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Ethnic minorities and non-response in the Millennium Cohort Study

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1. Introduction

Attrition is one of the perennial worries in conducting prospective longitudinal surveys. Knowledge has advanced over time about the characteristics of those respondents who are more or less likely to continue to participate. In relation to ethnicity, a number of US longitudinal studies have shown that black respondents usually suffer higher attrition rates than white respondents (NLSY, SIPP, PSID), but if in addition they are young black men, the rates are dangerously high and threaten to make analyses of this group unviable. Less is known about survey non-response for minority ethnic groups in the UK and especially about attrition for specific minorities in longitudinal surveys. Analyses of non-response helps to uncover biases in longitudinal data, and can provide the necessary information to produce non-response weights, but potentially can also offer advice on future fieldwork strategies that are likely to help to minimise attrition. There is the notable case of the National Longitudinal Study of Youth (NLSY) where analyses of non-response changed the follow up rules for longitudinal survey participants (Olsen, 2005). This paper sets out to analyse the non-response of mothers who took part in Sweep 1 of the Millennium Cohort Study (MCS) focussing in particular on differences in response by ethnicity. The main aim is to learn lessons that may help future field work practice for longitudinal studies including significant minority ethnic samples.

MCS was unusual in being designed to over sample families from minority ethnic groups. It did this by over-sampling wards with high minority ethnic populations which were one of the strata in the sampling design. At Sweep 1, around 3000 families were interviewed where the main respondent (mostly mothers of the cohort child) identified themselves as being of minority ethnicity (2972 were given a valid code). It has been recognised that minority ethnic groups in the UK differ from each other in ways that are hidden if analyses focus on the combined group of non-whites. For this reason, it is now argued to be ill-advised to analyse minorities in combined groups (Modood, 1992; Modood et al, 1997). This MCS sample was heralded at its inception as offering unique opportunities, therefore, for separate group analyses of minority ethnic families in the UK, and of the development process over time for minority ethnic children. Similar sample sizes of minority ethnic households are expected to emerge from the new UK Household Longitudinal Study which will collect its first wave of data in 2009. But will these sample sizes be sufficient for separate analyses of particular minority groups in future waves? This question is more acute in the case of a birth cohort study that is not designed to refresh its sample and it is a question that will be addressed in this paper. This paper also sets out to analyse response rates for UK minority ethnic families in MCS in order to see if there are lessons to be learnt. Analyses of who continued to respond (or not respond) to this study can potentially inform future fieldwork sweeps of MCS as well as the designs of other studies.

2. Earlier literature

Studies of non-response in longitudinal studies have revealed that it most often has systematic elements and is not random. However, at the same time, many studies have found that the systematic components of non-response account for a very small part of the variation in response. Conclusions have often been drawn, therefore, that non-response, even though systematic, is not such a serious problem in many longitudinal panel studies. The analysis of non-response in the US Panel Study of Income Dynamics (PSID) was probably the first study to reach this conclusion (Fitzgerald, 1998a) but it has since been re-iterated by others (Macurdy et al, 1998 for NLSY; Hawkes and Plewis, 2006 for NCDS; Watson, 2003 for ECHP). [1]

Analyses of non-response have focussed on two sets of predictors in examining its systematic components; first the characteristics of the individuals or households have been examined (eg. (Hausman and Wise, 1979; Lillard and Panis, 1998; Fitzgerald et al, 1998). Such characteristics are obtained from earlier waves of the study and may be constant or varying characteristics about individuals. Second, and more recently, characteristics of the fieldwork process, so-called paradata, have been collected and examined; again this is usually from earlier waves of the survey (eg. Campanelli et al, 1997; Lepkowski and Couper, 2002; Groves and Couper, 1998; Lynn et al, 2002) . Finding systematic elements in the survey process offers direct routes to intervening in future surveys practice to prevent or reduce non-response.

The characteristics from earlier waves associated with non-response clearly vary according to the nature of the study and the survey units. None the less there are some common findings, as well as some differences in findings across studies. So, for example, it is common to find higher non-response rates among men in comparison with women, those who recently moved house compared with those in longer tenure, those in rented accommodation compared with owner occupiers, young people and older age groups compared with the middle aged, the never married (or divorced/separated) compared with married, on welfare compared with off welfare, disabled compared with non disabled and lower educated compared with higher educated (SIPP, McArthur, 1988; ECHP, Behr et al, 2005; PSID, FitzGerald et al, 1998). Given the focus of this paper it is worth noting that many US studies have found lower response rates from black Americans (McArthur for SIPP, FitzGerald for PSID, and Olsen for NLSY; Allen et al, 1991). Some UK analyses have also found lower responses rates for minorities, but usually all minorities combined in a single category, as either non-white or non-UK born (Foster, 1998; Lynn and Clarke, 2001). However, while findings on these characteristics are more systematic across studies of non-response, other characteristics vary more between studies. For example, low income or poor households sometimes appear to have higher non-response (Behr et al for ECHP) and sometimes not (McArthur, 1998 for SIPP found non-poor had higher non-response). Similarly whether survey participant was unemployed or employed, or has a small versus larger family size can both be associated with higher and lower non-response rates. Other notable variations in response rates

[1] However analyses of the impact of non-response on particular topics have found attrition sometimes does produced biases in the results but on other topics or data sets it does not. Studies on the impact of attrition on particular outcomes, of which there are many, are too numerous to cover in this paper given its main focus.

have been found across countries from analyses of the European Community Household Panel Study (ECHP), although some analysts have pointed to this being partly related to undocumented differences in survey practices across the countries included (Behr, et al, 2005; Watson, 2003; Vandecasteele and Debels, 2006). A further examination has been made in some studies of whether item non-response on particular questions, or an incomplete questionnaire has been linked with unit non-response at the next wave (Vandecasteele and Debels, 2006) with some correlations being found.

Research on non-response has examined the role of fieldwork procedures and paradata, for example, the length of the fieldwork period, interviewer effects, interviewer continuity from one wave to another, number of call-backs or re-issues[2], and the gender and ethnicity of the interviewers. Evidence has been found that many of these survey process characteristics are correlated with subsequent non-response. For example SIPP and BHPS show a relationship between there being more call backs at an earlier wave and higher likelihood of non-response at the subsequent wave; ECHP found that response was higher when the interviewer was the same person wave on wave (Behr et al, 2005), but also found correlations between non-response and the duration of the interview, the mode of interview, the number of visits, and the length of fieldwork period (Vandercasteele and Debels, 2007).

Some studies suggest that these fieldwork process measures explain less of the variation in response than do survey participants' characteristics (Nicoletti and Peracchi, 2005 for ECHP). However Olsen argues that it is survey methodology – getting the survey process as good as possible - that holds the key to successfully achieving higher response (Olsen, 2005). Olsen claims that survey response can be expected to rise as much as from 71.5 to 87.5 per cent from changing the survey process in a number of ways, which is a sizeable increase.

Lynn et al (2002) drew attention to a weakness of much previous research. They argued that modelling of non-response typically either confounds ease of contact with reluctance to participate, or isolates one without considering simultaneously the effect of the other. However, the subsequent attempts to analyse these two main types of non-response in BHPS data did not find any evidence of correlation between these two (Lynn et al, 2002). Nicoletti and Peracchi (2006) carried out a similar analysis of the ECHP data and reached the same conclusions.

It is worth noting that theorising about non-response in longitudinal studies is relatively under-developed, compared with psychological and sociological theories about why individuals respond or not to a (cross-sectional) survey (eg. Leverage Salience theory; Belief-Sampling theory; Rules theory). Lepkowski and Couper (2002) have set out the main framework used to consider response theory in longitudinal studies by differentiating a set of hierarchical and conditional relationships where the first stage is a model of the propensity to locate respondents; the second stage is a model of propensity to contact the individuals having located

[2] The 'Issued' sample means that names and addresses are allocated to a fieldwork interviewer and they can be re-issued at a later date when that interviewer has failed to locate or contact the person at the address in question.

them; and the third stage is a model of propensity to cooperate, having contacted the respondent and located them. Both survey operations as well as respondents' past and current characteristics are thought to influence the extent of location, and cooperation. Potential salient factors are discussed in more detail later in this paper.

However, this still leaves largely unexplained the issue of why we might expect differences in survey responses by minority ethnic group. It may be that marginalised groups are less likely to feel committed to society, know less about particular topics or about surveys in general than majority groups. These factors may make them less likely to respond through suspicion, feelings of vulnerability, or lack of cultural traditions in being surveyed. But that would imply all minority groups would be similar in the extent of their lower response. However, on the little evidence available, this is not the case. In some ethnic groups, women, who are generally more likely to respond to surveys than men, may not be allowed to host interviews in their own homes without chaperones. This may also produce a response bias if they were approached by a male interviewer which would be more specific to ethnic or religious groups.

3. Millennium Cohort Study (MCS) data

This large-scale survey of the new century's babies, and the families who are bringing them up made its first contact with the 18818 babies in 18552 families in 2001-2002 when the children were aged nine months. A two-stage stratified and cluster sampling design was used based on 1998 ward geography which first stratified wards in the four UK countries into 3 groups; those with high minority ethnic populations (England only)[3]; those disadvantaged wards with a high Child Poverty Index[4], and the rest. Disadvantaged wards in England, Wales, Scotland and Northern Ireland and wards in England with high minority ethnic populations were over-sampled. Children with birth dates eligible for the survey living in these 398 selected wards across the UK were taken from the Child Benefit Register (excluding some cases[5]) were first contacted at 9-10 months old. Oversampling also boosted the sample size in the three smaller UK countries. The survey aimed, from this design, to include sufficient sample sizes of minority ethnic families in England to be able to analyse them separately. Some additional details about the survey are presented in the Appendix. Full details about the survey, its origins, objectives, sampling, content, fieldwork agency and funding are contained in the survey's documentation (Hansen, 2008; Plewis et al, 2007; NatCen, 2004).

3.1 Achieved sample at MCS 1

The survey reached 18552 families, which, after allowance for 246 sets of twins and 10 sets of triplets, amounted to 18818 children in the cohort. 18532 main face-to-face CAPI interviews were given at MCS1, almost entirely by mothers. 3194 parents, again almost all of them mothers, were living without a resident partner. In 1760 cases there was a resident (or part-time resident) father who did not give information. 338 of the partners' information was given by proxy. There was thus some information for 89 per cent of resident partners (not including part-time resident partners). In 20 cases it was information from the mother that was missing. Table 1 shows how these parents are distributed over the four countries of the UK.

In the case of the collection of information from partners, 13192 of the total 13441 were natural fathers of the cohort baby, one was a foster father, 32 were step fathers, and 2 were adoptive fathers. Proxy information was obtained about 215 natural fathers who were not available to have an interview. Five mothers also gave the information requested about partners because the father in these cases was the main carer of the child and gave the information for the main interview. The achieved overall response rate was 72 per cent. An in-scope response rate is also calculated. It has a different denominator from the achieved overall rate. The denominator for the in-scope response rate includes only the cases issued to the fieldwork agency after

[3] These wards, constituting the minority ethnic stratum, were those with at least 30% of their total population falling into two categories 'Black' or Asian' in the 1991 Census of Population data.
[4] Disadvantaged wards were those falling into the upper quartile (the poorest 25%) of wards based on the Child Poverty Index (CPI) for England and Wales.
[5] Cases thought to be sensitive by DWP and those who opted out were excluded from the issued sample.

initial filtering through the Department of Work and Pensions. It also omits those cases which became ineligible because the families had moved out of the sample areas before the interviewer contacted them. The in-scope response rate, therefore, measures interviewers' success at finding their targets. The overall in-scope response rate for MCS1 was 82 per cent.

