe the government nothing extra. Low SES groups could go either way. First, since low SES groups are more likely to receive benefits or other state support, they feel a duty to help the government in its data collection activities. Alternatively, low SES groups may feel the injustice of on-going disadvantage and when confronted by the survey interviewer as an agent of a more advantaged group they may be less willing to cooperate.

Together with occupation, SES is often indicated by educational attainment or income level or some combination thereof (Grusky 2001). Regarding education, Groves and Couper (1998) distinguish its effects from SES generally while at the same time saying nothing about income. They explain that those with greater educational attainment are more likely to see the utility of survey participation and the links between participation and the greater good. For this reason, one should find higher response rates amongst those with higher levels of education. Since higher educational attainment is often associated with higher SES, though not necessarily, this approach would be at odds with their general SES argument implying lower cooperation rates for high SES respondents. It should be noted that occupational group has never been hypothesised nor ever shown to be related to non-response.

Empirical findings for income and education do not necessarily comport with Groves and Couper's approach. Refusals are more likely amongst those with low incomes while less likely amongst those with higher incomes (Allen *et al*. 1991; Brehm 1993 ; DeMaio 1985; Fitzgerald, Gottschalk and Moffitt 1998; Goyder 1987; Iyer 1984; Nathan 1999; Ross and Reynolds 1996). Survey non-cooperation is also most likely amongst those who are less educated (Cheesbrough 1993; Dillman 2000; Dunkelberg and Day 1973; Foster and Bushnell 1994; Goyder 1987; Lynn *et al*. 1994; Nathan 1999; O'Neil 1979; Robins 1963; Wilcox 1977). Groves and Couper's approach has nothing to say about the relationship between SES – as either income or education – and non-contact. In Britain, a number of studies find that high income households are more likely to be non-contacts (Cheesbrough 1993; Dunkelberg and Day 1973; Foster and Bushnell 1994; Goyder 1987; Lynn and Clarke 2002).

In the panel context, the findings for income and education as specific indicators of SES are more disparate. Although the NLSY follows young people, Brandan *et al* (1995) found that having no earnings predicts non-response, but among those with earnings the

amount of earnings has no effect. On a panel with a broader age profile, Fitzgerald *et al* (1998) find, in the PSID, a linear negative effect of earnings on probability of ever non-responding among male householders, no effect for women, but having no earnings predicts non-response for female householders. Modelled dynamically, they further find that high earners are less likely to attrite but that those experiencing a large shift in earnings over time, either positive or negative, are more likely to become attritors. We might suppose that a large shift in earnings signals some other structural change in the household geographically or in terms of employment. Their finding suggests that household financial instability of any type, positive or negative, predicts non-response. These results do not seem supportive of Grove and Couper's social exchange approach to these types of factors, however.

Analyses of non-response in the ECHP by both Behr *et al.* (2005) and Watson (2003) provide the most evidence for the relationships posited by Groves and Couper. Watson finds that the main source of earnings matters but not always the amount of earnings. Income from pensions, benefits, and private sources rather than from labour, are all associated with higher attrition in the ECHP generally. Behr *et al*. revise the income measure and find that both the top and bottom of the income distribution are more likely to attrite across ECHP countries. These findings imply the curvilinear relationship between SES and survey cooperation in that those in the middle of the SES distribution are more likely to have income from earnings than from other sources. Watson goes on to find, however, that the lower portion of the income distribution is associated with higher attrition in northern European countries while the higher end of the income distribution is associated with attrition in southern European countries, broadly speaking. Although Watson and Behr *et al* differ in modelling strategies, the similarity in their results suggest that the relationship between SES and survey response exists but that it perhaps depends on broader socio-cultural factors observable cross-nationally.

Concerning the link between education and non-response in the panel context, Branden *et al* (1995) find that educational enrolment decreases non-response in the NLSY, and that attainment is negatively related to non-response among men, but not women. Similarly, Jones *et al.* (2006) find that respondents with higher achieved qualifications have higher response probabilities over the life of the panel. At the same time both Lillard & Panis (1998) and Fitzgerald *et al*. (1998) confirm that the less educated are more likely to attrite in PSID. Watson (2003) also finds that more education is associated with less attrition in northern Europe. However, Watson also finds that less education is associated

with less attrition in southern Europe implying that the participation explanation proffered by Groves and Couper may not be operational in all societies.

3.3.8 Prior Survey Experiences. In addition to respondent characteristics, aspects of respondents' prior experiences with being interviewed, particularly in an on-going panel study, can influence their likelihood of continued cooperation – including the survey organisation's ability to locate respondents and maintain contact with them.

With longitudinal or panel studies, a respondent's prior survey experience will affect their willingness to cooperate with each successive survey request (Laurie, Smith and Scott 1999; Lepkowski and Couper 2002). Respondents' general cooperativeness with prior interviews seems to indicate a willingness for further participation wherever it has been examined (Branden, Gritz and Pergamit 1995; Laurie, Smith and Scott 1999; Lepkowski and Couper 2002). Initial refusal, however, is countered in several panel studies with refusal conversion programmes. Undergoing refusal conversion is highly predictive of eventual non-response in the NLSY (Branden, Gritz and Pergamit 1995) and in the BHPS (Burton, Laurie and Lynn 2006; Laurie, Smith and Scott 1999). The effectiveness of retaining respondents depends on the refusal reasons, with situational refusals less likely than survey related refusals to be lost from studies long-term (Burton, Laurie and Lynn 2006) Incentivisation is also a factor in determining subsequent non-response (Laurie, Smith and Scott 1999) although Groves *et al* (2000) find that those maintaining stronger norms of civic duty are less influenced by the size and nature of incentives. The running time of the interview can signal greater respondent burden or it can signal a greater commitment by respondents to engaging with the interviewer. Interview length has, however, been found to be associated with lower levels of attrition (Branden, Gritz and Pergamit 1995; Zabel 1998) while a greater number of questions answered is also indicative of lower attrition (Hawkes and Plewis 2006). It would seem, then, that longer interview running time and more questions answered indicates respondent interest rather than overburdening. Thematic coverage of a study – either asking sensitive questions or covering topics of variant saliency in a population – is implicated in respondent interest and subsequent participation. Brenden *et al* (1995) found that questioning marijuana use does not predict non-response in the NLSY, but that those refusing income questions are more likely to subsequently non-respond. Lepkowski & Couper (2002) find that interest in politics predicts greater cooperation in the panel component of the NES.

In addition to the above discussed features of the survey design itself, prior interview experiences are largely tempered through the interviewer. As the main contact between a

survey organisation and the respondent, aspects of the interviewer and interviewer behaviour often colour the experience of respondents. Indeed, Zabel (1998) reports that for SIPP participants, one of the main reasons for continuing participation listed by respondents is liking the interviewer. Burton *et al* (2006) report from anecdotal evidence that both respondents and interviewers prefer to have the same interviewer returning each year for the interview. Some research finds interviewer continuity is highly predictive of subsequent panel cooperation (Behr, Bellgardt and Rendtel 2005; Branden, Gritz and Pergamit 1995; Laurie, Smith and Scott 1999; Pannenberg and Rendtel 1996; Zabel 1998), however the reasons for this are unclear. Consistency in interviewer could represent some form of liking process inducing cooperation, yet the observed interviewer effect could be a spurious result of living an area with high interviewer turnover such as a central city – associated with non-response in its own right (Campanelli and O'Muircheartaigh 1999; Groves and Couper 1998) – or geographic mobility – associated with loss due to tracking failure (Laurie, Smith and Scott 1999; Lepkowski and Couper 2002). However, Laurie *et al*, (1999) found that the strongest effect of a change of interview was among those who have not moved in the prior year suggesting that the rapport built up over time between respondents and their interviewers may be a significant factor in respondent retention.

3.3.9 Other Findings. Groves *et al* (2000) suggest that survey cooperation may be more likely for those maintaining a sense of civic duty. Normative feelings of civic duty may be indicated by a number of opinion items although little prior research explores whether the opinions or values respondents hold predict the likelihood of non-response. Opinions and attitudes may be expressive of respondent interest in the themes and topics covered by a survey. For example, Lepkowski and Couper (2002) find that those less interested in politics were more likely to non-respond in the panel component of the NES. A more direct test of this civic duty thesis may be derived from measures of social participation. Civic mindedness may be more prevalent amongst people highly engaged in community affairs. It follows that respondents highly engaged in community life would be more willing to provide survey data. Lepkowksi and Couper (2002) also generally find that social participation inhibits subsequent panel non-participation.

4 The British Household Panel Study: Sampling and Fieldwork

Drawing on the survey participation literature, I explore survey participation in the British Household Panel Study. Here, I analyse only the response patterns of initial individual respondents over the first 14 waves of the panel. I first describe the initial sampling design before discussing the fieldwork procedures.

The British Household Panel Study (BHPS) is a multi-purpose panel that began in 1991. Original sample units consisted of 8,217 addresses drawn from the small users Postcode Address File (PAF) as a sampling frame. The frame itself comprised Great Britain south of the Caledonian canal and excluded Northern Ireland. In a first stage of selection, 250 postcode sectors were selected as the primary sampling units (PSUs) from an implicitly stratified listing of all sectors on the PAF using a systematic sampling method. In a second selection stage, fieldwork delivery points, which are approximately equivalent to addresses, were sampled from each selected PSU using an analogous systematic procedure. The Interviewers conducted a third stage of selection at the household level. BHPS defines a household as "*one person living alone or a group of people who either share living accommodation OR share one meal a day and who have the address as their only or main residence."* Interviewers selected households from delivery points at the time of fieldwork, excluding non-residential addresses and institutions, using two rules: (a) any point containing up to three households, include all; and (b) for more than three households at a delivery point, select up to three households using a random selection procedure defined on the total number of households present.

At Wave 1, interviewers sought to contact and solicit interviews with all resident household members who were aged 16 or over on 1st December 1991. Interviewers attempted to secure proxy interviews for eligible household members who could not be interviewed because of illness or absence. The net result was an interviewed sample of 10,264 individuals at Wave 1 including 352 proxies. Subsequent to Wave 1, interviews were sought with all Wave 1 respondents – including proxies – wherever they may be located. Interviews were also sought with all resident members of the household in which interviewers found a Wave 1 respondent. In subsequent waves, interviewers posted an advance letter to all eligible respondents just before expecting to call on the household. The letter informs respondents that the interviewer will call on the household within the next week. Any prior wave firm refusals are excluded from fieldwork. Interviewers made a minimum of six calls at each sampled address before it was considered a non-contact; interviewers were encouraged to make further calls, if possible.

4.0.1 Types of Interviews From Wave 1 to Wave 8, data was gathered through a face-to-face PAPI interview, with CAPI being introduced from Wave 9. The individual interview normally takes between 30 and 40 minutes. Interviewers also administer a household questionnaire lasting approximately 10 minutes to one person in the household. All individual respondents are also asked to complete a confidential paper questionnaire. Interviewers collect proxy data for a small number of respondents who may be absent long-

term from the household or too ill to participate. Beginning at Wave 3, a selected set of highly skilled interviewers would attempt to convert current wave refusals or previous wave adamant refusals to a full-interview. Refusal conversion follows an established protocol, full details of which are outlined by Burton *et al*. (2006) and also can be found in the BHPS documentation (Taylor *et al*. 2006). In the event that a refusing respondent cannot be converted to a full interview, refusal conversion interviewers offer a short 10-minute telephone interview. For the present study, I consider both telephone interviews as well as proxy interviews as study compliance and not attrition.

5 Analytic Methods

To understand the characteristics of attrition in the BHPS, I estimated a set of transition models treating the non-response process as akin to any sort of survival process (see also Watson 2003). Original sample members were considered "responders" so long as they gave complete interviews – either full, proxy or telephone – wave on wave (i.e., survive within the panel). A respondent transitioned into a state of being an "attritor" once they failed to provide an interview because they could not be located or contacted, or refused the survey request. The non-response hazard rate, then, was the probability of "attriting" and was modelled as a function of observable covariates to understand what factors might explain non-response over the life of the panel (Allison 1984; Nicoletti and Peracchi 2005). While a person could conceivably become ineligible for interview by reason of moving abroad or into an institution of some sort, or otherwise decide to non-respond at any point in time, the measure of response or non-response occurs at the point of attempted contact between the interviewer and respondent. Given wave on wave interviewing, with repeated attempts to contact a given respondent at each wave, the response outcome is best viewed as a state measured at the close of fieldwork. Hence the way time was conceived in these models was discrete rather than continuous with any non-response outcome recorded once at each wave.

In a discrete-time transition model, the hazard is modelled as a function of time and a set of covariates. The hazard rate is typically expressed as the odds, ϑ, of an event, Y, defined as the ratio of the probability of the event Y occurring to the probability of that same event not occurring:

$$\vartheta(Y=1) = \frac{\Pr(Y=1)}{1-\Pr(Y=1)}$$

Given that probabilities range from 0 to 1, the odds can range from 0, when Pr(Y = 1) = 0, to infinity when the Pr(Y = 1) = 1. By taking the natural logarithm of the odds, we obtain the *logit*:

$$L = \log_e \vartheta$$

In this paper, I model the *logit* transformation of the probability of responding in a given wave (L_t). The independent variables are modelled as a linear function using maximum likelihood estimation. In short, this discrete-time transition approach adopts standard logistic regression methods with the data transformed into person-years and pooled with time entered as a covariate (Allison 1984; Hanushek and Jackson 1977; Watson 2003):

$$L_{it} = \beta_0 + \beta_t + \beta_{t-1} X_{it-1} + \varepsilon_{it}; \quad t = 2,...14$$

t indicates time and X_{it-1} represents lagged covariates for each respondent *i*. The non-response probability is modelled as a function of lagged covariates – the prior year's information is used to predict the likelihood of subsequent non-response. I did not test any interactions between independent variables and time. Note that each individual may appear more than once in the data set, thus the standard errors in the model need to be adjusted to take account of clustering at the individual level which results in a within-person correlated error term (Watson 2003). In the present analysis, I specify the Primary Sampling Unit (PSU)[3] as the clustering variable (Kreuter and Valliant 2007). I pooled data from the first 14 waves, thus modelling non-response at Wave 2 through to Wave 14. Covariates were measured from Waves 1 to 13.

[TABLE 1 HERE]

All Wave 1 respondents – including those interviewed by proxy at Wave 1 – form the sample over which this analysis proceeded. Table 1 accounts for the fieldwork outcomes of all Wave 1 respondents between Wave 1 and Wave 14. As previously mentioned, the refusal conversion process could result in a respondent with a telephone interview rather than a proxy or full-interview from Wave 3. I included telephone respondents in the risk set at each wave, thus I considered any type of interview – full, proxy or telephone – as an interview for analytic purposes. While the number of proxy interviews with Wave 1 respondents has decreased over the life of the panel, the number of telephone interviews at each wave has been more erratic. At Wave 14, 5,288 Wave 1 respondents were

[3] Please see (Taylor et al. 2006) for a further discussion of the BHPS sampling structure including the definition of primary sampling units.

interviewed in full, or approximately 51.5 percent of all Wave 1 respondents. The modelling strategy is based on pooled data where each case is retained if their interview outcome is a full-interview, a proxy, a telephone interview, a non-contact or a refusal. I treated any respondent who was not issued to field in a given wave because they moved abroad, died, were a long-term or adamant refusal, long-term non-contact or otherwise ineligible for interview under the following-rules of the BHPS as censored in this analysis. Censoring was handled by removing cases from the risk set in the wave that they became ineligible for interview. Since I modelled non-response as an absorbing state, those moving back into scope – say, returning from abroad, deciding to be interviewed after a period of refusal – were not re-introduced into the sample history.

Non-response could be due to failure to locate, failure to contact or failure to secure an interview with any given survey respondent. Here I present results for models with three different dependent variables. The first models the rate of general non-response. The second and third sets of models predict the non-contact hazard, i.e., Y = NC, and the hazard rate of refusal given contact, i.e., Y = *(REF | NC)*[4]. I do not distinguish between failure to locate a respondent, e.g., they remain untraced, and non-contact because the timing of untraced respondents is not clear in the resulting data. Some non-contacts in any given wave, for example, may actually be respondents for whom the contact information is no longer valid. This may not become apparent immediately but instead only after several waves. I combine non-contacts with failures to locate respondents for purposes of analysis. Also, BHPS survey staff may not be able to verify whether a respondent has died between waves. A small proportion of listed non-contacts will in fact be ineligible for interview due to death. At Wave 10, a search for death certificates yielded an updating on this status for several respondents who will have been listed as long-term non-contacts at prior waves.

5.1 Time Dependence

Figure 1 shows the hazard rate of initial non-response – i.e., the attrition rate – for BHPS Wave 1 respondents over the first 14 waves. The solid black line indicates the rate of non-response, while the dashed line shows the rate of non-contact and the dotted line shows the refusal rate. We can see that the attrition rate is highest over the first 5 waves of the panel before levelling off from about Wave 5 through Wave 11. From Wave 12 onwards, the attrition rate increases. This increase in attrition of Wave 1 respondents after Wave 12 may be due to at least two reasons. First, the cohort of Wave 1 respondents is not refreshed with younger respondents who matriculate into the study by turning 16. As the

[4] The refusal model treats wave non-contacts as censored and therefore these cases are excluded from the refusal analysis at the wave of non-contact.

pool of initial Wave 1 respondents, ages, they may be more likely to either refuse or be lost through non-contact – even temporarily – for reasons of ill-health or aging. This could increase the hazard of non-response for initial respondents later in the panel. Second, as the panel ages, Wave 1 respondents may feel they have done enough to support the survey and may feel a greater motivation to refuse participation in the study after 10 or more years of providing data regardless of their health.

[FIGURE 1 HERE]

As with the general non-response rate, non-contact and refusal are both initially quite high before levelling off between about Wave 5 and Wave 10 though these rates are not high overall. During the initial four waves of the study, refusal rates are higher than non-contact rates suggesting that those who are predisposed not to cooperate with an ongoing survey request drop out early during the life of a panel. Non-contact rates, though higher over the initial few waves than later in the panel, remain relatively constant for Wave 1 respondents over the life of the panel. Refusal is more likely, but this too reaches a steady state from about Wave 5 onwards. It should be noted that unobserved heterogeneity could produce specific patterns of time-dependence (Allison 1984). Heterogeneity across individuals that are not observed and therefore not incorporated into the model tend to produce evidence of declining rates in models of this sort even if the hazard rate of interest should not decline as a function of time (Heckman and Singer 1982). However, since the attrition rate – generally as well as due to non-contact or refusal -- for Wave 1 BHPS respondents is effectively U-shaped, increasing after Wave 10, unobserved heterogeneity is unlikely to present problems for this analysis.

