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Effects of mothers' education on parenting: an investigation across three generations

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The paper investigates the relationship between mother's education and her parenting using data from the child supplement of the 1958 National Child Development Study (NCDS). By considering data across generations, our dataset allows us to estimate the size of the bias in the relationship between education and parenting from failing to account for background characteristics, early cognitive development and mother's own parenting experiences. The subjects were 1,182 longitudinally sampled mothers of 1,879 children aged between 3 and 18 years old and divided approximately equally across gender (51% sons, 49% daughters). Controlling for a wide range of family background variables and mother's own achievement prior to 16, results indicate a confounding bias of 73% for cognitive stimulation and 89% for emotional support. This confounding bias is larger for daughters than for sons. Even after the inclusion of a large set of controls, a small effect of maternal education on parenting, assessed in terms of the provision of a cognitively stimulating environment, remains statistically significant but only for sons. Although educational effects estimated here suffer from downwards bias owing to underrepresentation of older mothers within the data, some unobserved factors could remain as a source of bias.

Introduction

The social science literature is abundant with studies examining the possible mechanisms within the family context that explain why children of parents with higher levels of education do better in standard tests of school attainment and show positive social and behavioural development, than those of parents with less education (Bee *et al.*, 1982; Feinstein *et al.*, 1999, 2004; Gregg & Machin, 2000; Bynner & Joshi, 2002; Wolfe & Haveman, 2002). Possible factors by which

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educational effects may be transmitted include income, family size, parental well-being, beliefs and aspirations, parenting and the quality of the parent–child relationship. In this paper we focus on the relationship between parental education and parenting.

Why parenting? In the field of child development, few would argue against the view that parents and family environments are among the most important influences. And, in recent years, changes in the demographics and dynamics of family life have fuelled the interest and debate in the topic of what constitutes responsible and effective parenting (Ramey & Ramey, 2000).

The importance of parenting and parenting style on children's development has been well documented. For example, an extensive literature documents connections between aspects of warmth in parent–child relationships and children's development and adjustment. In particular, the importance of parental warmth and secure attachment for the development of children's cognitive and behavioural competence is widely acknowledged (see Baumrind, 1967, 1971; Bowlby, 1969, 1973; Masten & Coatsworth, 1998).

Similarly, parents who use a proactive parenting style with their children, i.e., one that is affectionate, warm, structured and consistent, are more likely to promote prosocial behaviour and academic readiness (Maccoby & Martin, 1983; Masten & Coatsworth, 1998). A large number of studies also find correlations between the warmth of parent–child interactions and later cognitive outcomes (Estrada *et al.*, 1987; Barocas *et al.*, 1991; Diaz *et al.*, 1991; McGroder, 2000).

Theories considering the aetiologies of conduct problems and depression among children suggest that inconsistent, erratic and harsh parenting practices characterize a coercive cycle of conflict and parent–child interactions that lead to increased problem behaviour and depressive symptoms (see Patterson, 1986; Patterson *et al.*, 1989). Parent–child interactions are also important for internalized behavioural outcomes, such as social and emotional understanding (Dunn, 1988; Laible & Thompson, 2002) as well as academic success from early childhood through adolescence, independent of gender and socio-economic status (Egeland *et al.*, 1993; Steinberg *et al.*, 1995; Fagot & Gauvain, 1997).

Why does parents' education matter for parenting and its impact on parent–child interaction? At first glance, one may not imagine that education would impact heavily on parental warmth or socialization practices which are more about enjoyment of relationships with children and parental well-being than about parental demographics. However, to the extent that education enhances efficacy and well-being it may lead to increased parental warmth. And as noted by Eccles and Davis-Kean (this volume), proponents of this view argue that education may provide parents with important skills, values and knowledge that enable them to better support and facilitate their children's learning and development. In turn, these cognitive strategies may influence parents' own personal resources to provide an environment that presents greater opportunities and enables broader life chances. Evidence consistently points to parental education as influencing multiple aspects of parenting and family functioning which, in turn, are strongly associated with

