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Keeping in touch with mobile families in the UK Millennium Cohort Study

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Abstract

This paper focuses on the problem of locating mobile families in Millennium Cohort Study (MCS), a large-scale longitudinal study in the UK, and examines what proportion of families who move between waves are successfully located through the study's tracking procedures. It also examines the effectiveness of techniques designed to pick up address changes prior to the start of fieldwork for a particular wave compared with interviewer tracking in the field and investigates some of the factors associated with success or failure to locate mobile families. It shows that over 9 in 10 mobile families were successfully located between wave 2 and wave 3 of the study with the majority (55%) located before the start of fieldwork for second wave. Although some differences are found in the observable demographic and socio-economic characteristics of mobile and non-mobile families, very few of these characteristics are associated with the success or failure to locate families.

Key Words

1. Introduction

One of the main analytic benefits of longitudinal surveys is that they offer researchers the opportunity to study change over time. Attrition from longitudinal surveys can lead to bias in the findings from the study if sample members who drop out over time are systematically different to those who remain in the study. A particular concern is that if the factors associated with sample loss are themselves associated with the substantive processes which the study is aiming to measure over time, this can lead to biased estimates of change. Lepkowski and Couper (2002) distinguish between three different sources of attrition: failure to locate, failure to make contact having located and failure to co-operate having contacted. This paper focuses on sample attrition due to failure to locate. One of the main reasons that longitudinal studies aim to track sample members who move is that the dynamics of residential mobility, and the processes related to it such as relationship and employment change, are of substantive interest and failure to locate sample members who move may lead to biased estimates of change in these and other important domains.

Information from the Millennium Cohort Study (MCS), the fourth in the series of internationally renowned birth cohort studies in the UK, will be used to examine the location problem. Previous research on the MCS reported in Plewis (2007a) and Plewis et al. (2008) showed that residential mobility between wave 1 and wave 2 was a predictor of non-response at wave 2 but conditional on successful location, mobile families were no more likely to refuse to be interviewed at wave 2 than non-mobile families. The research also showed that although residential mobility was associated with non-response at wave 2, it was not a predictor of permanent drop out from the study.

This paper will examine what proportion of families who move between wave 2 and wave 3 are successfully located through the study's tracking procedures and, in particular, examine the effectiveness of techniques designed to pick up address changes prior to the start of fieldwork for a wave compared with interviewer tracing in the field. It will also examine some of the factors associated with success or failure to locate mobile families.

2. Locating sample members in longitudinal surveys

The problem of locating sample members in longitudinal surveys is related to individual's propensity to move and, conditional on moving, to be located. Couper and Ofstedal (2009) offer a general model to help understand the location process which hypothesises that the main factors affecting the propensity to move are person-level factors such as age, family circumstances, employment and housing situation, and societal-level factors such as the general level of mobility and degree of urbanisation. The propensity to be located, on the other hand, is influenced by survey design factors, such as the interval between waves and tracking procedures and structural factors, such as the availability of population registers, mail forwarding rules and the portability of phone numbers. Couper and Ofstedal provide a review of the literature in relation to the likelihood of moving showing that mobility rates vary

both within and between countries and that a variety of demographic and socio-economic factors are associated with mobility. They also discuss the structural factors and survey design factors which are likely to associated with the ability to locate sample members who move. This includes a useful review of tracking procedures which are commonly employed on longitudinal surveys which distinguishes between retrospective tracking, designed to find sample members with whom contact has been lost and prospective tracking, designed to prevent the loss of contact by keeping details up to date and between office and field based tracking. The authors note that although most longitudinal surveys devote considerable resources to tracking mobile sample members and have developed highly successful procedures for minimising attrition through failure to locate[1], there is very little methodological evidence on the relative success, and cost-effectiveness, of different tracking procedures.

As well as reporting on the overall effectiveness of the tracking procedures on the MCS, this paper aims to advance the literature in this area in two ways. Firstly, by examining what proportion of mobile sample members are located prior to the start of fieldwork for a wave compared with during fieldwork and secondly, by evaluating whether individual-level demographic and socio-economic variables are associated with the propensity to be located. It is well-established that these types of variables are related to the propensity to move but there is very little theory or evidence about whether they are related to the propensity to be located. Tracking is sometimes characterised as something that is 'done to' sample members but they are, of course, active agents in this process and so it is reasonable to hypothesise that tracking procedures may be more effective for certain types of people, distinguishable by their observable demographic and socio-economic factors, than others.

