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Millennium Cohort Study

Technical Report on Response in the Teacher Survey in MCS 4 (Age 7)

Tarek Mostafa

with contributions from Rachel Rosenberg

November 2013



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Introduction

The Millennium Cohort Study (MCS) is a multi-disciplinary, multi-purpose research project following the lives of more than 19,000 children born in the UK in 2000-01. It is the most recent of Britain's world-renowned national longitudinal birth cohort studies. The study has been tracking the Millennium children through their early childhood years and plans to follow them into adulthood. It has collected information on the children's siblings and parents, and has collected consents to link to administrative records.

The fourth sweep (MCS4) was carried out when the children were aged seven. Fieldwork started in January 2008 and finished in February 2009. The cohort children were in their third year of compulsory schooling. Interviews were conducted with the co-resident parents and the cohort children were asked to participate in four cognitive tests, three physical measurements, and to complete a simple questionnaire. In addition, following consent from parents to contact their child's class teacher, a teacher survey was conducted and information was collected from the cohort children's teachers using a 12-page self-completion questionnaire. A concise description of the teacher survey can be found in the ['Guide to the Teacher Survey Dataset'](#) and in the ['Teacher Survey Technical Report'](#).

This report aims to analyse non-response in the MCS4 teacher survey and to ascertain whether non-response is a source of sample bias and whether adjustment is needed.

The target sample for the teacher questionnaire was all teachers of cohort members (CMs) in MCS4. During the MCS main respondent interview the parent was asked to give the name of the child's class teacher and to give permission for the teacher to be contacted. The actual issued sample comprised teachers of CMs in MCS4 where:

1. The main respondent had given written consent for the teacher to be contacted.
2. The contact details for the teacher and the school were complete enough for a questionnaire to be posted.

The information needed to collate this sample was collected from parents of the cohort children during the MCS4 main respondent interview, along with permission to send a questionnaire directly to the child's teacher.

The main MCS4 sample (i.e. productive respondents on the main survey) consisted of 13,857 families and 14,034 CMs when twins and triplets from the same family were considered separately. Hence, the base sample for the teacher survey contains 14,034 CMs and each one of them might be expected to have a teacher.

However, among the 14,034 CMs, a small number of CMs were home-schooled and didn't have a teacher, so were therefore ineligible for the teacher survey. For these CMs consent for the teacher survey was not sought. Among those who were eligible some parents did not consent to the teacher survey and for these cases the teacher questionnaire was not issued.

Among the CMs for whom the teacher questionnaire was issued some were out of scope due to a number of reasons: teacher left school; address unknown; teacher not known at address; school moved or demolished; other reasons; or no reasons were given. In addition to this, some teachers did not answer the questionnaire and were considered to be unproductive. In total, among the 14,034 CMs, 8,867 (63.2%) were productive (i.e. the teachers answered and returned the questionnaire), and 5,167 (36.8%) had completely missing records due to the aforementioned combination of reasons (not-issued, ineligible and non-response).

In what follows, all categories where records from the teacher survey are completely missing (i.e. ineligible, non-consented (by parent), not issued, and non-response) are labelled as non-response for simplicity.

The teacher survey was in the form of a postal self-completion questionnaire sent to the school. The head teacher of the school would also receive an information pack containing a covering letter and survey leaflet at the same time when teachers were first sent the questionnaire. Since the MCS sample is clustered at ward level, some CMs could have been attending the same schools and could have had the same teacher answering the questionnaire, especially in small wards.

In this report, we address three practical questions relating to the use of the MCS4 teacher survey:

1. To what extent are the CMs clustered within the same schools and teachers?
2. Is the teacher survey affected by the design characteristics of the MCS and by non-response on the main MCS survey?
3. Does teacher-level non-response lead to bias in the teacher survey?

The extent to which CMs are clustered within the same schools and teachers

Among the 14,034 CMs in MCS4, 8,867 had teachers who were sent, received, answered and returned the teacher questionnaire. In a number of cases CMs attended the same schools as each other, and some had their teacher questionnaire completed by the same teacher. The following tables present how CMs are clustered within schools and within teachers for those CMs whose teachers completed the questionnaire.

Table 1: Students attending the same schools in MCS4

Number of CMs attending a school	No. schools	Per cent	Total CMs
1	2475	61.31	2,475
2	666	16.50	1,332
3	275	6.81	825
4	178	4.41	712
5	123	3.05	615
6	84	2.08	504
7	60	1.49	420
8	46	1.14	368
9	30	0.74	270
10	23	0.57	230
11	19	0.47	209
12	5	0.12	60
13	13	0.32	169
14	10	0.25	140
15	7	0.17	105

16	6	0.15	96
17	2	0.05	34
18	1	0.02	18
19	3	0.07	57
20	5	0.12	100
22	3	0.07	66
23	2	0.05	46
25	1	0.02	25
Total	4,037	100	8,876

The first column of table 1 gives the clustering possibilities (i.e. the number of CMs attending a given school), the second column gives the number of schools with this number of CMs, the third gives the percentage of schools, and the last gives the total number of CMs for each possibility (the product of the first and second columns). Table 1 shows that 2,475 responding schools (nearly two-thirds of all schools covered) provided teacher surveys for only one CM, while six schools provided responses for 16 CMs each, and two schools provided responses for 23 CMs each. Hence, it is obvious that there is some differential clustering of pupils in schools.