Table 1 MCS1 achieved sample sizes by country

COUNTRY	Number of sample 'wards' *	Target sample as boosted	Achieved Responses **			
			Children	Families interviewed	Partners++	Single Parents
England	200	13146	11695	11533	8485	1853
Wales	73	3000	2798	2760	1933	590
Scotland	62	2500	2370	2336	1727	375
N Ireland	63	2000	1955	1923	1296	376
Total UK	**398**	**20646**	**18818**	**18552**	**13441**	**3194**

Notes: * Counting 'super wards' as a single unit. ** All productive contacts
++ excluding proxy information

Follow ups of the MCS1 achieved sample were carried out when the child was aged 3 (MCS2) and aged 5 (MCS3). Since the focus of MCS is the cohort child, the follow-up rules aimed to interview (or re-interview) the main carer of the child, whoever that was at the later sweeps. If a previous main carer had left the household, but the child had remained, the new main carer would be interviewed. As well as the main carer, any resident partners were asked to complete a face-to-face CAPI interview at each sweep. Again where partners changed between sweeps, the partner in the household where the cohort child lived was asked to complete a partner interview at successive sweeps of data collection.[6]

At MCS2 a sample of what were called 'new families' in England were contacted to see if they would agree to be in the study. These were families who, subsequent to MCS1 fieldwork, were found to have been living at an eligible address that had not been confirmed in the Child Benefit Records until after the first Sweep 1. This mostly arose where families had moved into a survey ward recently and it took time for their address to be updated by DWP. As a result, 692 new families were included in MCS2.

The overall productive response across the first three waves of MCS is displayed in Table 2. 'Productive' in this context means that at least some data were collected from these families using at least one survey instrument at the respective sweeps of MCS. The rest of this paper focuses on respondents from the top 4 rows of this table thus excluding, for simplicity, new families who only entered the study at MCS2. A

[6] Where the child lived in two homes, only one interview was held and preference was given to the person who had been the main carer from the earlier sweep.

total of 13234 of the original Sweep 1 sample of 18552 individuals participated in all 3 waves (71.3%).

3.2 Ethnicity classification

Main respondents were asked at MCS1 to indicate which of a set of ethnic identity categories they regarded themselves as belonging to and which group the baby belonged to. Partners were asked the same question. The 2001 Census ethnicity categories were used to classify the ethnic identity of main and partner respondents and the child in the MCS data. Aggregate groupings were imposed on these categories to create a smaller manageable number of categories for reporting. These are as follows: white; Indian; Pakistani; Bangladeshi; black Caribbean (including black British); black African; mixed origin; and other. The latter two groups were added together in many analyses due to their small size.

Table 2. MCS Sample sizes across 3 Sweeps.

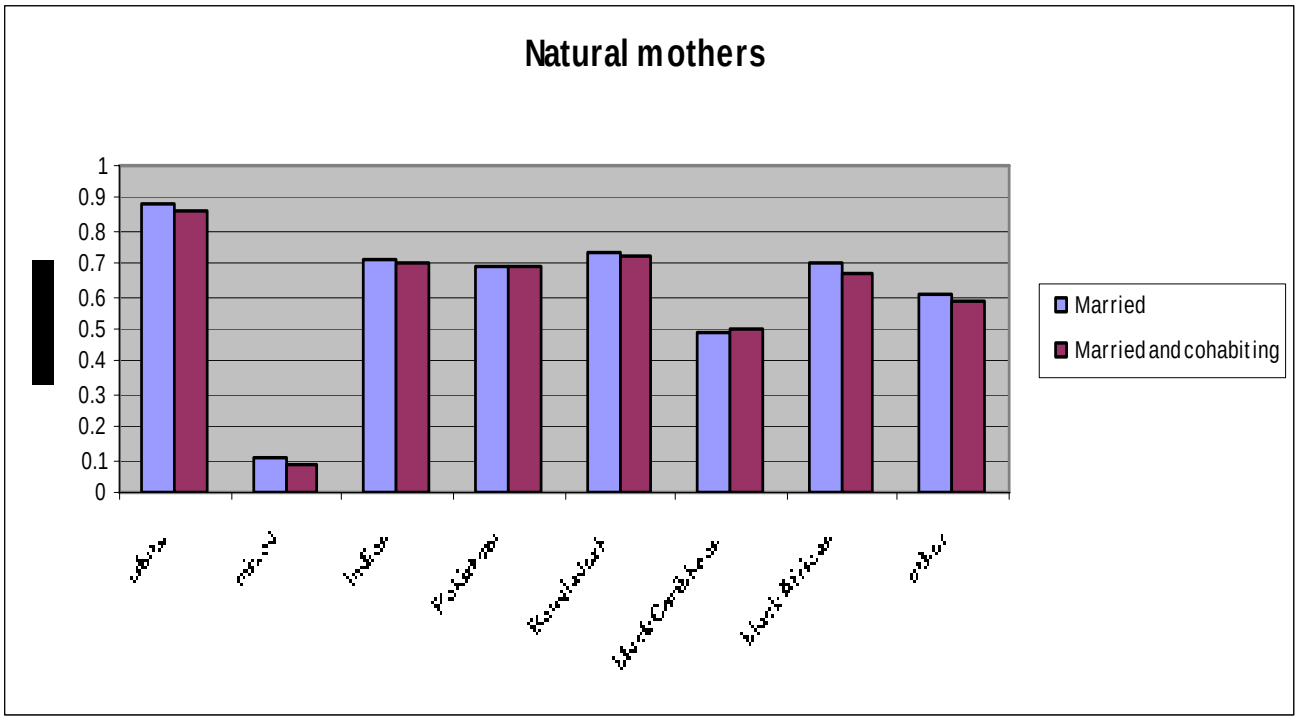
Response Description	**MCS Sample**	**Country at MCS1**			
		England	**Wales**	**Scotland**	**N. Ireland**
Productive at all waves	**13234**	**8314**	**2002**	**1596**	**1322**
Productive at wave 1 and 2 but not 3	**1664**	1044	259	218	143
Productive at wave 1 and 3 but not 2	**1444**	835	179	218	212
Productive at wave 1 only	**2210**	1340	320	304	246
New families: Productive at wave 2 and 3	**568**	568	NA	NA	NA
New families: Productive at wave 2 only	**124**	124	NA	NA	NA
MCS cohort (MCS1 productive+ Productive New families)	**19244**	12225	2760	2336	1923

In total, 2962 of the main respondents who were natural mothers at the first sweep classified themselves as belonging to one of the minority ethnic groups. Of the partners, 1932 natural fathers who completed the partner interview classified themselves as belonging to a minority ethnic group at MCS1. Of the other fathers in the survey 6 of the 22 natural fathers who did a main interview and one of the 34 who were a father figures doing a partner interview were also from minority ethnic groups. The numbers of minority ethnic natural mothers and minority ethnic partners in the survey at Sweep 1 are set out in Appendix Table A2.

The rates of ethnic homogamy among partnered couples in MCS varied by the ethnicity of the natural mother (Figure 1). Rates of common ethnicity among partners were highest among white natural married mothers (88%) and extremely low in the case of mothers of mixed origin (less than 10%). Cohabiting mothers were usually slightly less likely than married mothers to have a partner of the same ethnicity, with the exception of black Caribbean partnered mothers. However, rates of living with a

partner of the same ethnicity were also very low, around 50 per cent, for black Caribbean partnered mothers.

Figure 1. Extent of same ethnicity among partnered natural mothers at MCS1 by mother's ethnicity.



Note: Since cohabiting partnerships are very small in number for some minority ethnic groups, they are displayed here only in combination with married couples.

It is also relevant to note that the data collection made provision for non-English language speaking families. At MCS1, the Introductory leaflet, the advance letter and the thank-you letter were translated into the most common non-English languages spoken in the 19 selected ethnic wards. The languages appropriate for translation were: Bengali, Gujarati, Kurdish, Punjabi, Somali, Turkish and Urdu. The first leaflet had already been translated into Welsh. Some interviews were carried out in verbal translation (in these and other languages) by relatives, friends or the interviewer. In certain circumstances where no-one was available to translate into English, translator interviewers were provided.

Other languages encountered in non-trivial numbers included Arabic, Hindi and Tamil. Main interviews at MCS1 were carried out in a non-English language in 226 cases (1%), of which one main respondent interview was in Welsh. A further 547 (3%) were done in a mix of English and another language of which 3 were in Welsh. For partners the corresponding figures were 306 (2%) of which one was in Welsh and 94 (1%) of which 2 were in Welsh.

4. Defining response in this analysis

4.1 Problems to resolve

MCS has a complex longitudinal survey design. In the Millennium Cohort Study the cohort child is the main focus of interest. However, since babies and children are not capable of being productive survey units of analysis in their own right, their family is the survey unit for the childhood years of their life. MCS was designed in its first 3 Sweeps to collect data from a main respondent who was the main carer of the child and a partner respondent. At MCS1, nearly all main respondents were natural mothers (4 were other mothers; 18 were lone fathers; 2 were natural fathers; 5 were other guardians). But in later sweeps, there were growing numbers each time of fathers or male partners answering the main respondent questionnaire, and mothers or female partners responding to the partner questionnaire.

In all longitudinal surveys attrition is an issue with the expectation that sample sizes will fall over each successive sweep. The general experience has been that the largest attrition occurs between waves 1 and 2. Respondents who stay in a longitudinal survey at the second sweep are expected to be more committed to it and have higher wave-on-wave response rates at waves 3 onwards. MCS has had an experience, little reported in the literature, of having a sizeable loss at its second Sweep (2210 families, 11.9%), but a sizeable recruitment at Sweep 3 of those lost at Sweep 2 (1444 families). One major change that occurred from MCS2 to MCS3, and which probably contributed to this change was a change in the fieldwork contractor. This would have meant a very substantial change in interviewers from Sweep 1 to 2. The fieldwork contractor was changed again for Sweep 3. At Sweep 3, 1664 of those interviewed at Sweeps 1 and 2 did not respond. The relative success of getting families back into the survey at Sweep 3 makes calculation of response rates, R at time t, using Rt/Rt-1 somewhat problematic from MCS2 to MCS3. These are the general problems in reporting MCS response rates over its first three waves. In addition to these general problems, further problems arise when focussing on ethnicity as listed below.

1. When main and partner respondents were asked to self classify their ethnicity, a small number of people refused to do this. Ethnicity classifications are missing at MCS1 for 33 main respondent natural mothers and 6 resident partner respondents. However, at subsequent sweeps 25 of the mothers gave their ethnicity so only 8 natural mothers remained without an ethnicity classification. We exclude individuals where ethnicity is unknown at any sweep from the analyses below.

