BERJ | British Educational Research Journal

BERA

British Educational Research Journal
Vol. 40, No. 5, October 2014, pp. 749–771

DOI: 10.1002/berj.3127

Stratified at seven: in-class ability grouping and the relative age effect

Tammy Campbell*
Institute of Education, University of London, UK

There is an established body of evidence indicating that a pupil's relative age within their school year cohort is associated with academic attainment throughout compulsory education. In England, autumn-born pupils consistently attain at higher levels than summer-born pupils. Analysis here investigates a possible channel of this relative age effect: ability grouping in early primary school. Relatively younger children tend more often to be placed in the lowest in-class ability groups, and relatively older children in the highest group. In addition, teacher perceptions of pupils' ability and attainment are associated with the child's birth month: older children are more likely to be judged above average by their teachers. Using 2008 data for 5481 English seven-year-old pupils and their teachers from the Millennium Cohort Study, this research uses linear regression modelling to explore whether birth month gradation in teacher perceptions of pupils is more pronounced when pupils are in-class ability grouped than when they are not. It finds an amplification of the already disproportionate tendency of teachers to judge autumn-born children as more able when grouping takes place. The autumn–summer difference in teacher judgements is significantly more pronounced among in-class ability grouped pupils than among non-grouped pupils. Given evidence that teacher perceptions and expectations can influence children's trajectories, this supports the hypothesis that in-class ability grouping in early primary school may be instrumental in creating the relative age effect.

Introduction

Month of birth and academic attainment

In England, as in many other countries, the vast majority of pupils are educated within class groups formed according to the structure of the school academic year. Annually, pupils born over the period beginning in September and ending in August will, with a very few exceptions, comprise a distinct cohort (Riggall & Sharp, 2008).

There is a mounting body of international evidence which indicates a relationship between month of birth, school year structure, and a variety of academic and extra-academic outcomes. Pupils who are younger in the school year (in England, those born during the summer months) tend consistently, throughout compulsory education, to score lower on tests of academic ability than their relatively older peers (Daniels *et al.*, 2000; Menet *et al.*, 2000; Martin *et al.*, 2004; Strom, 2004; Bedard & Dhuey, 2006; Boardman, 2006; Lawlor *et al.*, 2006; Oshima & Domaleski, 2006; Crawford *et al.*, 2007, 2011; McEwan & Shapiro, 2008; Sykes *et al.*, 2009;

*Institute of Education, Department of Quantitative Social Science, 55–59 Gordon Square, London, WC1H 0NU, UK. Email: tcampbell@ioe.ac.uk

Department for Education, 2010a). They are more often diagnosed with special educational needs (Wallingford & Prout, 2000; Wilson, 2000; Gledhill *et al.*, 2002; Goodman *et al.*, 2003; Martin *et al.*, 2004; Crawford *et al.*, 2007; Polizzi *et al.*, 2007; Sykes *et al.*, 2009; Department for Children, Schools and Families, 2009; Department for Education, 2010a) and progress less frequently into further education (Bedard & Dhuey, 2006; Sykes *et al.*, 2009; Crawford *et al.*, 2011; Sampaio *et al.*, 2011). Relatively younger children are also disproportionately likely to report bullying victimhood, to demonstrate lower levels of confidence and self-efficacy, and to report lesser enjoyment of school (Department for Education, 2010a; Mühlenweg, 2010; Crawford *et al.*, 2011).

To date, no one theory (or set of theories) on the primary cause(s) of this 'relative age effect' has definitively been supported (Sharp *et al.*, 2009; Sykes *et al.*, 2009; Crawford *et al.*, 2011). With regard specifically to birth month disproportionalities in academic attainment, research has proposed and is providing the beginnings of evidence that differences in absolute age at testing might, to some extent, explain birth month variation—given that August pupils are up to a year younger than September-borns when undertaking national assessments (Crawford *et al.*, 2011, 2013).

However, other studies have suggested that it is the relative social, emotional, behavioural and/or cognitive immaturity of summer-born pupils in early primary school that is key to laying the foundations for inequalities (Boardman, 2006; Sharp *et al.*, 2009). Most pupils in England enter primary school at some point during the year following their fourth birthday (Riggall & Sharp, 2008). At this stage, and throughout their early education, the in-cohort age difference of up to a year between relatively younger and relatively older pupils comprises a significant fraction of life lived, and of development.

The possibility, therefore, is that the early maturational inequalities necessitated by the structure of the annual cohort-based educational system are instrumental in creating the relative age effect. This theory is supported by research which indicates that younger pupils may disproportionately frequently be diagnosed with special educational needs on the basis of relative developmental immaturity, rather than any inherent trait difference (Wallingford *et al.*, 2000; Gledhill *et al.*, 2002; Elder & Lubotsky, 2009; Dhuey & Lipscomb, 2010). In addition, analysis of international evidence by Sprietsma (2010) begins to suggest that ability grouping (where groups are constructed on the basis of performance/perceived ability relative to cohort peers) may account for some of the attainment variation associated with month of birth.

In-class ability grouping and month of birth

Analysis of 2008 data for a large, national sample of British seven-year-olds who are participating in the Millennium Cohort Study (MCS) shows that, across both whole-year and in-class grouping practices, relatively younger pupils are disproportionately frequently placed in lower groups, while their relatively older peers are more often found in the highest placements. This tendency is consistent across all practices and steadily, linearly–incrementally related to birth month (Hallam & Parsons, 2012; Campbell, 2013).

Campbell (2013) reports that 78.8% of 5374 English MCS children are subject to an overriding, high-level within-class ability grouping, and shows that among these pupils, September-born children are more than twice as likely than August-born children to be placed in the highest group, with the inverse being the case for the lowest grouping (Figure 1). There is strong evidence, therefore, that a large proportion of pupils are in-class ability grouped at a very early age, and there are indications of major disparities in placement according to relative age within-cohort. This lends initial support to a theory that early in-class ability grouping, at a stage where absolute age differentials are highly pronounced, may be influential in the creation of the month of birth effect.

In-class ability grouping and academic attainment

Reviews of the wider research on the associations between ability grouping and pupil attainment have generally suggested that grouping entrenches between-pupil difference and may have a detrimental effect on pupils placed at lower levels, while advantaging children who are in higher groups (Kutnick *et al.*, 2005; Blatchford *et al.*, 2008; Hallam & Parsons, 2012). There is also evidence that pupils' positions within in-school hierarchies have tended largely to be stable over time (Blatchford *et al.*, 2008). In-class ability grouping in early primary school may, therefore, establish a structured hierarchy which is predicated on birth month and which embeds differentiated trajectories of academic achievement.