Table 2: Students with the same teacher answering the teacher questionnaire

N of CMs with the same teacher	No. teachers	Percent	Total CMs
1	3,789	70.40	3,789
2	799	14.85	1,598
3	349	6.48	1,047
4	159	2.95	636
5	114	2.12	570
6	78	1.45	468
7	39	0.72	273
8	25	0.46	200
9	18	0.33	162
10	4	0.07	40
11	5	0.09	55
12	1	0.02	12
13	2	0.04	26
Total	5,382	100	8,876

Table 2 is similar to Table 1 except that instead of examining how CMs are clustered within schools we examine how CMs are clustered within responding teachers. The table shows that 3,789 (or 7 out of 10) teachers had only one CM each and hence they answered only one questionnaire. By contrast, two teachers each answered the questionnaire for 13 different pupils.

One should note that CMs are not intentionally clustered within schools and teachers. The main stratification unit is the electoral ward. Some wards are very small in size and this is why CMs end up attending the same school. When conducting statistical analyses using the `svy` command in Stata, researchers should take account of clustering at the ward level but not at school or teacher levels because the latter arises as a consequence of the overall

sample selection and is not part of the sample design. In the following section we describe how the sample design affects results from analysis with the teacher survey.

Sample design in MCS and the consequences for the teacher survey

MCS cohort members are stratified by UK countries (i.e. England, Wales, Scotland, and Northern Ireland) and within countries by ward type (see below), and are clustered by electoral wards. The stratification rules are described in the MCS technical report on sampling (4th edition, 2007). Sample stratification and clustering implies that a number of design characteristics need to be taken into account in any statistical analysis. These characteristics are the following:

Stratification: The MCS is stratified by design. There are nine different strata with all UK countries having two strata (i.e. advantaged and disadvantaged). England has one more stratum to oversample those in areas of higher ethnic minority density. The stratum variable is called ptype2.

Clustering: The MCS is also clustered at ward level. Wards were the primary sampling unit. A few wards were combined into one, making what is referred to as super-wards. The ward variable is called sptn00.

Finite Population Correction factor (fpc): When the size of the sample becomes a large fraction of the size of the population, a finite population correction factor is used to account for how much extra precision we achieve when the sample size becomes close to the population size. The fpc variable is called nh2.

Sample-design and non-response weights: Some groups were over sampled and hence sampling weights need to be used in order to take account of the distortion caused by sample-design. Further, initial non-response in the first wave and subsequent attrition are also a problem with longitudinal surveys. Initial non-response occurs when sampled respondents refuse to take part in the survey at wave 1 and attrition refers to the situation when CMs drop out of a study and never return, and situations where individual CMs have interrupted response patterns over time. These attrition patterns are distinguished as monotone and non-monotone response respectively. In most surveys, response weights are used to adjust for attrition, and these are constructed as inverse probability weights based on logit response models. In the MCS, researchers need to use the combined weights to adjust for sample design and for non-response. Design and non-response weights have been produced in the MCS and can be used for country specific analyses and for whole of UK analyses. The [‘MCS Technical Report on Response’](#) discusses how response weights were constructed and the [‘User Guide to Analysing MCS Data Using Stata’](#) and [‘User Guide to Analysing MCS Data Using SPSS’](#) give a full account of the weights and how they should be used.

When working with the teacher survey, one should bear in mind that teachers are not the units on which the sampling was based. As mentioned before, CMs (and not teachers) were sampled by country and ward based on certain rules. Then teacher response on the teacher questionnaire was sought for each CM. Further, if a CM did attrit in sweep 4 then there would be no possibility of attempting to contact his or her teacher. In other words, non-response on the main MCS survey leads to necessary non-response on the teacher survey. By and large, teachers are stratified according to the same rules as CMs and response on the teacher survey is conditional on response to the main MCS survey. In order to have

unbiased results when using the teacher survey, one therefore has to use the sample-design and non-response weights in order to adjust for stratification, clustering and attrition. The variable combining these two weights for sweep 4 is called dovwt2 if the analysis is for the UK as a whole and dovwt1 if it is country specific.