2. Some main and partner respondents (including 135 natural mothers) were asked again to self classify their ethnicity at Sweep 2 and/or 3 and in a few cases (e.g. 9 natural mothers) respondents gave a different answer than they had given at MCS1. In these cases we have used the most recent description of the person's ethnicity and applied it to all earlier sweeps.

3. Families with two resident parents have the potential to be of different ethnicities (see Figure 1 for the extent of this). It is not possible, therefore, to consider the family as having a single ethnicity classification. Ethnicity classifications only apply to individual family members. This means that response by ethnicity can only be analysed at an individual rather than at a family unit level in the MCS data.

4.2 What constitutes non-response?

Of course non-response is typically analysed initially starting at the first wave using information about the eligible population from its sampling frame. Analyses of MCS Sweep 1 responses have been undertaken using the limited data known about the issued sample from the Child Benefit Register (Plewis 2003, 2007). Response rates varied by the type of areas (strata) in which families lived (see Appendix Table A1). They were highest in areas of relative advantage and lowest in areas of minority ethnic concentration confirmed by a multilevel analysis by Plewis (2007). Other significant predictors of higher non-response were being listed as 'Miss' on the CB Register, being a recent mover into the selected wards, being in wards with a higher Child Poverty Index, and being a mother under 33 at the same time as not having a bank account. Unfortunately, the ethnicity of its recipients was not available from the Child Benefit Register, so this characteristic could be not examined in the initial analysis of achieved response. For the same reason, the analysis of non-response in this paper is conditional on an individual having a productive response at the MCS1 interviews. Plewis (2007) also analysed Sweep 1 to Sweep 2 response and found that being unproductive at Sweep 2 was significantly associated with being a mover between Sweep 1 and Sweep 2, living in one of the smaller UK countries, having the lowest band of household income or refusing to answer the income question at Sweep 1, being in rented or other non owner occupied housing, and not in a house or bungalow at Sweep 1, being a mother under 30, having no qualifications, no stable address, not having breastfed the baby, having a long standing illness and no partner. Compared with white main respondents, main respondents of Mixed, Pakistani combined with Bangladeshi, black plus black British and black Other and Other ethnicities all had significantly higher non-response.

It is necessary to stipulate what constitutes a full response in our analysis of non-response for both mothers and fathers.

- If information is given by proxy for an individual who was eligible for a main or partner interview we consider this is a non-response. This definition affects 215 male fathers or father figures from our analysis.
- Where the female main respondent at MCS1 completed a partner interview at a subsequent Sweep, we consider this to be a full response.

In addition, for analysing non-response, given a first interview, we have decided to focus on main respondent natural mothers responding at MCS1, as one group. Of the 18552 families at Sweep 1 there were 27 with no natural mother, 20 where the natural mother was not interviewed and 3 where they were interviewed by proxy; excluding these leaves us with an initial response group for analysis of 18502 natural mothers, for whom an ethnicity classification was available from MCS1.

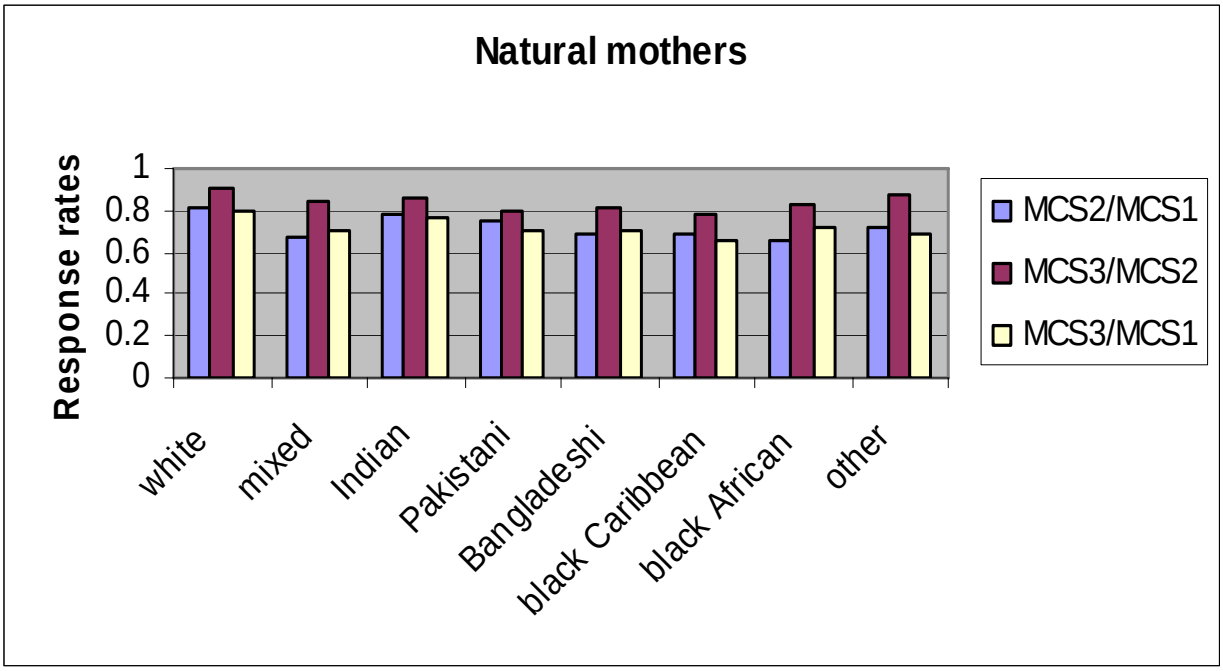
Defining survey response is more difficult for male partners than it is for mothers because more changes of partner took place between survey contacts and new partners were more common than new main respondents. While we originally intended to include an analysis of partners in this paper, this turned out to be so complicated that it was not possible to include it here, and partners' responses will be written up in another paper.

5. Natural mothers' response rates

Mothers' response rates at Sweep 2 and 3 by ethnicity are displayed in Figure 2. The response rate figures MCS3/MCS2 are only those who were also interviewed at MCS2 excluding the ineligible families who were not part of the issued sample at either MCS2 or MCS3 and excluding any other ineligible families. However, in the MCS3/MCS1 ratio all those who responded at MCS3 are included even where they had not been in the study at MCS2.

Mothers' response rates by ethnicity at MCS2 range from 81.5 per cent to 65 per cent. White mothers had the highest response rates of all ethnic groups of mothers at MCS2, followed in order by Indian (79%), Pakistani (75%), Other (72%), black Caribbean (69%), Bangladeshi (68%), Mixed (68%) and black African (65%) mothers. Response rates at MCS3, given response at MCS2 ranged from 91.4 per cent to 78.2 per cent. These are the higher rates which past experience of longitudinal studies has led us to expect after the second wave. All ethnic groups had higher MCS3/MCS2 ratios than MCS2/MCS1 ratios. However, the very large improvement in response from MCS2 to MCS3 is only for some ethnic groups, and not all. White mothers had the highest response rate again for MCS3/MCS2, but now black Caribbean mothers had the lowest rate (78%). Also the order of the other groups changed going from next highest Other (88%), to Indian (86%), mixed (84%) black African (83%), Bangladeshi (82%), and Pakistani (80%) mothers at the lowest.

Figure 2. Response rates of MCS1 same natural mothers at MCS2 and MCS3 by natural mother's ethnicity.



Base: MCS natural mothers who were eligible to be interviewed at the Sweep because they were either the main carer or partner of the cohort child. (The 166 MCS families at MCS2 and the 296 families at MCS3 who were ineligible due to death of the child or emigration were excluded from the relevant denominators).

However, when the response ratio MCS3/MCS1 is calculated, given there was a large recruitment of families lost at MCS2 back into the study at MCS3, the response rates and ranking by ethnicity change once more. Response rates now range from

the highest at 80.4 per cent for white mothers, followed by Indian (75.8%), black African (72.2%), mixed (70.1%), Pakistani (70.1%), Bangladeshi (69.5%), Other (69.1%) and finally black Caribbean (66.2%) mothers. One interesting thing about these response rates is that three groups have higher rates from MCS3/MCS1 than they did for MCS2/MCS1, namely black African, Bangladeshi and mixed origin mothers.

The implications of these response rates for the overall sample sizes of minority ethnic groups are serious, especially for groups who had relatively small sample sizes even at MCS1, as displayed in Appendix Table A2. The number of Indian mothers in the sample at MCS3 was 361, down from 478. For Pakistani mothers, 893 at MCS1 reduced to 623 by MCS3; for Bangladeshi mothers 372 at MCS1 reduced to 258 by MCS3; for black Caribbean mothers the 265 at MCS1 was reduced to 174 by MCS3; for black African mothers, 375 at MCS1 reduced to 270 by MCS3; and Mixed race mothers declined from 192 at MCS1 to 131 by MCS3. Carrying out analyses on samples as low as those for black Caribbean or mixed race mothers is problematic. With the exception of Pakistani mothers, all of the groups start to run into problems of insufficient samples for carrying out further detailed descriptive analyses which are robust.

As a final description, we have combined the response across all three MCS Sweeps to show how minorities rates of overall response varied (Table 3). Groups that sustained highest losses after Sweep 1 (Pattern 1 1 0) and which were not recouped at Sweep 3 (Pattern 1 0 1) were mothers of Bangladeshi, black Caribbean, mixed and to a slightly lower extent black African ethnic origin. This pattern of loss was approximately 20 per cent of the Sweep 1 sample for most of these groups. These same groups all had high rates of recruitment back into the survey by MCS3 (pattern 1 0 1) but clearly not sufficient to reverse their decline between Sweep 1 and 2, with the exception of black African mothers whose response by MCS3 (111 plus 101) at 72 per cent almost matches that of Indian mothers at 75 per cent. Pakistani, Bangladeshi and black Caribbean mothers also had high percentages than other groups with pattern 1 1 0, 15-16 per cent missing the Sweep 3 survey.