Testing various time specifications I settled on a fully flexible time specification as shown in Table 2. The first column contains the results for a model of non-response, generally, while the remaining two columns contain results for models of non-contact and refusal given contact respectively. The fully flexible specification uses a dummy variable for each wave. This results in an effect coded specification of time with Wave 13 as the omitted category.

[TABLE 2 HERE]

As indicated by Figure 1, the non-response rates are highest at the beginning of the panel then drop over the life of the panel, then rebound from about Wave 8 onwards (though recall that these time dummies should be interpreted relative to Wave 13 rates). Note that the refusal rate is higher in the first wave than the non-contact rate. Specifically, the odds-ratio

for Wave 1 in the refusal model suggests that refusal at Wave 2 is nearly 5.5 times more likely than at Wave 14 (e.g., $\hat{b}$ = 1.706, $p < 0.001$, $e^{1.706}$ = 5.507 in the refusal model), but no more nor no less likely, with few exceptions, from about Wave 5 onwards. Similarly, non-contact is about 4.9 times more likely at Wave 2 than at Wave 14 ($\hat{b}$ = 1.599, $p < 0.001$, $e^{1.599}$ = 4.948 in the non-contact model), with a steady pattern over the life of the panel from about Wave 5. The rise in non-response after Wave 10 is largely due to a combination of both non-contact and refusal at about Wave 11 onwards. Note the mildly significant coefficients at Wave 10 and Wave 12 for both non-contact and refusal given contact.

6 Substantive Findings

Tables 3 through 11 contain results for models with covariates from specific thematic domains. I have organised the results by thematic domain rather than around substantive themes derived from the literature on response and non-response to highlight the relationship between variables often used for substantive research and their relationship to non-response. I discuss each table in turn, summarising the findings with respect to the literature on non-response where the results address a point in this literature. Within each section, I include descriptions of how covariates are measured and the meaning of the various response categories for each covariate where necessary.

Prior research suggests that item non-response for certain types of items predicts subsequent unit non-response in panel surveys (Branden, Gritz and Pergamit 1995; Nicoletti and Peracchi 2005). To retain cases and test whether item non-response does in fact predict unit non-response, I incorporated for most, if not all, covariates a category representing missing data on the given item. Recall that I include proxy and telephone respondents as being at risk for subsequent non-response. Some items are not asked of proxy or telephone respondents because both of these questionnaires are abridged versions of the full questionnaire. For this reason, the missing category for some variables will indicate questionnaire type rather than any meaningful aspect of item non-response. To control for this, I incorporate indicators of questionnaire type in all models. This means that item non-response indicators for any substantive variable reflects the association of item missing data and subsequent response propensity rather than masking a mode effect in response propensity.

Some covariates are derived from questions that are not asked at each wave. At the same time, the type of model I have estimated required complete data. For each item not

repeated at a given wave, I used the value from the most recent administration of the item. In instances where the response was missing, this was similarly carried forward to complete the data set.

With few exceptions, each table presented here takes the same form. The first three columns contain results of models with the rate of non-response as dependent variable. The next three columns include results from models predicting the rate of non-contact. The final three columns report results of models predicting the rate of refusal. Within each set, the first column presents the "Bivariate" relationship between the covariate and the rate. This is not really a bivariate relationship, but instead the relationship between this covariate and the dependent variable with only time and interview mode also controlled in the model. I do not report the time and interview mode coefficients in each table as they largely do not change from model to model. The "Domain" model in the second column presents results from a model that includes all the covariates within the thematic domain covered by the table while excluding any covariates from other thematic domains. The thematic domains include:

- Demographics, region and geographic mobility
- Household Structure including marital status, household size and the presence of children
- Individual health status and service usage
- Housing characteristics as well as neighbourhood attachment
- Interview conditions
- Labour market participation, socio-economic status and financial standing
- Opinions and political preferences
- Social participation and religiosity

The final column within each set presents results from a "Multi-domain" model. This is a full-model which includes covariates from all thematic domains however only the covariates from the relevant domain are presented together.

6.1 Non-Response as a Function of Demographics, Region and Geographic Mobility

Table 3 and Table 4 contain results from models incorporating measures of demographic characteristics. Table 3 reports the results from models regressing the hazard rate of non-response, non-contact and refusal on various individual demographic characteristics, geographic region and geographic mobility. Table 4 contains results from models incorporating measures of relationship status, household size and household structure. Many of the covariates presented in Table 4 are highly related to one-another, for example overall household size is the sum of the number adults plus number of children and a single household is a household of size one. For these reasons, not all variables are

included in the domain or multi-domain models presented in Table 4. This section reports and discusses these results in turn.

[TABLE 3 HERE]

***6.1.1 Birth Cohort*.** Non-response theory suggests that non-contact will be greater among younger respondents. Older respondents are more likely to be cooperative out of a sense of civic duty while younger survey members will be more likely to refuse cooperation for reasons of a lower sense of obligation. I use birth cohort as a measure of respondent age because age is collinear with wave in the model. Those born in 1970 or after are the omitted category. We see that in the general non-response model, an inverted-U shape across the birth cohorts, those born prior to 1920 are no more nor no less likely to non-respond than those born in 1960 or after while those born between 1920 and 1959 are less likely to be non-respondents. The multi-domain non-response model indicates that those born between 1940 and 1949 are the least likely to non-respond ($\hat{b}$ = -0.371, $p < 0.001$). Comparing these effects to the results for non-contacts and refusals, we see that age predicts non-contact across age groups rather more than refusal. Across the board, the negative effects for birth-cohort mean that the highest non-contact rate is for those born in 1970 or after. Note that the multi-domain non-contact model shows that those born between 1920 and 1929 are about 75 percent less likely to be lost through non-contact compared to those born in 1970 or later ($\hat{b}$ = -1.380, $p < 0.001$, $e^{-1.380} = 0.252$). Further, across the cohorts chronologically toward 1970, the coefficients monotonically decrease in magnitude. This means that non-contact is more likely for younger respondents and that this effect might largely be monotonic. Note the exception for respondents born before 1920 where the coefficient of -0.595 ($p < 0.001$) suggests the oldest of the old are slightly less contactable than other ages. Interestingly, refusals are more likely among the oldest age groups. Those born before 1920 are about 53.1 percent more likely to refuse than those born after 1970 ($\hat{b}$ = 0.426, $p < 0.01$, $e^{0.426} = 1.531$ in the multi-domain refusal model) while those born between 1920 and 1929 are about 32.7 percent more likely than respondents born after 1970 to refuse ($\hat{b}$ = 0.283, $p < 0.05$, $e^{0.283} = 1.327$). These results confirm the theoretical predictions about the relationship between age and non-contact and age and survey cooperation. Moreover, these findings tend to be consistent with findings from studies of other longitudinal data sets which find a positive relationship between non-response and age.

6.1.2 Gender. Consistent with prior research, I find that women are less likely to non-respond than men. The "bivariate" and domain specific models suggest that women are about 10 percent less likely to non-respond than men ($\hat{b}$ = -0.116, $p < 0.001$, $e^{-0.116} = 0.890$, $\hat{b}$ = -0.121, $p < 0.001$, $e^{-0.121} = 0.886$ respectively) . However, this effect disappears in the multi-domain model notably with the addition of respondent employment status (results not shown). This implies that men and women are no less likely to non-respond, but that the patterns of response observed for women have more to do with sex differences in employment patterns. We might expect, then, that women and men are equally difficult to contact since employment outside the home theoretically limits contactability with household members. This notion is not supported, however. Women remain significantly more contactable than men – being about 12.5 percent less likely to be a non-contact than men all things considered ($\hat{b}$ = -0.133, $p < 0.01$, $e^{-0.133} = 0.875$ in the multi-domain model). There is no difference between men and women in the likelihood of refusal once all other factors are controlled. Above and beyond any effect of employment outside the home as well as the presence of children, women remain easier to contact than men and no different from men in their propensity to cooperate with the survey request. These data support the approach outlined in Groves and Couper (1998) who suggest a gendered division of household labour which militates in favour of female contactability.

6.1.3 Race. Race is entered as a simple dichotomous variable indicating whether the respondent is white or non-white. The sample otherwise under-represents non-white Britons and so meaningful analyses of different ethnic groups cannot be conducted. We see that being non-white is a highly significant predictor of non-response in the "bivariate" and domain specific models. However, once other factors are controlled the effect of race is reduced and remains marginally significant in the multi-domain model ($\hat{b}$ = 0.665, $p < 0.001$ in "bivariate" model vs. $\hat{b}$ = 0.304, $p < 0.01$ in multi-domain model). Disaggregating this effect into non-contacts and refusals, we see that maintaining contact with non-white respondents is the main problem. Non-whites remain approximately 52.8 percent more likely to be lost due to non-contact than whites, all things considered ($\hat{b}$ = 0.529, $p < 0.001$, $e^{0.529} = 1.697$). Once other factors are controlled in the multi-domain refusal model, the effect of race disappears altogether. The race effect is attenuated when interviewer rated cooperativeness is included in the general non-response model (results not shown). However, the remaining evidence does not suggest that non-white respondents are more likely to refuse the survey request when asked than white respondents.

6.1.4 Region. Region is entered as a series of regional indicators with London as the omitted category. When region is included in the model controlling for other demographic covariates shown in Table 3 (domain model) various regions are significantly less likely to non-respond subsequently than London notably the Southeast, Southwest, East Anglia, and the North/Northeast. Supposing the regions found to be no different from London in this model have a higher population density in common, this finding comports with the literature suggesting that interviewing is generally more difficult in highly urban areas (Groves and Couper 1998; Stoop 2005)[5]. In the multi-domain non-response model, however, only the coefficient for East Anglia remains significant with an associated odds-ratio indicating those living in East Anglia are about 31.7 percent less likely to non-respond than Londoners ($\hat{b}$ = -0.381, $p < 0.05$, $e^{-0.381} = 0.683$). When the non-response effect is split into non-contact and refusals, the multi-domain models show that region has no effect on non-contact but the effect for East Anglia remains in the refusal model ($\hat{b}$ = -0.360, $p < 0.05$)[6]. While the domain specific non-contact model shows some effects for various regions, the multi-domain model shows no effect of regional at all. The addition of housing structure, in this model, seems to be the factor that reduces the effect of region (results not shown). The regions, therefore, must vary in housing structure such that once housing structure is controlled the regional effect disappears. This must be interpreted with respect to London as the reference category implying that something about the housing stock in London, per se, affects the observed response rates. Flats and multi-unit dwellings are associated with non-contact in other studies of non-response, which are likely dwelling types for respondents living in London. The specific results for dwelling type are discussed in greater detail in below.

***6.1.5 Geographic Mobility*.** In the literature, geographic mobility is associated with lower contactability (Groves and Couper 1998; Lepkowski and Couper 2002; Stoop 2005). This is of particular concern for panel studies where locating and maintaining on-going contact with respondents is important. For respondents moving between waves and failing to be contacted at the latter wave, we cannot know that the move itself has occasioned non-contact. However, we can identify respondents who have moved within the prior two years

[5] No urbanicity measure is available with the BHPS data so we cannot test whether residence in a central city affects response propensities above and beyond any regional variation in response propensities. However, other factors that may be associated with central city living such as possessing a car could indicate a central city-residence. Table 8 contains results for personal access to a car or van.

[6] The BHPS is run from the University of Essex which located in the region of East Anglia. For this reason, residents of East Anglia may be more motivated to participate relative to sample members elsewhere.

and examine whether this predicts greater odds of subsequent non-response. The history of geographic mobility, then, may be associated with the likelihood of greater mobility in the future and hence greater odds of eventual non-contact. In the general non-response model, we see that those moving in the prior two years are, indeed, more likely to non-respond. In the multi-domain non-response model we see that among those with a history of moving, the odds of non-response are increased about 21 percent as compared to others ($\hat{b}$ = 0.188, $p < 0.01$, $e^{0.188} = 1.207$). Once non-response is disaggregated into non-contact and refusal, we see that movers are significantly more likely to be lost due to non-contact than refusal, as we might expect ($\hat{b}$ = 0.337, $p < 0.001$ and $\hat{b}$ = -0.001, n.s., respectively). The odds of non-contact are increased about 40.1 percent ($e^{0.341} = 1.401$). These findings broadly comport with theoretical predictions about geographical mobility and non-response while corresponding with the findings of others regarding geographic mobility.

[INSERT TABLE 4 HERE]

***6.1.6 Marital Status*.** The first five rows of Table 4 contain results for the effect of marital status with those who are "never married" as the omitted category. Table 4 shows that controlling for birth cohort and other factors in the multi-domain model, those who are divorced or widowed are less likely to non-respond, but all other groups are no different from those never married in their response propensity ($\hat{b}$ =-0.182, $p < 0.05$ and $\hat{b}$ = -0.341, $p < 0.001$, respectively). Interestingly, the "bivariate" relationships indicate that persons married or partnered have lower odds of non-response, but this association disappears in the multi-domain model. This is largely due to the inclusion of spousal employment status in the multi-domain model where having no spouse is the omitted category (see Table 8 for results). The non-contact models show marital status having no affect on non-contact once all other factors are controlled. The divorced and widowed remain significantly less likely to refuse than those never-married ($\hat{b}$ = -0.335, $p < 0.01$ and $\hat{b}$ = -0.437, $p < 0.001$ respectively). These findings differ slightly from the findings for other studies where married couples are more easily contacted and less likely to refuse cooperation (Behr, Bellgardt and Rendtel 2005; Fitzgerald, Gottschalk and Moffitt 1998; Lillard and Panis 1998; Watson 2003).

***6.1.7 Household Size*.** Non-response theory and empirical evidence both imply that survey non-response is less likely amongst larger households (Groves and Couper 1998; Groves *et al*. 2002; Lepkowski 1989; Lepkowski and Couper 2002; Nicoletti and Peracchi

2005; Stoop 2005). The results (Table 4) show that the "bivariate" relationship between household size and non-response is in this expected direction ($\hat{b}$ = -0.071, $p < 0.01$) with the likelihood of non-response reduced by about 6.9 percent for each household member ($e^{-0.071} = 0.931$), although the "bivariate" effect for the number of adults in the household works the opposite direction ($\hat{b}$ = 0.117, $p < 0.001$). At the same time, single households are significantly more likely to non-respond which corresponds to what might be expected given the literature ($\hat{b}$ = 0.215, $p < 0.001$). In the domain and multi-domain models, I include only household size as the number of adults and the indicator for a single household vary strongly with household size. However, once other factors are controlled, the effect of household size is the opposite – larger households are more likely to non-respond ($\hat{b}$ = 0.061, $p < 0.01$ in the domain specific model) – but then disappears in the full-model. Considering non-contact and refusal, the multi-domain model shows no relationship between household size and non-contact, but instead a direct positive relationship between household size and refusal ($\hat{b}$ = -0.049, p = n.s., and $\hat{b}$ = = 0.124, $p < 0.001$, respectively). Indeed, the odds of refusal increase about 13.3 percentage points for each household member ($e^{0.124} = 1.132$). With respect to arguments about contactability, these findings contradict the theoretical proposition that large households are more contactable. It may be the case that the presence of school aged children actually takes parents and families outside the home. On the other hand, being a household survey, the response burden is enhanced for larger households and if the burden is high, the members of larger households may be less willing to provide interviews in subsequent waves.

6.1.8 Children. Theoretically, the presence of children in a household indicates residential stability and community integration which imply greater contactability on the one hand and a greater willingness to cooperate with survey requests on the other (Groves and Couper 1998; Lepkowski and Couper 2002; Stoop 2005). The results in Table 4 for the most part confirm these predictions. Notably, the presence of any children in the household significantly reduces the odds of non-response for reasons of both non-contact and refusal ($\hat{b}$ = -0.240, $p < 0.001$ in the non-response model, $\hat{b}$ = -0.246, $p < 0.001$ and $\hat{b}$ = -0.229, $p < 0.001$ in the non-contact and refusal models respectively). The ages of children is implicated in theory to have a relationship with the odds of contact and refusal (Groves and Couper 1998). Specifically, the presence of pre-school aged children but not infants is expected to enhance the contactability of households (Groves and Couper 1998). Four variables indicate the presence or absence of children in the household of various ages: 0-2,

3-4, 5-11 and 12-15 relative to no children in the household at all. Table 4 shows that while the results in the "bivariate" models are as expected, the presence of variously aged children seems to have effects somewhat different than might be theoretically expected. Contrary to expectation, the results in the multi-domain models show that the presence of children of various ages has no effect on non-contact. Children, however, reduce the likelihood of refusal with a significant negative gradient across the age range. That is, the younger the child the less likely is a refusal ($\hat{b}$ = -0.545, $p < 0.001$ for any children aged 0-2, versus $\hat{b}$ = -0.219, $p < 0.05$, for children aged 5-11). Note that the presence of children aged 12-15 is no different from having no children in the household at all in terms of subsequent refusal. Taken together, these findings support the general approach to non-response for children – their presence can ease contact with the household but a respondents propensity for household cooperation is greater if they live with younger aged children.

6.2 Non-response as a function of Individual Health

Table 5 contains the results of non-response, non-contact and refusal regressed on various health related factors. As with the effect of demographic factors, all models include a measure of time specified as a series of wave dummies and the interview mode effect coded with full-interview as the omitted category. The BHPS contains a wide variety of health indicators as well as measures of health service use. Indicators measuring usage of various health services tend to be highly collinear. For this reason, the multi-domain models do not contain a full compliment of health service measures.

Health can have two effects within the context of a general non-response theory. First, poor health can act against survey cooperation if those with poor health are unfit for or uninterested in contact with others, particularly a stranger asking them survey questions about their lives. Thus, poor health may have a strong positive effect on the likelihood of non-response due to refusal. Second, poor health could occasion trips to the doctor or even overnight stays in the hospital. For surveys conducted in the home, contactability may be affected by poor health. Thus, we might expect that poor health leads to non-response generally, and both refusal and non-contact rates specifically.