In what follows, we present sample proportions for a number of derived variables depicting CM characteristics in order to illustrate how sample-design and MCS non-response weights (dovwt2) affect the results. The chosen variables represent key family characteristics associated with ongoing participation in the study. They are: parents' marital status; parents' labour market status; language spoken at home; housing tenure; ethnic group; religion; number of siblings; time at current address in months; predicted weekly net family income; and respondent's age. Table 3 describes these CM family characteristics for the sample of children for whom there were completed teacher questionnaires. This sample contains 8,876 observations.

Table 3: Descriptive statistics of sample of CMs with a productive teacher questionnaire

Variables	Categories	With weights	Without weights	Difference
Marital Status	NA	21.60	19.95	-1.65
	Married	57.60	60.78	3.18
	Cohabiting	16.30	15.32	-0.98
	Neither	4.52	3.94	-0.58
Labour market status	Both in work	50.90	52.43	1.53
	Main in work, partner not	2.41	2.48	0.07
	Partner in work, main not	20.40	20.50	0.10
	Both not in work	4.72	4.62	-0.10
	Main in work or on leave, no partner	10.80	10.27	-0.53
	Main not on work nor on leave, no partner	10.80	9.68	-1.12
	Main not in work, partner status unknown	0.01	0.01	0.00
Language spoken at home	English only	91.70	89.02	-2.68
	Mostly English-sometimes other	3.54	4.70	1.16
	About half English and half other	2.52	3.22	0.70
	Mostly other, sometimes English	1.88	2.48	0.60
	Other language(s) only	0.40	0.59	0.19
Housing tenure	Not applicable	0.40	0.38	-0.02
	Own outright	6.01	6.69	0.68
	Own - mortgage/loan	58.90	61.74	2.84
	Part rent/part mortgage (shared equity)	0.20	0.21	0.01
	Rent from local authority	14.20	12.91	-1.29
	Rent from Housing Association	8.63	7.62	-1.01
	Rent privately	9.73	8.60	-1.13
	Living with parents	1.29	1.15	-0.14

	Live rent free	0.64	0.70	0.06
Ethnic group	Not applicable	0.01	0.01	0.00
	White	89.70	88.33	-1.37
	Mixed	0.85	0.84	-0.01
	Indian	1.84	2.21	0.37
	Pakistani and Bangladeshi	3.55	4.48	0.93
	Black or Black British	2.82	2.73	-0.09
	Ethnic group (Chinese, other)	1.27	1.40	0.13
	Religion	Refusal	0.01	0.02
Don't know		0.04	0.03	-0.01
Not applicable		0.02	0.02	0.00
Christian		37.50	41.23	3.73
Muslim		4.89	6.03	1.14
Hindu		1.10	1.40	0.30
Sikh		0.67	0.73	0.06
Jewish		0.27	0.24	-0.03
Buddhist		0.22	0.17	-0.05
Other		0.38	0.33	-0.05
None		55.00	49.80	-5.20
Number of observations		8,876	8,876	0
Number of siblings		2.50	2.52	0.02
Time at current address in months		87.27	91.37	4.10
Predicted weekly net family income		589.72	581.53	-8.20
Respondents age		36.08	36.38	0.30
Number of observations		8,876	8,876	

Table 3 shows that the estimates vary in some cases quite substantially if the MCS design is not taken account of through design and non-response weights. For instance, the percentage of married respondents is overestimated by 3.2 per cent when weights are not used. The percentage of those who speak English only is underestimated by 2.7 per cent. The percentage of home owners is overestimated by 2.9 per cent. The percentage of Christians is overestimated by 3.7 per cent and that of Muslims by 1.1 per cent. Similarly, average time at current address is overestimated by 4.1 months and weekly net family income is underestimated by £8.20.

Based on these results and the previous discussion, it is clear that researchers should use the design and MCS non-response weights when undertaking statistical analyses with the teacher survey in order to avoid biased estimates of cohort member characteristics.

Non-contact in the teacher survey

As mentioned before, some cohort members were ineligible for the teacher survey (e.g. home schooled) and some cases were out of scope (e.g. address not known, school closed). In addition to these two categories, some teachers did not answer the questionnaire. In total 36.8 per cent of the CMs who were surveyed at age 7 had no completed teacher questionnaires. In this section, we undertake two analyses to examine how representative the teacher survey sample is of the main MCS4 sample. First, we compute the same statistics as in Table 3 with two different samples: the entire MCS4 sample, including twins and triplets, (= 14,043 cases) and the sample with productive teacher questionnaires (= 8,876 observations). Secondly, we model response using a logit model with all the variables from Table 3. The dependent variable is binary and takes the value of 1 if the teacher survey was productive for that CM and 0 otherwise.