measures of children's cognitive achievement, socio-emotional development and behavioural adjustment. For example, parents with higher levels of education show greater average levels of warmth and emotional supportiveness in parent–child interactions (Bradley *et al.*, 1989; Klebanov *et al.*, 1994) and lower levels of harsh and/or erratic discipline (Fox *et al.*, 1995). In comparison with parents with lower levels of education, parents with higher levels of education are more likely to provide cognitively stimulating learning environments, engage in educational behaviours (Kohl *et al.*, 2000; Davis-Kean *et al.*, 2002; Linver *et al.*, 2002; Davis-Kean, 2005) and adopt teaching strategies that promote skill and foster interest and motivation (Laosa, 1983; Diaz *et al.*, 1991; Uribe *et al.*, 1993).

Similarly, those parents with higher levels of education are more likely than those with less education to have high educational aspirations for their children (Alexander *et al.*, 1994; Davis-Kean, 2005), lower levels of depression (Feinstein, 2002), fewer children (Ferri & Smith, 2003) and higher earnings (Hobcraft, 1998, 2000; Dearden *et al.*, 2000; McIntosh, 2004), which, in turn, impact on the quality of parenting and parent–child relations.

The theoretical stance behind these associations is also strong. Bronfenbrenner (1986) notes that parents' education takes on special significance from an ecological systems perspective because it offers a unique advantage for the analysis of causal pathways. Unlike either occupational status or income, it typically precedes both family formation and the birth of children and hence provides an index of social background that is less likely to be influenced by subsequent family processes. He argues that it can therefore be more confidently interpreted primarily as unidirectional in its effects.

Based on such theoretical reasoning and a wealth of evidence supporting this strong association, much of the developmental literature takes for granted a causal relationship between parental education and parenting. Consequently, parents' education is typically modeled as either a mediating factor or, more often, a control (Feinstein *et al.*, 2004). Such methodologies, however, assume that educational attainment and the decisions therein are exogenous which may be incorrect.

The primary goal of the research presented here is to investigate the relationship between mother's education and her parenting and attempt to establish an unbiased estimate of the size of the effect of mother's education. By considering data across generations, our dataset allows us to estimate the size of the bias in the relationship between education and parenting from failing to account for background characteristics, earlier cognitive achievement and the parenting mother's experienced during their own childhood. Inasmuch as we control for such variables, then our estimates of education effects can be considered unbiased. However, we remain cautious that some unobserved factors could remain a source of bias.

We do not attempt to model the complex processes or pathways involved, nor do we strive to answer questions relating to *how* education might affect parenting. Rather we aim to identify one part of a pathway implicated in the inter-generational transmission of educational success.

Method

The methodology used in this paper takes seriously the important call in Duncan *et al.* (2004) for studies on developmental themes that take into account the bias introduced by endogeneity problems in the estimation of causal effects. The endogeneity problem is important here because decisions about staying on in education and post-compulsory academic trajectories are likely to be made on the basis of unobserved cognitions, features of personality and wider, social contexts that may also predict parenting style, behaviours and practices. Therefore, our estimate of the 'staying on' decision may be biased: if unobserved factors influencing the woman's education decision also positively predict her parenting, it may be these features of the mother, rather than her education, that carry the gains for better parenting and, in turn, her child's development.

There are a number of ways to counter problems of endogeneity, for example, through the use of randomized control trials (RCTs) or using research designs that make use of natural experiments. Other authors address this problem by modeling trajectories in relation to changes in education or use instrumental variable (IV) estimation to identify exogenous variation in the variables of interest and so assess causality more robustly.[1] For example, Magnuson (in press) uses IV estimation and finds that increases in maternal education led to improvements in the quality of home learning environments. Using the variability from experimentally induced differences in educational activities, Magnuson shows that mother's educational participation increased the level of cognitive stimulation in the home, as assessed by mother's reports of how often they engaged in different stimulating activities their child, such as playing guessing games, playing with puzzles or going to the library.

This type of data, however, is not always available. And thus, in the absence of experimental studies or viable instruments we follow Duncan *et al*'s (2004) specification and adopt the standard next best approach and attempt to 'measure the unmeasured' by controlling for as many covariates as possible in multivariate regression.