3. The Millennium Cohort Study

The Millennium Cohort Study is a longitudinal birth cohort study following the lives of over 19,000 children in the UK who were born in 2000 and 2001. The sample was drawn from the Child Benefit register and was initially geographically clustered by electoral ward with an over-representation of areas with high proportions of Black or Asian families, disadvantaged areas and areas in the three smaller UK countries. Child Benefit is a universal benefit payable to families with children and payments begin from the time of the child's birth. There have been four waves of the study so far, when the cohort member was aged 9 months, 3, 5 and 7. At all waves, interviews were conducted with both resident parents and from the second wave onwards data has been collected directly from the cohort member. The study has also collected data from siblings and teachers as well as consents to link to administrative data for

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[1] For example, the Panel Survey of Income Dynamics and the Health and Retirement Study successfully located 97%-98% of sample members who moved between the 2003-5 and 2002-4 waves of these studies and the German Socio-Economic Panel and the British Household Panel had tracking rates of 96% between 2003-5 and 94% between 2003-4 respectively (Couper and Ofstedal, 2009).

cohort member, parents and siblings. More information about the design of the study can be found in Plewis (2007b).

The MCS employs a variety of both prospective and retrospective tracking procedures. The study provides a Freephone number, email address and a website through which cohort families can inform us if they change their address or contact details. Contact details for study members are updated annually. In survey years, this is done during the interview. In non-survey years, this is achieved through the mailing of a reply-slip which is pre-printed with all of the families' contact details i.e. address, names, phone numbers, email address and stable contact details. They are asked to return the form, either with corrections and/or additions or to confirm that the information is correct and complete. The forms are returned by around 75% of families after two reminders. Undelivered mail, usually indicating that the family has moved, is returned to the study by the post office which triggers retrospective office-based tracking. Multiple attempts are made to contact sample members, their nominated 'stable' contact person and the current occupiers of the address previously occupied by sample members through telephone, mail, email and text messaging. We also use publicly available Post Office, electoral and phone records which are available on the internet or through specialist software and through other administrative data sources such as the National Health Service Central Register and Child Benefit Records. During the fieldwork for the study, interviewers also attempt to track families who have moved. Interviewers in the field are able to make personal visits to the last known addresses of cohort members and, if local, their stable contacts in addition to attempting contact through phone and mail. Interviewers can also attempt to trace through neighbours, follow visual clues at the property e.g. 'for sale' signs which can lead to tracking through estate agents and use other sources of information which are available locally.

From a survey management and budgetary perspective, it is much more desirable to find out that a sample member has moved and ideally, find a new address for them in advance of fieldwork for a wave than during fieldwork because field-based tracking by interviewers is generally more expensive than office-based tracking and can lead to delays in fieldwork due to the extra time needed for locating. There will always be a residual of movers who it would not be possible to locate before the start of fieldwork, either because the move does not take place until fieldwork has commenced or because the move is not discovered until the interviewer attempts to make contact.

4. Results

This paper examines mobility between wave 2 (age 3) and wave 3 (age 5) of the study and uses survey process data to identify whether a family has moved between wave 2 and wave 3, whether they were located if they have moved and if they have moved and were located, whether they were located prior to or after the start of fieldwork. The first part of this section presents these descriptive results and the second part presents results from statistical models which use substantive variables

from the survey data collected at wave 2 to predict propensity to move, be located and be located before the start of fieldwork. For this reason, the analytical sample is restricted to families who took part in wave 2 (15,590).

4.1 Descriptive results

Table 4.1-1 shows that 21 per cent of co-operating families at wave 2 (MCS2) moved by wave 3 (MCS3). For a very small number of families (169), it is not possible to know with certainty whether or not they moved. These are a combination of ineligible cases and refusal and sensitive cases which were not issued to the field. For all other cases, it is possible to know with a very high degree of certainty whether or not they moved because, even if they didn't participate in the survey, an interviewer visited their address and established whether or not they were still resident.