[INSERT TABLE 5 HERE]

***6.2.1 Respondent Health*.** The first 14 rows of Table 5 contain results for indicators of respondent health. These include the count of stated physical health problems, likelihood of mental health problems as measured by the General Health Questionnaire, whether the

respondent smokes, whether the respondent is disabled and the respondent's self-assessed health status.

First, the count of health problems has a curious negative effect on non-response, generally. The more health problems mentioned, the lower the likelihood of non-response. This effect does not remain in the non-contact model but is mirrored in the refusal model ($\hat{b}$ = -0.123, n.s.; $\hat{b}$ = -0.187, $p < 0.01$, respectively).

Next, there appears to be no real association between likely mental health problems as measured by the General Health Questionnaire, being a smoker or self-reported disability status. Some slight significance can be noted in the "bivariate" and domain models, but these effects disappear in the multi-domain models.

Lastly, the relationship between self-assessed health and non-response differs somewhat from Jones *et al*. (2006) who examine this relationship with a different modelling framework. Here, the omitted category is "Excellent" health. The general non-response model indicates a monotonically increasing likelihood of non-response as the poorer one rates their own health the more likely they are to non-respond at subsequent waves. Yet once other factors are controlled in the multi-domain model, this pattern disappears and we only see some continued significance for poor or very poor health. The non-contact rate continues to be associated with self-assessed poor health as those indicating their health is poor remain somewhat likely to be lost due to non-contact ($\hat{b}$ = 0.424, $p < 0.05$) but there is no association between self-assessed health and refusal. The link with age, here, is important to note. There, the oldest cohorts were found to be more likely to refuse participation even when health problems and subjective health status were included in the full-model. Here, health has no independent effect on refusal. The reasons for higher rates of elderly refusal are, therefore, slightly unclear and may require further investigation.

The sum of these findings does not provide evidence that poor health predicts refusal as few health indicators are indicative of refusal over the life of the panel. In fact, the presence of health problems seems to inhibit survey refusal rather than promote it. However, situational refusal at the point of contact may reflect the onset of ill health or infirmity between waves that we would not observe in these data. Prior poor health does seem to predict non-contact, somewhat, suggesting that poor health eventually leads people out of their households – perhaps in the pursuit of care.

***6.2.2 Service Use*.** The results suggesting poor health leads to attrition through non-contact, however slight, might result from poor health occasioning trips outside the home for medical care. We would expect, then, that a history of greater use of health care would predict non-contact as well. I include four indicators of health care usage: number of GP visits, number of health checks, whether the respondent stayed as an in-patient in the hospital overnight or longer and whether the respondent used any health services such as meals on wheels, home help, or a health visitor.

In the general non-response model, we find, relative to those never visiting their GP in the prior 12 months, a general negative relationship between visiting the GP and non-response with this effect disappearing in the domain specific model. Along with GP visits, receiving check-ups is also associated with a reduced likelihood of survey non-response. Those receiving three or more different types of check-ups such as blood pressure checks, cholesterol checks, dental checks, eyesight tests, and chest X-rays are significantly less likely to non-respond, generally ($\hat{b}$ = -0.236, $p < 0.001$). Moreover, the coefficient for three or more check-ups is somewhat larger than the coefficient for one or two check-ups (Wald X^2 = 3.34, 1 *d.f.*, $p < 0.10$). Receipt of health checks is also inversely proportional to the likelihood of non-contact ($\hat{b}$ = -0.246, $p < 0.01$ for three or more check-ups) and refusal ($\hat{b}$ = -0.215, $p < 0.05$, for three or more check-ups). Note that these respondents may not have actually been suffering poor or ill health otherwise at the time of interview. Instead, obtaining more health checks could be indicative of seeking better health and that respondents actively engaged in self-care this way are more less likely to be survey non-respondents.

Both being an in-patient and receiving health services might directly indicate likelihood of being bound to the home for reasons of poor health. Being an in-patient over night or longer in the year prior may be too distantly removed in time from the contact attempt and response request to be useful as it largely does not contribute significantly to these models. The use of health or welfare services is largely unrelated to non-response, per se, as there is no significant association between service use and non-response in the multi-domain model. However, use of health services has a significant negative association with refusal, all things considered ($\hat{b}$ = -0.166 $p < 0.01$ in the multi-domain refusal model).

Taking these findings together, it would seem that health has a mild effect on response propensities in the BHPS. These results suggest that only extremely poor health

impairs response and those people actively engaged in managing their health through the use of health services are easier to retain in the study.

6.3 Non-Response as a Function of Housing Characteristics and Neighbourhood Attachment

Non-response theory suggests respondent contactability is affected by the nature of housing tenure, the structural characteristics of the dwelling itself and any factors affecting the local stability of the household unit including place attachment (Groves and Couper 1998; Groves *et al*. 2002; Lepkowski and Couper 2002; Martin 2007; Watson 2003; Zabel 1998). Table 6 contains results from models incorporating features of respondents' housing situation as well as two measures of place attachment.

***6.3.1 Housing Tenure*.** The results presented in Table 6 are consistent with results elsewhere. Renters are more likely to be lost between waves than those living in owner occupied accommodation ($\hat{b}$ = 0.150, $p < 0.10$ in the multi-domain non-response model; $\hat{b}$ = 0.361, $p < 0.001$ in the multi-domain non-contact model). These findings clearly reflect a greater mobility and less "settled" nature of renting.

6.3.2 Dwelling Type. Physical barriers preventing access to respondents for interviewing can strongly influence the likelihood of non-response. Respondents dwelling in structures such as apartment blocks with access to several flats through a shared entrance can be particularly difficult to reach. I categorised dwelling type into dwellings with their own entrance, flats and other multi-story units and finally bedsits, institutions, and other structures. The omitted category, here, is living in a dwelling with its own entrance, including detached, semi-detached, and terraced houses. The results in Table 6 show that those dwelling in flats, with any number of flats in the structure, are highly likely to non-respond relative to those living in a dwelling with its own entrance ($\hat{b}$ = 0.170, $p < 0.01$ in the multi-domain non-response model). Not surprisingly, this is largely due to non-contact rather than refusal ($\hat{b}$ = 0.340, $p < 0.001$ in the multi-domain non-contact model, $\hat{b}$ = -0.021, n.s. in the multi-domain refusal model). Dwelling in a bedsit, institutional accommodation or some other type of structure is associated further with non-contact relative to a house with its own entrance ($\hat{b}$ = 0.377, $p < 0.10$). In other words, even in a panel study, inability to access respondents remains an impediment to contact wave on wave. Once contact is made, however, those living in flats, bedsits or other dwelling types are no less likely to cooperate with the survey over time than others as is evidenced by the lack of any significance in the non-response model for this variable.

6.3.3 Place Attachment. Place attachment refers to the feelings of being settled in a given accommodation or in a local community (Lepkowski and Couper 2002; Martin 2007). Two measures in the BHPS touch on this concept: whether the respondent would like to move and whether the respondent likes their neighbourhood. In the general non-response model, those expressing a desire to move, relative to those not interested in moving are highly likely to non-respond at the next wave ($\hat{b}$ = 0.185, p < 0.001 in the multi-domain non-response model). At the same time, not liking one's neighbourhood is associated with subsequent non-response ($\hat{b}$ = 0.162, p < 0.05 in the multi-domain non-response model). The finding for desire to move remains in the non-contact model ($\hat{b}$ = 0.374, p < 0.001) as does the effect of disliking one's neighbourhood ($\hat{b}$ = 0.197, p < 0.05 in the multi-domain non-contact model). Those expressing a desire to move, additional to any past history of geographic mobility as shown in Table 3, have non-contact odds about 45 percent higher than others ($e^{0.374}$ = 1.454 from the coefficient in the multi-domain non-contact model).

These findings comport with general non-response theory. Any physical impediment preventing access by interviewers to respondents can significantly affect response propensities. Once contact is established, however, those living in difficult to contact residential settings are no less likely to cooperate with the survey. At the same time, low place attachment signals lower contactability.

6.4 Non-Response as a Function of Interview Conditions

Respondents' prior experience with surveys, either with an on-going panel or with one-off cross-sectional studies, can affect the likelihood subsequent survey response (Groves and Couper 1998; Groves, Singer and Corning 2000; Lepkowski and Couper 2002). Interview length, themes of the study, use of incentives, mode, etc.,… all can affect a respondents feelings about participation each time a survey request is put to them. Data on interview length in the BHPS is incomplete so this was not included in these models. The content of the BHPS questionnaire also rotates across themes or topics over time. This is broadly collinear with the time specification in these models so any effects of thematic coverage in the study would be confounded with time. Included here are only measures largely indicative of the conditions under which the interviews were completed. These measures gauge to some extent the rapport respondents maintain with interviewers, their interest in the study and their ability to participate. Included are indicators of interview mode, the presence and influence of other people during the course of the interview, completion of tracking information, interviewer assessed cooperativeness and the effects of

changing interviewers between waves. Table 7 presents results of non-response models including these interview characteristics.

[TABLE 7 HERE]

***6.4.1 Interview Mode*.** Most BHPS data is gathered using face-to-face interviews while a small proportion of interviews are obtained by proxy or over the telephone (Taylor *et al*. 2007). Both proxy and telephone interviews obtain significantly less data than the full interview (Burton, Laurie and Lynn 2006; Laurie, Smith and Scott 1999; Taylor *et al*. 2007). Much of the item non-response evident in other variables of the models presented in this paper result from the abridged proxy or telephone instruments. Since I have defined proxy or telephone interviews as a survey response and a large component of item non-response is due to the reduced form of data collection with proxies and telephone interviews, I have included these factors in all domain and multi-domain models as controls.

The initial rows of Table 7 show the relation between interview mode and subsequent non-response. The "bivariate" relationship between proxy or telephone interviewing and subsequent non-response is very large. Notably, proxy interviews are about 5.6 times more likely than face-to-face interview to yield complete non-response at the subsequent wave ($\hat{b}$ = 1.730, $p < 0.001$; $e^{1.730} = 5.64$). Similarly, telephone interviews are associated with a 19.45 times greater likelihood of non-response at the subsequent wave ($\hat{b}$ = 2.968, $p < 0.001$; $e^{2.968} = 19.45$). With all covariates controlled, these effects disappear in the multi-domain non-response model most likely as a result of controlling interviewer rated cooperativeness (see below), amongst other factors. Moreover, the effects of interview mode have no association with non-contact or refusal all things considered. Note that both age and health – two factors associated with increased likelihood of a proxy interview – are controlled.

Proxy respondents and those undergoing refusal conversion yielding a telephone interview both could eventually provide full interview data gathered through face-to-face interviewing at a subsequent wave. Having ever given a proxy or ever given a telephone interview are both still predictive of subsequent non-response. Respondents ever being proxied are about 1.6 times more likely to subsequently non-respond than others ($\hat{b}$ = 0.490, $p < 0.001$; $e^{0.490} = 1.632$ from the multi-domain non-response model). This effect remains in the refusal model ($\hat{b}$ = 0.565, $p < 0.001$). Ever providing a telephone interview, as expected, is positively associated with subsequent panel non-response ($\hat{b}$ = 0.804, $p < 0.001$).

Respondents ever providing a telephone interview, meaning they have ever refused an interview, are more than 3 times more likely to eventually drop-out of the study than respondents providing either full or a mixture of full and proxy interviews over the life of the panel ($\hat{b}$ = 1.110, $p < 0.001$; $e^{1.110} = 3.034$).

These findings comport with Burton, Laurie and Lynn (2006) who show that the refusal conversion programme in the BHPS is successful in retaining respondents for a number of waves, but that those undergoing the programme tend to eventually drop out of the panel. Similarly, respondents who are proxied may remain in the study for a number of waves but will eventually drop out.

6.4.2 Presence and Influence of Others. Since, the BHPS is administered face-to-face in the respondent's home, the presence of others is often unavoidable as is their influence over the interview itself. The results in Table 7 show that the presence of others is associated with lower odds of subsequent non-response ($\hat{b}$ = -0.138, $p < 0.05$, in the multi-domain non-response model), and this relationship remains in the non-contact model ($\hat{b}$ = -0.221, $p < 0.01$) but not the refusal model once other factors are controlled. This appears to be related to the presence of children in the home (not shown), as children are the most likely candidates to be present during other interviews. While the presence of others may have a positive impact on contactability, the influence of others on the survey itself seems to have a deleterious effect on response propensities. If others influence the interview, itself, the odds of subsequent non-response are about 25 percent increased ($\hat{b}$ = 0.224, $p < 0.01$; $e^{0.224} = 1.251$). This effect disappears in the non-contact model, but remains in the refusal model ($\hat{b}$ = 0.217, $p < 0.05$).

6.4.3 Tracking. In prior research, failure to provide the name, address and phone number for someone who would know how to contact the respondent in the event that they cannot be otherwise found was associated with higher rates of subsequent non-response (Burton, Laurie and Lynn 2006). That is, failure to provide information about who will know of respondent's whereabouts is an effective advance refusal to continued panel participation. Respondents not providing this tracking information have associated odds of non-response nearly 2 times higher than respondents providing it ($\hat{b}$ = 0.701, $p < 0.001$; $e^{0.701} = 2.016$ in the multi-domain non-response model). While this stable contact information is integral to maintaining contact with respondents, the effect for providing these details is stronger for

refusal than for non-contact ($\hat{b}$ = 0.455, $p < 0.01$ in the multi-domain non-contact model; $\hat{b}$ = 0.766, $p < 0.001$ in the multi-domain refusal model). Partial tracking info is also associated with eventual refusal but not non-contact. On the one hand, this suggests that providing partial stable contact information is an advance soft-refusal, perhaps, whereas not completing is a strong one. On the other, providing less than complete tracking information could represent an underlying resistance to survey participation generally.

***6.4.4 English Language*.** BHPS interviews are conducted in English[7] which means that any survey respondent not fluent in English could be motivated not to participate at subsequent waves. Also, one might suppose that non-native English speakers live in less stable accommodation resulting in lower likelihood of subsequent contactability. Considering the "bivariate" and domain models, having English language problems predicts non-response ($\hat{b}$ = 1.021, $p < 0.001$ in the "bivariate" non-response model and $\hat{b}$ = 0.549, $p < 0.001$ in the domain non-response model). This is largely due to non-contact ($\hat{b}$ = 1.283, $p < 0.001$, $\hat{b}$ = 0.843, $p < 0.001$, in the "bivariate" and domain models respectively) but not refusal. All things considered, English language problems affects non-contact only ($\hat{b}$ = 0.580, $p < 0.05$). Upon investigation, this attenuated effect results once the respondent's race and not having access to a car or van for personal use – a factor associated with urban living – are included in the model. Note however that English problems are persistent indicators of subsequent non-contact. A similar set of findings for problems with the self-completion instrument emerges as some sort of problem with finishing the self-completion component of the BHPS is associated with subsequent non-contact ($\hat{b}$ = 0.526, $p < 0.05$). Note various "bivariate" and domain effects for requiring assistance and refusing the self-completion instrument, but that these effects disappear in the full model. Reading these results together, we might surmise that respondents with a lower ability to participate are also likely to be difficult to contact. This issue is a larger problem for maintaining contact with respondents with poor English skills than for inducing them to cooperate with the interview.

***6.4.5 Interviewer Assessed Cooperativeness*.** Over the course of a 35 to 40 minute interview, the interpersonal contact between interviewer and respondent can be marked by quite high rapport. Poor respondent cooperativeness with the interview process itself can indicate a lack of interest in the survey topics, dislike for the interviewer, mistrust for the

[7] Translations into Welsh are required by law but very few interviews are conducted in Welsh.

survey organisation or other attitudes. BHPS interviewers rate respondents cooperativeness at the end of the interview as either Excellent, Good, Fair, Poor or Very Poor. Very few respondents exhibit Poor or Very Poor cooperation, however, while the majority of respondents are rated as having Excellent cooperativeness. Table 7 shows the results of including this measure of respondent cooperativeness with categories set relative to a rating of 'Excellent'. There is a general monotonically increasing propensity to non-respond as cooperativeness declines ($\hat{b}$ = 0.311, p < 0.001; $\hat{b}$ = 0.833, p < 0.001; and $\hat{b}$ = 1.229, p < 0.001 for Good, Fair and Poor/Very Poor cooperativeness respectively in the multi-domain non-response model). Poor cooperativeness seems to have a more important effect for eventual refusal rather than non-contact although the monotonic effects remain and are strongly significant. This suggests that any respondent disinterest is likely to be evident to the interviewer and that disinterested or otherwise difficult respondents are, in fact, more likely to attrite from the study at subsequent waves.

6.4.6 Change of Interviewer. Within the BHPS, every effort is made to return the same interviewers back to respondents because it is believed that interviewer continuity minimises the risk of subsequent non-response (Behr, Bellgardt and Rendtel 2005; Burton, Laurie and Lynn 2006; Laurie, Smith and Scott 1999; Zabel 1998). A change of interviewer may be occasioned by a respondent move but also interviewer turnover. High interviewer turnover is noted in some urban areas and both geographic mobility and urban living are theoretically associated with non-response (Groves and Couper 1998; Laurie, Smith and Scott 1999; Lepkowski and Couper 2002). Most studies that purport to demonstrate interviewer continuity effects are non-experimental and might confound interviewer stability with area effects. At BHPS Waves 2 and 3, interviewer continuity was examined experimentally (Campanelli, Sturgis and Purdon 1997). Campanelli and O'Muircheartaigh (1999) found no effect of continuity at Wave 2 but when extended to Waves 3 and 4 significant differences emerged (Laurie, Smith and Scott 1999). Re-analysis by Campanelli and O'Muircheartaigh (2002) suggests that apparent non-response differences due to interviewer non-continuity could result from non-random interviewer attrition. The results from the present analysis in Table 7 suggest that having a new interviewer is weakly associated with non-response ($\hat{b}$ = 0.140, p < 0.05 in the multi-domain non-response model), whereas ever having a new interviewer and the more frequent number of changes in interviewer have no effect. Splitting non-response into non-contact and refusal, I find that interviewer change has no effect on either. Although liking the interviewer may induce respondents to cooperate on the doorstep (Groves and Couper 1998; Groves, Singer and Corning 2000), change in

interviewer does not seem to impair the cooperativeness of panel respondents nor does it signal subsequent problems with respondent contactability all things considered.