Table 4: Difference in sample composition between the entire MCS sample and the MCS CMs for whom there were teacher responses

Variables	Categories	The entire MCS4 sample	MCS4 Teacher sample	Difference
Marital Status	NA	22.60	21.60	-1.00
	Married	56.00	57.60	1.60
	Cohabiting	16.60	16.30	-0.30
	Neither	4.80	4.52	-0.28
Labour market status	Both in work	48.10	50.90	2.80
	Main in work, partner not	2.70	2.41	-0.29
	Partner in work, main not	21.40	20.40	-1.00
	Both not in work	5.26	4.72	-0.54
	Main in work or on leave, no partner	10.90	10.80	-0.10
	Main not on work nor on leave, no partner	11.70	10.80	-0.90
	Main not in work, partner status unknown	0.01	0.01	0.00
Language spoken at home	English only	89.90	91.70	1.80
	Mostly English-sometimes other	4.00	3.54	-0.46
	About half English and half other	3.05	2.52	-0.53
	Mostly other, sometimes English	2.57	1.88	-0.69
	Other language(s) only	0.52	0.40	-0.12
Housing tenure	Not applicable	0.96	0.40	-0.57
	Own outright	5.82	6.01	0.19
	Own - mortgage/loan	56.60	58.90	2.30
	Part rent/part mortgage (shared equity)	0.27	0.20	-0.07
	Rent from local authority	15.30	14.20	-1.10
	Rent from Housing Association	9.30	8.63	-0.67
	Rent privately	9.61	9.73	0.12
	Living with parents	1.46	1.29	-0.17
	Live rent free	0.68	0.64	-0.04

Ethnic group	Not applicable	0.02	0.01	-0.01
	White	87.30	89.70	2.40
	Mixed	0.96	0.85	-0.11
	Indian	1.98	1.84	-0.14
	Pakistani and Bangladeshi	4.75	3.55	-1.20
	Black or Black British	3.47	2.82	-0.65
	Ethnic group (Chinese, other)	1.49	1.27	-0.22
Religion	Refusal	0.04	0.01	-0.03
	Don't know	0.15	0.04	-0.10
	Not applicable	0.44	0.02	-0.42
	Christian	36.10	37.50	1.40
	Muslim	6.40	4.89	-1.51
	Hindu	1.09	1.10	0.01
	Sikh	0.79	0.67	-0.12
	Jewish	0.19	0.27	0.07
	Buddhist	0.19	0.22	0.02
	Other	0.34	0.38	0.04
	None	54.20	55.00	0.80
Number of siblings		2.53	2.50	-0.03
Time at current address in months		88.31	87.27	-1.04
Predicted weekly net family income		565.00	589.72	24.72
Respondent's age		35.89	36.08	0.19
Number of observations		14,043	8,876	-5,167

Table 4 shows that the results are not widely different if the distributions are estimated only for the teacher survey sample compared to the whole MCS4 sample. When the teacher survey sample is considered we find that we have more house owners, English-only speakers, married respondents, families where both respondents are in employment, ethnically white, Christian, and higher income households in comparison with the entire MCS4 sample. Similarly we have fewer renters, Pakistanis/Bangladeshis and Muslims. It is important to note, however, that the difference on these statistics, between the two samples, is small. This indicates that teacher non-response, although substantial, does not cause the sample composition to vary by much. This finding is confirmed by the logit regressions shown in Table 5.

Table 5: Logit regression of response in the teacher survey using MCS4 derived variables (UK as a whole)

	With Sample Design		Without Sample Design	
Marital status, reference: Married				
Cohabiting	0.89	(0.060)	0.94	(0.052)
Neither	0.85	(0.088)	0.86	(0.079)
NA	0.83*	(0.073)	0.81**	(0.063)