In our rich, nationally representative, longitudinal dataset the mother is surveyed from birth enabling us to control for a great many features of her development, achievement and proximal environment that precede participation in post-compulsory education. This estimation strategy is graphically represented in Figure 1 below. The boxes on the left identify factors that may influence both mother's educational choice and her parenting. By controlling for these factors in stepwise OLS regression analyses (arrows marked 1), we aim to remove their potentially confounding bias (arrows marked 2) and so the endogeneity of mother's education decision. Therefore, any residual association represents the causal effect of staying on in education on children's development (arrows marked 3). While our ability to identify causality is less than that of an experimental situation, this multivariate approach has considerable merits when the control set is as strong and longitudinal as it is here, drawing on data from three generations.

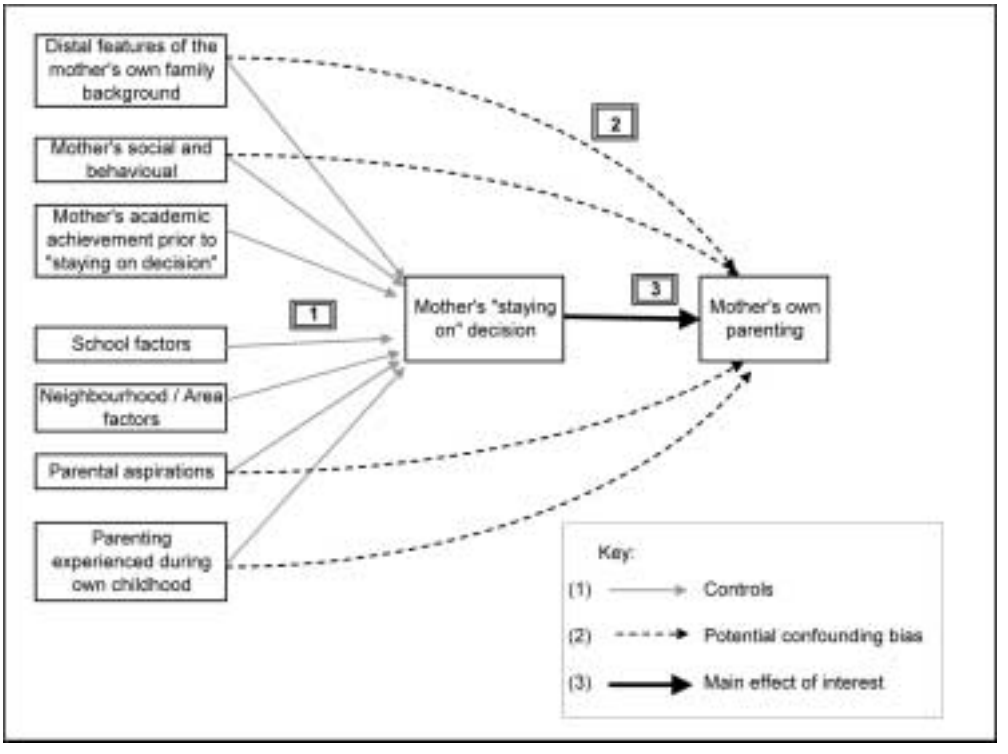

Figure 1. Conceptual model for analytic strategy: removing the endogeneity of mother's education decision

Data

The data analysed come from the National Child Development Study (NCDS), a longitudinal survey of over 17,000 people born in Britain between March 3–9, 1958. To date, six follow-up sweeps have taken place, at age 7, 11, 16, 23, 33 and most recently 42. In addition to the information gathered for the cohort member at age 33, information was also obtained for and from the children of one in three randomly sampled cohort members and their mothers (Ferri, 1993). This gives three generations of longitudinal information. We denote G1 to refer to the cohort member's parents, G2 to the cohort member and G3 to the child of the cohort member. This structure is summarized in Figure 2 below.