Campbell (2013) proposes a theoretical model where the initial disparity in within-class group position may play out in as a disparity in eventual attainment

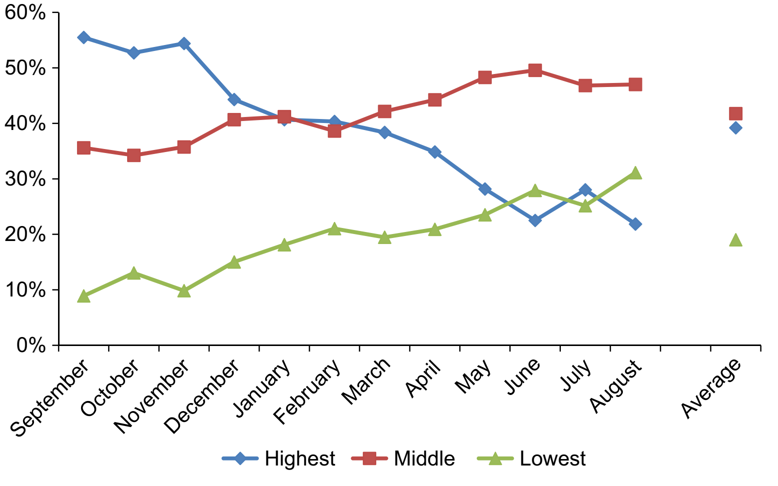

Figure 1. Percentage of pupils born in each month who are reported as being in each within-class ability group, among those pupils who are reported as being within-class grouped*(n = 4140) *Source:*From Campbell (2013).

via three possible routes: through pupils' self-perceptions, as engendered by their in-class position; through the educational and assessment opportunities offered to pupils placed at different in-class levels; and through teacher perceptions, expectations of, and behaviours towards pupils situated in different groups. The investigation presented in the current paper begins to explore this third hypothetical channel.

Teacher perceptions and academic attainment

Since Rosenthal and colleagues began investigating the relationships between teacher expectations and pupil performance in the 1960s (Rosenthal & Jacobsen, 1968), a solid body of evidence has built which suggests that teacher perceptions of, expectations of, and beliefs about their pupils can influence attainment, and lead to self-fulfilling prophesies: 'when teachers believe… their students [are] very able [they interact] with them in ways which promote… their academic development'—and vice versa (Rubie-Davies, 2010).

Research has indicated that teacher judgements of their pupils can relate to the groups of which children are members—groups which may bear little or no necessary relationship to a child's ability or potential (Harlen, 2004). Recent studies have suggested that this bias is apparent, for example, in relation to pupil ethnic group (Burgess & Greaves, 2009), gender (Hansen & Jones, 2011) and special educational needs status (Reaves *et al.*, 2001).

Most significantly, there is evidence that teacher perceptions of pupil ability and attainment are gradated according to birth month, with August-born pupils tending to be judged as less able by their teachers, and September-borns as more able. Crawford *et al.* (2011) indicate that, at age seven, relatively younger pupils are more likely to be judged by their teacher as of 'below average' ability in reading, writing and maths, while Crawford *et al.* (2013) use national data to show a steady downward September–August trend in the grades allocated through the teacher assessed component of Key Stage 2 tests. Unless there truly is a difference in pupil ability which corresponds, expediently, to the structure of the cohort-based educational system, this indicates a fundamental bias in teacher assessments of children according to their birth month—a bias which may further be confounded by the unequal distribution of pupils born in different months across in-class ability groups.

The current study

To investigate whether in-class ability grouping is, as hypothesised, instrumental in the construction of the relative age effect, the current study therefore focuses on the mediating pathway of teacher perceptions of pupil ability, and examines whether birth month gradation in these perceptions is greater where there *is* in-class ability grouping than where there *is not*. If there is *no* difference in magnitude of variation, then in-class grouping will not be indicated as a key mechanism in the creation and proliferation of the effect. If variation in teacher perceptions according to birth month *is* more pronounced where in-class ability grouping takes place, and given evidence that teacher perceptions may affect pupil attainment, then in-class ability grouping will begin to be implicated as playing a part in the formation of the relative age effect.

Therefore, the hypothesis being tested is that: birth month gradation in teacher perceptions of pupil ability will be more pronounced among pupils who are in-class ability grouped than among pupils who are not in-class grouped.

Methodology

Sample

Analyses in this paper use 2008 data on seven-year-old, English Millennium Cohort Study (MCS) children and the children's teachers. The MCS is an on-going, UK-wide longitudinal sample survey, whose target population in England is defined as:

> … all children born between 1 September 2000 and 31 August 2001… alive… at age nine months and eligible to receive Child Benefit at that age; and, after nine months: for as long as they remain living in the UK at the time of sampling. (Plewis *et al.*, 2007, p. 7)

Five waves of the MCS have taken place to date: in 2001, 2004, 2006, 2008 and 2012. At wave one, 11,695 individual babies were included in the final achieved sample in England. At wave four, 8887 interviews took place in England, of which 5627 (63%) also generated responses to the separate questionnaire completed by the child's class teacher (Johnson *et al.*, 2011) which is used for analyses here. Analyses are for MCS children surveyed in England only so that, in line with the assumption that the structure of a school system underpins associations between month of birth and child outcomes, findings apply within a single educational framework with consistent school year cut-off points.

Twins and triplets are removed from analyses, because in-class groupings and teacher judgements for these pupils may be subject to different tendencies compared to singleton children. This leaves a base total of 5481 English seven-year-old pupils with returned teacher surveys. There are some variations in sample sizes across analyses due to missing data; exact numbers are stated throughout reporting.

Campbell (2013) demonstrates that the 5481 English MCS teacher sample seven-year-olds are, at an aggregate level, similar to the national population of seven-year-olds as reported in (then) Department for Children, Schools and Families statistics for the corresponding year 2008–2009. They may therefore tentatively be considered reasonably to represent the target population. Unweighted data are used throughout this paper, as weights are not available for the teacher survey sample.

See Campbell (2013), Chaplin Grey *et al.* (2010), Huang and Gatenby (2010), Johnson *et al.* (2011), Plewis *et al.* (2007) and http://www.cls.ioe.ac.uk/ for further information on procedures, technical details, documentation and discussion of the MCS in general and the teacher survey in particular. All MCS data used for analyses here are publically available (University of London, Institute of Education, Centre for Longitudinal Studies, 2011a,b; 2012a,b,c) and can be downloaded at http://www.esds.ac.uk/.

Key measures

The two key predictor variables used in analyses are pupil season of birth and teacher report of whether the pupil is in-class ability grouped or not. The outcome variable is teacher assessment of whether the pupil is of *above average* 'ability and attainment' at a given subject.

The *season of birth* predictor combines month of birth into four categories (autumn, winter, spring, summer), in order to ensure robust sample sizes for modelling. Autumn comprises those born in September, October or November (27.3% of the sample); Winter: December, January, February (25.2%); Spring: March, April, May (24.3%); Summer: June, July, August (23.2%). As detailed in the results section, and in line with the linear incremental associations demonstrated throughout relative age research, this amalgamation of months into seasons does not affect the direction of findings.

The ability grouping predictor variable derives from a question in the wave four teacher survey which asks whether, at age seven, 'In this child's class, is there within-class ability grouping?'—having defined within-class ability grouping as follows:

- Some schools group children within the same class by general ability and they are taught in these ability groups for most or all lessons.

Respondents provided a *yes/no* answer to this question, and this is used as a binary 1/0 variable in analyses. 79% of the base sample pupils are reported as being in-class grouped.