These findings are broadly indicative of respondent disinterest. Failure to provide tracking information, poor cooperativeness as rated by the interviewer, and difficulty in obtaining data resulting in proxy or telephone interviews all suggest uninterested or poorly motivated response. Such respondents are more likely to subsequently refuse which is a natural expectation. This leaves only cooperative, motivated and interested respondents as the panel ages. It should be noted that many of these predictors of non-response may be unrelated to outcomes of substantive interest and for this reason they could be fruitful instruments in adjusting for response propensities in substantive analyses of these data.

6.5 Non-Response as a Function of Labour Market Participation, Socio-economic Status and Financial Standing

Time spent at home and out of the home should be related to patterns of labour market participation. That is, respondents who are employed or households with a greater proportion of members employed outside the home, will spend less time occupying the home during any given week. Less presence in the home reduces the likelihood of contact and hence non-response should be more likely for employed respondents. Respondents with high socio-economic status (SES) are theoretically expected to have higher rates of non-response while low SES respondents could have either low or high rates of non-response (Groves and Couper 1998). Table 8 and Table 9 contain results of models including measures of labour market participation, socio-economic status and household financial standing.

[TABLE 8 HERE]

***6.5.1 Respondent's Employment*.** Certain employment situations can influence response propensities in different ways. Table 8 shows the results of models incorporating respondent employment status. I modelled the effects of each labour market situation relative to working full-time. Full-time work, here, is between 37 and 45 hours because "full-time" depends on occupation. Respondents who are unemployed are significantly more likely to non-respond than full-time workers ($\hat{b}$ = 0.233, $p < 0.01$ in the multi-domain non-response model) and this is largely due to subsequent non-contact rather than refusal ($\hat{b}$ = 0.360, $p < 0.001$ in the multi-domain non-contact model vs. no effect in the refusal model). Respondents found unemployed in any wave might subsequently non-respond because they move to a new city or town for employment or in search of employment so this finding might be expected.

Labour market situations suggesting greater time spent present in the home should predict greater contactability. Results in Table 8 show that those who are retired and long-term sick are significantly less likely to non-respond than full-time workers ($\hat{b}$ = -0.211, p < 0.05 for retired; $\hat{b}$ = -0.364, p < 0.01 for long-term sick). Interestingly, only the results for long-term sick or disabled remain in the non-contact model, all things considered ($\hat{b}$ = -0.383, p < 0.05). The refusal model shows that the employed are more likely to refuse the survey request than are retirees ($\hat{b}$ = -0.210, p < 0.05), respondents providing family care or on maternity leave ($\hat{b}$ = -0.176, p < 0.05), full-time students ($\hat{b}$ = -0.493, p < 0.01) and the respondents who are long-term sick or disabled ($\hat{b}$ = -0.368, p < 0.01). We might suppose that full-time workers may feel more burdened by the interview process, valuing time spent at work and with family rather than providing interview data, hence they are more likely to refuse the survey request. These other groups (retires, students, etc.) do not, in contrast, which would yield a negative effect on refusal for these statuses relative to full-time employment. Employment greater than full-time is not significant in the refusal model which contradicts this view to some extent as there is no effect of hours worked on refusal. Employment greater than full-time, however, does affect contactability as those working greater than full-time are significantly more likely to be lost due to non-contact ($\hat{b}$ = -0.286, p < 0.01).

6.5.2 Spousal Employment. As discussed above, including spousal employment eliminates the effect of being married or partnered on non-response. In additional to patterns of respondent employment, patterns of employment and labour market activity for respondent's spouse, if they have one, will affect the likelihood of locating respondents or other household members for interview. Relative to respondents without a spouse, respondents with a working spouse controlling for respondents own employment, should be less contactable assuming that employment amongst household members makes households less contactable more generally. The results presented Table 8 indeed indicate that having a working spouse significantly reduces the likelihood of non-response relative to those with no spouse ($\hat{b}$ = -0.232, p < 0.05 from the multi-domain non-response model). A non-working spouse in the household is no different from someone with no spouse present in propensity to non-respond. While simply being married or partnered enhances the likelihood of response for reasons discussed earlier, spousal employment seems more important. These results are mirrored in the "bivariate" and domain non-contact models, but

not the refusal models. Contacting respondents with a working spouse is significantly easier than contacting respondents with no spouse or a spouse that works (e.g., $\hat{b}$ = -0.981, p < 0.001 for a working spouse in the domain non-contact model). These results disappear in the multi-domain model once age, gender and other factors are controlled. Although not tested in these models directly, these results may suggest that one of the reasons why women have higher response propensities is that they are more likely to be at home during the times interviewers call – such as when their spouse is at work -- and hence easier to contact.

6.5.3 Education. Education enters the models as a series of dummy variables indicating roughly the level of education received: respondents holding a higher degree versus CSE/O Level/A level with the omitted category being no qualifications at all. The "bivariate" non-response models reported in Table 8 shows, as expected, that those with any type of higher degree and CSE/O/A level are less likely to non-respond than those with no qualifications at all. Controlling for age – a factor strongly associated with the receipt of educational qualifications – only the results for CSE/O/A level persist in the multi-domain non-response model ($\hat{b}$ = -0.108, p < 0.05). Splitting the effect into non-contact and refusal, we see that educational attainment has no effect on contactability, but does influence the likelihood of refusal as might be expected. The multi-domain refusal model suggests a monotonic effect in education with the coefficient for holding a higher degree at -0.365 (p < 0.001) being significantly lower than the coefficient of -0.144 (p < 0.01) for CSE/O/A level (Wald X^2 = 6.89, 1 *d.f.*, p < .01). This evidence is consistent with prior research on survey participation in panel studies as well as supporting the proposition that sample members with greater education may be more able to see the utility of providing survey data and hence be less likely to refuse the survey request.

6.5.4 Income Data. Turning next to the effects of income on panel non-response, I have incorporated two aspects of income into these non-response models: item non-response for income questions and the amount of stated income. Income is a highly sensitive topic for many people (Branden, Gritz and Pergamit 1995; Groves, Singer and Corning 2000) and item non-response for income questions often tends to be higher than for other themes. For this reason, we might suppose item non-response would be indicative of low interest in the study, or even offence at the survey content, which would be predictive of subsequent unit refusal (Branden, Gritz and Pergamit 1995). The BHPS data includes a range of income measures, included in Table 9 are measures of missing data for households and for individuals, both annual and monthly. I have treated imputed income data as missing for

these models. It should be noted that proxy and telephone respondents are both asked to report income hence non-response here does not reflect interview mode. The "bivariate" non-response models, including the models for non-contact and refusal, indicate that missing income items are significantly associated with subsequent non-response – both due to non-contact and refusal. In the domain and multi-domain models, I include only one measure of missing income data because of collinearity[8]. In the multi-response models, missing annual individual income remains highly predictive of non-response ($\hat{b}$ = 0.281, p < 0.001) whether due to non-contact ($\hat{b}$ = 0.206, p < 0.001) or refusal given contact ($\hat{b}$ = 0.301, p < 0.001).

[TABLE 9 HERE]

Although missing income is predictive of non-response, what is the relationship between stated income and response propensity more generally? I focus only on annual household income because individual monthly, individual annual, and household monthly income are strongly correlated. I split the income distribution into the lower quintile and upper quintile relative to the middle three-fifths of the distribution. Missing household income, here, does not include imputed data so those households with imputed annual income are included in the income distribution. Similar to Watson's (2003) findings with ECHP data for southern Europe, I find that respondents in households with income at the upper end of the distribution are more likely to non-respond subsequently ($\hat{b}$ = 0.177, p < 0.01 in the multi-domain non-response model) and that this effect is due to non-contact ($\hat{b}$ = 0.229, p < 0.05) rather than refusal (not significant). Recall that those employed greater than full-time were more likely to be lost due to non-contact. This income effect, then, is above and beyond any employment related effect.

The effect across models for low income does not correspond to findings in other studies of attrition. Notably, there is no effect of being at the low end of the household income distribution for non-response, generally, although there is a slight effect for non-contact ($\hat{b}$ = 0.206, p < 0.05 in the multi-domain model) but the opposite effect for refusal ($\hat{b}$ = -0.170, p < 0.05). It would seem, then, that low income respondents in Britain are happy to participate in an ongoing survey in which income and financial well-being are central themes but can be somewhat difficult to maintain in the sample.

[8] Household income is derived from aggregating individual reports of income. Annual or monthly income are derived from whichever period of income the respondent reports.

6.5.5 Access to Personal Transport. Having no access to a car or van for personal use is included in these models on the assumption that this indicates wealth to some degree. That is, having no access to a personal transport of this type is indicative of material deprivation which as an indicator of low SES is theoretically linked to the willingness to participate in social surveys (Groves and Couper 1998). Admittedly, absence of access to automotive transport could also indicate central city living where having a car or van for personal use is less important than outside of a central city. The BHPS does not include information about the respondent's specific geographic setting other than region so we might reasonably assume that lack of access to personal automotive transport or not being able to drive might indicate residential urbanicity once other more direct measures of SES are controlled. Nevertheless, lack of personal transport or driving ability should predict non-response for either theoretical reason. The results in Table 9 show that not having access to a car or van is predictive of subsequent non-response ($\hat{b}$ = 0.225, $p < 0.001$). The stronger relationship is with non-contact ($\hat{b}$ = 0.280, $p < 0.01$) rather than refusal ($\hat{b}$ = 0.167, $p < 0.05$). Note the slight positive effect for having no ability to drive ($\hat{b}$ = 0.106, $p < 0.05$) suggesting this variable might be capturing urbanicity to some extent rather than material deprivation.

6.5.6 Self-Assessed Financial Well-Being. The results for subjective financial standing contradict the argument that the less well off are more likely to be non-respondents. These results comport with the findings from low income respondents. The measure of subjective financial well-being comes from the question "How well would you say you yourself are managing financially these days?" with response options of "Living comfortably", "Doing alright", "Just about getting by", "Finding it quite difficult" and "Finding it very difficult". I combined the bottom two responses for analysis while treating "Doing alright" as the reference category. In the multi-domain non-response model, those answering "Just about getting by" and "Finding it difficult" or "Very difficult" are significantly less likely to non-respond than those "Doing alright" ($\hat{b}$ = -0.112, $p < 0.05$ for "Getting by"; $\hat{b}$ = -0.162, $p < 0.05$ for "Difficult"). Considering non-contact and refusal separately, the results indicate no effect in the non-contact model but that those who self-assess their financial condition as difficult are significantly less likely than those doing alright to refuse participation ($\hat{b}$ = -0.247, $p < 0.05$) further confirming the effect for low income. This translates into roughly a 22 percent lower odds of non-response for those believing themselves to be in a difficult financial situation ($e^{-0.256} = 0.781$).

The findings for labour market activity, SES and wealth suggest a positive relationship between economic well-being and non-response in the BHPS. Although the results for education are as predicted and do not support this conclusion, the weight of economic evidence suggest otherwise. Specifically, employment predicts survey refusal while those with low income and respondents believing their financial situation to be difficult are least likely to refuse. Moreover, those at the upper end of the income distribution are likely to be lost through non-contact. Income seems a sensitive topic as the findings here are consistent with research elsewhere showing that income item non-response predicts unit non-response.

6.6 Non-Response as a Function of Opinion or Political Preference

While little prior research on non-response incorporates measures of opinion or values, one motivation for the present analysis is to document covariates of panel non-response generally. While there is no clear reason to believe that certain core values or political leanings might be predictive of subsequent non-contact or refusal in a household panel, the relationships are worth investigating. Tables 9a through 9c include the results for models incorporating two sets of opinion items routinely asked in the BHPS along with political party preference. A first set of opinion items concerns the traditional role of women in the household and tends towards indicating support for women to stick to traditional roles overseeing home and family life. Sample members who support a traditional role for women in the home may actually be more contactable insofar as held beliefs are suggestive of a greater household presence. A second battery of value items concerns the role of government in society. This might be read to hint at a strong welfare state expectation which touches on the SES argument. Recall that Groves and Couper (1998) argue that low SES sample members may feel obligated to the government by virtue of being somewhat dependent upon it and hence more likely to provide survey data. Party preference, if anything, may be indicative of interest in public affairs. Supposing survey participation in a household panel concerned largely with general social conditions is more likely amongst people interested in public affairs, political participation and party support may predict survey cooperation.

6.6.1 Family Values. Table 10a includes "bivariate" results for 9 value items related to the appropriate structure and nature of families with an emphasis on the provision of child care. The original items included 5 response options ranging from "Strongly Agree" to "Strongly Disagree" and I have recoded them into simple valence of "Agree" or "Disagree" using "Neither Agree nor Disagree" as the omitted category. Across the 9 items, we see that in 6 missing data is highly predictive of non-response generally. This is largely due to

subsequent non-contact with those not answering the opinion items as all 9 coefficient for missing data in the non-contact models are significant and generally quite large.

[Table 10a HERE]

A factor analysis of these items yielded a single underlying factor reflecting a strongly traditional view of women's role in the home. From this factor analysis, I identified four items which scored highly on this factor and disregarded all others. These four items include: "A pre-school child is likely to suffer if his or her mother works", "All in all, family life suffers when the woman has a full time job", "A woman and her family would all be happier if she goes out to work" (negatively associated), and "A husband's job is to earn money, a wife's job is to look after the home and family". An index created from these items has an alpha of 0.726[9]. To create the index, I rescored disagreement with only these items (or agreement for the item reverse scored) as -1 with agreement (disagreement, as required) as +1 with neither agreement nor disagreement being 0, then summed them. The index was then recoded into an indicator variable where 0 means neither traditional nor non-traditional and 1 means "Traditional Values" if the index score was greater than 0. This indicator variable was entered into the non-response model with missing values on any of the items comprising the scale included.

The last two rows of Table 10a include results for this "Traditional Values" variable. We see that those with missing data on any of the index items are significantly more likely to non-respond subsequently ($\hat{b}$ = 0.318, p < 0.001). The same effect is found in the non-contact model ($\hat{b}$ = 0.564, p < 0.001) but not the refusal model. Those respondents tending to hold traditional values about the role of women seem less likely to be lost through non-contact than those holding less traditional views ($\hat{b}$ = -0.227, p < 0.001) but are more likely to refuse survey cooperation once contacted ($\hat{b}$ = 0.136, p < 0.01).

[Table 10c HERE]

Table 10c contains results for this factor in a full opinion domain model and the multi-domain non-response, non-contact and refusal models. Once other factors are controlled, the effect of missing data on this factor completely disappears. Maintaining traditional family values also has no effect on subsequent non-response all things considered.

[9] Both the factor analysis and the alpha calculation used data pooled across waves for all wave 1 respondents prior to attrition with no assumption of clustering.

6.6.2 Views of Government. Table 10b contains "bivariate" results for 6 opinion items relating to the proper role of government and the nature of law in British society. As with the family values items, these items included 5 response options ranging from "Strongly Agree" to "Strongly Disagree" and I have recoded them into simple valence of "Agree" or "Disagree" using "Neither Agree nor Disagree" as the omitted category. Note that in 4 of the six items, missing data predicts non-response and that item missing values are strongly predictive of subsequent non-contact rather than refusal.

[Table 10b HERE]

A factor analysis of these items yields a single underlying factor amongst four of the items. As with the Family Values indicator, I retained only items that loaded highly on this single factor. These items include "Private enterprise is the best way to solve Britain's economic problems" (negatively scored), "Major public services and industries ought to be in state ownership", "It is the government's responsibility to provide a job for everyone who wants one", and "Strong trade unions are needed to protect the working conditions and wages of employees". We can interpret these items as reflecting a leaning towards collectivist values. An index created from these items has a alpha score of 0.556[10]. As with the Family Values indicator, I rescored disagreement with these items (or agreement for the item reverse scored) as -1 with agreement (disagreement, as required) as +1 with neither agreement nor disagreement being 0, then summed them. The index was then recoded into an indicator variable where 0 means no or negative support for collectivist or socialist values and 1 means "Collectivist Values" if the index score was greater than 0. This indicator variable was entered into the non-response model with missing values on any of the items comprising the scale included.

The last two rows of Table 10b contain the results for this Collectivist Values measure. We see that both missing data and Collectivist Values predict non-response ($\hat{b}$ = 0.237, $p < 0.001$; and $\hat{b}$ = 0.128, $p < 0.001$ respectively). Missing data is predictive of non-contact ($\hat{b}$ = 0.381, $p < 0.001$), whereas maintaining some Collectivist Values is predictive of survey refusal given contact ($\hat{b}$ = 0.174, $p < 0.001$). Table 10c includes this measure in the multi-domain models, where we see its effect altered somewhat. Once other factors are

[10] As with the Family Values measure, both the factor analysis and the alpha calculation used data pooled across waves for all wave 1 respondents prior to attrition with no assumption of clustering.

controlled, missing data continues to predict non-contact ($\hat{b}$ = 0.245, p < 0.05), but here Collectivist Values inhibits loss from non-contact ($\hat{b}$ = -0.180, p < 0.01).

6.6.3 Supporting a Political Party. Table 10c also contains results from models incorporating measures of support for political parties in Britain. Relative to those who indicate that they support a particular political party, those not supporting a political party are generally more likely to non-respond ($\hat{b}$ = 0.120, p < 0.001 in the domain specific non-response model). Missing data, here, however is highly indicative of non-response generally as those with missing data have odds of non-response nearly 4 times greater than respondents supporting a political party ($\hat{b}$ = 1.380, p < 0.001, $e^{1.380}$ = 3.97 in the domain specific model). This effect of missing data persists in the multi-domain non-response model ($\hat{b}$ = 0.825, p < 0.01) and the refusal model specifically ($\hat{b}$ = 0.842, p < 0.001). Perhaps some respondents are sensitive to providing information about their political leanings.