Table 3. Combined responses of natural mothers across 3 MCS Sweeps by natural mother's ethnicity

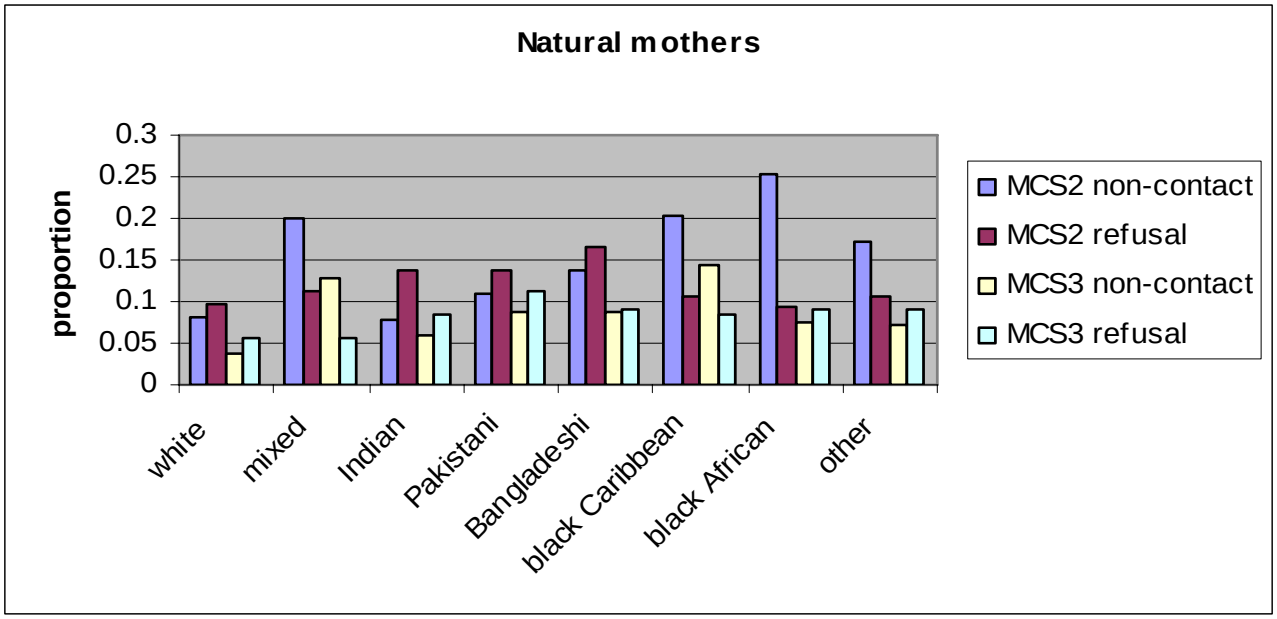
Per cents

	1 1 1	**1 1 0**	**1 0 0**	**1 0 1**	**Total %**	**Obs**
White	72.2	8.6	11.9	7.4	100	15535
Indian	67.0	11.5	13.2	8.4	100	478
Pakistani	59.6	15.2	15.3	9.9	100	893
Bangladeshi	55.4	15.5	18.9	12.8	100	372
black Caribbean	52.8	15.5	18.9	12.8	100	265
black African	53.6	11.2	16.8	18.4	100	375
mixed	53.1	13.0	18.8	15.1	100	192
Other	58.1	12.2	20.3	9.4	100	384

Key: 1 1 1 – responded at all 3 Sweeps
1 1 0 - responded at MCS1 and MCS2 but not at MCS3
1 0 0 – responded at MCS 1 only
1 0 1 – responded at MCS1 and MCS3 but not at MCS 2.

Some initial conclusions can be drawn from these response rate figures. If we started out thinking that some ethnic groups may be better at responding than others, these descriptive statistics suggest this is not straightforwardly the case. Clearly white mothers' response was highest on all ratios, although Indian mothers were pretty close behind them. But there is no consistent ranking of the other groups across all of the ratios.

Figure 3. Breakdown of natural mothers' non-response at MCS 2 and MCS3 into refusal and non-contact by natural mother's ethnicity.



Base: MCS natural mothers who were eligible to be interviewed at the Sweep because they were either the main carer or partner of the cohort child. Ineligible at MCS2 or MCS3 were excluded. Proxy interviews were treated as refusals as were main or partner not interviewed code when other household member was interviewed. Non-contact is a combination of unproductive untraced, unproductive non-contact, and unproductive other codes.

The breakdown of natural mothers' non-response into either non-contact or refusal also displays variation by mother's ethnicity. Figure 3 displays non-response and non-contact rates by ethnicity at MCS2 and MCS3 on the basis of the eligible samples at each Sweep (Figures showing the extent of non-response along with eligibility are displayed in Appendix Figures A1 and A2.) Rates of non-contact and refusal elements of non-response were higher at MCS2 than at MCS3, as we would expect from the response rates shown above. For white, Indian, Pakistani, and Bangladeshi mothers, non-contact rates were lower than refusal rates at both MCS2 and MCS3. However, for mothers of mixed, black Caribbean, black African and other ethnicities, non-contact rates were substantially higher than refusal rates; these continued to be so at MCS3 as well as at MCS2 for mixed and black Caribbean mothers but not for black African and Other mothers. Non-contact rates at MCS2 for mixed, black Caribbean and black African mothers stand out in this chart since they are 20 per cent or more of the MCS1 sample. Refusal rates were highest for Bangladeshi mothers at MCS2, followed by Pakistani and Indian mothers at the same sweep. Pakistani mothers continued to have the highest refusal rates at MCS3 although the refusal rates of the rest of the minority groups were more alike at MCS3, and still higher than for white and mixed mothers.

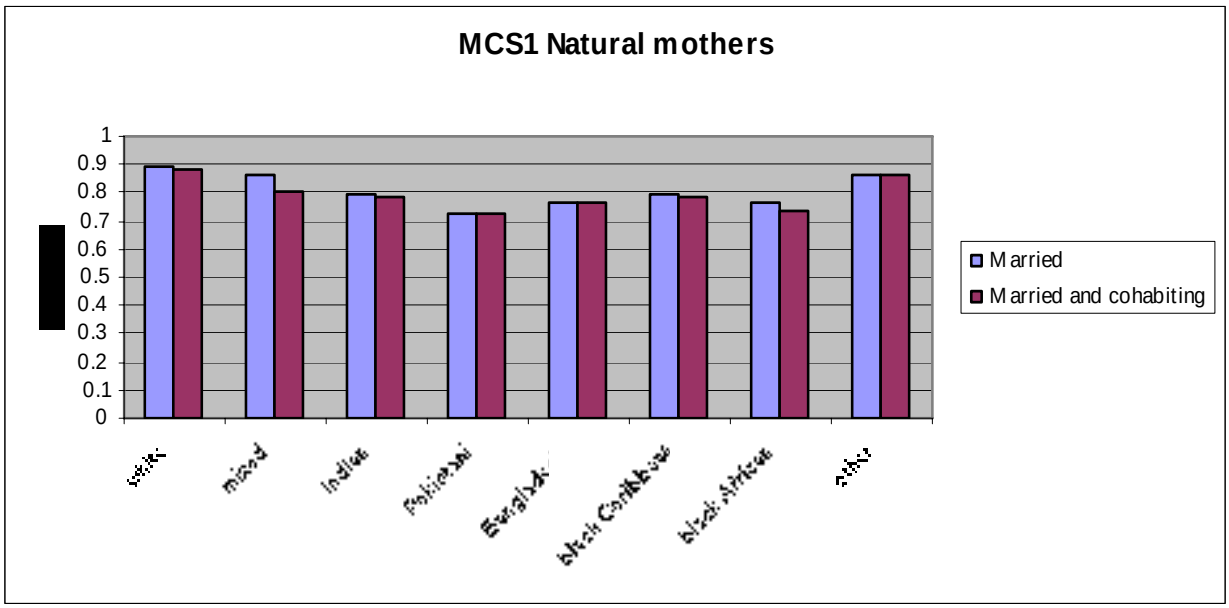
6. Male partner responses

6.1 Recruitment into the study

At MCS1, interviewers approached the Child Benefit Register families and first got someone at the address to fill in a relationship grid of those who lived at this address. Full interviews were then sought with the person designated the main carer, and where resident, the partner of the main carer. This approach meant that main carers, who were almost wholly mothers, were usually the first to be recruited into the study and male partners were recruited into the study for an interview subsequently. The number of full MCS1 interviews with partners of mothers living in a partnership provides, therefore, one approximate response rate for partners, as displayed in Figure 4.

As the rates in Figure 4 show, partners of white partnered natural mothers had the highest rates of recruitment into MCS at MCS1, when their baby was 9-10 months old. The cell sizes for cohabiting mothers were too small for a separate analysis for the majority of ethnicity groups, but where they were of sufficient size to be examined, recruitment of partners into the study was less for cohabiting than for married natural mothers. For example, for white natural mothers, 90 per cent of partners of married mothers agreed to be interviewed compared with 84 per cent of partners in cohabiting unions. Pakistani partnered mothers had the lowest rates of recruitment of partners into MCS, 72 per cent in total.

Figure 4. Partnered natural mothers at MCS1 where partner gave an interview by natural mother's ethnicity



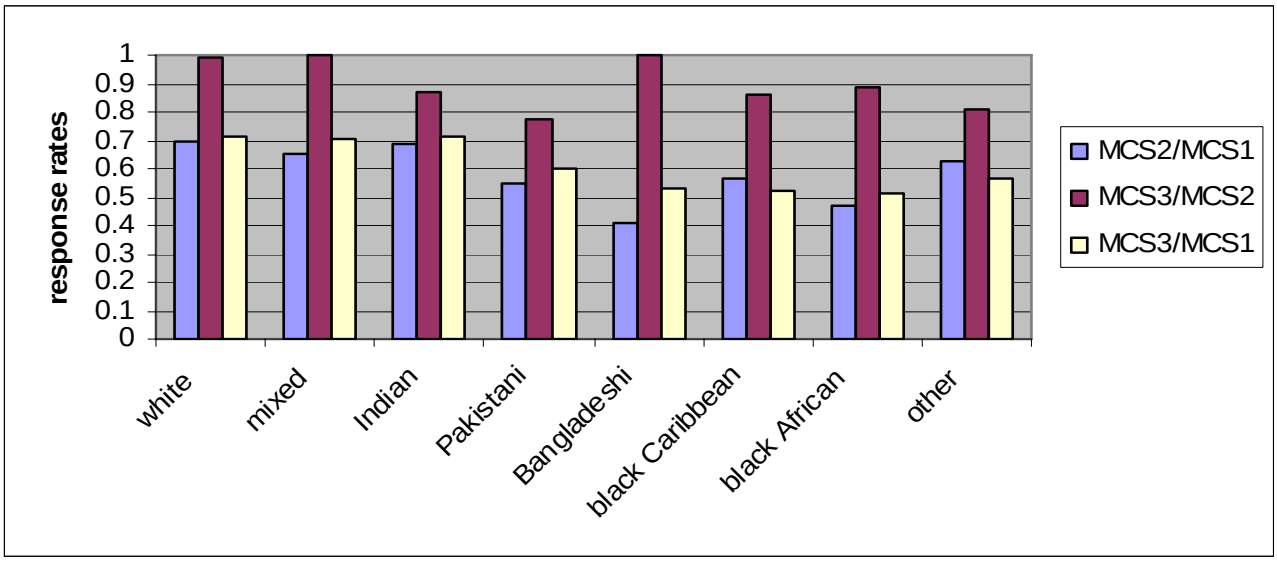
Note: Since cohabiting partnerships are very small in number for some minority ethnic groups, they are displayed here only in combination with married couples.

6.2 Male partner response rates after initial participation

Attrition rates at MCS2 were much higher among the male partners than for the mothers. MCS2 response rates ranged from around 70 per cent for white and Indian fathers to 40 per cent among Bangladeshi fathers (Figure 5). White fathers did not exhibit the same lead in response rates over minorities that was evident among natural mothers. However the lowest MCS2 response rates for Bangladeshi fathers does coincide with the same rank for Bangladeshi mothers.