The outcome variable derives from a question in the teacher survey asking the respondent to 'rate some aspect of the study child's ability and attainment… in relation to all children of this age…' Teachers could rate children as *well above average*, *above average*, *average*, *below average* or *well below average.* Teachers were asked their opinion on children's *ability and attainment* in the following domains: speaking and listening; reading; writing; science; maths and numeracy; physical education; information and communication technology; and expressive and creative arts. See Appendix A for a breakdown of teacher responses in each domain for all sample pupils. For brevity, the results presented in this paper are for the first four domains on which teachers were questioned: speaking and listening, reading, writing and science. Analysis using responses in other domains has also been undertaken and is available from the author on request; results are consistent with those included in this paper.

In each subject domain, there is an overriding month of birth gradient in teachers' ratings of pupils' *ability and attainment*, where relatively older children are more likely to be judged *well above average* or *above average*, and relatively younger children are more likely to be judged *average*, *below average* or *well below average.* Figure 2 illustrates this for judgements of speaking and listening *ability and attainment.*

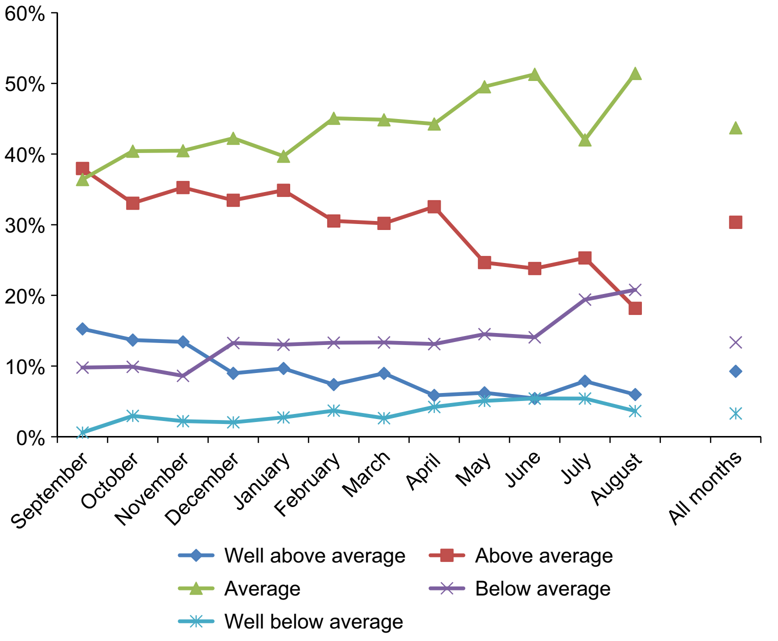

Figure 2. Percentage of sample pupils born in each month judged to be at each level of *speaking and listening* ability and attainment by their teacher (n = 5429)

This five-category teacher judgement outcome variable is recoded to be binary, so that 1, 'above average', combines teacher responses of *well above average* and *above average*, and 0, 'average or below', combines responses of *average, below average* or *well below average.* This focusses analysis on disproportionalities and patterns in positive, favourable judgements of pupils.

Analytical approach

Linear probability regression is used to model the relationships between birth season, ability grouping and whether teacher judgement is 'above average'. All main analyses use the *Generalised Linear Modelling* option in PASW (SPSS) 18. Linear probability regression has been used in some of the most recent research into relative age effects (Crawford *et al.*, 2013) and is chosen for analyses here because the model-predicted probabilities offered are more straightforwardly interpretable than the odds ratios produced by a logistic regression. However, as a check, equivalent analyses have also been performed using the latter technique, and do not affect results. They are available from the author on request, and an example is described in the results section.

Because analyses investigate whether the relationship between season of birth and teacher perceptions varies *according to* whether pupils are ability grouped or not, an interaction between these two predictors is key to each model (SoB x Gr), and included along with the season of birth (SoB) and ability grouping (Gr) predictors. The basic equation underpinning all analyses is therefore:

$$y = a + \beta_{123}SoB + \beta_4 Gr + \beta_{567}SoB \times Gr + e \qquad (1)$$

The reference categories in each analysis are set as *summer* and *not grouped*. Therefore, given the inclusion of the interaction, the first three coefficients in the equation describe the relationships between likelihood of being judged 'above average' and birth season (autumn, winter or spring—in comparison to the summer reference) among pupils who are *not grouped*. The fourth coefficient describes the relationship between being grouped and probability of being judged 'above average' for summer pupils. The fifth coefficient, for the interaction, isolates the association between being grouped and being judged 'above average' for autumn-born pupils (and the sixth and seventh for winter and spring-born pupils). Key coefficients are described throughout the results section, alongside graphs which illustrate model predicted probabilities (estimated marginal means) of being judged 'above average' for pupils born in each season who are grouped and not grouped.

Stages two, three and four: addition of controls

Because any difference in the relationships between being born in the autumn/summer, being grouped or not, and teacher perceptions may be due to selection of pupils with different family backgrounds and individual characteristics into schools which group/do not group, a second stage of analysis adds controls for a range of pupil- and family-level factors. Table 1 describes the variables included at this second stage (and Appendix B details each, its origin and identifier in the MCS surveys, and its distribution in the sample, in greater depth).

Even controlling for the factors included at this second stage, it is still possible that there are other, systematic, school- or teacher-level differences between grouping/non-grouping establishments which influence teacher perceptions. Stage three therefore attempts to account for this, by adding further controls available in the MCS (see Table 1).

Lastly, a fourth stage adds additional controls for previous in-school assessments of pupils, which serve two potential purposes, each premised on a separate assumption.

The MCS data contain no information on the point at which ability grouping commenced for sample pupils, so, firstly, based on an assumption that pupils are grouped at school entry, stage four provides an indication of any continuing, pervasive, additional effect of grouping, *after* Foundation Stage Profile (FSP) teacher assessment at age five, and *after* any special educational needs (SEN) diagnoses prior to surveying at age seven.

Alternatively, if the assumption that grouping placement commences immediately on school entry does not hold, inclusion of the FSP and SEN variables should account for additional school decisions and evaluations which may be entangled with relative age and with grouping practice and placements as initiated, at some point, between entry and age seven. Pupils may be placed in a lower in-class group because they have a SEN diagnosis or vice versa; because they have

Table 1. Controls added cumulatively to each model at stages 2, 3 and 4

Stage 2: Pupil and family controls	Stage 3: School and teacher controls	Stage 4: Previous in-school assessments of pupil
Pupil gender	Whether school at wave four same school child attended two years previously	Total (teacher-assessed, age 5) Foundation Stage Profile score
Pupil ethnicity	Whether family pays fees for schooling	Teacher report of any identified special educational need
Pupil age 5 British Ability Scale (age-) standardised T-scores (Pattern Construction, Picture Similarity, Naming Vocabulary)	Whether family displayed religiosity for school admission	
Family income at age 7	Whether there are mixed year groups in child's class	
Family housing tenure at age 7	Number of classes in child's year group	
Whether languages other than English are spoken in pupil's home at age 7	Number of pupils in child's class	
Main parent's highest academic qualification at child's birth	Respondent teacher's gender	
Main parent's highest vocational qualification at child's birth	Number of years respondent teacher has taught	
Whether a single parent when child was born	Number of years respondent teacher taught at this school	
Whether internet is available in family home at age 7		
Whether, and length of time for which, pupil was breastfed		

a low FSP score or vice versa; these decisions may take place sequentially or concurrently.