We restrict the analyses in this paper to G3 children, aged 3-years-old or over (N=1879, mean age in months = 103.65, *S.D.*= 41.46) living at home with an NCDS cohort member mother (N=1102). This excludes only a small number of children who were not resident with their cohort mothers (Joshi *et al.*, 1999). Information on the G3 child was gathered from both the child and the mother, regardless of whether she was the cohort member or the partner of the cohort member. However, we only have longitudinal cohort member data as well as parent-level information for the G3 child for children whose mother was the cohort member. As

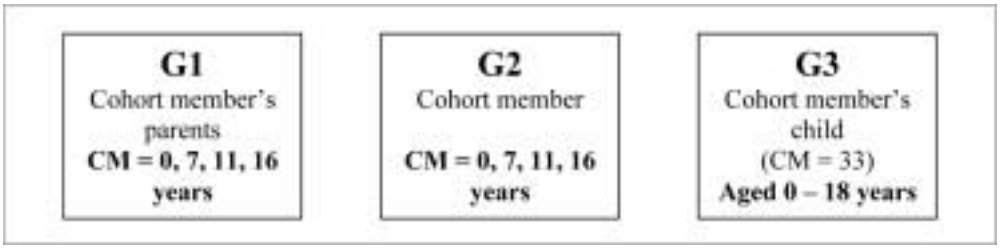

Figure 2. Structure of the NCDS data sub-sample

such, children for whom the study cohort member was the father are also excluded from our analyses (N=1144 children aged 3-years-old or over of N=685 fathers).

Dependent variables

As noted above, parenting encompasses elements of parent–child interaction that include warmth and secure attachment as well as discipline and intrusiveness within a structured and consistent environment. Similarly, educational behaviours and parents teaching of their children include reading and the provision of and engagement in a cognitively stimulating environment and have also been consistently associated with children's development. As such, to measure parenting we use the Home Observation Measurement of the Environment—Short Form (HOME–SF); a consistently used measure of the quality of parenting and the child's home environment.

A modification of the HOME inventory (Caldwell & Bradley, 1984), the HOME–SF is a measure of the quality of the cognitive stimulation and emotional support provided in a child's home. The HOME assesses parental quality on two sub-scales: *emotional support*, i.e., measures of warmth and discipline, as well as *cognitive stimulation*, i.e., household resources, such as reading materials and the physical appearance of the home. It is made up from both mother reported items such as 'how often do you read to your child?' and 'approximately how many books does your child have?' as well as interviewer observation of mother–child interaction. Observations include, for example, did the mother caress, kiss or hug the child at least once during observation, did the mother slap or spank the child at least once during observation and is the child's play environment safe, clean and/or perceptually monotonous.

It is divided into four age-appropriate versions: children under age 3, children aged 3–5, children aged 6–9 and those over 10-years-old. Note however, that interviewer observations are missing for children under 3-years-old and so we only consider assessments for those children 3-years-old and over. Overall between 92 and 97% of children have a completed HOME assessment, with some variation by age. Owing to the missing interviewer observations, we use an aggregated measure for each sub-scale that groups together the age standardized scores rather than analysing them within age blocks.

Longitudinal research indicates that the HOME predicts later cognitive, social and physical development (Bee *et al.*, 1982; Yeates *et al.*, 1983). The HOME scale

has also been shown as a useful early indicator of a variety of developmental risks and delays such as clinical malnutrition, failure-to-thrive, language delay, developmental delay and poor academic achievement (Elardo & Bradley, 1981).

Education variable

Our variable of interest here is mother's education defined here in terms of her 'staying on' decision. Reducing the proportion of pupils with a low level of schooling and raising 16–18 participation has been a recent policy priority in trying to break cycles of poverty and so this outcome of specific policy interest in the UK

The 'staying on' decision made at 16 is assessed here using a binary variable indicating whether or not the G2 mother stayed on in post-compulsory education. This staying on decision is made at 16-years-old and so by controlling for as many family, contextual and individual level characteristics up to this point as possible we hope to condition out possible confounding bias. The extent to which we can do this depends on the richness of our measures. Because we select an age 16 education measure, we control for measures at that age and not subsequent to it. We therefore estimate the effect of staying on conditional on the development and context of mothers-to-be up to, and including, that point. Under our assumption that we have removed all possible confounding bias through the introduction of comprehensive controls, any residual association represents the causal effect of staying on education on parenting.

Covariates

Summary statistics for all the control variables used are presented in order under these headings and are entered, stepwise, into the regression model (see Appendix 1).