Labour status, reference: Both in work				
Main in work, partner not	0.82	(0.102)	0.79*	(0.085)
Partner in work, main not	0.84**	(0.051)	0.87**	(0.043)
Both not in work	0.88	(0.093)	0.82*	(0.074)
Main in work or on leave, no partner	1.10	(0.104)	1.17	(0.093)
Main not on work nor on leave, no partner	1	(.)	1	(.)
Main not in work, partner status unknown	1.02	(1.364)	1.18	(1.680)
Language spoken at home, reference: English only				
Mostly English-sometimes other	0.95	(0.112)	0.86	(0.079)
About half English and half other	0.92	(0.133)	0.79*	(0.089)
Mostly other, sometimes English	0.73*	(0.106)	0.71**	(0.087)
Other language(s) only	0.83	(0.221)	0.86	(0.188)
Housing tenure, reference: Own outright				
Own - mortgage/loan	0.92	(0.085)	0.84*	(0.065)
Part rent/part mortgage (shared equity)	0.43*	(0.173)	0.48*	(0.162)
Rent from local authority	0.88	(0.108)	0.79*	(0.075)
Rent from housing association	0.87	(0.114)	0.75**	(0.075)
Rent privately	0.98	(0.128)	0.90	(0.090)
Living with parents	0.82	(0.138)	0.81	(0.138)
Live rent free	0.89	(0.248)	1.11	(0.261)
NA	0.61	(0.181)	0.56*	(0.159)
Ethnicity, reference: White				
Mixed	0.78	(0.190)	0.95	(0.179)
Indian	0.76	(0.168)	0.68*	(0.128)
Pakistani and Bangladeshi	0.68	(0.167)	0.67**	(0.103)
Black or Black British	0.65***	(0.079)	0.64***	(0.067)
Ethnic group (inc. Chinese, other)	0.71	(0.162)	0.78	(0.130)
NA	0.69	(0.846)	0.41	(0.548)
Religion, reference: Christian				
Muslim	0.91	(0.171)	0.87	(0.124)
Hindu	1.36	(0.312)	1.39	(0.296)
Sikh	0.88	(0.287)	1.00	(0.258)
Jewish	3.25***	(1.143)	1.72	(0.861)
Buddhist	1.55	(0.770)	1.14	(0.513)
Other	1.56	(0.606)	1.21	(0.398)
None	0.98	(0.050)	0.94	(0.038)
NA	0.069***	(0.037)	0.068***	(0.031)
Number of siblings	0.98	(0.020)	0.99	(0.017)
Time at current address	1.00***	(0.000)	1.00***	(0.000)
Predicted weekly net income	1.00**	(0.000)	1.00***	(0.000)
Respondent's age	1.01	(0.004)	1.01	(0.003)
<i>N</i>	14043		14043	
pseudo <i>R</i> ²			0.027	

Exponentiated coefficients; Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 shows that the estimates are largely statistically non-significant except for 'partner in work - main not', 'Black/Black-British', 'Part rent/part mortgage', and 'Mostly other/sometimes English', for which the estimates are significant at the 0.001 level. All these variables are negatively related to response. The findings indicate that CM characteristics are weakly

related to the probability of teachers responding and the low pseudo R-squared indicates that the predictive power of the overall model is weak.

The descriptive statistics and the logit models confirm that teacher non-response does not affect the composition of the sample and that response is weakly explained by CMs' characteristics. However, it is still possible that response is affected by school characteristics. One should note that we do not have any information on the teachers who were not contacted, or on their schools, from the teacher survey. However, it is possible to overcome this limitation by using linked administrative data which has almost complete records for all MCS cohort members.

In the following analyses, we compare school characteristics for the two samples (i.e. the entire MCS4 sample vs. the MCS4 teacher sample) using pupil and school characteristics from the National Pupil Database. These administrative data were collected separately in each of the four countries of the UK and were subsequently linked to the MCS. Hence, the variables are not the same across all four countries and this limits comparability between countries. In our analyses, we therefore only use the data for England and Wales. Note that the administrative data we are using contains missing values on some of the variables; therefore the number of observations can vary.

Table 6: Difference in school sample composition for England using administrative (NPD) variables

Variables	Categories	The entire MCS4 sample	MCS4 teacher sample	Difference
	Not applicable	0.00	0.00	0.00
Ethnic group	White	82.70	85.70	3.00
	Mixed	3.91	3.57	-0.34
	Indian	2.29	2.06	-0.23
	Pakistani and Bangladeshi	5.59	4.18	-1.41
	Black or Black British	3.95	3.21	-0.74
	Chinese, other	1.57	1.27	-0.30
	Number of observations		8,880	5,539
Language group	English	91.00	92.00	1.00
	Other	8.92	7.95	-0.97
	Unclassified	0.09	0.06	-0.02
Number of observations		6,773	4,538	-2,235
Index of multiple deprivation	Bottom tenth	12.20	10.40	-1.80
	10 - < 20%	10.40	9.24	-1.16
	20 - < 30%	9.75	9.20	-0.55
	30 - < 40%	8.60	8.07	-0.53
	40 - < 50%	9.87	9.81	-0.06
	50 - < 60%	9.53	10.10	0.57
	60 - < 70%	9.96	10.90	0.94
	70 - < 80%	9.41	10.40	0.99
	80 - < 90%	9.45	10.30	0.85