If associations between ability grouping and teacher perceptions remain, even taking into account the potential confounding effects of these final factors (on top of the variables added at previous stages), stage four will therefore strengthen indications that grouping has a strong, independent effect.

Results

Table 2 indicates, for each subject domain, whether and the extent to which non-grouped autumn pupils are more likely to be judged as of 'above average' *ability and attainment* by their teachers, compared to summer-born, non-grouped pupils ('Autumn'; see equation (1) —this is coefficient 1). In each subject domain, at stages one, two and three, there is a positive, significant relationship between being born in the autumn and being judged 'above average'. For example, according to stage one analysis, autumn-born pupils are 11.9 percentage points more likely to be judged 'above average' than summer-borns at speaking and listening. At stage four, however,

Table 2. Key coefficients at each stage of analysis for relationships between month of birth/ability grouping and probability of being judged 'above average' by teacher

	Stage 1	Stage 2	Stage 3	Stage 4
Speaking and listening				
Autumn (ref: summer)	.119**	.159***	.158***	.031
Winter (ref: summer)	.072	.111**	.117**	.019
Spring (ref: summer)	–.009	–.003	–.001	–.058
Ability grouped (ref: not grouped)	–.050	–.019	–.010	–.005
Autumn x ability grouped	.110**	.092*	.093*	.109*
N.	5325	5036	5036	4531
Reading				
Autumn (ref: summer)	.124**	.171***	.158***	.024
Winter (ref: summer)	.051	.100*	.098*	.013
Spring (ref: summer)	.025	.039	.036	–.008
Ability grouped (ref: not grouped)	–.069*	–.039	–.039	–.026
Autumn x ability grouped	.127**	.111*	.119**	.118**
N.	5322	5033	5033	4530
Writing				
Autumn (ref: summer)	.115**	.163***	.158***	.036
Winter (ref: summer)	.032	.073	.077**	–.010
Spring (ref: summer)	.008	.024	.027	–.009
Ability grouped (ref: not grouped)	–.071*	–.035	–.027	–.020
Autumn x ability grouped	.107*	.082*	.081*	.094*
N.	5233	5032	5032	4530
Science				
Autumn (ref: summer)	.160***	.191***	.183***	.058
Winter (ref: summer)	.045	.081*	.084*	–.004
Spring (ref: summer)	.008	.016	.016	–.030
Ability grouped (ref: not grouped)	–.038	–.018	–.014	–.016
Autumn x ability grouped	.076	.078	.083*	.099*
N.	5319	5029	5029	4526

Notes: *** = p < .001; ** = p < .01; * = p < .05. Each coefficient indicates percentage change in predicted probability of being judged 'above average'. Controlled at stage two for pupil and family characteristics; stage three adds school and teacher factors; stage four adds pupil FSP score/presence of SEN diagnosis—see Table 1.

upon addition of controls for previous in-school judgements, this difference is no longer significant. Having controlled for pupil, family, school and teacher characteristics, and previous in-school judgements, non-grouped autumn pupils and non-grouped summer pupils do not significantly differ in their chances of being judged 'above average' by their teacher.

Table 2 also indicates any association, for summer pupils, between being ability grouped and being judged 'above average' ('Ability grouped'; coefficient 4 from the equation). At each stage of analysis, in each subject domain, this relationship is negative—being grouped appears to lessen the chances of summer pupils of being judged 'above average'—but it is not statistically significant at the 5% level, in any subject, upon addition of controls beyond stage one.

However, the relationship indicated in Table 2 between being grouped and being judged 'above average' for autumn pupils ('Autumn x ability grouped'; coefficient 5) is positive and statistically significant at the 5% level or above at all stages of analysis, across all subject domains. For example, autumn-born children who are grouped have chances 11 percentage points higher than autumn-born pupils who are not grouped of being judged 'above average' at speaking and listening by their teacher at stage one, and this difference is barely altered at stage four, where it remains significant, at 10.9 percentage points higher.

There are therefore three initial findings. Firstly, ungrouped autumn-born pupils are more likely than ungrouped summer-born pupils to be judged as of 'above average' ability and attainment by their teachers. This tendency holds upon addition of controls for pupil, family, school and teacher characteristics—but is negated upon addition of controls for previous in-school judgements.

Secondly, the difference made to summer pupils by being grouped appears minimal, though negative. Grouping appears slightly to lower teacher judgements of summer pupils—but these apparent effects are largely non-significant.

Thirdly, however, and in contrast, the practice of in-class grouping is indicated as strongly, positively related to teacher judgements of autumn pupils, even upon addition of all controls, including previous in-school evaluations and decisions.

Crucially, these associations result in a much wider autumn–summer gap in teacher perceptions among pupils in schools which in-class group than among pupils in schools that do not in-class group. Figures 3 to 6 illustrate this finding for judgements in each subject domain, at stage four of analysis, with all controls.

Figure 3 shows an autumn–summer difference in mean percentage predicted probability of being judged 'above average' in speaking and listening of 14 percentage points among pupils in schools which group ($p < .001$). Among pupils in schools which do not group, this difference is much smaller (3.1 percentage points) and non-significant ($p = .435$). For judgements of reading (Figure 4), the difference

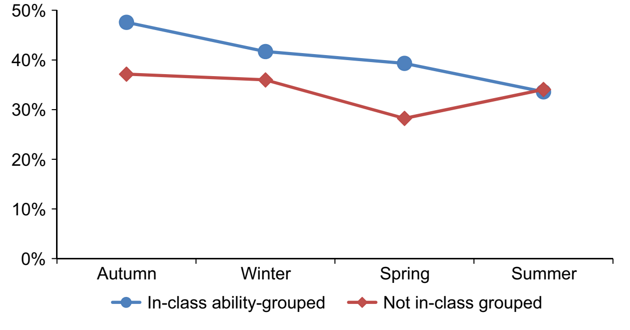

Figure 3. Mean average percentage predicted probabilities for pupils in each season of birth/in-class grouped or not category, produced by stage four regression—probability of being judged 'above average' in speaking and listening*ability and attainment* by teacher (n = 4531; controlled for pupil and family characteristics *and* school and teacher factors *and* pupil FSP score/presence of SEN diagnosis)

is 14.2 percentage points for grouped pupils (p < .001) and 2.3 for non-grouped (p = .553); for writing (Figure 5) it is 13 percentage points for grouped pupils (p < .001) and 3.5 percentage points for non-grouped (p = .355); and for science (Figure 6) it is 15.6 percentage points for grouped pupils (p < .001) and 5.7 for non-grouped (p = .138).