However, rates of response from MCS2 to MCS3 were, as expected, higher than at MCS2, but also higher among these men than among the mothers (Figure 5). The MCS3/MCS2 response rate reached almost 100 per cent for white, mixed and even Bangladeshi fathers who stayed in the survey after its second sweep. Pakistani fathers had the lowest response rate from MCS2 to MCS3 at 78 per cent. The ratio from MCS3 to MCS1 response rate shows again that some fathers were disproportionately recruited back into the study at MCS3 having been absent at MCS2. This did not apply to partners who were classified as black Caribbean or Other fathers.

Figure 5 Response rates of same MCS1 male partner individuals at MCS2 and MCS3



Base: MCS male partners who were eligible to be interviewed at the Sweep because they were still a resident partner at the Sweep and had been resident and interviewed at the relevant earlier Sweep. (The 166 MCS families at MCS2 and the 296 families at MCS3 who were ineligible due to death of the child or emigration were excluded from the relevant denominators).

7. Predictors of mothers' responses

A number of multivariate models were estimated on mothers' productive responses and response patterns as listed below. They rest, in part, on the theoretical distinctions in Lepkowski and Couper (2002) and Lynn et al (2002) outlined above. Location propensity, (L), contact propensity and cooperation propensity (C) of a survey respondent, i, may be influenced by different predictors. In practice, Lynn notes that once located, contact is not usually a major issue. Ideally, therefore, we would want to model location/contact and cooperation propensities as separate but inter-related and multi-level events as follows:

$$L_{it} = f (S_{t}, S_{t-1}, X_{t-1}) \quad (1)$$

$$C_{it} = f^* (S^*_{t}, S^*_{t-1}, X^*_{t-1} \mid L_{it}) \quad (2)$$

Location is likely to be related to survey operations, S, such as the number of the panel wave, the length of time between panel waves, and organisational efforts to find people who have moved. Propensity to be located may also be proxied by survey process variables at an earlier wave (or waves), for example, the number of call backs at an earlier interview. Lynn and Clarke's (2001) examination of call-backs shows that it is not perfect as a proxy for location/contact. Location is also likely to be related to a vector of respondent characteristics known from earlier waves, Xt. Respondent characteristics that affect being located are likely to be the propensity to move which may be related to demographic characteristics like age, family status, community attachment, and housing tenure.

Cooperation , once located, is likely to be related to a set of survey operation characteristics from the wave (e.g. interviewer approach, repeated call-backs, refusal conversion techniques) as well as from earlier waves (e.g. the length of the last interview, the rapport with the earlier interviewer, and extent of interviewer continuity), as well as respondent characteristics (community attachment factors, social current stresses).

In this paper, we are only at the early stages of this analysis and, given the available data on survey operations, and model a single equation of cooperation or 'response', of these two processes.

$$C_{it} = f^* (S^*_{t}, S^*_{t-1}, X^*_{t-1}, S_{t}, S_{t-1}, X_{t-1}) \quad (3)$$

We report only non-hierarchical logistic regression models on response, given participation in earlier waves, or multinomial logistic regression models of the combined response across three MCS sweeps, as a function of a large range of survey respondent characteristics from Sweep 1, and a few measures of survey operation indicators from Sweep 1. The survey operation measures at Sweep 1 does include the number of call backs at Sweep 1, which we consider to be a reasonable proxy measure of location propensity at subsequent sweeps. We do not have the more precise data advocated by Lynn and Clarke which would count the number of call backs until first contact was achieved.

7.1 Dependent variables

(1) Logistic regression on being productive at each of the following sweeps separately:

(a) MCS2 given interviewed at MCS1 and eligible at MCS2.

(b) MCS3 given interviewed at MCS 1 and eligible at MCS3

(c) MCS3 given interviewed at MCS2 and eligible at MCS3.

These models were all estimated on the whole sample, including ethnic dummies. There were two main aims in carrying out these analyses of the whole sample; to identify characteristics that were important predictors of response in the whole sample, in order to test whether they were also important for minorities; and to see if significant coefficients on ethnic group dummies could be explained by adding more explanatory characteristics.

We also estimated logistic regression models on each ethnic group separately using both the entering all the variables at once and by Forward Stepwise methods to allow for identifying characteristics that were important predictors for six separate ethnic groups of mothers.

(2) Multinomial logistic regression models were also estimated on the overall patterns of response as outlined in Table 3. The omitted reference group was the majority pattern of being productive at all three MCS Sweeps (1 1 1). These models were all estimated on the whole sample, including ethnic dummies. They were also estimated on each of six ethnic groups separately, in all cases entering all the variables and using the Forward Stepwise method.

7.2 Independent variables

A large set of independent variables were entered into all of these models informed by earlier research on non-response in UK and US surveys. Following Lepkowski and Couper's general sub headings we included respondent characteristics measures from MCS Sweep 1 data as follows: [7]

Socio-demographic factors (age at motherhood; gender, ethnicity, educational qualifications including measures of literacy and numeracy, size of family);

Community attachment factors (interest in politics and voting combined into a set of four dummies; length of housing tenure; type of housing tenure; satisfaction with area; satisfaction with home); [8]

[7] It is arbitrary in some cases, whether the variables come under one heading or another.

[8] Evidence about the importance of community attachment factors can be found in Groves et al's (2000) finding about civic or community involvement. Lepkowski and Couper (2002) found that cooperation at wave 2 of the *American Changing Lives Survey* was associated with involvement in voluntary activity and attendance at community meetings. Taylor et al (1996) showed propensity to refuse at Wave 2 of British Election Survey was positively associated

Social integration factors (marital and partnership status; whether has a bank or building society account);

Situational circumstances (employment status; hours of work of the mother; time of day worked; whether in receipt of means tested benefits; mental and physical ill health of mother; ill health of child).

The limited *survey process variables* from the Sweep 1 survey process included: the time of day of the Sweep 1 interview (divided into morning, afternoon, evening and missing), the number of call-backs, and the gender of the interviewer. We expect that the time of day the Sweep 1 interview was carried out and the number of call-backs are proxy, if imperfect indicators of the location/contact propensity. We consider the gender of the interviewer is potentially an indicator affecting cooperation. This full set of variables entered with their definitions is displayed in Appendix Table A3 along with a list of means and standard deviations for each minority ethnic group of mothers.

7.3 Results from logistic regression model

One issue of interest was whether, by including a larger range of respondents' characteristics and survey process information we could explain more of the lower responses rates of minority ethnic groups. In all of the general models estimated on the whole sample including ethnic dummies, a significantly higher proportion of variance was explained by including additional explanatory variables, but it still left the models with highly significant ethnic dummy variables in most cases, and with relatively low overall goodness of fit measures. The summary results from this exercise using logistic regression on the three possible dependent variables are displayed in Table 4. There, as one example, the model of being productive at MCS2 (Product12) increased its quasi R squared from 0.013 to 0.188 as a result of adding a large range of additional explanatory variables. However, the coefficients and odds for each ethnic dummy did not all decrease the gap between white respondents; the gap between white and minority mothers grew larger as a result of adding other explanatory variables in the case of Indian, Pakistani, Bangladeshi and black Caribbean mothers, but grew smaller in the case of black African, mixed and Other mothers. Examining the other responses at MCS3 reveals similar diversity in what happens to ethnic dummy coefficients as a result of adding further covariates. Only at MCS3 (conditional on MCS1 response) was there a majority of groups experiencing a decreasing gap with whites' productive responses.

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with lack of interest in politics and low score on political knowledge, results also found in the US about election studies by Lepkowski and Couper (2002). Phillips et al's (2002) qualitative examination of why participants continued to be involved in the FACS survey found that wanting to assist UK government policy making was an important element.

Table 4 Odds of being productive, P, for ethnic group dummies of MCS mothers (Estimated by logistic regression)

	Product 12	Product 12	Product 23	Product 23	Product 13	Product 13
White	1.0	1.0	1.0	1.0	1.0	1.0
Indian	0.87	0.72**	0.78**	0.67**	0.78**	0.71**
Pakistani	0.71**	0.56**	0.57**	0.53**	0.58**	0.60**
Bangladeshi	0.51**	0.43**	0.48**	0.50**	0.57**	0.62**
Black Caribbean	0.52**	0.48**	0.43**	0.45**	0.49**	0.51**
black African	0.44**	0.50**	0.45**	0.54**	0.66**	0.78**
mixed	0.47**	0.58**	0.44**	0.56**	0.55**	0.68**
other	0.57**	0.59**	0.53**	0.57**	0.53**	0.57**
Other covariates+	NO	YES	NO	YES	NO	YES
Nagelkerke R2	0.013	0.188	0.019	0.145	0.011	0.083
Chi square, p	150.7, p=.000	2365.9, p=.000	243.8, p=.000	1991.4, p=.000	137.6, p=.000	1025.9, p=-000

Sample: MCS Sweep 1 sample of natural mothers who were main respondents with known ethnicity ** significant at 5 per cent level of confidence
+ Yes means full set of covariates across MCS1 respondent characteristics and survey process information.

Results from the multinomial regression model, discussed in more detail below (Table 6) found a similar result on the overall model fit and the significant ethnic dummy variables. The fit was marginally improved by adding a large number of covariates. However, adding covariates did not substantially change the size or significance of the ethnic dummies across all ethnic groups. The changes in coefficient size, compared with white mothers both widened and narrowed slightly across the minority ethnic comparisons with white mothers.

Table 5 sets out a chart of significant associations found across the various logistic regression models for separate minority ethnic groups. Results are reported where they were significant at less than 0.1. Positive findings, P (or negative associations, N) were those where the characteristic was associated with higher (or lower) response for the group. What is obvious at a casual glance is that, in a few cases, there are similarities across ethnic groups and in many cases differences in the significant findings. Also, in a few cases the same characteristic is significant in all sweep responses investigated, or two out of three. I regard these as stronger results indicating more robust associations with the ethnic group in question.
Significant predictors of lower response across a number of response sweeps are listed below:

- Not having a bank or savings account at MCS1 for Indian and Pakistani mothers;
- Being a lone parent in the case of black Caribbean and Pakistani mothers;
- Being aged 20-29 in the case of black African mothers;
- Having a larger family in the case of Pakistani mothers;
- Having a partner who is not employed in the case of Bangladeshi and mixed/other mothers;
- Numeracy problems in the case of Bangladeshi mothers;
- Not having voted at the last election at MCS1 for Indian mothers;

- Being dissatisfied with the area lived in for Bangladeshi mothers;
- Living in rented accommodation in the case of mixed/other mothers;
- Living in a shared flat or maisonette, a studio flat or a bedsit in the case of black African mothers;
- Having a male interviewer in the case of Indian and Pakistani mothers; and
- Having a high number of issues/call backs in the case of Indian and mixed/other mothers.