	Highest tenth	10.90	11.60	0.70
	Number of observations	8,880	5,539	-3,341
	Eligible for free school meals	17.30	16.30	-1.00
	Number of observations	6,773	4,538	-2,235
	SEN provision			
	None	75.50	76.90	1.40
	School Action	14.40	13.40	-1.00
	School Action Plus	7.85	7.47	-0.38
	Statement	2.26	2.27	0.01
	Number of observations	6,773	5,539	-1,234
	Type of establishment			
	Community	69.10	69.00	-0.10
	Voluntary aided	17.80	17.20	-0.60
	Voluntary controlled	10.20	11.20	1.00
	Foundation	2.46	2.28	-0.18
	Community Special	0.35	0.36	0.02
	Academies	0.02	0.00	-0.02
	Number of observations	6,773	4,538	-2,235
	KS1 science			
	Working towards level 1	1.22	1.12	-0.10
	Achieved Level 1	8.62	7.95	-0.67
	Achieved Level 2	66.00	64.80	-1.20
	Achieved Level 3	24.00	26.00	2.00
	Unable to access	0.16	0.16	0.00
	Number of observations	6,773	4,538	-2,235
	School size			
	< 60 pupils	1.99	2.57	0.58
	< 180 pupils	19.20	19.30	0.10
	< 240 pupils	35.70	35.60	-0.10
	< 360 pupils	24.00	23.80	-0.20
	300 + pupils	19.20	18.80	-0.40
	Number of observations	8,622	5,369	-3,253
	Sex of the school			
	Missing	2.36	2.53	0.17
	Boys	0.31	0.38	0.07
	Girls	0.43	0.61	0.18
	Mixed	96.90	96.50	-0.40
	Number of observations	8,857	5,533	-3,324
	School type			
	First School 5-8	0.54	0.35	-0.19
	First School 5-9	2.15	2.15	0.00
	First School 5-10	0.50	0.54	0.04
	First and Middle School 5-12	0.32	0.38	0.06
	Middle School 8-12 (Primary)	0.07	0.10	0.04
	Middle School 9-13 (Secondary)	0.03	0.05	0.02
	Comprehensive Upper School 13-18	0.02	0.02	0.01

Infant School 5-7 or 5-8	15.50	14.20	-1.30
Junior School 7-11 or 8-11	3.93	5.26	1.33
Infant and Junior School 5-11	71.30	70.10	-1.20
Other Secondary School	0.01	0.02	0.01
Middle School 10-14 (Secondary)	0.02	0.04	0.01
First School 5-7	0.24	0.25	0.01
Special (Maintained Day)	1.15	1.54	0.39
Special (Maintained Hospital)	0.01	0.01	0.00
Special (Non-maintained Day)	0.01	0.02	0.01
General Hospital	0.01	0.02	0.01
Pupil Referral Unit	0.01	0.00	-0.01
Independent School	4.16	4.92	0.76
Number of observations	8,622	5,369	-3,253
Percent special needs	1.63	2.11	0.48
Number of observations	8,622	5,369	-3,253
School average attainment point score	15.54	15.72	0.18
Number of observations	6,770	4,536	-2,234
School average percentage of FSM	15.33	14.20	-1.13
Number of observations	7,992	4,936	-3,056
School average percent white British	78.80	80.85	2.05
Number of observations	7,721	4,797	-2,924

Table 6 shows that the results vary by a small amount on certain administrative variables. When the sample of productive teachers is considered we find that we have more white British pupils (3 per cent more), more English speakers (1 per cent more), fewer pupils in the bottom half of the index of multiple deprivation, fewer pupils eligible for free school meals (1 percentage point fewer), fewer infant schools and more junior schools. Further, the school average percentage of pupils eligible for free school meals drops by 1 percentage point and the school average percentage of white British pupils increases by 2 percentage points. In what follows, we model teacher response using a logit model and the variables from Table 6 as explanatory variables. This model is estimated with and without the survey design features. The most reliable model is the one that uses these features since it takes account of the clustering and stratification of the MCS sample.

Table 7: Logit regression of response in the teacher survey using administrative variables (England): Odds ratios (SEs)

	Teacher response with sample design		Teacher response without sample design	
Index of multiple deprivation (reference: bottom tenth)				
10 - < 20%	1.11	(0.129)	1.13	(0.126)
20 - < 30%	1.14	(0.190)	1.25	(0.148)
30 - < 40%	1.13	(0.212)	1.16	(0.144)
40 - < 50%	1.11	(0.212)	1.14	(0.149)
50 - < 60%	1.53*	(0.295)	1.65***	(0.229)
60 - < 70%	1.42	(0.310)	1.53**	(0.219)
70 - < 80%	1.71*	(0.398)	1.82***	(0.273)
80 - < 90%	1.54	(0.366)	1.70***	(0.256)
90 - < 100%	1.41	(0.335)	1.50**	(0.225)