Robustness checks

Two key alternative analyses were carried out in order to check whether methodological choices may have influenced the direction of results. Firstly, as mentioned, repeating analyses using a binary logistic regression rather than a linear regression produces equivalent findings. For example, in the logistic model, at stage four of analysis inves-

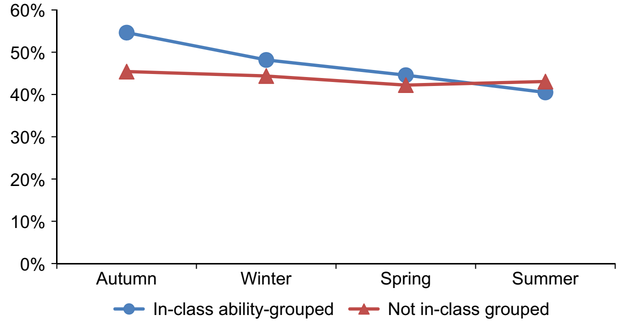

Figure 4. Mean average percentage predicted probabilities for pupils in each season of birth/in-class grouped or not category, produced by stage four regression—probability of being judged 'above average' in reading*ability and attainment* by teacher (n = 4530; controlled for pupil and family characteristics *and* school and teacher factors *and* pupil FSP score/presence of SEN diagnosis)

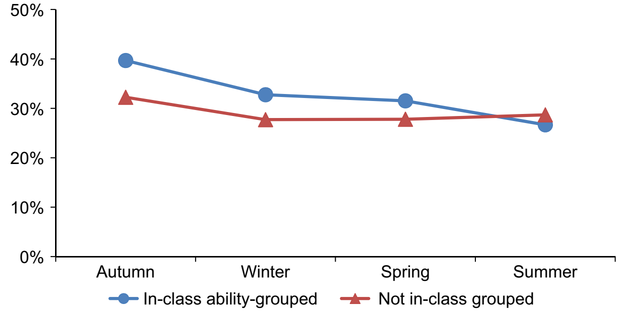

Figure 5. Mean average percentage predicted probabilities for pupils in each season of birth/in-class grouped or not category, produced by stage four regression—probability of being judged 'above average' in writing*ability and attainment* by teacher (n = 4530; controlled for pupil and family characteristics *and* school and teacher factors *and* pupil FSP score/presence of SEN diagnosis)

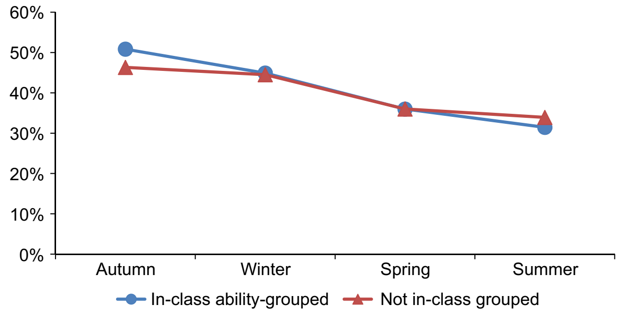

Figure 6. Mean average percentage predicted probabilities for pupils in each season of birth/in-class grouped or not category, produced by stage four regression—probability of being judged 'above average' in science*ability and attainment* by teacher (n = 4526; controlled for pupil and family characteristics *and* school and teacher factors *and* pupil FSP score/presence of SEN diagnosis)

tigating teacher judgements of pupils' speaking and listening *ability and attainment*, autumn-born pupils have odds 13% higher than summer born pupils of being judged 'above average,' but as with the linear model, this is not significant (p = .62); grouped summer-born pupils have 4% lower odds than non-grouped summer-borns of being judged 'above average,' but, again like the linear model, this difference is non-significant (p = .84); while, true to the linear model, the difference between ability grouped and non-ability grouped autumn-born pupils is large and significant: grouped autumn-borns have odds 88% higher than non-grouped of being judged 'above average' (p = .016).

Secondly, using month rather than season of birth in modelling results in larger standard errors for some estimates due to reduced sample sizes, but does not influence the direction or significance of key results. Indeed, given the linear incremental pattern of associations with birth month, coefficients for the September–August difference are larger than those for the autumn–summer difference. For example, at stage four of analysis using teachers' judgements of speaking and listening, being in-class ability grouped results in a predicted probability of being judged 'above average' 16 percentage points higher for September-born pupils who are grouped compared to those who are not grouped (p = .038). The September–August difference among grouped pupils according to this specification is 22 percentage points (p < .001), while the difference among non-grouped pupils is smaller and non-significant at six percentage points (p = .405).

Discussion

Analyses set out to investigate whether there is evidence for the possibility that in-class ability grouping early in primary school may contribute to the creation of systematic birth month differentials in pupil attainment. Findings provide support for the hypothesis proposed. Among children who *are* in-class ability grouped, autumn–

summer variation in teacher perceptions of *ability and attainment* is greater than among pupils who are *not* grouped. The already disproportionate tendency of autumn-borns favourably to be judged 'above average' is amplified among grouped children. This finding holds upon addition of a range of potentially confounding family, pupil, school and teacher factors.

Results here are consistent both with previous research which indicates that teacher perceptions of pupils are gradated according to birth month (Crawford *et al.*, 2011, 2013) and with studies which suggest that ability grouping may create or embed difference by providing an advantage to pupils placed at higher levels (Kutnick *et al.*, 2005; Blatchford *et al.*, 2008; Hallam & Parsons, 2012). Findings in this paper suggest that because they are often placed in the top group when in-class ability grouping takes place, autumn-born pupils may be advantaged through a heightening of teachers' judgements of their *ability and attainment* which is related to this group placement.

Research indicates that teacher opinions and expectations can influence the academic trajectory of their pupils. Therefore, analyses here indicate that in-class ability grouping may provide a significant 'boost' to the development of autumn-born children which raises their progress above their relatively younger peers. Findings begin to support a model where grouping is instrumental in the relative age effect—and where cessation of in-class ability grouping may go some way towards alleviating the effect.

Alternative explanations and implications of these

The data available in the MCS do not contain information on the exact decision-making and administrative processes that led to each of the study children being grouped or not grouped. Therefore it is not possible to know whether the presence or absence of grouping is due to school policy, choice on the part of individual teachers or some combination of these factors. The exact chain of events and pattern of effects is, therefore, uncertain. The main hypothesis proposed in this paper is that in-class grouping affects teacher perceptions—but it is possible that, in some cases (and as has, for example, been suggested by Kuklinski & Weinstein, 2000), teachers with a propensity to notions of fixed ability, and a tendency to more extreme discrimination and differentiation between students (including that, potentially, according to birth month), enact these tendencies in a decision to ability group their pupils.

However, this possibility, if it is, in fact, the case for some of the MCS respondent teachers, does not negate the suggestion that ending in-class grouping during early primary school may assuage the month of birth effect. If a policy of *no* early in-class groupings were prescribed, it would disallow a practice which legitimises and reifies assumptions of intrinsic differences in ability and potential (which, as discussed, appear invalidly biased by pupil characteristics, including month of birth); a practice which embeds these assumptions, providing a deterministic conduit through which they may play out. Disallowing ability grouping may therefore, in itself, evoke some reassessment of teachers' own practices and beliefs—or, at least, provide some restraint to the application of premature and divisive categorisations and delineations between pupils.