Table 5. Summary of results from 3 logistic regressions on being productive run on separate ethnic samples of MCS natural mothers

	Indian	Indian	Indian	Pakistani	Pakistani	Pakistani	Bangla-Deshi	Bangla-Deshi	Bangla-Deshi
	Product12	**Product23**	**Product13**	**Product12**	**Product23**	**Prodcut13**	**Product12**	**Product23**	**Prodcut13**
Works evenings			P						
Working Full time							P		
High qualification									P
Numeracy problems							N	N	N
Age20-29	N								
Age30-39									
Cohabiting									
Lone parent		P	P	N	N				
Employed partner							P	P	P
One child only				P	P	P	P		
Contact with grandparent				P					
No-one to share feelings				N					
Depressed									
No bank/savings account	N	N	N	N		N			
Voting	P	P	P						
Dissatisfaction with home	N			P					
Dissatisfied with area							N		N
Renting									
Other housing tenure									
Not house/bungalow				N			N		
Afternoon interview							N		
Gender interviewer male		N	N	N	N		P		
Call backs	N	N	N				N		

	Black Caribbean	**Black Caribbean**	**Black Caribbean**	**Black African**	**Black African**	**Black African**	**Mixed+ Other**	**Mixed+ Other**	**Mixed+ Other**
	Product12	**Product23**	**Product13**	**Product12**	**Product23**	**Prodcut13**	**Product12**	**Product23**	**Prodcut13**
Works evenings	P			N					
Not working at MCS 1	N							N	N
High qualification		P						N	
Age20-29				N	N	N			
Age30-39	P	P						P	P
Cohabiting	P								
Lone parent		N	N						
Employed partner							P	P	P
Only one child	P		N				P		
Contact with grandparent									
No-one to share feelings									
Depressed							N	N	
Smokes		P	P						
No bank/savings account				N					
Voting									
Dissatisfied with area									
Renting				N			N	N	
Other housing tenure	N						N		
Not house/bungalow				N	N			N	
Afternoon interview									
Gender interviewer male									
Call backs	N						N	N	N

P / N-has a positive/negative association significant at 95% confidence

Whether it is possible to devise targeted incentives to these groups that would influence them in favour of responding is another matter. Of course we also need to be cautious in our interpretations of these findings given the small sample sizes, especially for some ethnic groups.

7.4 Results from the multinomial combined response model

The results from the combined 3 wave response model (Table 6). After controls were added, compared with responding at all three MCS Sweeps, all minority groups were more likely to be in these non-response patterns than white mothers, but there were variations between groups as to which were their most and least likely patterns of response. Indian and black Caribbean mothers were both equally likely to be in the 110 or 101 patterns of responses, but less likely in the 100 pattern. Pakistani, Bangladeshi, black African and mixed origin mothers were most likely to be in the 101 pattern, and least likely to be in the 110 pattern.

The results on the other covariates included in estimating this multinomial model on the whole sample (including ethnic dummies) are displayed in Appendix Table A3. Having lower or no qualifications was systematically associated with being in all of the non-responding patterns, as was working full time or not working at all at the MCS1 interview; other variables associated with all 3 non-response patterns were not voting, not living in a house or bungalow, and being dissatisfied about the area or one's home.

Table 6. Model coefficients from multinomial logistic regression on combined 3-wave response, for ethnic group dummies for MCS mothers
(Reference Group is responded at all 3 MCS Sweeps, (1 1 1) .

	1 1 0	1 0 0	1 0 1	1 1 0	1 0 0	1 0 1
white (REF)						
Indian	0.372**	0.181	0.194	0.414**	0.342**	0.438**
Pakistani	0.769**	0.450**	0.474**	0.581**	0.631**	0.721**
Bangladeshi	0.656**	0.698**	0.878**	0.443**	0.847**	0.970**
black Caribbean	0.905**	0.777**	0.858**	0.722**	0.895**	0.825**
black African	0.568**	0.647**	1.205**	0.367*	0.530**	0.962**
mixed	0.727**	0.765**	1.016**	0.500**	0.557**	0.715**
other	0.576**	0.756**	0.450**	0.481**	0.692**	0.411**
Other covariates+	NO	NO	NO	YES	YES	YES
% predicted	69.9%			70.1%		

Sample: MCS Sweep 1 sample of natural mothers who were main respondents with known ethnicity.
** significant at 5 per cent level of confidence
+ Yes means full set of covariates across MCS1 respondent characteristics and survey process information.
NOTE: 1 1 0 – responded at MCS1 and MCS2 but not MCS3: 1 0 0 – responded at MCS1 only. 1 0 1 – responded at MCs1 and MCS3 but not MCS2.

Dropping out after the first Sweep and not returning (1 0 0) was significantly associated with having difficulty with reading, having a non-employed partner at MCS1, having no-one to share feelings, and not having a bank or savings account. The lack of a bank account was also significantly associated with the 101 recapture

at MCS3 pattern. Working at weekends at MCS1 was significantly associated with dropping out after MCS1 (1 0 0) or after Sweep 2 (1 1 0). Being a lone mother at MCS1 was significantly associated with dropping out after MCS2 (1 1 0) or missing the MCS2 interview. Having a longstanding illness or an ill child were 'protective' factors associated with higher response as noted in some other studies.

Survey response characteristics associated with these response patterns for each ethnic group are displayed in Table 7. It was harder to find significant variables at the 0.05 confidence level most likely due to the small sample sizes. Variables significant at less than 0.1 are included in the Table. It is difficult to summarise this vast array of results so comment is made about a few of these findings only.

Table 7. Significant coefficients on survey respondent characteristics in multinomial regression on combined 3-Sweep response for separate minority ethnic groups of MCS mothers

Factors associated with being more likely to be in pattern

	1 1 0	**1 0 0**	**1 0 1**
INDIAN	(numeracy problems)	(No qualifications)	
		(Teenage or 20s mother)	
	(Not lone parent)	(Not lone parent)	(Not lone parent)
		No bank/saving account	
	Dissatisfied with 2 or more aspects of area		Dissatisfied with home
		Other housing (not owner occ)	Other housing (not owner occ)
	(Not vote + no interest in politics)	Not vote + no interest in politics	Not voting+interest in politics
PAKISTANI	More than one child		(Works weekends)
	Not employed partner On benefits	(Employed partner)	
	No partnership dissolution		Lone parent
			(Not smoker)
			Has people to share with
		Child **not** ill	
		Not vote + no interest in politics	
	Lived current address less than 1 yr	Other housing (not owner occ)	
BANGLADESHI	Problems with numeracy Works full time	(No qualifications) Works evenings	(Works weekend) (Not age 30s)
	Not lone parent	Not employed partner	On benefits
	Not dissatisfied with area	Dissatisfied with area	Dissatisfied with area
		(Not voting)	
		(Not renting) (Not Other home tenure)	(Not renting) Not house/bungalow
BLACK CARIBBEAN		Not working (Not working evenings)	
	Lone parent		Not cohabiting (Not lone parent)
		(Mother not depressed)	Child **not** ill

	1 1 0	1 0 0	1 0 1
		(Not smokes)	
	(Longer housing tenure)	(Less than one year at Address) Other housing tenure	
BLACK AFRICAN	Not work weekend		Works evening
	(Ages above teenage)	Age 20-29	(Age 20-29)
	Partnership dissolution		(Lone parent)
	(No one to share with)		
	Mother depressed	(Mother not ill)	
		(No bank/savings account)	Interest in politics +not vote
		Not house/bungalow	Renting (Other housing tenure) (Not house/bungalow)
MIXED+ OTHER	Lower or no qualifications	(Not working)	Works weekends Not high qual (No numeracy problems)
	Not working		
	(Not lone parent)	(Not lone parent)	(Lone parent)
		Non-employed partner	
			Mother depressed
		Not on benefits	On benefits
		(Dissatisfied with area)	(Renting) Not living house or bungalow

Sample: MCS natural mothers at MCS 1 with known ethnicity
( ) – significant at p<0.1.

Some factors were regularly associated with loss from the sample after MCS1; namely, difficult to reach housing (living in flats, bedsit etc) or non owner occupiers, lack of a bank/savings account, and the lack of community attachment reflected in voting. These factors were significant for Indian, Pakistani and black African mothers; lack of voting was also an indicator for Bangladeshi mothers being lost after MCS1. Prominent factors associated with this loss for Bangladeshi mothers were more general indicators of disadvantage; having low or no qualifications, working evenings and having a partner who was not employed. These same factors were associated with loss from the sample after MCS2 for mixed/other mothers. For black Caribbean mothers not working, having short housing tenure and being in difficult to reach housing were associated with loss from the sample after MCS1. It is also worth noting that the more difficult to reach types of housing, when significant, were usually positively associated with one of other of these non-response patterns except in the case of Bangladeshi mothers; then being in more difficult to reach housing was negatively associated with being in these non-response patterns, compared with responding at all 3 MCS Sweeps.

Lastly the significant survey process variables, when entered separately from the survey responses are displayed in Table 7. Higher numbers of call-backs at MCS1 were associated with being in all of these non-response patterns for the whole sample as well as being significantly related to the worst response patterns (1 0 0 or 1 1 0) for Indian, Bangladeshi, black Caribbean and mixed/other mothers. Having a male interviewer to interview these mothers resulted in lower response after MCS2 but also a greater likelihood of being recaptured at MCS3 for the whole sample. Indian mothers lost to the sample after MCS1 were more likely to have had a male

interviewer at MCS1, and Bangladeshi mothers recaptured into MCS3 were more likely to have had a female interviewer.

Table 7. Significant MCS1 survey process characteristics in multinomial regression on combined 3-Sweep response for separate minority ethnic groups of MCS mothers

Factor associated with being more likely to be in pattern

	1 1 0	**1 0 0**	**1 0 1**
ALL SAMPLE+	Not evening interview	Evening interview	Not evening interview
	Male interviewer		Male interviewer
	Number of call backs	Number of call backs	Number of call backs
INDIAN		Male interviewer	
	Number of call backs	Number of call backs	
PAKISTANI			
BANGLADESHI		(Number of call backs)	(Afternoon interview)
			Female interviewer
BLACK CARIBBEAN	(Not afternoon interview)	(Number of call backs)	
BLACK AFRICAN			
MIXED+OTHER	(Not evening interview)	Number of call backs	Number of call backs

Sample: MCS natural mothers at MCS 1 with known ethnicity
( ) – significant at p<0.1. + after controlling for ethnic dummies.

8 Conclusions

What can we learn from MCS's experience of recruiting and surveying minority ethnic families and these analyses of response which might inform future survey designs and fieldwork practice? Given their higher non-response, a desire to carry out survey analyses of separate minority ethnic groups in a longitudinal survey requires over sampling to a much greater extent than was the case in the Millennium Cohort Study. Also, in order to achieve higher initial samples of groups who are not so concentrated in areas of high minority ethnic populations may need a different design and approach than the one adopted by MCS. For example, an interest in black Caribbean or mixed ethnicity families may need to look for ways of boosting these groups through selecting wards where these particular groups are in higher prevalence, rather than areas where BME groups in general are concentrated. However, this will not help with groups who are more dispersed.

Any learning from the analyses carried out needs to await further research analysing the more refined measures of non-contact and refusal in order to be sure findings are robust. However, some conclusions are clear at this stage. Ethnic group differences are evident in the predictors of response across these 3 MCS Sweeps and these are unlikely to be completely eliminated in more refined analyses. This reinforces the conclusions of earlier substantive research that has argued against assuming or treating all minorities in one homogenous 'minority' category. Indian mothers in MCS were the closest in response behaviour to white mothers in these analyses, and the same result has been noted in other substantive research on mother's labour market participation.