***6.6.4 Specific Party Supported*.** The final set of indicator variables in Table 10c capture the range of political parties supported by respondents. Respondents were asked to name the political party that they supported or felt a little closer to if they did not say they explicitly supported any specific party. Also, respondents not supporting a party nor feeling a little closer to a particular party were asked which party they would vote for if the general election were to occur "tomorrow". I aggregated the named party derived from each routing and recoded the listing of parties into Conservative, Labour, Liberal Democrats, No Party and "Can't Vote" with the omitted category being "Other Party". This coding allows for a direct comparison of support for the three main parties in Britain as they can each be compared to "Other Party" and indirectly through this to each other. Table 10c contains results showing Conservative and Liberal Democrat supporters are less likely to non-respond relative to "Other" and that Labour supporters are no different from "Other Party" supporters to non-respond (e.g., in the domain non-response model, $\hat{b}$ = -0.262, p < 0.01 for Conservative; $\hat{b}$ = -0.399, p < 0.001 for Liberal Democrat). These results disappear in the multi-domain non-response model. Exploring the non-contact and refusal models, we see that Liber-Democrat supporters are less likely to be lost through non-contact ($\hat{b}$ = -0.321, p < 0.05) and that Labour supporters are more likely than all others to refuse participation ($\hat{b}$ = 0.253, p < 0.05). The effect of missing data here remains striking. Respondents failing to answer about their preferred political party are about 59 percent more likely to refuse subsequently

that others providing this information ($\hat{b}$ = 0.464, $p < 0.001$). This further implies that politics is also a sensitive topic that affects non-response.

This collection of findings is somewhat surprising and not quite as expected. Although support for women's traditional household roles may be indicative of greater household presence, there is no effect of holding such a view on non-response. I found a slight negative effect on non-contact amongst respondents valuing a collectivist approach to government. Furthermore, I found little evidence to suggest political participation is predictive of survey cooperation generally. Although contact is more easily maintained with Lib-Dem supporters and Labour supporters are slightly more likely to refuse survey participation over the life of the panel, item missing data on political preference suggests that politics seems to be a sensitive topic that promotes subsequent survey refusal.

6.7 Non-Response as a Function of Social Participation and Religiosity

Social participation might affect at-home patterns and hence respondent contactability and likely continued survey response (Groves and Couper 1998; Lepkowski and Couper 2002). On the other hand, greater social activity can indicate a greater amiability for human interaction which balances in favour of higher levels of survey participation. At the same time low levels of social participation suggesting social isolation – a condition not conducive to survey cooperation (Groves and Couper 1998; Groves, Singer and Corning 2000). Table 11 contains results from models incorporating various direct measures of social participation including organisational membership, joining in the activities of various social organisations, as well as religious preference, importance and attendance. We might expect greater social participation to be associated with lower levels of non-response, generally, as well as non-contact and refusal specifically.

[TABLE 11 HERE]

6.7.1 Organisational Membership and Activity. BHPS respondents are asked to list the types of organisations of which they are members including political parties, environmental groups, sports clubs, professional organisations, women's groups, parents associations amongst other groups. The count of organisation types listed reflects a diversity of social interests and ranges from 0 to 12. Fewer than 10 percent of respondents indicate participating in three or more types of organisation while just under 50 percent report no organisational memberships at all. Even if the respondent was not a member of any of the listed types of organisations, they are asked whether they join in any of the activities of such organisations. Again, the count of "active" organisation types reflects a diversity of social participation. Here, fewer than 8 percent of respondents indicate joining in the activities of

three or more different types of organisations while more than half do not join in the activities of any organisations. The variables entered, then, indicate membership or activity with one, two, and three or more organisation types with zero organisation types as the omitted category.

In prior theoretical and empirical work, people who exhibit a greater intensity of social engagement tend to be less likely to be non-respondents (Lepkowski and Couper 2002). This work does not consider omnivorousness in social engagement, however, which is what we can measure in the BHPS. Nevertheless, a diverse social portfolio still suggests greater social involvement and could indicate a lower likelihood of subsequent non-response in panel studies. In the "bivariate" non-response model, greater diversity of organisational memberships is associated with significantly reduced likelihood of non-response and that the effect is monotonic (Wald test X^2 = 78.9, p < 0.001). This relationship holds in the domain specific model, but in the multi-domain model only membership in three or more types of organisations is significant. Here, membership in a diverse set of organisations predicts significantly less non-response ($\hat{b}$ = -0.409, p < 0.001). Splitting out non-contacts and refusals, the findings mirror the general non-response findings as membership in three or more types of organisation reduces the odds of both non-contact ($\hat{b}$ = -0.544, p < 0.01) and refusal ($\hat{b}$ = -0.316, p < 0.05).

The results for organisational activity are similar to membership in organisations. Where membership in types of organisations can signal diversity in social interests, activity has a physical effect on the presence of the respondent at home as well as indicating sociability. The "bivariate" result for the number of organisation types in which the respondent is active parallels organisational memberships. We see a monotonically decreasing odds of non-response as the count of active types of groups increases (Wald test X^2 = 49.8 p < 0.001). Once other factors are controlled in the multi-domain model, activity in three or more types of organisations retains somewhat its negative effect on non-response ($\hat{b}$ = -0.330, p < 0.05). Organisational activity does seem to indicate sociability rather than absence from the home. I find no effect on non-contact in the multi-domain model but sample members active in three or more types of organisations are significantly less likely to refuse survey participation once contacted ($\hat{b}$ = -0.447, p < 0.05).

6.7.2 Religiosity. Religiosity and religious service attendance may be contra indicators of social isolation and consequently would be predictive of a greater propensity to cooperate

with strangers, such as a survey interviewer making a survey request (Groves, Singer and Corning 2000). These factors may also signal community attachment, implying greater contactability (Groves and Couper 1998).

BHPS respondents are asked to state how much difference religious beliefs make to their lives: "None", "A little", "Some" or a "Great difference". I modelled these indicators with "None" as the reference group because just under half of respondents report that religion makes no difference to their lives. The "bivariate" non-contact model reported in Table 11 suggests that respondents maintaining that religious beliefs matter "some" or "greatly" are significantly less likely to subsequently non-respond than non-religious respondents. However, these effects disappear once organisational participation and other religious attendance variables are included in the model. These effects similarly are not found in either the non-contact or the refusal models. Note that I did not include this measure of religiosity in the multi-domain model because of the general lack of effect across the entire range of the variable in the domain specific models and because religiosity is highly related to religious attendance which was retained across models.

6.7.3 Stated Religious Preference. Specific religious preference is indicated with a series of dummy variables with "No Religion" as the reference category. The results in Table 11 show that Anglicans are slightly less likely to subsequently non-respond ($\hat{b}$ = -0.118, p < 0.05 in the domain specific model) while Catholics are slightly more likely to subsequently non-respond ($\hat{b}$ = 0.160, p < 0.05). Once other factors are controlled in the multi-domain non-response model, only Non-Christians are significantly less likely to non-response ($\hat{b}$ = -0.384, p < 0.05). The effect for Anglicans and Non-Christians remains in the non-contact model ($\hat{b}$ = 0.150, p < 0.05, $\hat{b}$ = -0.797, p < 0.05 respectively). Stated religious preference has no association with refusal.

6.7.4 Religious Attendance.. Religious attendance as a more direct measure of religious behaviour should signal greater community attachment and hence greater propensity for survey cooperation and contactability. The attendance measure ranges from "Only at weddings or funerals" to "Weekly" and I used "Weekly" attendance as the reference category. Respondents with lower levels of attendance might be expected to exhibit higher rates of non-contact and refusal. The results in Table 11 show that in the "bivariate" non-contact model, this is indeed the case. Respondents who attend religious services less than annually are highly likely to subsequently non-respond ($\hat{b}$ = 0.296, p < 0.001). This effect is

paralleled in the "bivariate" non-contact and refusal models and persists in the multi-domain refusal model ($\hat{b}$ = 0.218, $p < 0.05$). Once other factors are controlled in the domain specific and multi-domain models, religious attendance is no longer a significant predictor of non-response. Instead, respondents who attend religious services only for weddings and/or funerals are more likely to be contactable ($\hat{b}$ = -0.267, $p < 0.05$ in the multi-domain non-contact model).

Taken together these findings for religious participation and organisational membership and activity are consistent with other social participation findings. Respondents with wide interest and intense social participation are easier to retain in the panel and more likely to cooperate with the survey once contacted. Hence, panel participation would seem to be enhanced by social participation generally.

7 Summary

Using data from the British Household Panel Study, I have estimated a series of discrete time transition models predicting panel non-response, generally, and non-response due to non-contact and refusal given contact more specifically. Although the BHPS is a household panel survey and respondents could exhibit multiple episodes of non-response, I have followed the trend in prior research on panel attrition and treated the first instance of non-response as the attriting event.

The rate of non-response in the BHPS is broadly similar to other panel studies. I found that non-response was highest over the first few waves before levelling off. When broken in to non-response due to refusal and non-response due to non-contact, I found that initial non-response was largely a result of refusal and that refusal rates are higher than non-contact rates over the life of the panel. The evidence also indicates that both refusal and non-contacts have increased in recent waves.

Time dependence patterns aside, the results of these analyses largely comport with aspects of general non-response theory. Focusing first on non-contact, findings for the BHPS largely support the argument that failure to contact respondents is largely a function of physical impediments to contact, patterns of presence in the home and likely geographical mobility. As with other studies, indicators of physical impediments to contact predict non-contact in the BHPS even though respondents may have a history of survey participation. The likelihood of non-contact was higher for respondents in rental accommodation as well as respondents residing in flats, bedsits and other types of

arrangements relative to respondents living in dwellings with their own entrance. Factors related to patterns of presence in the home when interviewers are likely to call were also largely indicative of subsequent non-contact. These include sex, self-reported poor health, working greater than full-time, not having a car, and having high income. Factors suggestive of prior or predictive of subsequent geographic mobility were also indicative of non-contact. I found that respondent wishing to move home, disliking their neighbourhood, having moved in the prior two years, and being unemployed are all indicative of subsequent non-contact all things considered.

Panel attrition can also result from respondents refusing to comply with the request to be interviewed. Some respondents may adamantly refuse participation – largely because they have issues with surveys generally – while others may be willing to participate but for situational reasons may be unwilling in any given wave. Given the definition of attrition I have used, both types of refusals were considered attriting events even though respondents refusing situationally may well return to the study in the longer term at the next wave. The literature on survey cooperation, as distinct from non-contact, is quite disparate ranging in explanations revolving around social psychological processes taking place when the interviewer approaches a household, to decision making heuristics such as those related to rational choice theory, normative compliance, and innate psychological traits such as low desire for sociation. Individual level characteristics could indicate several of these processes, however fine grained analysis into the mechanisms that lead to refusing a survey request could not be addressed with these data. Nevertheless, a number of results are suggestive of various processes leading to a survey refusal.

Respondents who may have lower levels of interest in the themes or topics of the study seem more likely to refuse. For example, any respondent ever refusing in the past occasioning a telephone interview were more likely to subsequently refuse. Respondents failing to provide any tracking information or failing to provide complete tracking information were more likely refuse subsequently suggesting that respondent may be willing to provide one or two interviews but may be otherwise unwilling to be followed to their graves by the survey organisation. Respondents rated anything less than excellent in terms of their cooperativeness were also likely to subsequently refuse. Of course respondent cooperation could be indicative of their feelings about the survey generally but also the interviewer specifically. Failure to provide income information as well as reluctance to state political preferences could also indicate a low level of interest – if not confidence – in the study. Educational background, independent of its indication of SES, seemed to be a contra

indicator of survey interest. Those with higher educational qualifications are less likely to refuse compared to those with no or lower level degrees.

Some respondents may be motivated to be counted or heard and so are more likely than others to participate. In particular, respondents in the lowest quintile of the income distribution are significantly less likely than middle income respondents to refuse participation. This finding is supported by subjective feelings about financial situation where those finding life quite difficult are also less likely to refuse survey participation. Respondents engaged in family care, who are long-term sick or disabled, as well as full-time students were significantly less likely than full-time employees to refuse the survey request.

Theoretically, people who are socially isolated should be less willing to participate in social surveys. I found various contra-indicators of social isolation to be predictive of lower odds of survey refusal generally. Consistent with the literature on this topic, the presence of children in the home – namely younger children – was inversely predictive of refusal. Membership and activity in a diverse set of organisations also inhibited refusal. We might also interpret obtaining health checks, a negative predictor of refusal, to be supportive of this line of thought.

8 Conclusion

In closing, I would like to highlight several future directions that might be fruitfully explored and may be implied by the present research. First, response in the BHPS occurs in a household context. I have found that respondents who are influenced at all in their survey participation by other household members are significantly more likely to refuse survey participation at later waves. Although we do not know the nature of this influence, perhaps not all members of the household are survey participants. The respondent household member could be influenced by non-responding household members to avoid survey participation at later waves, or alternatively non-responding household members might be encouraged to start participating by household members who consent to being interviewed. Further investigation into the household context of survey participation may be warranted. To this end, incorporating the response behaviour of panel entrants could undoubtedly add to our understanding of the social setting under which decisions to participate in an on-going panel are made.

Second, the literature suggests that the elderly and in particular the oldest of the old are more likely to refuse survey requests and that this refusal is the result of poor health. I have found that those born before about 1930 are significantly more likely than other age

groups to refuse the survey request but I found no effect of self-reported health on the odds of refusal amongst Wave 1 respondents. This finding is curious and might benefit from further investigation into the nature and refusal amongst older respondents while at the same time investigating with greater care the link between respondent health and survey participation.

Third, I have focused almost exclusively on the effect of factors observable only at the wave prior to the non-responding event. By its very nature, a household panel survey has a wealth of information about respondents that accumulates over time. The wealth of information will vary across respondents as they attrite over the life of the panel yet further work could be done to incorporate measures that rely on a greater wealth of data. Notably, change scores or measures of prior change in the characteristics and statuses of respondents may be fruitfully explored. At the same time, I have not incorporated any measures which explicitly interact with time. Some factors may be more strongly predictive of non-response earlier in the panel and less so as the study ages. Both types of covariates may be beneficially added to the models presented here.

Next, I have focused exclusively on the initial instance of non-response as the indicator of attrition however respondents may non-response for a single wave then return to the study. We know very little about interim non-response including the act of being re-interviewed as well as the predictors of non-response a second, third or more times. Further work might be beneficial in at least two areas related to this: (a) predictors of repeated non-response and (b) predictors of re-interview.

Finally, data on the interviewers working on the BHPS is limited. Notably, we know nothing about interviewer's age, gender, or degree and nature of experience as an interviewer. All of these may have direct effects on response propensity and further exploration into the nature and causes of attrition in panel studies would undoubtedly benefit from controlling for these factors if not exploring their effects more explicitly.

I have examined a broad array of factors that could predict survey non-response through either non-contact or refusal. Substantive researchers may find amongst these results ideas for instrumental variables that will allow for statistical correction or accommodation of non-response in the BHPS. At the same time, these findings generally comport with prior research on non-response both in the panel context and with cross-sectional data and are broadly supportive of general theoretical arguments about survey response propensities.

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Figure 1 Hazard rate of non-response, non-contact and refusal shown as a function of time.

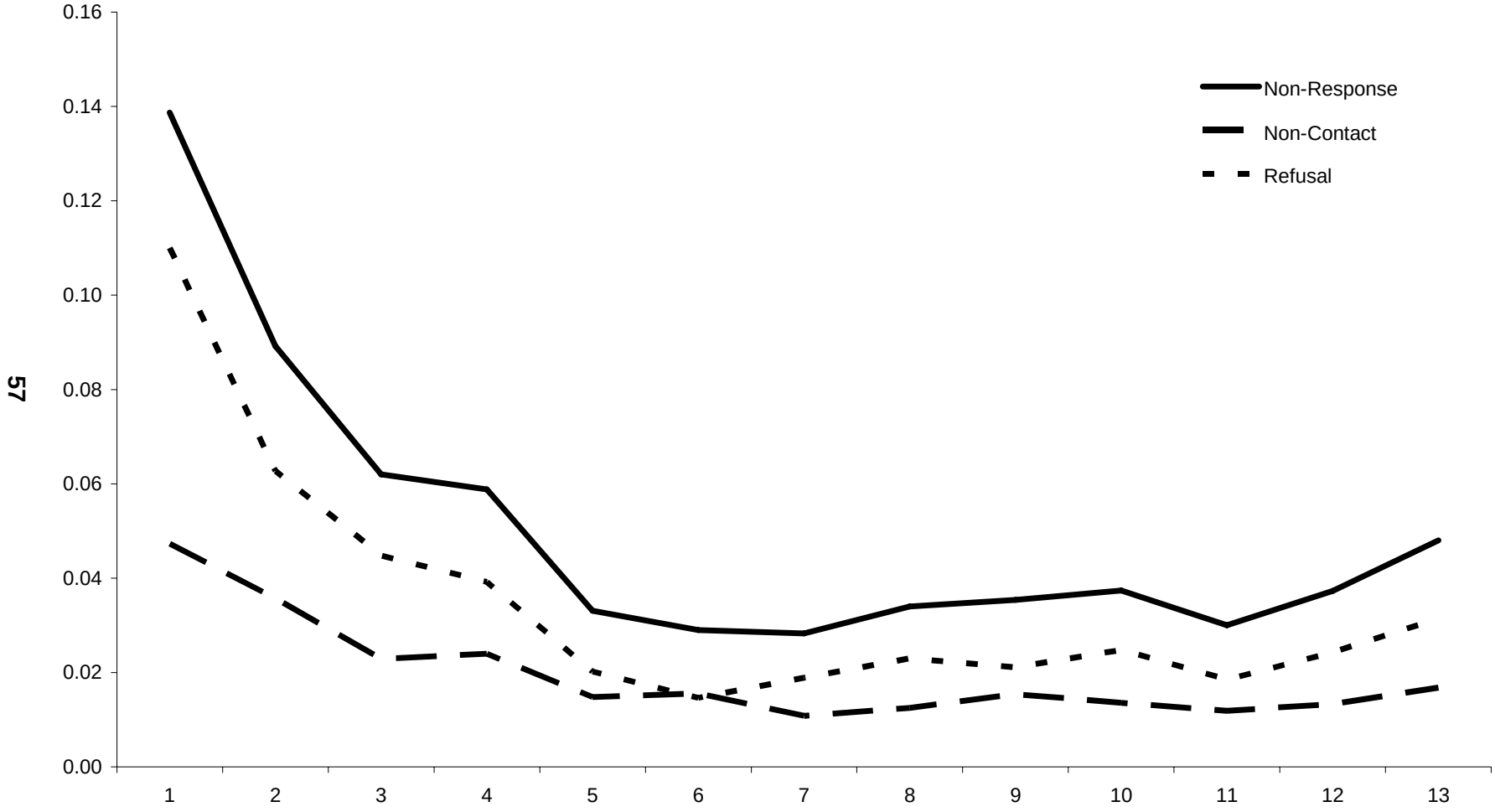

Table 1 Accounting of Wave 1 respondent outcomes through Wave 14

	Full	Proxy	Tele	Non-Contact	Refusal	Censored[†]	Total
Wave 1	9,912	352	0	0	0	0	10,264
Wave 2	8,680	290	0	505	789	0	10,264
Wave 3	7,958	231	238	709	1,030	98	10,264
Wave 4	7,675	209	107	797	1,010	466	10,264
Wave 5	7,279	179	119	949	826	912	10,264
Wave 6	7,236	153	43	916	675	1,241	10,264
Wave 7	7,007	135	30	666	571	1,855	10,264
Wave 8	6,747	131	49	747	397	2,193	10,264
Wave 9	6,493	120	50	821	437	2,343	10,264
Wave 10	6,234	109	84	918	448	2,471	10,264
Wave 11	6,002	93	133	928	460	2,648	10,264
Wave 12	5,777	91	165	747	488	2,996	10,264
Wave 13	5,557	86	137	817	550	3,117	10,264
Wave 14	5,288	75	238	872	441	3,350	10,264

Notes: [†] Non-issued sample for reasons of residency abroad, death, long-term refusal, long-term non-contact, previous wave adamant refusal, or otherwise ineligible for interview.