We ground the introduction of control variables in ecological models of development (Bronfenbrenner, 1979, 1986; Bronfenbrenner & Crouter, 1983). These models are based on a distinction between distal factors, characteristics of the family context, proximal family processes, as well as the salient features of other developmental contexts, here the school and neighbourhood. We control for a range of measures of child and family characteristics collected at all four time points detailed above, namely birth, 7-years, 11-years and 16-years. Baseline information detailing parental characteristics (family distal factors) such as G1 parents' SES, age, family size and structure and the presence of a foreign language being spoken in the home was provided by the mother at the time of study enrolment, i.e., birth. Whether the G1 parents stayed on in school at age 16 own as well as additional income proxy measures such as persons per room and having free school meals at age 11 were also included. Information on the presence or absence of local amenities such as parks, libraries and swimming pools was also gathered to proxy for economic status.

Information about the mother's own childhood home environment (family proximal factors), including teacher rated G1 parental interest in the child's education, G1 educational behaviours at home such as reading to their G2 child, going on

outings and using local amenities such as parks and libraries and G1 educational aspirations for their G2 child were collected at age 7 and 11 interviews. G2 school and area level factors were also collected during these sweeps.

G2 child level covariates were again collected at all four time points used and cover whether the child reads, the activities they pursue in their spare time, their anticipated post-16 plans at age 11, social and behavioural development including physical health as well as maths and reading test scores, other measures of cognitive achievement and teacher ratings of ability. Mother and teacher rated internalizing and externalizing behaviour problems were also gathered.

Estimation strategy

To test our hypothesis that mother's education has a causal effect on children's development, we use stepwise OLS regression analysis. As described above, our aim is to control for as much information about the development of G2 as possible prior to age 16, when the decision to stay on in post-compulsory education or not is made. Inasmuch as we condition out such the potential influence of omitted variables, then our estimates of maternal education effects can be considered unbiased.

Step 1 in this stepwise procedure gives the raw effect of education for each outcome assessed, controlling for the age and gender of the G3 child. Each subsequent step introduces into the model a new set of comprehensive cohort member (i.e., G2) control variables, measured prior to the staying on decision. Step 2 adds in sets of family level demographic controls such as whether her parents stayed on in post-compulsory education, her parent's SES and ages, her family size, structure and proxy measures of familial income. In Step 3 we introduce controls of G2's own family level developmental context, for example, whether or not she was read to regularly, presence of educational toys and resources, G1 parenting attitudes and aspirations and teacher ratings of parental involvement. Step 4 adds G2 school factors into the model and include the percentages studying for and achieving GCE O level/CSE and A levels, as well as the SES makeup of the school and whether the school was independent and Step 5 adds in which geographical area G2 grew up in.

The final model reveals the competency sets contributing the most to G2's earlier academic success and introduces a number of features of G2's own childhood development and achievement, including test scores and measures of general and personal development from birth up to and including age 16. Furthermore, these steps are ordered to approximate time, such that Steps 2 and 3 are mostly determined before or at birth, school and area level covariates are relatively fixed and unaffected by G2 and the final step introduces features of G2 as she develops and progresses though her compulsory education.

Note that we expect to see the greatest attenuation in the size of any education effect on the introduction of G2 development and aspirations controls, since these covariates (which include many measures of G2's own achievement at 7, 11 and 16 as well as teacher ratings of general aptitude) are likely to be most highly correlated with her decision to stay on in education.

Methodological problems

Selection bias

Data on the children of the NCDS sample were collected in 1991, when cohort members were 33-years-old; children of cohort member mothers ranged in age from 0- to 18-years-old. Our sample is therefore more representative of younger and hence less educated mothers. This heterogeneity issue is illustrated in Figure 3 and shows the distribution of mothers' age at the birth of her first child for mothers of children aged 3-years-old and over. We show the distributions of mother's age for those who stayed on at school and, separately, for those who did not, i.e., our education variable.