Language group (reference: English)				
Other	1.04	(0.150)	1.02	(0.112)
Unclassified	0.64	(0.688)	0.42	(0.385)
Eligibility for free school meals (reference: no)				
Yes	1.08	(0.100)	1.11	(0.090)
Special needs provision (reference: none)				
School action	0.91	(0.098)	0.97	(0.091)
School action plus	1.10	(0.163)	1.17	(0.146)
Statement	1.37	(0.415)	1.38	(0.345)
Type of establishment (reference: community)				
Voluntary aided	0.89	(0.125)	0.85*	(0.068)
Voluntary controlled	1.17	(0.236)	1.13	(0.125)
Foundation	0.65	(0.271)	0.81	(0.154)
KS1 science National Curriculum level awarded (reference: working towards level 1)				
Achieved level 1	1.00	(0.332)	0.92	(0.286)
Achieved level 2	0.93	(0.350)	0.89	(0.299)
Achieved level 3	1.03	(0.435)	0.94	(0.358)
Unable to access	1.34	(1.207)	0.54	(0.554)
School size (reference: < 60 pupils)				
< 180 pupils	0.22**	(0.115)	0.29**	(0.139)
< 240 pupils	0.25**	(0.127)	0.33*	(0.158)
< 360 pupils	0.22**	(0.116)	0.29**	(0.138)
300 + pupils	0.26*	(0.136)	0.30*	(0.147)
School type (reference: first school 5-8)				
First school 5-9	1.99	(1.217)	1.25	(0.450)
First school 5-10	2.29	(1.297)	1.56	(0.869)
First and middle school 5-12	4.16**	(2.135)	4.06*	(2.843)
Infant school 5-7 or 5-8	1.54	(0.838)	0.93	(0.280)
Junior school 7-11 or 8-11	12.7***	(8.044)	7.10***	(2.776)
Infant and junior school 5-11	2.10	(1.109)	1.31	(0.393)
First school 5-7	0.86	(0.636)	0.48	(0.356)
CM with special needs (reference: No)				
Yes	3.86	(2.847)	2.84*	(1.325)
Percentage of FSM				
	1.00	(0.005)	0.99	(0.003)
Percentage of white British				
	1.00	(0.002)	1.00*	(0.001)
Attainment point score				
	1.04	(0.022)	1.04*	(0.018)
<i>N</i>	5940		5940	
pseudo <i>R</i> ²			0.042	

Exponentiated coefficients; Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Most of the variables in Table 7, do not have a statistically significant association with the probability of response to the teacher survey. However, teachers are 50 per cent less likely to respond to the questionnaire if the CM is Pakistani or Bangladeshi than if he is white.

In conclusion, we can say that despite some small variations in the descriptive statistics, the administrative variables do not explain much of the variation in teacher response. Hence, one can reasonably assume that, in England, non-response in the MCS teacher survey is reasonably close to being completely at random. In Tables 8 and 9 the same analyses are carried out for Wales. Note that the administrative variables differ between the two countries.

Table 8: Difference in sample composition for Wales using administrative variables

Variables	Categories	The entire MCS4 sample	MCS4 teacher sample	Difference
Ethnic group	White	97.40	97.30	-0.10
	Mixed	1.17	1.33	0.16
	Indian	0.16	0.07	-0.09
	Pakistani and Bangladeshi	0.46	0.23	-0.23
	Black or Black British	0.40	0.45	0.05
	Ethnic group (Chinese, other)	0.41	0.63	0.22
Number of observations		1962	1180	-782
Eligible for free school meals		18.80	16.80	-2.00
Number of observations		1708	1047	-661
English teacher assessment level	Not applicable/Missing	18.70	20.10	1.40
	Level 1 attained	9.34	9.64	0.30
	Level 2 attained	51.50	48.60	-2.90
	Level 3 attained	18.10	19.20	1.10
	Disapplied - i.e. not taking subject	0.10	0.17	0.07
	Not awarded level	0.10	0.00	-0.10
	Working towards level assessed	2.14	2.26	0.12
Number of observations		1708	1047	-661
Welsh teacher assessment level	Not applicable/Missing	81.30	79.90	-1.40
	Level 1 attained	1.82	1.90	0.08
	Level 2 attained	12.40	13.10	0.70
	Level 3 attained	4.34	5.09	0.75
	Level 4 attained	0.04	0.00	-0.04
	Working towards level assessed	0.11	0.09	-0.01
Number of observations		1708	1047	-661
Math teacher assessment level	Level 1 attained	9.21	9.38	0.17
	Level 2 attained	65.00	63.20	-1.80
	Level 3 attained	24.00	25.40	1.40
	Level 4 attained	0.07	0.00	-0.07
	Disapplied - i.e. not taking subject	0.10	0.17	0.07
	Not awarded level	0.10	0.00	-0.10
	Working towards level assessed	1.52	1.79	0.27
Number of observations		1708	1047	-661
Science teacher assessment level	Level 1 attained	7.76	8.68	0.92
	Level 2 attained	64.60	63.20	-1.40
	Level 3 attained	26.30	27.00	0.70
	Disapplied - i.e. not taking subject	0.10	0.17	0.07
	Not awarded level	0.10	0.00	-0.10
	Working towards level assessed	1.20	0.94	-0.26
Number of observations		1708	1047	-661