Moreover, research suggests a number of additional channels alongside that of teacher expectations through which ability grouping might affect pupil attainment—including pupil self-perceptions, and differentiated educational and assessment opportunities (Kutnick *et al.*, 2005; Blatchford *et al.*, 2008). Given the disproportionate distribution of pupils born in different months across the in-class hierarchy, whether the presence of grouping affects teacher perceptions or vice versa, or both, an *absence* of in-class grouping may, theoretically, prevent its effects from manifesting by blocking a variety of subsequent pathways.

Policy implications

Recent UK governments have consistently encouraged ability grouping (see Department for Education and Skills, 2005; Conservative Party, 2007; Department for Children, Schools and Families, 2008; Department for Education, 2010b)—while, at the same time, stating a desire for an educational system which engenders parity of access and opportunity:

> Our schools should be engines of social mobility, helping children to overcome the accidents of birth and background to achieve much more than they may ever have imagined. But, at the moment, our schools system does not close gaps, it widens them. (Department for Education, 2010b, p. 6)

Findings in this paper, from a large, recent, national sample of seven-year-olds, suggest that the policy and practice of in-class ability grouping pupils early in primary school may, in fact, be detrimental to mobility. If systematic month of birth variation in attainment is to be 'overcome' through changes to policy and practice—and few 'accident[s] of birth' are more arbitrarily foisted upon an individual than their birth *date*—then the evidence here indicates that reversal of the policy of in-class ability grouping in early primary school may contribute to 'closing the gap' between relatively younger and relatively older pupils.

Acknowledgments

Many thanks to Lorraine Dearden and Lucinda Platt for feedback and advice. Thanks also to Erica McAteer and Rukki Sehmi for useful comments on an initial draft, and to Ellen Greaves, Claire Crawford and Susan Hallam for advice on and critique of early analysis which formed a basis for this paper. This study presents analyses contributing to my PhD, which I am very grateful to the Economic and Social Research Council for funding. It uses data from the Millennium Cohort Study. I am grateful to the Centre for Longitudinal Studies, Institute of Education for the use of these data, and to the UK Data Archive and Economic and Social Data Service for making them available. However, these organisations bear no responsibility for the analysis or interpretation of these data.

References

Bedard, K. & Dhuey, E. (2006) The persistence of early childhood maturity: International evidence of long-run age effects, *The Quarterly Journal of Economics*, 121(4), 1437–1472.

Blatchford, P., Hallam, S., Ireson, J., Kutnick, P. & Creech, A. (2008) *Classes, groups and transitions: Structures for teaching and learning*. Available online at: http://www.primaryreview.org.uk/downloads/Int_Reps/9.Teaching-learning/RS_9-2_briefing_160508_Structures_for_teaching_learning.pdf (accessed 27 May 2013).

Boardman, M. (2006) The impact of age and gender on Prep children's academic achievements, *Australian Journal of Early Childhood*, 31(4), 1–6.

Burgess, S. & Greaves, E. (2009) *Test scores, subjective assessment and stereotyping of ethnic minorities*. Available online at: http://www.bris.ac.uk/cmpo/publications/papers/2009/wp221.pdf (accessed 27 May 2013).

Campbell, T. (2013) In-school ability-grouping and the month of birth effect: Preliminary evidence from the Millennium Cohort Study. Available online at: http://www.cls.ioe.ac.uk/shared/get--file.ashx?itemtype=document&id=1618 (accessed 27 May 2013).

Chaplin Grey, J., Gatenby, R., Simmons, N. & Huang, Y (2010) *Millennium Cohort Study Sweep 4 technical report (second edition)*. Available online at: http://www.cls.ioe.ac.uk/shared/get-file.ashx?id=844&itemtype=document (accessed 27 May 2013).

Conservative Party (2007) *Raising the bar, closing the gap: An action plan for schools to raise standards, create more good school places, and make opportunity more equal*. Available online at: http://image.guardian.co.uk/sys-files/Education/documents/2007/11/20/newopps.pdf (accessed 27 May 2013).

Crawford, C., Dearden, L. & Meghir, C. (2007) *When you are born matters: The impact of date of birth on child cognitive outcomes in England*. Available online at: http://www.ifs.org.uk/docs/born_matters_report.pdf (accessed 27 May 2013).

Crawford, C., Dearden, L. & Greaves, E. (2011) *Does when you are born matter? The impact of month of birth on children's cognitive and non-cognitive skills in England*. Available online at: http://www.ifs.org.uk/bns/bn122.pdf (accessed 27 May 2013).

Crawford, C., Dearden, L. & Greaves, E. (2013) *When you are born matters: evidence for England*. Available online at: http://www.ifs.org.uk/comms/r80.pdf (accessed 27 May 2013).

Daniels, S., Shorrocks-Taylor, D. & Redfern, E. (2000) Can starting summer-born children earlier at infant school improve their national curriculum results?, *Oxford Review of Education*, 26(2), 207–220.

Department for Children, Schools and Families (2008) *Twenty-first century schools: A world class education for every child*. Available online at: http://webarchive.nationalarchives.gov.uk/20130401151715/https://www.education.gov.uk/publications/eOrderingDownload/DCSF-01044-2008.pdf (accessed 27 May 2013).

Department for Children, Schools and Families (2009) *Children with special educational needs 2009: An analysis*. Available online at: http://dera.ioe.ac.uk/9446/1/Main.pdf (accessed 27 May 2013).

Department for Education (2010a) *Month of birth and education*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182664/DFE-RR017.pdf (accessed 27 May 2013).

Department for Education (2010b) *The importance of teaching—the schools White Paper 2010*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/175429/CM-7980.pdf (accessed 27 May 2013).

Department for Education and Skills (2005) *Higher standards, better schools for all: More choice for parents and pupils*. Available online at: http://dera.ioe.ac.uk/5496/1/DfES-Schools%20White%20Paper.pdf (accessed 27 May 2013).

Dhuey, E. & Lipscomb, S. (2010) Disabled or young? Relative age and special education diagnoses in schools, *Economics of Education Review*, 29(4), 857–872.

Elder, T. E. & Lubotsky, D. H. (2009) Kindergarten entrance age and children's achievement: Impacts of state policies, family background, and peers, *Journal of Human Resources*, 44(3), 641–683.

Gledhill, J., Ford, T. & Goodman, R. (2002) Does season of birth matter? The relationship between age within the school year (season of birth) and educational difficulties among a representative general population sample of children and adolescents (aged 5–15) in Great Britain, *Research in Education*, 68, 41–47.

Goodman, R., Gledhill, J. & Ford, T. (2003) Child psychiatric disorder and relative age within school year: Cross sectional survey of large population sample, *British Medical Journal*, 327, 472–475.

Hallam, S. & Parsons, S. (2013) Prevalence of streaming in UK primary schools: Evidence from the Millennium Cohort Study, *British Educational Research Journal*, 39, 514–544.