The implications of these findings for defining the follow up rules for including cohort participants in the issued samples for subsequent waves of a longitudinal are the same as those noted by Olsen. Retention of minority groups in a longitudinal survey will need them to be included in the issued sample despite having missed two successive interviews. However, that in itself will not necessarily raise response rates, and this would need to be accompanied by other incentive strategies to raise response.

In these analyses of response there are pointers to ways in which fieldwork might start to think of ways of targeting particular minority ethnic groups with incentives to continue to respond in a longitudinal survey. Future responses might be increased by identifying respondents who did not have a bank or savings accounts, or who had low community attachment as revealed by voting combined with lack of interest in politics, or who had high numbers of call backs at earlier sweeps and targeting them with incentives. Similarly, offering incentives to those who live in difficult to reach housing may prove beneficial. However, to take advantage of such identifications, fieldwork practice will also need to experiment with types of incentive if it hopes to achieve higher response rates among all minority ethnic groups, since it may also be the case that the type of incentive that appeals to respondents and secures higher response may also vary by their particular ethnic origin.

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Appendix 1. The Millennium Cohort Study

The sample for the first sweep included babies born between September 1 2000 and August 31 2001 in England and Wales, who form an academic year cohort. In Scotland and Northern Ireland the start date of the birthdays was delayed to November 23 2000 in order to avoid an overlap with an infant feeding survey being carried out in September and October. In the event the sampled cohort was extended to 59 weeks of births to make up for a shortfall in numbers, which became apparent during fieldwork. The last eligible birth date in these countries was January 11 2002.

The first Sweep of data collection covered a range of topics with the two or one parent resident in the household. Parents were asked to provide this information either face-to-face with the interviewer who entered it into a computer using computer assisted interviewing (CAPI) or they were asked to enter their answers confidentially and by self-completion into a computer. Seventy-five per cent of main interviews took place while the baby was aged 9 months, 19 per cent at 10 months, with 3 per cent at 8 months and 3 per cent took place late, at 11 months

Table A1 Response rates by ward/stratum and country

Country By Type of Ward		Expected Overall Response Rate	Achieved Overall Response Rate	In-scope Response Rate Fieldwork
England	Non-disadvantaged	75%	73%	86%
	Other Disadvantaged	70%	68%	82%
	High Minority ethnic	65%	62%	76%
	Total	70%	68%	82%
Wales	Non-disadvantaged	75%	78%	89%
	Other Disadvantaged	70%	69%	83%
	Total	71%	72%	84%
Scotland	Non-disadvantaged	75%	73%	86%
	Other Disadvantaged	70%	68%	83%
	Total	71%	70%	85%
N Ireland	Non-disadvantaged	75%	65%	81%
	Other Disadvantaged	70%	61%	78%
	Total	71%	63%	79%
UK	All	71%	68%	82%

Source: MCS Technical Report on Sampling, Plewis et al (2007)

Table A2. Numbers of natural mothers and partners interviewed at each MCS Sweep, either as main carer or partner by ethnicity where ethnicity is known

	MCS1		MCS2		MCS3	
Ethnicity	'Mothers'	'Fathers'	'Mothers'	'Fathers'	'Mothers'	'Fathers'
white	15535	11285	12545	8066	12371	8640
mixed	192	94	127	62	131	74
Indian	478	368	375	255	361	268
Pakistani	893	617	670	348	623	382
Bangladeshi	372	265	254	111	258	152
black Caribbean	265	130	181	81	174	84
black African	375	190	243	103	270	120
other	384	275	271	163	260	148
Ethnicity unknown	8	6	6	826	4	340
Total	18502	13230	14672	10015	14452	10208

Base: MCS natural mothers giving interview as main carer or partner at each sweep
The 692 new families entering at MCS2 were not included in these figures

Table A3. Means and standard deviations of the MCS1 independent variables included for natural mothers in the survey at MCS 1 by ethnicity.

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African	Mixed and Other	White
Socio-demographic factors							
Age at interview under 20 0/1	0.004 (0.06)	0.035 (0.18)	0.011 (0.10)	0.060 (0.24)	0.027 (0.16)	0.061 (0.24)	0.062 (0.24)
dummies 20-29 0/1	0.525 (0.50)	0.634 (0.48)	0.729 (0.45)	0.400 (0.49)	0.341 (0.47)	0.408 (0.49)	0.427 (0.49)
30-39 0/1	0.437 (0.50)	0.306 (0.46)	0.234 (0.42)	0.487 (0.50)	0.557 (0.50)	0.491 (0.50)	0.477 (0.50)
40+ (ref)							
Highest education NVQ4/5 0/1	0.335 (0.47)	0.105 (0.31)	0.081 (0.27)	0.309 (0.46)	0.333 (0.47)	0.306 (0.46)	0.302 (0.46)
dummies NVQ3 0/1	0.126 (0.33)	0.110 (0.31)	0.091 (0.29)	0.155 (0.36)	0.104 (0.31)	0.092 (0.29)	0.147 (0.35)
NVQ1/2 0/1	0.236 (0.43)	0.231 (0.42)	0.255 (0.44)	0.366 (0.48)	0.157 (0.36)	0.200 (0.40)	0.401 (0.49)
None (ref)							
Problems with literacy 0/1	0.088 (0.47)	0.132 (0.34)	0.137 (0.34)	0.057 (0.23)	0.093 (0.29)	0.115 (0.32)	0.065 (0.25)
Problems with numeracy 0/1	0.034 (0.18)	0.050 (0.22)	0.075 (0.26)	0.030 (0.17)	0.051 (0.22)	0.069 (0.24)	0.031 (0.17)
Speaks a mixture of language 0/1	0.676 (0.47)	0.690 (0.46)	0.634 (0.48)	0.030 (0.17)	0.520 (0.50)		0.029 (0.17)
Speaks only other language 0/1	0.165 (0.37)	0.259 (0.44)	0.350 (0.48)	0.004 (0.06)	0.152 (0.40)	0.181 (0.38)	0.007 (0.09)
Cohort child is first born 0/1	0.425 (0.49)	0.326 (0.47)	0.266 (0.44)	0.381 (0.49)	0.291 (0.45)	0.455 (0.50)	0.430 (0.50)
Social integration factors							
Lone parent at MCS1	0.046	0.082	0.065 (0.25)	0.506 (0.50)	0.437	0.196	0.170

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African	Mixed and Other	White
Socio-demographic factors							
0/1	(0.21)	(0.27)			(0.50)	(0.40)	(0.38)
Cohabiting at MCS1 0/1	0.015 (0.12)	0.011 (0.11)	0.013 (0.12)	0.200 (0.40)	0.136 (0.34)	0.142 (0.35)	0.271 (0.44)
Married (ref) 0/1							
Had partnership dissolution 0/1	0.086 (0.28)	0.084 (0.28)	0.054 (0.23)	0.094 (0.29)	0.184 (0.39)	0.092 (0.29)	0.111 (0.31)
No bank/savings account 0/1	0.050 (0.22)	0.218 (0.41)	0.172 (0.38)	0.193 (0.39)	0.336 (0.47)	0.198 (0.40)	0.128 (0.33)
Mother in contact with own parents 0/1	0.310 (0.46)	0.391 (0.49)	0.277 (0.45)	0.517 (0.50)	0.195 (0.40)	0.287 (0.45)	0.691 (0.46)
Mother feels no-one to share feelings with 0/1	0.107 (0.31)	0.157 (0.36)	0.164 (0.37)	0.189 (0.39)	0.167 (0.37)	0.162 (0.37)	0.074 (0.26)
Situational circumstances							
Employed full time at MCS1 0/1	0.140 (0.35)	0.035 (0.18)	0.030 (0.17)	0.249 (0.43)	0.187 (0.39)	0.113 (0.32)	0.139 (0.35)
Not working at MCS1 0/1	0.613 (0.49)	0.890 (0.31)	0.911 (0.28)	0.574 (0.50)	0.696 (0.46)	0.722 (0.45)	0.511 (0.50)
Employed part time at MCS1(ref)							
Partner employed at MCS1 0/1	0.870 (0.34)	0.728 (0.45)	0.680 (0.47)	0.377 (0.49)	0.400 (0.49)	0.641 (0.48)	0.736 (0.44)
Partner unemployed (ref)							
Worked weekends at MCS1 0/1	0.136 (0.34)	0.035 (0.18)	0.022 (0.15)	0.159 (0.37)	0.109 (0.31)	0.111 (0.31)	0.195 (0.40)
Works nights at MCS1 0/1	0.021 (0.14)	0.006 (0.07)	0.000 (0.00)	0.064 (0.25)	0.056 (0.23)		0.070 (0.26)
Worked evenings at MCS1 0/1	0.128 (0.33)	0.036 (0.19)	0.016 (0.13)	0.189 (0.39)	0.123 (0.33)	0.129 (0.33)	0.233 (0.42)

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African	Mixed and Other	White
Socio-demographic factors							
On means-tested benefits at MCS1 0/1	0.364 (0.48)	0.670 (0.47)	0.723 (0.45)	0.691 (0.46)	0.659 (0.47)	0.538 (0.50)	0.565 (0.50)
Depressed at MCS1 0/1	0.180 (0.38)	0.202 (0.40)	0.124 (0.33)	0.162 (0.37)	0.101 (0.30)	0.130 (0.34)	0.143 (0.35)
Longstanding illness 0/1	0.144 (0.35)	0.145 (0.35)	0.167 (0.37)	0.219 (0.41)	0.187 (0.39)	0.186 (0.39)	0.219 (0.41)
Child has ill health 0/1	0.170 (0.38)	0.212 (0.41)	0.102 (0.30)	0.170 (0.38)	0.152 (0.36)	0.191 (0.39)	0.206 (0.40)
Child had accident or injury 0/1	0.050 (0.22)	0.036 (0.19)	0.027 (0.16)	0.068 (0.25)	0.048 (0.21)	0.066 (0.25)	0.085 (0.28)
Mother smokes 0/1	0.050 (0.22)	0.038 (0.19)	0.016 (0.13)	0.343 (0.48)	0.048 (0.21)	0.194 (0.40)	0.343 (0.47)
Community attachment factors							
Not in interest in politics but voted last election 0/1	0.400 (0.49)	0.427 (0.49)	0.505 (0.50)	0.204 (0.40)	0.203 (0.40)	0.158 (0.37)	0.293 (0.45)
Interest in politics and voted at last election 0/1	0.182 (0.39)	0.152 (0.36)	0.199 (0.40)	0.166 (0.37)	0.240 (0.43)	0.168 (0.37)	0.209 (0.41)
Interested in politics and did not vote 0/1	0.121 (0.33)	0.076 (0.27)	0.054 (0.23)	0.162 (0.37)	0.123 (0,33)	0.186 (0.39)	0.087 (0.28)
Not interest in politics and not voted (ref)							
Lived at address 8+ years 0/1	0.140 (0.35)	0.155 (0.36)	0.183 (0.39)	0.200 (0.40)	0.080 (0.27)	0.099 (0.30)	0.117 (0.32)
Lived at address 3-7 years 0/1	0.416 (0.49)	0.349 (0.48)	0.389 (0.49)	0.430 (0.50)	0.443 (0.50)	0.352 (0.48)	0.377 (0.48)
Lived at address 1-2 years 0/1	0.331 (0.47)	0.334 (0.47)	0.298 (0.46)	0.219 (0.41)	0.296 (0.46)	0.359 (0.48)	0.329 (0.47)