Table 2 Rate (hazard) of non-response, non-contact and refusal regressed on fully flexible expression of time (Wave indicators), shown are betas.

	Non- Response	Non- Contact	Refusal
Wave 1	1.693***	1.599***	1.706***
	(0.112)	(0.178)	(0.139)
Wave 2	1.229***	1.330***	1.149***
	(0.113)	(0.185)	(0.144)
Wave 3	0.855***	0.887***	0.825***
	(0.123)	(0.204)	(0.156)
Wave 4	0.808***	0.944***	0.715***
	(0.121)	(0.188)	(0.152)
Wave 5	0.227	0.473*	0.063
	(0.128)	(0.197)	(0.170)
Wave 6	0.101	0.536**	-0.242
	(0.136)	(0.200)	(0.177)
Wave 7	0.090	0.172	0.043
	(0.144)	(0.221)	(0.175)
Wave 8	0.285*	0.327	0.259
	(0.134)	(0.199)	(0.181)
Wave 9	0.336*	0.550**	0.196
	(0.132)	(0.202)	(0.169)
Wave 10	0.402**	0.431*	0.382*
	(0.132)	(0.211)	(0.170)
Wave 11	0.186	0.315	0.108
	(0.133)	(0.207)	(0.178)
Wave 12	0.420***	0.434*	0.408**
	(0.125)	(0.215)	(0.156)

* p<0.05, ** p<0.01, *** p<0.001

Table 3 The rate (hazard) of non-response, non-contact and refusal regressed on various individual demographic characteristics.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Born pre-1920	-0.209**	-0.070	0.066	-0.449***	-0.189	-0.595**	0.038	0.081	0.482**
	(0.075)	(0.075)	(0.128)	(0.108)	(0.109)	(0.216)	(0.105)	(0.105)	(0.164)
1920 - 1929	-0.666***	-0.543***	-0.305**	-1.621***	-1.373***	-1.380***	-0.075	-0.050	0.283*
	(0.072)	(0.074)	(0.116)	(0.123)	(0.126)	(0.198)	(0.092)	(0.093)	(0.137)
1930 - 1939	-0.590***	-0.492***	-0.313***	-1.658***	-1.457***	-1.298***	0.032	0.046	0.207
	(0.071)	(0.070)	(0.088)	(0.138)	(0.136)	(0.167)	(0.089)	(0.089)	(0.114)
1940 - 1949	-0.624***	-0.534***	-0.371***	-1.249***	-1.069***	-0.805***	-0.146	-0.130	-0.049
	(0.060)	(0.060)	(0.078)	(0.096)	(0.097)	(0.124)	(0.078)	(0.076)	(0.102)
1950 - 1959	-0.515***	-0.455***	-0.194**	-0.881***	-0.754***	-0.437***	-0.165*	-0.162*	0.025
	(0.058)	(0.058)	(0.074)	(0.088)	(0.087)	(0.113)	(0.081)	(0.081)	(0.098)
1960 - 1969	-0.386***	-0.359***	-0.129	-0.462***	-0.405***	-0.199*	-0.271**	-0.265**	-0.024
	(0.057)	(0.056)	(0.066)	(0.078)	(0.077)	(0.091)	(0.084)	(0.084)	(0.096)
Female	-0.116***	-0.121***	-0.049	-0.168***	-0.174***	-0.133*	-0.083**	-0.089**	0.001
	(0.025)	(0.025)	(0.035)	(0.044)	(0.042)	(0.056)	(0.030)	(0.030)	(0.043)
Race, Mis.	0.230	0.233	0.493***	0.446*	0.452*	0.553**	0.083	0.078	0.419**
	(0.129)	(0.131)	(0.137)	(0.186)	(0.193)	(0.215)	(0.159)	(0.158)	(0.163)
Non-White	0.665***	0.601***	0.304**	0.991***	0.800***	0.529***	0.356**	0.388***	0.067
	(0.078)	(0.080)	(0.094)	(0.107)	(0.111)	(0.127)	(0.114)	(0.115)	(0.137)

* p<0.05, ** p<0.01, *** p<0.001

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Table 3 The rate (hazard) of non-response, non-contact and refusal regressed on various individual demographic characteristics (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Region, Mis.	0.345 (0.457)	-0.081 (0.423)	0.027 (0.500)	0.270 (0.724)	-0.668 (0.580)	-0.660 (0.871)	0.363 (0.476)	0.356 (0.500)	0.389 (0.543)
Southeast	-0.249** (0.088)	-0.171* (0.087)	-0.018 (0.084)	-0.418** (0.143)	-0.279* (0.137)	0.035 (0.129)	-0.100 (0.110)	-0.068 (0.108)	-0.016 (0.112)
Southwest	-0.305** (0.102)	-0.219* (0.100)	-0.068 (0.098)	-0.601*** (0.160)	-0.442** (0.158)	-0.130 (0.155)	-0.081 (0.124)	-0.048 (0.124)	-0.022 (0.125)
East Anglia	-0.569*** (0.154)	-0.492*** (0.149)	-0.381* (0.154)	-0.845** (0.272)	-0.681** (0.261)	-0.346 (0.244)	-0.340* (0.151)	-0.323* (0.148)	-0.360* (0.177)
Midlands	-0.198* (0.094)	-0.137 (0.092)	0.027 (0.089)	-0.530*** (0.143)	-0.427** (0.136)	-0.095 (0.129)	0.045 (0.119)	0.073 (0.117)	0.124 (0.121)
Northwest	-0.231* (0.096)	-0.150 (0.100)	-0.020 (0.100)	-0.457** (0.147)	-0.309* (0.142)	-0.019 (0.135)	-0.052 (0.122)	-0.023 (0.124)	-0.003 (0.131)
Yorkshire / Humberside	-0.194* (0.093)	-0.122 (0.086)	0.001 (0.083)	-0.447** (0.159)	-0.324* (0.148)	-0.018 (0.137)	0.008 (0.112)	0.044 (0.111)	0.047 (0.112)
North & Northeast	-0.335** (0.112)	-0.233* (0.115)	-0.150 (0.119)	-0.713*** (0.191)	-0.553** (0.191)	-0.282 (0.180)	-0.064 (0.134)	-0.009 (0.134)	-0.049 (0.148)
Wales	-0.270* (0.115)	-0.168 (0.119)	-0.025 (0.125)	-0.582** (0.203)	-0.394 (0.201)	-0.090 (0.207)	-0.049 (0.143)	-0.009 (0.145)	0.013 (0.152)
Scotland	0.005 (0.094)	0.089 (0.093)	0.159 (0.098)	-0.109 (0.172)	0.019 (0.158)	0.125 (0.139)	0.106 (0.128)	0.154 (0.126)	0.211 (0.130)

* p<0.05, ** p<0.01, *** p<0.001

Table 3 The rate (hazard) of non-response, non-contact and refusal regressed on various individual demographic characteristics (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Mover, Mis.	2.180*	2.186*	0.053	2.792*	3.179**	1.106	1.241	0.974	1.586
	(1.013)	(1.011)	(1.654)	(1.170)	(1.099)	(1.111)	(1.163)	(1.242)	(0.946)
Movers	0.409***	0.310***	0.188**	0.957***	0.678***	0.337***	-0.084	-0.052	-0.001
	(0.055)	(0.057)	(0.063)	(0.071)	(0.077)	(0.081)	(0.085)	(0.087)	(0.094)

* p<0.05, ** p<0.01, *** p<0.001

Table 4 Rate (hazard) of non-response, non-contact and refusal regressed on various household and family characteristics.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Marital Status, Mis.	0.659 (0.603)	0.666 (0.610)	-0.447 (0.592)	0.743 (0.848)	0.697 (0.853)	-0.637 (1.051)	0.469 (0.636)	0.494 (0.629)	-0.296 (0.630)
Married / Partnered	-0.499*** (0.039)	-0.475*** (0.041)	0.082 (0.106)	-1.042*** (0.069)	-1.081*** (0.070)	-0.022 (0.166)	-0.093 (0.051)	-0.026 (0.052)	0.058 (0.126)
Separated	-0.120 (0.113)	-0.044 (0.115)	-0.026 (0.123)	-0.121 (0.159)	-0.183 (0.159)	-0.016 (0.168)	-0.079 (0.158)	0.097 (0.161)	0.015 (0.173)
Divorced	-0.354*** (0.085)	-0.291*** (0.086)	-0.182* (0.091)	-0.311** (0.113)	-0.364** (0.111)	0.071 (0.125)	-0.389** (0.118)	-0.239* (0.120)	-0.335** (0.127)
Widowed	-0.423*** (0.060)	-0.366*** (0.063)	-0.341*** (0.085)	-0.554*** (0.090)	-0.623*** (0.092)	0.027 (0.135)	-0.278*** (0.083)	-0.126 (0.087)	-0.439*** (0.107)
No. Adults in HH	0.117*** (0.030)	--- ---	--- ---	-0.075 (0.055)	--- ---	--- ---	0.215*** (0.035)	--- ---	--- ---
HH Size	-0.071** (0.022)	0.061** (0.024)	0.050 (0.026)	-0.064 (0.036)	-0.073 (0.038)	-0.049 (0.041)	-0.071** (0.027)	0.149*** (0.031)	0.124*** (0.035)
Single Person HH	0.215*** (0.045)	--- ---	--- ---	0.754*** (0.068)	--- ---	--- ---	-0.244*** (0.065)	--- ---	--- ---
Any Children Present	-0.240*** (0.042)	--- ---	--- ---	-0.246*** (0.071)	--- ---	--- ---	-0.229*** (0.052)	--- ---	--- ---
No. Children in HH	-0.077*** (0.022)	--- ---	--- ---	-0.061 (0.036)	--- ---	--- ---	-0.086** (0.027)	--- ---	--- ---

* p<0.05, ** p<0.01, *** p<0.001

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Table 4 Rate (hazard) of non-response, non-contact and refusal regressed on various household and family characteristics (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Any Kids Aged 0-2	-0.064	-0.067	-0.244*	0.394***	0.685***	0.135	-0.474***	-0.649***	-0.545***
	(0.092)	(0.095)	(0.105)	(0.112)	(0.117)	(0.128)	(0.137)	(0.139)	(0.148)
Any Kids Aged 3-4	-0.212*	-0.212*	-0.300**	-0.145	0.085	-0.212	-0.256*	-0.402***	-0.325**
	(0.085)	(0.092)	(0.097)	(0.117)	(0.127)	(0.129)	(0.111)	(0.116)	(0.124)
Any Kids Aged 5-11	-0.135*	-0.162*	-0.204**	-0.180*	0.079	-0.161	-0.105	-0.314***	-0.219*
	(0.056)	(0.063)	(0.068)	(0.090)	(0.102)	(0.110)	(0.072)	(0.085)	(0.091)
Any Kids Aged 12-15	-0.040	-0.110	-0.113	-0.215	-0.036	-0.120	0.052	-0.174	-0.118
	(0.062)	(0.072)	(0.078)	(0.114)	(0.127)	(0.129)	(0.075)	(0.090)	(0.096)

* p<0.05, ** p<0.01, *** p<0.001

Table 5 Rate (hazard) of non-response, non-contact and refusal regressed on various individual health characteristics.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Health Problems, Mis.	0.052 (0.266)	-0.146 (0.265)	-0.160 (0.279)	0.215 (0.366)	-0.043 (0.367)	0.002 (0.392)	-0.038 (0.327)	-0.202 (0.332)	-0.254 (0.355)
One Health Problem	-0.135*** (0.040)	-0.159*** (0.043)	-0.115** (0.042)	-0.172** (0.060)	-0.241*** (0.063)	-0.056 (0.064)	-0.109* (0.051)	-0.108* (0.053)	-0.151** (0.055)
Two+ Health Problems	-0.148*** (0.039)	-0.226*** (0.050)	-0.165** (0.051)	-0.179** (0.062)	-0.365*** (0.082)	-0.123 (0.088)	-0.124** (0.048)	-0.134* (0.059)	-0.187** (0.062)
GHQ, Missing	0.758*** (0.095)	0.696*** (0.090)	0.055 (0.145)	0.921*** (0.132)	0.834*** (0.126)	0.034 (0.206)	0.613*** (0.117)	0.573*** (0.116)	0.076 (0.179)
Mental Health Problem Likely	0.027 (0.037)	0.035 (0.037)	0.001 (0.038)	0.113 (0.060)	0.116 (0.060)	0.014 (0.061)	-0.028 (0.050)	-0.018 (0.051)	-0.004 (0.051)
Smoker, Mis.	0.622*** (0.121)	0.285 (0.274)	-0.175 (0.283)	0.500* (0.195)	0.379 (0.498)	-0.149 (0.520)	0.718*** (0.156)	0.194 (0.328)	-0.246 (0.338)
Smoker	0.214*** (0.044)	0.155*** (0.044)	0.018 (0.045)	0.456*** (0.063)	0.402*** (0.064)	0.131 (0.067)	0.035 (0.056)	-0.026 (0.057)	-0.068 (0.058)
Disabled, Mis.	0.408 (0.283)	-0.041 (0.312)	-0.059 (0.299)	0.778* (0.350)	0.292 (0.336)	0.265 (0.350)	0.085 (0.346)	-0.274 (0.414)	-0.224 (0.383)
Disabled	0.058 (0.074)	-0.002 (0.080)	0.002 (0.088)	0.161 (0.095)	0.044 (0.106)	0.146 (0.123)	-0.018 (0.093)	-0.035 (0.106)	-0.063 (0.114)

* p<0.05, ** p<0.01, *** p<0.001

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Table 5 Rate (hazard) of non-response, non-contact and refusal regressed on various individual health characteristics (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Self-Reported Health, Mis.	1.548***	1.107**	1.220**	1.768***	1.230*	1.385**	1.217**	0.899	1.034
	(0.398)	(0.413)	(0.376)	(0.533)	(0.490)	(0.470)	(0.468)	(0.575)	(0.547)
Self-Reported Health, Good	-0.008	0.030	-0.013	-0.059	-0.063	-0.028	0.030	0.094	0.002
	(0.041)	(0.044)	(0.045)	(0.068)	(0.070)	(0.071)	(0.050)	(0.052)	(0.055)
Self-Reproted Health, Fair	0.073	0.184**	0.061	0.016	0.030	0.015	0.104	0.273***	0.096
	(0.052)	(0.060)	(0.061)	(0.083)	(0.096)	(0.098)	(0.064)	(0.074)	(0.075)
Self-Reported Health, Poor	0.131	0.308***	0.134	0.155	0.192	0.101	0.110	0.372***	0.172
	(0.067)	(0.083)	(0.083)	(0.102)	(0.123)	(0.121)	(0.088)	(0.106)	(0.108)
Self-Reported Health, Very Poor	0.357***	0.536***	0.346**	0.519***	0.510**	0.424*	0.216	0.516**	0.292
	(0.099)	(0.121)	(0.119)	(0.145)	(0.172)	(0.170)	(0.129)	(0.160)	(0.154)
GB Visits, Mis.	1.174***	0.769*	---	1.283*	0.712	---	1.015**	0.751*	---
	(0.311)	(0.301)	---	(0.527)	(0.435)	---	(0.330)	(0.361)	---
1-2 GP Visits in Past Year	-0.101*	-0.007	---	0.015	0.144*	---	-0.169**	-0.101	---
	(0.042)	(0.045)	---	(0.067)	(0.069)	---	(0.054)	(0.056)	---
3-5 GP Visits in Past Year	-0.150**	-0.005	---	0.040	0.246**	---	-0.266***	-0.161*	---
	(0.049)	(0.055)	---	(0.084)	(0.095)	---	(0.063)	(0.066)	---
6-10 GP Visits in Past Year	-0.141*	0.001	---	0.002	0.190	---	-0.225**	-0.109	---
	(0.065)	(0.075)	---	(0.104)	(0.119)	---	(0.084)	(0.095)	---
10+ GP Visits in Past Year	-0.039	0.047	---	0.212*	0.289*	---	-0.208*	-0.110	---
	(0.067)	(0.083)	---	(0.097)	(0.120)	---	(0.093)	(0.105)	---