As Figure 3 demonstrates there is strong evidence here for an interaction between the age of the mother at the birth of her first child and her staying on decision. For mothers who chose not to stay on, the peak age of first child's birth is at 22-years-old and by age 29 (i.e., women who at age 33 had a child aged 3-years or over) their distribution has tailed off considerably. However, for those mothers who stayed on past the minimum school leaving age, the distribution of age at the birth of her first child has only just peaked indicating that we are missing almost half of this sample and their children. Biological constraints mean that these two distributions will necessarily converge at some point. However, assuming normality we hypothesize that if we had data for these women and their children at later time points, those mothers who stayed on in post-compulsory education would continue to begin their families later in life and thus their distribution would only begin to tail off in their 30s.

Magnuson (2003) reports differential effects of increases in maternal education level by age of mother. Thus, we consider whether our apparent sample selection bias similarly affects our results by conducting additional sensitivity analysis to unpack

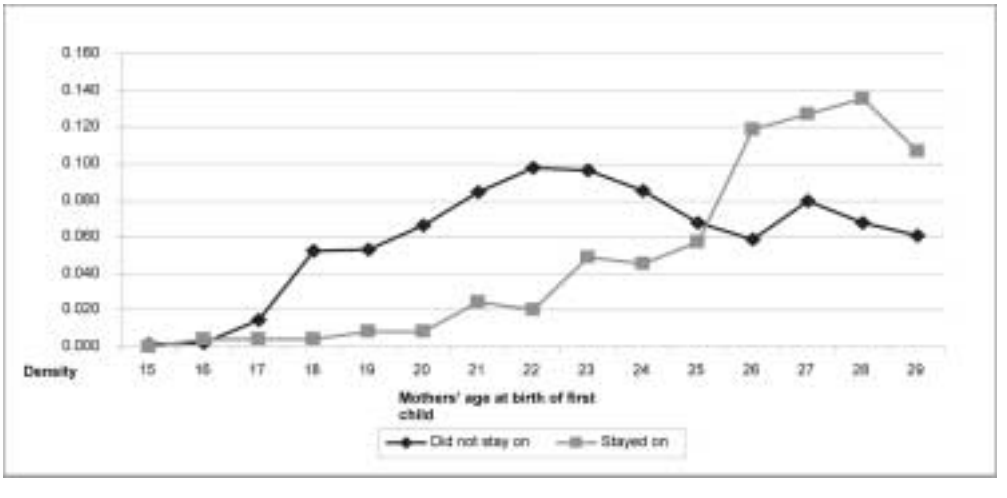

Figure 3. Distribution of mothers' age at birth of first child by staying on decision

any age of mother related differences in our results. We first carry out our analyses on the full sample of mothers and their children. Then, for mothers for whom we have child level data, we split the sample at the median age of the birth of her first child, younger mums and older mums, and repeat the analysis. Any differences in the split sample data would suggest that there is sample selection bias, i.e., differences between (older) mothers who chose to stay on and (younger) mothers who did not.

Note that this analyses varies depending on the outcome assessed: children aged 4-years-old and over have PPVT-R scores; children aged 5-years-old and over have PIAT scores; those 3-years-old and over have scores for both subscales of the HOME inventory. Measures of global self worth and scholastic competence are only available for children aged 8-years-old and over and so cannot be compared when the sample is divided into younger and older mums. Mothers whose children are under 3-years-old are necessarily excluded from the current analysis. Moreover, that this information was obtained when the cohort member (G2) was 33-years-old means that there are a further of group of potential mothers for whom we cannot begin to estimate education effects because they have not yet become mothers. Selection issues will be further discussed below.

Clustering

As noted above, in addition to the information gathered for the cohort member at age 33, information was also obtained for and from the children of one in three randomly sampled cohort members and their mothers. This sample is made up of 1182 mothers who, between them, have a total of 1879 children; 672 of these mothers had only one child, 360 had two children, 118 had three children, 29 had four children and three women had five children. Therefore in order to estimate the effects of mother's education only once for each mother, we conduct the regression analysis so that children from the same mother are clustered together. Note also that this sample also then over-represents first born children and under-represents larger families with later born children.

Missing data

Our analyses uses data collected across five time points, four in childhood when the cohort member was first born, and then at 7-, 11- and 16-years-old, with one further time point in adulthood when the cohort member was 33-years-old. These data come from cohort members themselves, their parents and their teachers. In addition to this cohort member information, we also have data on the cohort members' child(ren), again both cohort member and child completed.