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African	Mixed and Other	White
Socio-demographic factors							
Lived at address < 1 year (ref)							
Renting 0/1	0.193 (0.39)	0.227 (0.42)	0.540 (0.50)	0.649 (0.48)	0.848 (0.36)	0.498 (0.50)	0.337 (0.47)
Housing -other tenure 0/1 Flat, maisonette, studio, bedsit	0.140 (0.35)	0.205 (0.40)	0.151 (0.36)	0.072 (0.26)	0.024 (0.15)	0.068 (0.25)	0.052 (0.22)
Owner occupier (ref)							
Not living in house/bungalow 0/1	0.111 (0.31)	0.057 (0.23)	0.366 (0.48)	0.442 (0.50)	0.600 (0.49)	0.316 (0.47)	0.129 (0.34)
Living in house/bungalow (ref)							
Dissatisfied with area live in 0/1	0.213 (0.41)	0.240 (0.43)	0.167 (0.37)	0.325 (0.47)	0.277 (0.45)	0.233 (0.42)	0.183 (0.39)
Dissatisfied with own home 0/1	0.142 (0.35)	0.208 (0.41)	0.272 (0.44)	0.370 (0.48)	0.421 (0.49)	0.290 (0.45)	0.180 (0.38)
Area live in has one problem 0/1	0.421 (0.49)	0.371 (0.48)	0.371 (0.48)	0.306 (0.46)	0.363 (0.48)	0.335 (0.47)	0.332 (0.47)
Area has two or more problem0/1	0.138 (0.35)	0.199 (0.40)	0.132 (0.34)	0.249 (0.43)	0.243 (0.43)	0.194 (0.40)	0.161 (0.37)
Area has no problems (Ref)							
Survey process from MCS1							
Interviewer gender male 0/1	0.452 (0.50)	0.262 (0.44)	0.180 (0.38)	0.238 (0.43)	0.333 (0.47)	0.300 (0.46)	0.204 (0.40)
Interview held in afternoon 0/1	0.508 (0.50)	0.531 (0.50)	0.516 (0.50)	0.551 (0.50)	0.557 (0.50)	0.474 (0.50)	0.408 (0.49)
Interview held in evening 0/1	0.216 (0.41)	0.140 (0.34)	0.143 (0.35)	0.196 (0.40)	0.187 (0.39)	0.194 (0.40)	0.230 (0.42)
Was in CF sample at MCS2 0/1	0.190 (0.40)	0.330 (0.47)	0.340 (0.48)	0.280 (0.45)	0.260 (0.44)	0.170 (0.38)	0.090 (0.29)

	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African	Mixed and Other	White
Socio-demographic factors							
Contact Location Propensity							
Number of call backs/issues n/10	0.197 (0.13)	0.184 (0.13)	0.184 (0.14)	0.195 (0.14)	0.181 (0.14)	0.189 (0.13)	0.195 (0.13)
Sample size	478	893	372	265	375	576	15533

Table A4. Table significant coefficients on survey respondent characteristics in multinomial regression on combined 3-Sweep response

Factor associated with being more likely to be in pattern

	1 1 0	**1 0 0**	**1 0 1**
ALL SAMPLE+	Lower or no Qualifications	Lower or no Qualifications Difficulty reading	Lower or no Qualifications
	More than one child		
	(Teenage or 20s mother)		Teenage or 20s mother
	(Cohabitee)		Cohabitee
	Lone mother		Lone mother
	Working full time Not working Works weekends	Working full time Not working Works weekends	Working full time Not working
		Non-employed partner	
	(Mother depressed)	Mother **not** longstanding illness Child **not** ill	Mother **not** longstanding illness Child **not** ill
		No-one to share feelings	
		Not on benefits	
		No bank/saving account	No bank/saving account
	Did not vote	Did not vote + no interest in politics	Did not vote
	Not house or bungalow	Not house or bungalow	Renting Other housing (not owner occ) Not house or bungalow
	Dissatisfied with area	Not dissatisfied with home	Dissatisfied with area

Sample: MCS natural mothers at MCS 1 with known ethnicity
+ after controlling for ethnic dummies.

Figure A1. MCS response outcomes at MCS2 conditional on being in sample at MCS1.

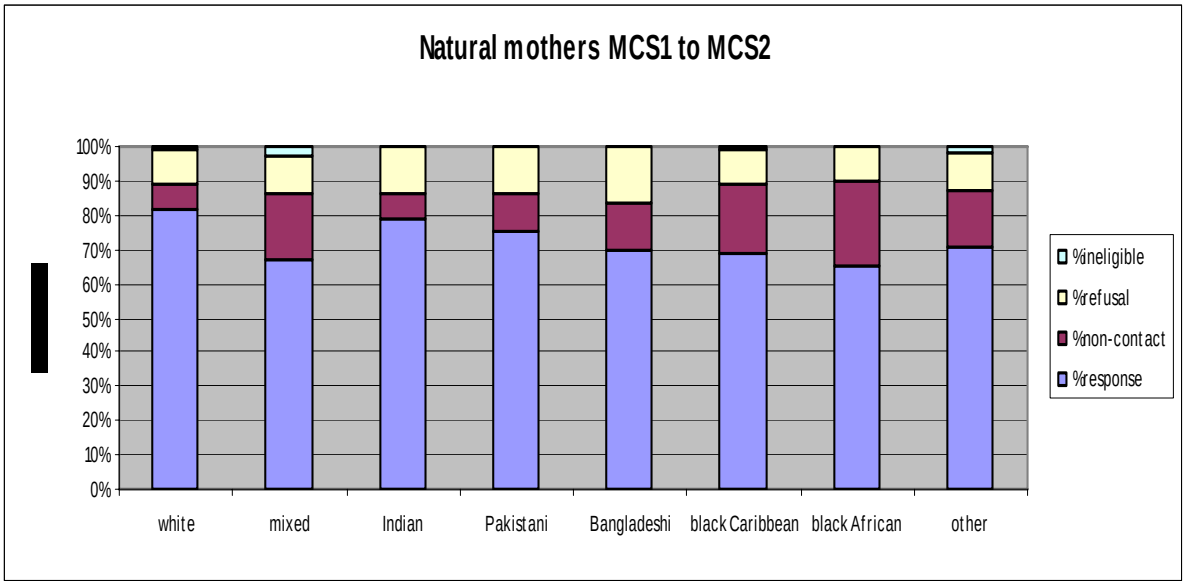


Figure A2. MCS response outcomes at MCS3 conditional on being in sample at MCS1.

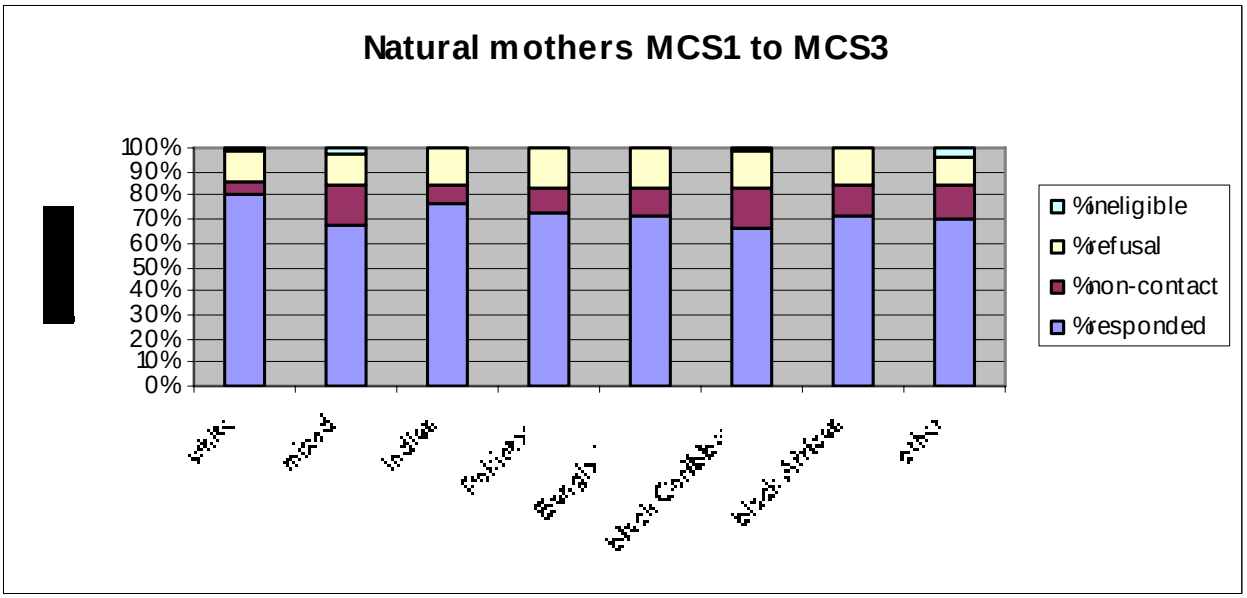
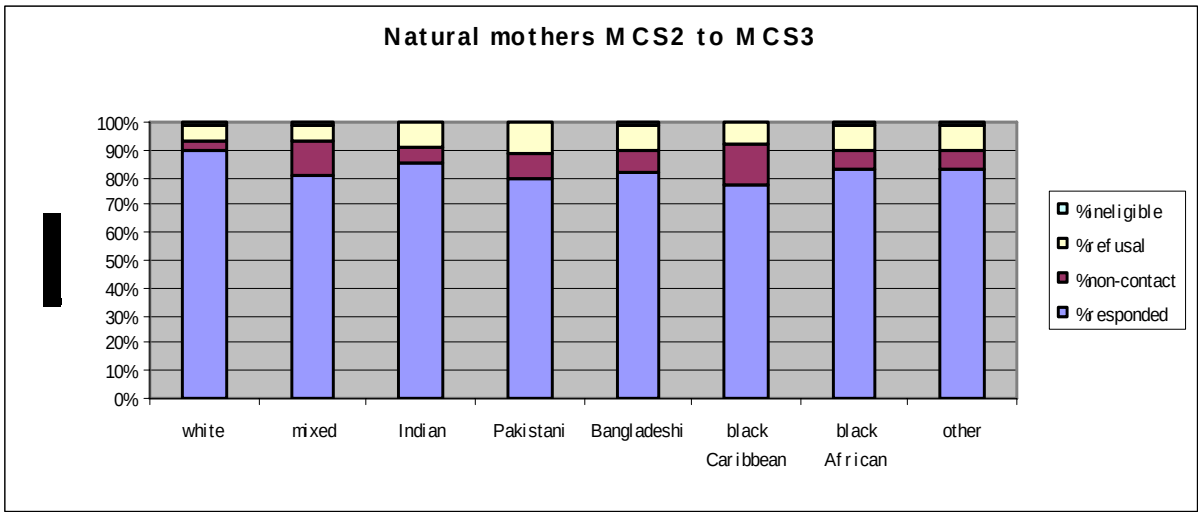


Figure A3. MCS response outcomes at MCS3 conditional on being in sample at MCS2.



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