Hansen, K. & Jones, E. (2011) Ethnicity and gender gaps in early childhood, *British Educational Research Journal*, 37(6), 973–991.

Harlen, W. (2004) *A systematic review of the evidence of reliability and validity of assessment by teachers used for summative purposes*. Available online at: http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=6_1H03rsumM%3D&tabid=117&mid=923 (accessed 27 May 2013).

Huang, Y. & Gatenby, R. (2010) *Millennium Cohort Study Sweep 4 teacher survey technical report*. Available online at: http://www.cls.ioe.ac.uk/shared/get-file.ashx?id=489&itemtype=document (accessed 27 May 2013).

Johnson, J., Rosenberg, R., Platt, L. & Parsons, S. (2011) *Millennium Cohort Study Fourth Survey: A guide to the teacher survey dataset, first edition*. Available online at: http://www.cls.ioe.ac.uk/shared/get-file.ashx?id=1341&itemtype=document (accessed 27 May 2013).

Kuklinski, M. & Weinstein, R. (2000) Classroom and grade level differences in the stability of teacher expectations and perceived differential teacher treatment, *Learning Environments Research*, 3(1), 1–34.

Kutnick, P., Sebba, J., Blatchford, P., Galton, M. & Thorp, J. (2005) *The effects of pupil grouping: Literature review*. Available online at: http://webarchive.nationalarchives.gov.uk/20130401151655/https://www.education.gov.uk/publications/eOrderingDownload/RR688.pdf (accessed 27 May 2013).

Lawlor, H., Clark, H., Ronalds, G. & Leon, D. (2006) Season of birth and childhood intelligence: findings from the Aberdeen children of the 1950s cohort study, *British Journal of Educational Psychology*, 76(3), 481–499.

Martin, R. P., Foels, P., Clanton, G. & Moon, K. (2004) Season of birth is related to child retention rates, achievement, and rates of diagnosis with specific LD, *Journal of Learning Disabilities*, 37 (4), 307–317.

McEwan, P. J. & Shapiro, J. S. (2008) The benefits of delayed primary school enrollment: Discontinuity estimates using exact birth dates, *Journal of Human Resources*, 43(1), 1–29.

Menet, F., Eakin, J., Stuart, M. & Rafferty, H. (2000) Month of birth and effect on literacy, behaviour and referral to psychological service, *Educational Psychology in Practice*, 16(2), 225–234.

Mühlenweg, A. (2010) Young and innocent: International evidence on age effects within grades on victimization in elementary school, *Economics Letters*, 109(3), 157–160.

Oshima, T. C. & Domaleski, C. S. (2006) Academic performance gap between summer-birthday and fall-birthday children in Grades K-8, *The Journal of Educational Research*, 99(4), 212–217.

Plewis, I., Canderwood, L., Hawkes, D., Hughes, G. & Joshi, H. (2007) *Millennium Cohort Study First Survey: Technical report on sampling (4th edition)*. Available online at: http://www.cls.ioe.ac.uk/shared/get-file.ashx?id=409&itemtype=document (accessed 27 May 2013).

Polizzi, N., Martin, R. & Dombrowski, S. (2007) Season of birth of students receiving special education services under a diagnosis of emotional and behavioural disorder, *School Psychology Quarterly*, 22(1), 44–57.

Reeves, D. J., Boyle, W. F. & Christie, T. (2001) The relationship between teacher assessments and pupil attainments in standard test tasks at Key Stage 2, 1996–98, *British Educational Research Journal*, 27(2), 141–160.

Riggall, A. & Sharp, C. (2008) *The structure of primary education: England and other countries*. (Primary Review Research Report 9/1.) Available online at: http://www.primaryreview.org.uk/Downloads/Int_Reps/6.Curriculum-assessment/Primary_Review_RS_9-1_briefing_Primary_education_structure_080208.pdf (accessed 27 May 2013).

Rosenthal, R. & Jacobsen, L. (1968) Pygmalion in the classroom, *The Urban Review*, 3(1), 16–20.

Rubie-Davies, C. M. (2010) Teacher expectations and perceptions of student characteristics: Is there a relationship?, *British Journal of Educational Psychology*, 80(1), 121–135.

Sampaio, B., da Matta, R., Ribas, R. & Sampaio, G. (2011) *The effect of age on college entrance test score and enrollment: A regression discontinuity approach*. Available online at: http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1766222_code1337569.pdf?abstractid=1471686&mirid=1 (accessed 27 May 2013).

Sharp, C., George, N., Sargent, C., O'Donnell, S. & Heron, M. (2009) *The influence of relative age on learner attainment and development*. Available online at: https://www.nfer.ac.uk/what-we-do/information-and-reviews/inca/RelativeAgeReviewRevised2012.pdf (accessed 27 May 2013).

Sprietsma, M. (2010) The effect of relative age in the first grade of primary school on long-term scholastic results: International comparative evidence using PISA 2003, *Education Economics*, 18(1), 1–32.

Strom, B. (2004) *Student achievement and birthday effects*. Available online at: http://www.hks.harvard.edu/pepg/PDF/events/Munich/PEPG-04-24Strom.pdf (accessed 27 May 2013).

Sykes, E. D. A., Bell, J. F. & Rodeiro, C. V. (2009) *Birthdate effects: A review of the literature from 1990 on*. Available online at: http://www.cambridgeassessment.org.uk/ca/digitalAssets/169664_Cambridge_Lit_Review_Birthdate_d3.pdf (accessed 27 May 2013).

University of London, Institute of Education, Centre for Longitudinal Studies (2011a) *Millennium Cohort Study: Fourth survey, Teacher Survey, 2008* [computer file], Colchester, UK Data Archive [distributor], August 2011, SN: 6848. Available online at: http://dx.doi.org/10.5255/UKDA-SN-6848-1 (accessed 27 May 2013).

University of London, Institute of Education, Centre for Longitudinal Studies (2011b) *Millennium Cohort Study: Third survey, Teacher Survey and Foundation Stage profile, 2006* [computer file], Colchester, UK Data Archive [distributor], August 2011, SN: 6847. Available online at: http://dx.doi.org/10.5255/UKDA-SN-6847-1 (accessed 27 May 2013).

University of London, Institute of Education, Centre for Longitudinal Studies (2012a) *Millennium Cohort Study: First survey, 2001–2003* [computer file], *11th edition*, Colchester, UK Data Archive [distributor], December, SN: 4683. Available online at: http://dx.doi.org/10.5255/UKDA-SN-4683-3 (accessed 27 May 2013).

University of London, Institute of Education, Centre for Longitudinal Studies (2012b) *Millennium Cohort Study: Fourth survey, 2008* [computer file], *4th edition*, Colchester, UK Data Archive [distributor], December 2012. SN: 6411. Available online at: http://dx.doi.org/10.5255/UKDA-SN-6411-3 (accessed 27 May 2013).

University of London, Institute of Education, Centre for Longitudinal Studies (2012c) *Millennium Cohort Study: Third survey, 2006* [computer file], *6th edition*, Colchester, UK Data Archive [distributor], December 2012, SN: 5795. Available online at: http://dx.doi.org/10.5255/UKDA-SN-5795-3 (accessed 27 May 2013).