* p<0.05, ** p<0.01, *** p<0.001

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Table 5 Rate (hazard) of non-response, non-contact and refusal regressed on various individual health characteristics (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Check-Ups, Mis.	-0.106 (0.218)	-0.121 (0.219)	0.002 (0.227)	-0.085 (0.329)	-0.143 (0.340)	-0.015 (0.329)	-0.101 (0.283)	-0.092 (0.283)	-0.002 (0.298)
1-2 Check-Ups in Past Year	-0.343*** (0.049)	-0.296*** (0.051)	-0.150** (0.050)	-0.481*** (0.078)	-0.468*** (0.081)	-0.270*** (0.080)	-0.240*** (0.058)	-0.176** (0.061)	-0.070 (0.060)
3+ Check-Ups in Past Year	-0.528*** (0.059)	-0.477*** (0.065)	-0.236*** (0.065)	-0.595*** (0.093)	-0.633*** (0.101)	-0.246* (0.101)	-0.465*** (0.077)	-0.359*** (0.083)	-0.215** (0.080)
In-Patient, Mis.	-0.079 (0.481)	-0.570 (0.353)	-0.019 (0.351)	0.041 (0.762)	-0.758 (0.597)	-0.269 (0.553)	-0.317 (0.400)	-0.497 (0.362)	0.050 (0.395)
Was In-Patient in Past Year	-0.013 (0.055)	0.008 (0.061)	0.005 (0.063)	0.164* (0.078)	0.102 (0.086)	0.046 (0.088)	-0.126 (0.074)	-0.050 (0.080)	-0.015 (0.083)
Service Use, Mis.	0.558*** (0.129)	0.224 (0.300)	0.234 (0.341)	0.370 (0.208)	-0.023 (0.538)	0.087 (0.603)	0.710*** (0.170)	0.455 (0.362)	0.488 (0.408)
Used Health Services in Past Yr.	-0.113** (0.039)	-0.076 (0.043)	-0.052 (0.044)	0.102 (0.057)	0.135* (0.065)	0.121 (0.067)	-0.264*** (0.054)	-0.224*** (0.059)	-0.166** (0.061)

* p<0.05, ** p<0.01, *** p<0.001

Table 6 Rate (hazard) of non-response, non-contact and refusal regressed on housing characteristics and place attachment.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Housing Tenure, Mis.	1.440*** (0.193)	1.070*** (0.227)	0.692** (0.228)	2.286*** (0.238)	1.739*** (0.264)	0.841** (0.275)	0.615* (0.269)	0.338 (0.345)	0.264 (0.347)
Mortgagor	-0.019 (0.059)	-0.038 (0.059)	-0.096 (0.066)	0.236** (0.088)	0.190* (0.086)	-0.050 (0.094)	-0.143* (0.072)	-0.146* (0.072)	-0.087 (0.085)
Renter	0.475*** (0.060)	0.352*** (0.063)	0.150* (0.068)	1.088*** (0.089)	0.807*** (0.094)	0.361*** (0.105)	0.067 (0.077)	0.065 (0.083)	0.007 (0.089)
House Structure Type, Mis.	1.337*** (0.193)	1.082*** (0.195)	0.630** (0.193)	1.545*** (0.347)	1.146*** (0.306)	0.789* (0.352)	1.120*** (0.224)	1.021*** (0.242)	0.532* (0.225)
Flat, Any number of units	0.476*** (0.048)	0.282*** (0.052)	0.170** (0.056)	1.026*** (0.066)	0.673*** (0.076)	0.340*** (0.082)	-0.012 (0.068)	-0.090 (0.076)	-0.021 (0.081)
Bedsits, Institutional, Other	0.563*** (0.104)	0.363** (0.115)	0.200 (0.121)	0.951*** (0.127)	0.619*** (0.150)	0.377* (0.158)	0.250 (0.143)	0.168 (0.162)	0.040 (0.164)
Would like to move, Mis.	1.379 (0.748)	0.304 (0.727)	-0.654 (1.208)	1.826 (1.051)	0.102 (0.940)	-2.382* (1.095)	0.889 (0.782)	0.538 (0.932)	0.119 (1.356)
Would like to move	0.270*** (0.040)	0.175*** (0.042)	0.185*** (0.042)	0.581*** (0.061)	0.410*** (0.065)	0.374*** (0.065)	0.054 (0.054)	0.018 (0.055)	0.053 (0.056)
Would like to move, Don't know	0.391** (0.149)	0.340* (0.148)	0.170 (0.155)	0.762*** (0.202)	0.650** (0.204)	0.424 (0.219)	0.106 (0.210)	0.100 (0.210)	-0.043 (0.214)

* p<0.05, ** p<0.01, *** p<0.001

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Table 6 Rate (hazard) of non-response, non-contact and refusal regressed on housing characteristics and place attachment (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Likes neighbourhood, Mis.	0.819 (0.480)	0.313 (0.422)	-0.114 (0.465)	1.224 (0.683)	0.633 (0.473)	0.192 (0.574)	0.363 (0.559)	0.022 (0.693)	-0.372 (0.812)
Doesn't like neighbourhood	0.438*** (0.057)	0.228*** (0.060)	0.162** (0.061)	0.695*** (0.080)	0.247** (0.087)	0.197* (0.090)	0.231** (0.083)	0.196* (0.085)	0.126 (0.088)
Likes neighbourhood, Don't know	0.432* (0.201)	0.215 (0.196)	0.013 (0.205)	1.026*** (0.243)	0.585* (0.242)	0.409 (0.256)	-0.248 (0.346)	-0.295 (0.341)	-0.487 (0.360)

* p<0.05, ** p<0.01, *** p<0.001

Table 7 Rate (hazard) of non-response, non-contact and refusal regressed on interview characteristics and fieldwork operations.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Proxy Interview	1.730***	0.531	0.131	1.515***	-0.769	-0.463	1.745***	1.580**	2.080
	(0.074)	(0.416)	(1.301)	(0.104)	(0.540)	(1.215)	(0.086)	(0.567)	(1.337)
Telephone Interview	2.968***	1.287***	0.571	1.639***	-0.483	0.424	3.332***	2.284***	1.989
	(0.094)	(0.385)	(1.372)	(0.166)	(0.501)	(1.234)	(0.099)	(0.551)	(1.378)
Ever proxied	0.687***	0.560***	0.490***	0.781***	0.644***	0.344	0.578***	0.465***	0.565***
	(0.105)	(0.108)	(0.119)	(0.138)	(0.142)	(0.175)	(0.132)	(0.137)	(0.148)
Ever gave Tel. interview	0.971***	0.881***	0.804***	0.602**	0.463*	0.257	1.166***	1.112***	1.110***
	(0.125)	(0.124)	(0.134)	(0.196)	(0.193)	(0.214)	(0.156)	(0.156)	(0.165)
Others present, Mis.	0.447	0.075	0.087	0.926**	0.833*	0.939*	-0.092	-0.595	-0.578
	(0.243)	(0.281)	(0.310)	(0.305)	(0.358)	(0.410)	(0.374)	(0.423)	(0.427)
Others present	-0.082*	-0.123**	-0.138**	-0.285***	-0.321***	-0.221**	0.055	0.013	-0.081
	(0.041)	(0.043)	(0.045)	(0.059)	(0.064)	(0.068)	(0.055)	(0.057)	(0.060)
Others influenced, Mis.	0.304**	0.245	0.133	0.197	-0.015	-0.066	0.349**	0.388*	0.239
	(0.110)	(0.141)	(0.145)	(0.176)	(0.187)	(0.195)	(0.128)	(0.174)	(0.176)
Other influenced interview	0.412***	0.247**	0.224**	0.279*	0.202	0.218	0.479***	0.261**	0.217*
	(0.073)	(0.080)	(0.081)	(0.123)	(0.132)	(0.135)	(0.089)	(0.097)	(0.098)
Tracking schedule, Mis.	0.292***	0.237**	0.094	0.174	0.038	-0.068	0.369***	0.360***	0.153
	(0.071)	(0.076)	(0.094)	(0.130)	(0.134)	(0.161)	(0.089)	(0.095)	(0.114)
Didn't complete tracking	1.077***	0.710***	0.701***	0.812***	0.438**	0.455**	1.144***	0.786***	0.766***
	(0.101)	(0.107)	(0.104)	(0.153)	(0.167)	(0.172)	(0.118)	(0.127)	(0.127)
Tracking incomplete	0.611***	0.346*	0.262	0.428*	0.121	0.008	0.672***	0.437**	0.366*
	(0.131)	(0.136)	(0.142)	(0.201)	(0.211)	(0.224)	(0.156)	(0.159)	(0.160)

* p<0.05, ** p<0.01, *** p<0.001

Continued, next page …

Table 7 Rate (hazard) of non-response, non-contact and refusal regressed on interview characteristics and fieldwork operations (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
English Problems, Mis.	0.109 (0.144)	-0.175 (0.173)	-0.066 (0.171)	0.305 (0.195)	-0.080 (0.244)	0.034 (0.241)	-0.027 (0.171)	-0.235 (0.206)	-0.115 (0.206)
Problems with English	1.021*** (0.119)	0.549*** (0.140)	0.336* (0.169)	1.283*** (0.179)	0.843*** (0.191)	0.580* (0.232)	0.770*** (0.181)	0.309 (0.206)	0.215 (0.224)
Self-Completion, Mis.	0.642* (0.294)	0.425 (0.290)	0.091 (0.305)	1.176** (0.389)	0.801* (0.379)	0.366 (0.394)	0.185 (0.368)	0.086 (0.360)	-0.075 (0.363)
Self-Compl. required assistance	0.592*** (0.082)	0.252** (0.089)	0.040 (0.096)	0.759*** (0.113)	0.474*** (0.124)	0.218 (0.129)	0.445*** (0.120)	0.089 (0.128)	-0.033 (0.136)
Self-Compl. refused	1.342*** (0.183)	0.530** (0.201)	0.277 (0.265)	1.270*** (0.251)	0.603* (0.264)	0.163 (0.351)	1.335*** (0.215)	0.483* (0.238)	0.367 (0.320)
Self-Compl. other	0.954*** (0.139)	0.472** (0.155)	0.185 (0.200)	1.299*** (0.170)	0.937*** (0.178)	0.526* (0.253)	0.605** (0.215)	0.081 (0.239)	-0.078 (0.284)
Cooperativeness, Mis.	0.298*** (0.089)	0.135 (0.112)	-0.060 (0.123)	0.261 (0.150)	0.033 (0.208)	-0.291 (0.226)	0.335*** (0.101)	0.192 (0.130)	0.043 (0.144)
Good cooperation	0.494*** (0.059)	0.412*** (0.058)	0.312*** (0.054)	0.306*** (0.079)	0.214** (0.078)	0.095 (0.079)	0.582*** (0.075)	0.513*** (0.074)	0.417*** (0.070)
Fair cooperation	1.224*** (0.085)	1.001*** (0.087)	0.833*** (0.084)	0.953*** (0.139)	0.692*** (0.144)	0.532*** (0.135)	1.310*** (0.096)	1.114*** (0.104)	0.937*** (0.105)
Poor/V. Poor cooperation	1.962*** (0.171)	1.480*** (0.183)	1.229*** (0.190)	1.816*** (0.207)	1.287*** (0.218)	1.045*** (0.243)	1.878*** (0.223)	1.465*** (0.230)	1.236*** (0.224)

* p<0.05, ** p<0.01, *** p<0.001

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Table 7 Rate (hazard) of non-response, non-contact and refusal regressed on interview characteristics and fieldwork operations (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Ever had a new interviewer	0.098 (0.058)	-0.136 (0.085)	-0.052 (0.081)	0.199* (0.084)	-0.154 (0.120)	-0.068 (0.114)	0.023 (0.075)	-0.117 (0.116)	-0.048 (0.115)
Number of interviewer changes	0.040 (0.026)	0.063* (0.032)	0.041 (0.031)	0.092* (0.036)	0.120** (0.045)	0.053 (0.044)	0.000 (0.034)	0.018 (0.045)	0.027 (0.045)
New interviewer last wave	0.183** (0.061)	0.199** (0.065)	0.140* (0.065)	0.230** (0.088)	0.255** (0.093)	0.118 (0.094)	0.138 (0.086)	0.145 (0.090)	0.137 (0.090)

* p<0.05, ** p<0.01, *** p<0.001

Table 8 Rate (hazard) of non-response, non-contact and refusal regressed on education and employment.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Education, Mis.	0.066 (0.384)	-0.049 (0.373)	-0.896* (0.391)	0.771 (0.505)	0.610 (0.477)	-0.154 (0.546)	-0.638 (0.514)	-0.706 (0.516)	-1.448* (0.575)
Higher degree	-0.259*** (0.062)	-0.223*** (0.062)	-0.119 (0.067)	0.257** (0.096)	0.322*** (0.094)	0.184 (0.102)	-0.651*** (0.080)	-0.635*** (0.081)	-0.365*** (0.096)
CSE/O Level/A Level	-0.152*** (0.039)	-0.131*** (0.039)	-0.108* (0.048)	0.109 (0.069)	0.143* (0.068)	-0.019 (0.083)	-0.303*** (0.044)	-0.289*** (0.043)	-0.144** (0.053)
Spouse's job, Mis.	0.860*** (0.174)	1.366** (0.455)	1.033 (0.627)	0.604* (0.289)	1.315* (0.522)	2.165** (0.672)	1.083*** (0.209)	0.901 (0.812)	-0.651 (0.725)
Spouse employed	-0.412*** (0.041)	-0.450*** (0.042)	-0.232* (0.110)	-0.961*** (0.075)	-0.981*** (0.076)	-0.312 (0.168)	-0.010 (0.052)	-0.058 (0.055)	-0.106 (0.135)
Spouse out of lab. mkt.	-0.317*** (0.052)	-0.293*** (0.052)	-0.157 (0.115)	-0.854*** (0.086)	-0.810*** (0.086)	-0.144 (0.173)	0.063 (0.065)	0.070 (0.065)	-0.080 (0.138)
Resp. wkly work hours, Mis.	0.076 (0.100)	0.076 (0.100)	-0.006 (0.106)	0.223 (0.145)	0.235 (0.145)	0.160 (0.149)	-0.031 (0.127)	-0.036 (0.127)	-0.109 (0.136)
Resp. works less than full-time	-0.207*** (0.048)	-0.188*** (0.049)	-0.108* (0.052)	-0.317*** (0.080)	-0.277*** (0.080)	-0.142 (0.087)	-0.147* (0.059)	-0.142* (0.059)	-0.109 (0.065)
Resp. works more than full-time	0.130 (0.071)	0.147* (0.071)	0.095 (0.072)	0.329*** (0.098)	0.387*** (0.098)	0.286** (0.100)	-0.002 (0.095)	-0.006 (0.095)	-0.026 (0.095)

* p<0.05, ** p<0.01, *** p<0.001

Continued, next page …

Table 8 Rate (hazard) of non-response, non-contact and refusal regressed on education and employment (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Employment, Mis.	-0.898***	0.540	0.147	-0.550	0.955	1.173	-1.133***	-0.268	-1.453*
	(0.201)	(0.472)	(0.598)	(0.288)	(0.517)	(0.637)	(0.206)	(0.787)	(0.665)
Unemployed	0.548***	0.449***	0.233**	0.990***	0.798***	0.360***	0.155	0.130	0.099
	(0.075)	(0.075)	(0.080)	(0.094)	(0.094)	(0.105)	(0.108)	(0.107)	(0.113)
Retired	-0.214***	-0.336***	-0.211*	-0.265**	-0.482***	-0.144	-0.195**	-0.239***	-0.210*
	(0.060)	(0.059)	(0.090)	(0.092)	(0.094)	(0.172)	(0.069)	(0.068)	(0.100)
Family Care / Maternity Leave	-0.054	-0.088	-0.071	0.183*	0.137	0.071	-0.199**	-0.213**	-0.176*
	(0.055)	(0.055)	(0.069)	(0.093)	(0.092)	(0.113)	(0.073)	(0.072)	(0.088)
FT Student	0.201	0.047	-0.193	0.775***	0.434**	0.004	-0.401*	-0.421*	-0.493**
	(0.114)	(0.114)	(0.122)	(0.134)	(0.137)	(0.147)	(0.178)	(0.179)	(0.185)
Lng trm sick / Disabled	-0.191	-0.258*	-0.364**	0.052	-0.071	-0.383*	-0.331**	-0.353**	-0.368*
	(0.102)	(0.102)	(0.122)	(0.143)	(0.142)	(0.181)	(0.126)	(0.127)	(0.149)
Other status	0.132	0.015	-0.210	0.390	0.164	-0.164	-0.036	-0.057	-0.218
	(0.236)	(0.237)	(0.243)	(0.320)	(0.317)	(0.337)	(0.311)	(0.312)	(0.312)

* p<0.05, ** p<0.01, *** p<0.001

Table 9 Rate (hazard) of non-response, non-contact and refusal regressed on indicators of income and financial well-being.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Car, Mis.	1.138***	0.732**	0.334	1.540***	1.161***	0.661	0.765*	0.355	0.090
	(0.289)	(0.261)	(0.297)	(0.409)	(0.343)	(0.377)	(0.369)	(0.371)	(0.434)
No car for use	0.489***	0.446***	0.225***	0.776***	0.602***	0.280**	0.249***	0.298***	0.167*
	(0.052)	(0.056)	(0.058)	(0.075)	(0.084)	(0.086)	(0.071)	(0.073)	(0.077)
Doesn't drive	0.342***	0.320***	0.106*	0.421***	0.297***	0.136	0.289***	0.336***	0.100
	(0.043)	(0.045)	(0.051)	(0.067)	(0.070)	(0.080)	(0.052)	(0.054)	(0.064)
HH annual income, Mis.	0.513***	---	---	0.364***	---	---	0.600***	---	---
	(0.046)	---	---	(0.065)	---	---	(0.058)	---	---
HH monthly income, Mis.	0.535***	---	---	0.365***	---	---	0.634***	---	---
	(0.047)	---	---	(0.066)	---	---	(0.057)	---	---
Ind annual income, Mis.	0.469***	0.438***	0.281***	0.444***	0.356***	0.206**	0.472***	0.478***	0.301***
	(0.041)	(0.041)	(0.043)	(0.063)	(0.061)	(0.063)	(0.051)	(0.051)	(0.053)
Ind monthly income, Mis.	0.374***	---	---	0.355***	---	---	0.371***	---	---
	(0.045)	---	---	(0.069)	---	---	(0.055)	---	---
HH Ann Inc. rank, Mis.	0.947	0.332	-0.827	1.091	0.025	-1.985*	0.737	0.375	0.116
	(0.883)	(0.527)	(0.550)	(3.363)	(1.228)	(0.800)	(0.616)	(0.493)	(0.619)
HH Ann. Inc. bottom 5th	0.279***	0.075	0.012	0.685***	0.440***	0.207*	-0.056	-0.223**	-0.170*
	(0.048)	(0.053)	(0.068)	(0.070)	(0.077)	(0.095)	(0.064)	(0.068)	(0.087)
HH Ann Inc. top 5th	0.053	0.151*	0.177**	0.092	0.213*	0.229*	0.023	0.099	0.139
	(0.063)	(0.064)	(0.067)	(0.084)	(0.086)	(0.093)	(0.080)	(0.082)	(0.088)

* p<0.05, ** p<0.01, *** p<0.001

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Table 9 Rate (hazard) of non-response, non-contact and refusal regressed on indicators of income and financial well-being (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Self-Assessed Financial Condition, Mis.	1.395***	0.885**	-0.057	1.500***	0.838*	-0.365	1.249***	0.894*	0.261
	(0.290)	(0.278)	(0.385)	(0.408)	(0.341)	(0.433)	(0.369)	(0.392)	(0.490)
Financially comfortable	-0.213***	-0.205***	-0.074	-0.256***	-0.238**	-0.002	-0.183**	-0.180**	-0.116
	(0.049)	(0.048)	(0.049)	(0.074)	(0.074)	(0.078)	(0.062)	(0.062)	(0.064)
Financially getting by	-0.008	-0.062	-0.112*	0.015	-0.092	-0.108	-0.021	-0.039	-0.109
	(0.046)	(0.048)	(0.047)	(0.071)	(0.072)	(0.073)	(0.060)	(0.061)	(0.062)
Financially finding it difficult	0.150*	0.057	-0.162*	0.497***	0.322***	-0.060	-0.129	-0.165	-0.247*
	(0.067)	(0.069)	(0.072)	(0.081)	(0.084)	(0.093)	(0.096)	(0.098)	(0.100)

* p<0.05, ** p<0.01, *** p<0.001

Table 10a. Rate (hazard) of non-response, non-contact, and refusal regressed on various values about family relationships Shown are "Bivariate" relations.