Table 4.1-1: Mobility between MCS2 and MCS3 for families who co-operated at MCS2

	Co-operating families at MCS2
Moved between MCS2 and MCS3	3,278 (21%)
Not moved between MCS2 and MCS3	12,143 (78%)
Unknown if moved between MCS2 and MCS3	169 (1%)
Base	15,590

The first column of Table 4.1-2 shows that an extremely high proportion of mobile families (93%) were located. It also shows that mobile families were much less likely than non-mobile families to be located and co-operate at wave 3: 84 per cent compared with 91 per cent.

Table 4.1-2: Location and co-operation at MCS3 for families who co-operated at MCS2 by whether moved since MCS2

	Mobile families i.e. moved since MCS2	**Non-mobile families i.e. not moved since MCS2**
Located and co-operated	2,766 (84%)	11,036 (91%)
Located and did not co-operate	284 (9%)	1,107 (9%)
Not located	228 (7%)	0 (0%)
Base	3,278	12,143

Table 4.1-3 shows that conditional on location, mobile families were no less likely than non-mobile families to co-operate at wave 3: 91 per cent for both groups.

Table 4.1-3: Co-operation at MCS3 for families who co-operated at MCS2 and were located at MCS3 by whether moved since MCS2

	Located mobile families i.e. moved since MCS2 and located at MCS3	Non-mobile families i.e. not moved since MCS2
Co-operated	2,766 (91%)	11,036 (91%)
Did not co-operate	284 (9%)	1,107 (9%)
Base	3,050	12,143

Overall, 55 per cent of all mobile families were located prior to the start of fieldwork with 38 per cent located during fieldwork (and 7 per cent not located). Table 4.1-4 shows that mobile families who were located prior to the start of fieldwork were just as likely as mobile families who were located during fieldwork to take part in an interview: 90 per cent and 91 per cent respectively.

Table 4.1-4: Co-operation at MCS3 for families who co-operated at MCS2 and were located at MCS3 by whether moved since MCS2 and when located

	Located mobile families i.e. moved since MCS2 and located prior to the start of fieldwork for MCS3	Located mobile families i.e. moved since MCS2 and located during fieldwork for MCS3	Non-mobile families i.e. not moved since MCS2
Co-operated	1,635 (90%)	1,131 (91%)	11,036 (91%)
Did not co-operate	175 (10%)	109 (9%)	1,107 (9%)
Base	1,810	1,240	12,143

Overall, these descriptive results show that the MCS has tracking rates which are high and has tracking procedures which locate a high proportion of mobile families in between waves of fieldwork.

4.2 Statistical modelling

This section reports results from logistic regression models which were used to predict propensity to move, be located and be located before the start of fieldwork. All variables shown in tables were statistically significant (Wald test; $p < 0.05$) and 95% confidence intervals are shown for all categories.

4.2.1 Predictors of mobility between wave 2 and wave 3

This section examines how the characteristics of mobile families differ from non-mobile families. A variety of geographic, demographic, socio-economic and attitudinal factors were examined and both unadjusted and adjusted results in the form of odds ratios are presented in Table 4.2.1-1.

Overall, the results did not tell an entirely consistent story. Some of the results indicate that less advantaged families were more likely to move than more advantaged families. The families who were most likely to move were those with younger mothers (under 25), those with another child younger than the (3-year old) cohort child and those who were living in a rented flat which they were dissatisfied with at wave 2. However, other indicators of socio-economic status showed that more

advantaged families i.e. those above the poverty line and those with higher numbers of vehicles were more likely to move[2]. Also, although having another child younger than the cohort child was associated with a higher propensity to move, having other children in addition to the cohort child (more than one child in the family) was associated with a lower propensity to move.

The regression model also showed that families in Scotland were slightly more likely to move than families in England and families who were dissatisfied with the area in which they lived were more likely to move than those who were satisfied. Families with mothers in all minority ethnic groups, except mixed, were less likely to move than those with white mothers in the unadjusted statistics though only those with black mothers were significantly less likely to do so in the model. Families who had changed from having two parents at wave 1 to one parent at wave 2 were more likely to move than families who had remained as one parent families at both waves, perhaps reflecting a delayed impact of relationship breakdown.