Wallingford, E. L. & Prout, H. T. (2000) The relationship between season of birth and special education referral, *Psychology in the Schools*, 37(4), 379–387.

Wilson, G. (2000) The effects of season of birth, sex and cognitive abilities on the assessment of special educational needs, *Educational Psychology*, 20(2), 153–166.

Appendix A

Table 3. Percentage in whole teacher survey sample judged to be at each level of *ability and attainment* in each subject domain

	Speaking and listening (n = 5429)	Reading (n = 5426)	Writing (n = 5426)	Science (n = 5423)	Maths (n = 5412)	PE (n = 5429)	ICT (n = 5418)	Arts (n = 5425)
Well above average	9.3	12.8	6.7	5.9	9.3	4.2	2.8	4.0
Above average	30.4	33.6	25.7	28.6	31.5	23.7	23.4	22.3
Average	43.7	32.1	38.0	51.5	38.9	63.0	62.2	60.7
Below average	13.4	15.9	22.9	11.3	16.1	7.5	9.7	11.1
Well below average	3.3	5.6	6.8	2.7	4.2	1.6	1.8	1.8

Appendix B

Table 4. Details of variables used at each stage of modelling

Intends to measure…	Original variable name in MCS dataset	Whether recoded	Response possibilities (in original variable or in recoded variable if applicable). Whole sample proportion in each category, or 25th/50th/75th percentiles, in brackets
Dependent variables: Whether at age 7 teacher assessment of 'ability and attainment' in given category is *above average/well above average*			
Speaking and listening	DQ2160	Yes	Above average (39.6%) Average or below average (60.4%)
Reading	DQ2162	Yes	Above average (46.4%) Average or below average (53.6%)
Writing	DQ2164	Yes	Above average (32.3%) Average or below average (67.7%)
Science	DQ2166	Yes	Above average (34.5%) Average or below average (65.5%)
Key predictors			
Child's season of birth	dhcdbma0	Yes	Summer (23.2%) Spring (24.3%) Winter (25.2%) Autumn (27.3%)
Whether in-class ability grouped or not	DQ2466	Yes	Yes (78.8%) No (21.2%)
Stage 2 controls: pupil and family characteristics			
Pupil gender	dhcsexa0	No	Male (50.2%) Female (49.8%)
Pupil ethnicity	ddc06ea0	Yes	White (80%) Mixed (3.4%) Indian (3.3%) Pakistani and Bangladeshi (6.9%) Black or Black British (3.9%) Other or missing (2.6%)
BAS Naming Vocabulary T-score at age 5	Cdnvtscr	No	20–80 (48, 56, 62)
BAS Pattern Construction T-score at age 5	Cdpctscr	No	20–80 (46, 51, 57)
BAS Picture Similarities T-score at age 5	Cdpstscr	No	20–80 (49, 55, 61)

Table 4. (Continued)

Intends to measure…	Original variable name in MCS dataset	Whether recoded	Response possibilities (in original variable or in recoded variable if applicable). Whole sample proportion in each category, or 25th/50th/75th percentiles, in brackets
Family income level when child is age 7	doedp000	Yes	Above 60% median level (72.7%) Below 60% or missing data (27.3%)
Family housing tenure when child is age 7	ddroow00	Yes	Own with mortgage or loan (60.7%) Rent (30.7%) Other (8.6%)
Whether English is spoken as an additional language in child's household at age 7	ddhlan00	Yes	English only or missing (86.3%) Mostly English (5%) Half English and half other language (4.6%) Mostly or only other language (4.1%)
Main parent's highest academic qualification when pupil was born	amacqu00	Yes	Higher degree (3.5%) First degree (14.4%) Dip HE (9%) A or AS level (8.8%) O level or GCSE A–C (32.1%) GCSE D–G (10.5%) Other academic inc overseas (2.6%) None, or missing data (19.2%)
Main parent's highest vocational qualification when pupil was born	amvcqu00	Yes	Professional at degree level (12.3) Nursing or other medical (4.6%) NVQ 3 (9.9%) NVQ 2 (9.3%) NVQ 1 (7.6%) Other (6.9%) None, or missing data (49.5%)
Whether single parent when child was born	adhtys00	Yes	One parent resident (12%) Two parents resident (88%)
Whether internet available in home at age 7	dminlna0	Yes	No or missing data (16.8%) Yes (83.2%)
Whether/length of time for which breastfed	ambfeaa0	Yes	Less than a week (11%) Some weeks (16.6%) Some months (28.6%) Still breastfeeding at wave one interview (13.8%) Did not try breastfeeding, or baby would not breastfeed (30%)

Table 4. (Continued)

Intends to measure…	Original variable name in MCS dataset	Whether recoded	Response possibilities (in original variable or in recoded variable if applicable). Whole sample proportion in each category, or 25th/50th/75th percentiles, in brackets
Stage three controls: School and respondent teacher characteristics			
Whether this is the same school as attended at Wave 3	dmsamsa	Yes	No, don't know, not applicable (15.5%)/yes (84.5%)
Whether child is in Year 2	dmstsca0	Yes	No, in different year (5.9%) Yes, in Year 2 (94.1%)
Whether parent reports paying fees for the school	dmsctya0	Yes	Yes (4.8%) No (95.2%)
Whether family displayed religiosity for school admission	dmfthsa0	Yes	Yes (28.3%) No, not a faith school, or missing data (71.7%)
Whether pupil's class contains mixed year groups	DQ2513	Yes	Yes (14%) No (46.5%) Question non-response (39.5%)*
Number of children in class	DQ2511	Yes	1–25 (21.6%) 26–29 (19.9%) 30 (14.9%) 31 + (3.2%) Question non-response (40.4%)*
Number of classes in pupil's year	DQ2524	Yes	One (21.2%) Two (24.5%) Three or more (13.8%) Question non-response (40.5%)*
Teacher gender	DQ2479	Yes	Male (4.1%) Female (46.1%) Question non-response (39.7%)*
Number of years teacher has taught	DQ2481	Yes	1–3 (11.2%) 4–7 (12.4%) 8–13 (10.6%) 14–23 (11.6%) 24–48 (11.1%) Question non-response (43.1%)*
Number of years teacher has taught at this school	DQ2487	Yes	1–3(19.9%) 4–7 (16.7%) 8–48 (20.4%) Question non-response (43%)*

Table 4. (Continued)

Intends to measure…	Original variable name in MCS dataset	Whether recoded	Response possibilities (in original variable or in recoded variable if applicable). Whole sample proportion in each category, or 25th/50th/75th percentiles, in brackets
Stage 4 controls: previous school/teacher assessments of pupil			
Foundation Stage Profile: total score – at age 5	FSPTOTAL	No	0–117 (77, 91, 102)
Whether teacher reports that child has any SEN at age 7	DQ2328	Yes	Yes (22.6%) No or missing data (77.4%)

Notes: *Due to administrative problems, a number of sections of the teacher survey suffer question non-response (personal correspondence with survey administrators). These instances are coded as such and included in analyses as a separate category.