	Non-Response	Non-Contact	Refusal
Pre-school child suffers if mother works, Mis.	0.289**	0.394**	0.201
	(0.098)	(0.145)	(0.127)
Agree	-0.062	-0.180**	0.012
	(0.042)	(0.064)	(0.052)
Disagree	-0.106*	0.001	-0.183**
	(0.048)	(0.072)	(0.062)
Family suffers if mother works, Mis.	0.284**	0.494**	0.128
	(0.096)	(0.155)	(0.121)
Agree	-0.062	-0.189**	0.014
	(0.038)	(0.064)	(0.050)
Disagree	-0.036	0.107	-0.139*
	(0.044)	(0.064)	(0.058)
A woman and her family happier if she works, Mis.	0.312***	0.492***	0.179
	(0.094)	(0.149)	(0.119)
Agree	0.105*	0.105	0.106
	(0.046)	(0.069)	(0.061)
Disagree	-0.018	-0.122*	0.046
	(0.038)	(0.058)	(0.051)
Husband and wife should both contribute to family income, Mis.	0.352***	0.577***	0.191
	(0.096)	(0.155)	(0.122)
Agree	0.131**	0.148*	0.118*
	(0.042)	(0.062)	(0.055)
Disagree	-0.046	0.006	-0.082
	(0.054)	(0.089)	(0.073)
Full-time job makes a woman independent, Mis.	0.299**	0.569***	0.110
	(0.098)	(0.157)	(0.122)
Agree	0.063	0.098	0.041
	(0.040)	(0.061)	(0.050)
Disagree	-0.131**	-0.098	-0.150**
	(0.045)	(0.080)	(0.058)
* p<0.05, ** p<0.01, *** p<0.001			

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Table 10a. Rate (hazard) of non-response, non-contact, and refusal regressed on various values about family relationships Shown are "Bivariate" relations. ***Continued.***

	Non-Response	Non-Contact	Refusal
Husband should earn and wife stay at home, Mis.	0.326***	0.630***	0.115
	(0.098)	(0.155)	(0.130)
Agree	0.160***	0.100	0.190**
	(0.047)	(0.078)	(0.059)
Disagree	-0.010	0.205**	-0.150**
	(0.040)	(0.066)	(0.054)
Children need a family as much as mother, Mis.	0.106	0.299	-0.031
	(0.106)	(0.168)	(0.143)
Agree	-0.205***	-0.235**	-0.184*
	(0.062)	(0.088)	(0.082)
Disagree	-0.220*	-0.176	-0.248
	(0.101)	(0.150)	(0.140)
Employers should help mothers with childcare, Mis.	0.172	0.649***	-0.127
	(0.099)	(0.155)	(0.124)
Agree	-0.098*	0.212**	-0.273***
	(0.042)	(0.076)	(0.055)
Disagree	-0.156*	-0.170	-0.150
	(0.073)	(0.137)	(0.088)
Single parents can bring up chidren as well as couples, Mis.	0.207*	0.560***	-0.028
	(0.096)	(0.148)	(0.126)
Agree	0.017	0.211**	-0.108
	(0.048)	(0.075)	(0.058)
Disagree	-0.139**	-0.111	-0.151**
	(0.045)	(0.076)	(0.057)
Traditional Family Index, Mis.	0.318***	0.564***	0.147
	(0.089)	(0.137)	(0.113)
Indicates Trad. Family Values	-0.004	-0.227***	0.136**
	(0.036)	(0.059)	(0.046)

* p<0.05, ** p<0.01, *** p<0.001

Table 10b. Rate (hazard) of non-response, non-contact, refusal regressed on various values about the role of government in Britain. Shown are "Bivariate" relations

	Non-Response	Non-Contact	Refusal
Ordinary people get their share of nation's wealth, Mis.	0.232*	0.375*	0.107
	(0.097)	(0.158)	(0.124)
Agree	-0.006	-0.087	0.046
	(0.057)	(0.099)	(0.073)
Disagree	-0.038	-0.045	-0.032
	(0.049)	(0.079)	(0.065)
One law for rich another for poor, Mis.	0.110	0.147	0.060
	(0.114)	(0.206)	(0.143)
Agree	0.013	-0.055	0.062
	(0.052)	(0.077)	(0.069)
Disagree	0.005	-0.027	0.027
	(0.065)	(0.088)	(0.088)
Private enterprise best way to solve Britain's economic problems, Mis.	0.294***	0.401***	0.198*
	(0.068)	(0.102)	(0.089)
Agree	-0.031	-0.016	-0.038
	(0.047)	(0.071)	(0.058)
Disagree	0.039	-0.051	0.095
	(0.044)	(0.064)	(0.054)
Public services ought to be state owned, Mis.	0.259**	0.415**	0.129
	(0.085)	(0.129)	(0.102)
Agree	0.035	0.099	-0.008
	(0.043)	(0.069)	(0.055)
Disagree	-0.036	-0.058	-0.021
	(0.044)	(0.073)	(0.059)
Govn't should provide job for anyone who wants one, Mis.	0.133	0.187	0.066
	(0.108)	(0.198)	(0.134)
Agree	0.075	-0.023	0.132
	(0.056)	(0.090)	(0.068)
Disagree	-0.133*	-0.084	-0.164*
	(0.055)	(0.088)	(0.067)

* p<0.05, ** p<0.01, *** p<0.001

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Table 10b. Rate (hazard) of non-response, non-contact, refusal regressed on various values about the role of government in Britain. Shown are "Bivariate" relations

	Non-Response	Non-Contact	Refusal
Strong unions needed to protect employees, Mis.	0.263**	0.353*	0.174
	(0.097)	(0.169)	(0.123)
Agree	0.092	0.119	0.073
	(0.047)	(0.079)	(0.062)
Disagree	-0.138*	-0.151	-0.126
	(0.056)	(0.091)	(0.072)
Collectivist Values, Mis.	0.237***	0.381***	0.123
	(0.060)	(0.091)	(0.076)
Collectivist Values	0.128***	0.049	0.174***
	(0.037)	(0.065)	(0.047)

* p<0.05, ** p<0.01, *** p<0.001

Table 10c Rate (hazard) of non-response, non-contact and refusal regressed on family and government values indices and political support.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Traditional Family Values, Mis.	0.194**	0.165*	-0.063	0.342***	0.323**	0.139	0.079	0.045	-0.182
	(0.064)	(0.065)	(0.102)	(0.097)	(0.099)	(0.154)	(0.079)	(0.079)	(0.137)
Traditional Family Values	0.127***	0.051	0.046	0.040	-0.025	-0.029	0.179***	0.097	0.095
	(0.037)	(0.037)	(0.039)	(0.065)	(0.065)	(0.065)	(0.047)	(0.050)	(0.051)
Collectivist Values, Mis.	0.216*	0.163	0.122*	0.420**	0.409**	0.245*	0.079	0.007	0.057
	(0.096)	(0.095)	(0.061)	(0.149)	(0.142)	(0.097)	(0.118)	(0.119)	(0.075)
Collectivist Values	-0.004	0.022	-0.033	-0.234***	-0.199***	-0.180**	0.140**	0.160***	0.054
	(0.036)	(0.036)	(0.038)	(0.058)	(0.059)	(0.068)	(0.046)	(0.046)	(0.051)
Supports a Political Party, Mis.	1.669***	1.380***	0.825**	1.642***	1.473***	0.755	1.634***	1.284***	0.842*
	(0.297)	(0.297)	(0.318)	(0.425)	(0.426)	(0.457)	(0.331)	(0.333)	(0.367)
Does Not Support a Party	0.183***	0.120**	0.027	0.270***	0.197**	0.005	0.122**	0.070	0.041
	(0.034)	(0.038)	(0.039)	(0.055)	(0.063)	(0.065)	(0.047)	(0.051)	(0.052)

* p<0.05, ** p<0.01, *** p<0.001

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Table 10c Rate (hazard) of non-response, non-contact and refusal regressed on family and government values indices and political support (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Indicated Party Supported, Mis.	0.139 (0.101)	0.056 (0.102)	0.166 (0.099)	-0.396** (0.148)	-0.528*** (0.155)	-0.243 (0.152)	0.540*** (0.131)	0.484*** (0.129)	0.464*** (0.134)
Conservative	-0.325*** (0.094)	-0.262** (0.098)	-0.060 (0.095)	-0.628*** (0.129)	-0.531*** (0.135)	-0.100 (0.124)	-0.047 (0.128)	-0.009 (0.130)	0.048 (0.134)
Labour	-0.077 (0.092)	-0.047 (0.093)	0.043 (0.092)	-0.455*** (0.127)	-0.379** (0.132)	-0.174 (0.121)	0.243* (0.120)	0.241* (0.121)	0.253* (0.128)
Liberal-Democrats	-0.415*** (0.110)	-0.399*** (0.110)	-0.118 (0.110)	-0.782*** (0.142)	-0.746*** (0.142)	-0.321* (0.144)	-0.098 (0.143)	-0.096 (0.143)	0.083 (0.149)
No Party	0.118 (0.104)	0.080 (0.104)	0.070 (0.103)	-0.071 (0.143)	-0.128 (0.142)	-0.102 (0.134)	0.291* (0.138)	0.265 (0.138)	0.242 (0.148)
Can't Vote	0.119 (0.197)	0.077 (0.199)	-0.130 (0.196)	0.111 (0.281)	0.037 (0.284)	-0.120 (0.280)	0.148 (0.264)	0.127 (0.266)	-0.034 (0.273)

* p<0.05, ** p<0.01, *** p<0.001

Table 11 Rate (hazard) of non-response, non-contact, and refusal regressed on various measures of social participation including religious attendance.

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Org Membership, Mis.	-0.311 (0.192)	0.085 (0.291)	0.146 (0.281)	-0.677* (0.300)	-0.306 (0.519)	-0.368 (0.480)	-0.161 (0.223)	0.241 (0.334)	0.389 (0.324)
Member of 1 Organisation	-0.231*** (0.041)	-0.186*** (0.046)	-0.083 (0.048)	-0.340*** (0.061)	-0.315*** (0.068)	-0.122 (0.068)	-0.153** (0.051)	-0.097 (0.058)	-0.063 (0.062)
-- 2 Organisations	-0.356*** (0.052)	-0.236*** (0.063)	-0.055 (0.067)	-0.426*** (0.084)	-0.363*** (0.098)	-0.051 (0.098)	-0.300*** (0.068)	-0.148 (0.081)	-0.065 (0.087)
-- 3+ Organisations	-0.939*** (0.076)	-0.675*** (0.107)	-0.409*** (0.110)	-1.093*** (0.133)	-0.963*** (0.173)	-0.544** (0.178)	-0.825*** (0.095)	-0.485*** (0.136)	-0.316* (0.141)
Active in Organisations, Mis.	-0.262 (0.177)	-0.120 (0.261)	-0.194 (0.253)	-0.534 (0.284)	-0.142 (0.419)	-0.352 (0.386)	-0.156 (0.205)	-0.129 (0.295)	-0.142 (0.304)
Active in 1 Organisation	-0.193*** (0.042)	-0.071 (0.048)	-0.048 (0.050)	-0.237*** (0.059)	-0.059 (0.066)	-0.114 (0.069)	-0.159** (0.055)	-0.076 (0.065)	-0.011 (0.067)
-- 2 Organisations	-0.464*** (0.061)	-0.220** (0.076)	-0.151 (0.078)	-0.462*** (0.096)	-0.130 (0.118)	-0.144 (0.117)	-0.454*** (0.083)	-0.271** (0.102)	-0.160 (0.105)
-- 3+ Organisations	-0.950*** (0.104)	-0.435** (0.137)	-0.330* (0.141)	-0.912*** (0.182)	-0.216 (0.226)	-0.128 (0.228)	-0.961*** (0.137)	-0.566** (0.181)	-0.447* (0.185)

* p<0.05, ** p<0.01, *** p<0.001

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Table 11 Rate (hazard) of non-response, non-contact, and refusal regressed on various measures of social participation including religious attendance (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Stated Religion, Mis.	-0.142	-0.560	-0.169	-0.108	-0.826	-0.088	-0.182	-0.251	-0.218
	(0.121)	(0.377)	(0.140)	(0.176)	(0.459)	(0.220)	(0.158)	(0.524)	(0.179)
Anglican	-0.202***	-0.118*	0.034	-0.572***	-0.487***	-0.150*	0.019	0.100	0.121
	(0.042)	(0.047)	(0.048)	(0.062)	(0.071)	(0.073)	(0.055)	(0.063)	(0.065)
Catholic	0.079	0.160*	0.153	-0.002	0.034	0.060	0.136	0.243*	0.198
	(0.072)	(0.078)	(0.080)	(0.093)	(0.106)	(0.107)	(0.092)	(0.098)	(0.102)
Other Christian	-0.071	0.044	-0.011	-0.138	-0.060	-0.078	-0.020	0.114	0.031
	(0.058)	(0.062)	(0.065)	(0.095)	(0.106)	(0.104)	(0.080)	(0.086)	(0.086)
Other Non-Christian	-0.079	-0.019	-0.384*	-0.340	-0.336	-0.797*	0.091	0.181	-0.080
	(0.152)	(0.157)	(0.175)	(0.279)	(0.283)	(0.310)	(0.179)	(0.185)	(0.215)
Respondent's Valuation of Religion, Mis.	-0.073	0.628	---	0.079	0.997*	---	-0.205	0.240	---
	(0.119)	(0.348)	---	(0.177)	(0.413)	---	(0.153)	(0.489)	---
Rel. Makes Little Difference in Resp's Life	-0.082	-0.020	---	-0.208**	-0.064	---	0.002	0.011	---
	(0.044)	(0.046)	---	(0.076)	(0.081)	---	(0.056)	(0.059)	---
-- Makes Some Difference …	-0.181***	-0.093	---	-0.312***	-0.141	---	-0.099	-0.065	---
	(0.048)	(0.054)	---	(0.081)	(0.090)	---	(0.062)	(0.070)	---
-- Makes a Great Difference …	-0.112*	0.006	---	-0.142	-0.001	---	-0.091	0.009	---
	(0.055)	(0.064)	---	(0.079)	(0.099)	---	(0.071)	(0.080)	---

* p<0.05, ** p<0.01, *** p<0.001

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Table 11 Rate (hazard) of non-response, non-contact, and refusal regressed on various measures of social participation including religious attendance (continued).

	Non-Response			Non-Contact			Refusal		
	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain	Bivariate	Domain	Multi-Domain
Religious Attendance, Mis.	-0.145	-0.415*	-0.375*	-0.300	-0.630*	-0.456	-0.042	-0.231	-0.250
	(0.138)	(0.175)	(0.183)	(0.200)	(0.273)	(0.290)	(0.172)	(0.233)	(0.236)
Attends Monthly	0.094	0.078	0.106	-0.048	-0.035	-0.145	0.188	0.155	0.255*
	(0.088)	(0.085)	(0.088)	(0.139)	(0.152)	(0.149)	(0.115)	(0.113)	(0.113)
Attends Annually	0.021	-0.084	0.006	-0.123	-0.230	-0.195	0.116	0.012	0.107
	(0.076)	(0.077)	(0.075)	(0.110)	(0.130)	(0.121)	(0.099)	(0.102)	(0.099)
Attends less than Annually	0.296***	0.106	0.083	0.266*	-0.033	-0.152	0.311***	0.192	0.218*
	(0.071)	(0.078)	(0.075)	(0.103)	(0.132)	(0.117)	(0.091)	(0.102)	(0.098)
Only Weddings / Funerals	0.061	-0.115	0.002	-0.106	-0.362*	-0.267*	0.174	0.050	0.161
	(0.074)	(0.081)	(0.079)	(0.115)	(0.142)	(0.136)	(0.097)	(0.106)	(0.102)

* p<0.05, ** p<0.01, *** p<0.001