Other variables which were included in the model but did not show a significant relationship with mobility were family type, mother's education and household employment status.

Table 4.2.1-1: Percentage of co-operating families at MCS2 who moved between MCS2 and MCS3 and odds ratios of moving from a logistic regression model, by MCS2 variables

MCS2 Variable	Unadjusted % moved	Odds ratios (OR)	95% Confidence interval for OR
Country			
England	21.0	1	Fixed
Wales	17.5	0.87	(0.73,1.02)
Scotland	24.0	1.16	(1.01,1.35)
Northern Ireland	19.5	1.14	(0.95,1.37)
Age of mother			
16-24	33.3	1	Fixed
25-29	26.2	0.89	(0.75,1.05)
30-34	20.6	0.76	(0.64,0.91)
35-39	15.3	0.58	(0.46,0.72)
40+	14.1	0.51	(0.40,0.68)
Ethnic group of mother			
White	21.0	1	Fixed
Mixed	27.9	1.14	(0.68,1.91)
Indian	16.6	0.82	(0.57,1.16)
Pakistani and Bangladeshi	18.6	0.80	(0.63,1.02)
Black or Black British	19.7	0.62	(0.46,0.83)
Other	21.7	0.93	(0.55,1.57)
Number of children in household (including cohort member)			
One	24.2	1	Fixed
Two	20.5	0.85	(0.74,0.99)
Three	18.7	0.79	(0.66,0.95)
Four or more	18.9	0.71	(0.56,0.91)
Whether cohort member has younger			

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[2] Interestingly, the direction of the relationship between mobility and both of these variables was reversed in the statistical model compared with the univariate analysis.

MCS2 Variable	Unadjusted % moved	Odds ratios (OR)	95% Confidence interval for OR
siblings			
Younger siblings	24	1.34	(1.17,1.53)
No younger siblings	19.8	1	Fixed
Family change since MCS1			
Same two parent family	18.4	0.29	(0.08,1.11)
Two parent to one parent	34.9	1	Fixed
One parent to two parent	28.9	0.28	(0.07,1.06)
Same one parent family	28.1	0.67	(0.52,0.86)
Other	39.7	0.45	(0.12,1.71)
Family poverty			
Unknown	22	1.17	(0.97,1.42)
Above 60% median	19.6	1.29	(1.10,1.51)
Below 60% median	24.6	1	Fixed
Tenure			
Own	16.3	1	Fixed
Rent	29.9	1.49	(1.23,1.79)
Other	38.9	2.53	(1.92,3.35)
Accommodation type			
House	19.1	1	Fixed
Flat	39.6	1.87	(1.58,2.22)
Car ownership			
None	28.1	1	Fixed
One	22.2	1.24	(1.06,1.46)
Two	17.7	1.39	(1.14,1.70)
Three or more	20.5	1.53	(1.12,2.10)
Satisfaction with home			
Very satisfied	14.0	1	Fixed
Fairly satisfied	21.6	1.51	(1.33,1.70)
Neither satisfied or dissatisfied	34.0	2.30	(1.89,2.79)
Fairly dissatisfied	33.0	2.25	(1.78,2.85)
Very dissatisfied	46.7	3.62	(2.82,4.64)
Satisfaction with area			
Very satisfied	17.2	1	Fixed
Fairly satisfied	21.5	1.10	(0.99,1.23)
Neither satisfied or dissatisfied	30.7	1.43	(1.01,1.86)
Fairly dissatisfied	32.0	1.53	(1.23,1.90)
Very dissatisfied	38.4	1.48	(1.16,1.90)

4.2.2 Predictors of being located at wave 3, conditional on mobility

This section examines how the characteristics of mobile families who are located differ from mobile families who are not located. The same set of geographic, demographic, socio-economic and attitudinal factors looked at in the previous section are examined here and results in the form of odds ratios are presented in Table 4.2.2-1. As discussed in section 2, it was hypothesised that tracking procedures may be more effective for certain types of families than others.