Language teacher assessment level	Level 1 attained	11.20	11.50	0.30
	Level 2 attained	63.90	61.60	-2.30
	Level 3 attained	22.40	24.30	1.90
	Level 4 attained	0.04	0.00	-0.04
	Not awarded level	2.45	2.52	0.07
Number of observations		1708	1047	-661
School size	< 60 pupils	3.18	3.57	0.39
	< 180 pupils	29.70	30.60	0.90
	< 240 pupils	42.10	42.00	-0.10
	< 360 pupils	17.60	17.00	-0.60
	300 + pupils	7.45	6.74	-0.71
Number of observations		1871	1123	-748
School type	Infant School 5-7 or 5-8	5.97	5.27	-0.70
	Junior School 7-11 or 8-11	3.92	5.06	1.14
	Infant and Junior School 5-11	13.50	13.90	0.40
	infant school, nursery	13.60	13.30	-0.30
	primary school	61.50	60.40	-1.10
	Independent School	1.03	1.46	0.43
	special school post 16	0.46	0.57	0.11
Number of observations		1871	1123	-748
Percent with special needs		1.64	1.22	-0.42
Number of observations		1871	1123	-748
Percent white British		91.02	91.29	0.27
Number of observations		1852	1108	-744

Table 8 shows that for most variables the variation is very limited in magnitude. When the sample of productive teachers is considered we find that we have fewer CMs eligible for free school meals (2 per cent fewer). For the rest of variables the differences are very small.

Table 9: Logit regression of response to the teacher survey using administrative variables (Wales): Odds ratio (SE)

	Teacher response with sample design		Teacher response without sample design	
Eligibility for free school meals (reference: no)				
Yes	0.65**	(0.089)	0.66**	(0.092)
English teacher assessment level (reference: level 1 attained)				
Level 2 attained	0.73	(0.199)	0.79	(0.194)
Level 3 attained	0.96	(0.254)	0.95	(0.285)
Working towards level assessed	1.76	(1.139)	1.31	(0.794)
NA/Missing	0.99	(0.344)	0.93	(0.242)
Math teacher assessment level (reference: level 1 attained)				
Level 2 attained	1.19	(0.358)	1.11	(0.310)
Level 3 attained	1.42	(0.515)	1.56	(0.496)
Working towards level assessed	4.97*	(3.643)	3.77	(2.911)
Science teacher assessment level (reference: level 1 attained)				
Level 2 attained	0.74	(0.226)	0.65	(0.194)
Level 3 attained	0.68	(0.206)	0.63	(0.214)

Working towards level assessed	0.096*	(0.091)	0.20*	(0.165)
School size (reference: < 60 pupils)				
< 180 pupils	0.75	(0.609)	0.77	(0.283)
< 240 pupils	0.65	(0.507)	0.57	(0.207)
< 360 pupils	0.66	(0.533)	0.62	(0.230)
300+ pupils	0.45	(0.395)	0.47	(0.193)
School type (reference: Infant School 5-7 or 5-8)				
Junior School 7-11 or 8-11	4.47	(4.048)	4.15***	(1.685)
Infant and Junior School 5-11	1.33	(0.915)	1.43	(0.373)
Infant school with nursery provision	1.24	(0.895)	1.23	(0.322)
Primary school	1.39	(0.904)	1.41	(0.330)
Percentage of white British	1.00	(0.010)	1.00	(0.005)
<hr/>				
<i>N</i>	1632		1632	
pseudo R^2			0.031	

Exponentiated coefficients; Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Table 9 shows that all variables, except eligibility for free school meals, have an insignificant effect on the probability of response in the teacher survey. Teachers of CMs eligible for free school meals (FSMs) are less likely to respond on the teacher questionnaire than teachers of CMs not eligible for FSMs. When the model was estimated without the survey design features, the pseudo R-squared was very low in magnitude (3.1%), indicating that its explanatory power is weak.

Conclusion

The main recommendations for data users can be summarised as follows.

Firstly, CMs are not intentionally clustered within schools and teachers. The design clustering occurs at the level of electoral ward; hence, when conducting statistical analyses using the `svy` command in Stata, researchers should take account of clustering at the ward level but not at school or teacher levels.

Secondly, teachers are not the units on which the sampling was based. In fact, cohort members (and not teachers) were sampled by country and electoral ward based on certain rules. Then teacher response on the teacher questionnaire was sought for each CM and hence the stratification in the teacher survey can be seen as an extension of that on the main survey. Further, teacher response on the teacher survey is conditional on CM response on the main survey. If a CM attrited in sweep 4 there would be no opportunity to contact his or her teacher. In order to have unbiased results when using the teacher survey, one therefore has to use the combined sample-design and non-response weights.

Thirdly, based on the results of the descriptive analyses and the logit models (Tables 3 to 9) we can reasonably conclude that, in the UK as a whole and in England and Wales, non-contact in the MCS teacher survey is reasonably close to being completely at random. It is not strongly affected by pupil or by school characteristics. Therefore the teacher survey can safely be used without adjustment for non-contact/non-response.

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