Overall, the results give little support to this hypothesis, as the only variables which are significant predictors of being located are mother's ethnicity and accommodation type. Families in which the mother is in any non-white ethnic group, except mixed, are much less likely to be located than those with white mothers and those who were living in a flat are less likely to be successfully located than those who were living in a

house. The study's tracking procedures are clearly working less effectively for minority ethnic groups which may be related to language barriers and for those living in flats which may be related lower residential stability in this part of the housing sector and barriers to contact such as entry phones.

Table 4.2.2-1: Odds ratios of being located, conditional on moving, from a logistic regression model, by MCS2 variables

MCS2 Variable	Odds ratios (OR)	95% Confidence interval for OR
Ethnic group of mother		
White	1	Fixed
Mixed	0.41	(0.14,1.24)
Indian	0.19	(0.07,0.51)
Pakistani and Bangladeshi	0.29	(0.13,0.63)
Black or Black British	0.21	(0.10,0.44)
Other	0.08	(0.03,0.19)
Accommodation type		
House	1	Fixed
Flat	0.60	(0.36,0.99)

4.2.3 Predictors of being located before start of fieldwork for wave 3, conditional on mobility and being located

This section examines how the characteristics of mobile families who are located prior to the start of fieldwork for wave 3 differ from mobile families who are located during fieldwork for wave 3. The same set of geographic, demographic, socio-economic and attitudinal factors looked at in the previous sections are examined here and results in the form of odds ratios are presented in Table 4.2.3-1. As discussed in section 2, it was hypothesised that tracking procedures which result in the location of families prior to the start of fieldwork may be more effective for certain types of families than others.

Overall, the results give little support to this hypothesis, as the only variables which are significant predictors of location prior to the start of fieldwork are mother's age, number of children and whether the cohort child has a younger sibling. Families with older mothers and younger siblings were more likely to be located prior to the start of fieldwork and families with more children were less likely to be located prior to the start of fieldwork.

Table 4.2.3-1: Odds ratios being located before the start of fieldwork at MCS3, conditional on moving and being located, from a logistic regression model, by MCS2 variables

MCS2 Variable	Odds ratios (OR)	95% Confidence interval for OR
Age of mother		
16-24	1	Fixed
25-29	1.44	(1.05,1.98)
30-34	1.59	(1.12,2.26)
35-39	2.01	(1.42,3.01)
40+	2.35	(1.39,3.98)

MCS2 Variable	Odds ratios (OR)	95% Confidence interval for OR
Number of children in household (including cohort member)		
One	1	Fixed
Two	0.82	(0.64,1.05)
Three	0.62	(0.46,0.82)
Four or more	0.72	(0.48,1.09)
Whether cohort member has younger siblings		
Younger siblings	1.39	(1.10,1.76)
No younger siblings	1	Fixed

5. Discussion

This paper, motivated by Couper and Ofstedal (2009), has shown that, in common with many other major longitudinal surveys, the Millennium Cohort Study has highly effective procedures for keeping in touch with mobile families. Over 9 in 10 (93%) families who moved between wave 2 and wave 3 were located with over half (55%) located prior to the start of fieldwork. It also showed that, conditional on successful location, mobile families were no less likely to co-operate than non-mobile families i.e. tracking efforts do lead to interviews. This evidence, along with the finding that mobile families have different characteristics from non-mobile families, provides scientific justification for the resources the study devotes to tracking.

As expected, several demographic and socio-economic characteristics were related to residential mobility. However, very few of these factors were related to the successful location of mobile families, either overall or before the start of fieldwork. This is reassuring as it shows that the study's tracking procedures are not systematically failing to reach certain types of respondents, with the exception of families in minority ethnic groups.

The planned next steps for this research are to use information on the timing of the move from wave 3 (available for responding families only) to estimate what proportion of mobile families who move prior to the start of fieldwork are located by study's tracking procedures prior to the start of fieldwork and to use information about the distance of the move (available for located families only) to examine whether mobile families who are located prior to the start of fieldwork are different from mobile families who are located during fieldwork in relation to the distance that they have moved. We would also like to use survey process data e.g. about how mobile families are located to try to evaluate the relative effectiveness and efficiency of different tracking procedures.

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