While rich, longitudinal data such as these provide a unique insight into the lives and development of individuals and their families, their scale and complexity mean that they are also inherently incomplete. Data may be missing for a number of reasons and may occur at one or more time points, on just some measures or a combination of both.

Standard methods of missing data imputation use substitution by regression whereby missing values are replaced by the predicted value of the variable from a regression analysis based only on the complete cases. One drawback of this method of data imputation, however, is that the resulting inferences (e.g., standard errors and p values) may be biased because uncertainty due to the nature of missing data has not been adequately addressed (Little & Rubin, 1987).

To address this issue and correct for possible bias in these results, we carried out a method of data imputation that enables inferences on incomplete datasets to be reached in a statistically optimal way, *multiple imputation* (MI). In MI, the data are completed several times by imputing multiple random draws of the missing values from a predictive distribution.[2] A standard complete-data analysis is applied to each completed dataset separately and the results are combined to obtain overall estimates and standard errors that reflect variability across imputations and result in more robust and reliable inferences about the population.

Results

Table 1 shows that the full sample of G3 children, while the initially strong raw effect of maternal education is reduced by 73%, from 8.21 to 2.26, with the introduction of additional control sets, the effect of mother's education remain statistically significant for cognitive stimulation ($p<0.05$). For emotional supportiveness however, this education effect is reduced from 4.70 to 0.56 and is not statistically significant once we introduce controls for school level covariates. The estimated bias in the effect of education for emotional supportiveness is relatively high from failing to include background characteristics.

It is interesting to note however, that many of the measures introduced here proxy for broad measures of school level success at 16, e.g., the percentage of pupils studying for GCSE O level and the numbers of pupils who went on into full time education (see Appendix 1 for further detail). These measures are likely to be closely related to the G2 woman's education decision as well as correlate with her own academic achievement. As such their predictive power here is not altogether unsurprising and highlights further the endogeneity problem inherent in trying to estimate educational effects.

Moderation by child gender

The estimated effect of maternal education on parenting differs significantly by child's gender. For both cognitive stimulation and emotional support there are large differences in the estimated parameters (Table 2). For example, without the inclusion of controls, the estimated parameter of mothers' education on G3 daughters is 6.00 and for G3 sons 3.42. Similarly, the estimated parameter of mother's education for G3 cognitive stimulation without the inclusion of controls is 9.12 for daughters and 7.39 for sons.

Table 1. Stepwise multilevel regression summary results for parenting outcomes

	Additional control sets					
	No controls	Family distal	Family Proximal	G2 Area	G2 School	G2 development & aspirations
HOME: Cognitive Stimulation						
β	8.21***	5.79***	3.97***	4.35***	4.19***	2.26**
se	(1.04)	(1.10)	(1.13)	(1.14)	(1.16)	(1.24)
N	1879	1879	1879	1879	1879	1879
R-sq	0.04	0.10	0.18	0.21	0.22	0.34
HOME: Emotional support						
β	4.70***	3.71***	2.65***	2.64***	2.00	0.56
se	(1.16)	(1.26)	(1.26)	(1.31)	(1.33)	(1.38)
N	1879	1879	1879	1879	1879	1879
R-sq	0.01	0.04	0.09	0.11	0.13	0.23
Home: TOTAL						
β	7.95***	5.84***	4.06***	4.32***	3.85***	1.86
se	(1.09)	(1.18)	(1.19)	(1.22)	(1.24)	(1.28)
N	1879	1879	1879	1879	1879	1879
R-sq	0.04	0.10	0.17	0.19	0.21	0.33

Note. ***p<0.01; **p<0.05; *p<0.1.

The bias in the estimated parameters from failing to account from background characteristics is larger for daughters than for sons. For daughters, the estimated parameter of education for cognitive stimulation of 9.12 is reduced to 0.46, a reduction of 95%. For sons this reduction is 61%. For emotional support, the size of the bias for daughters is over 100% whereas for sons is 74%. Finally, the only estimated effect of mother's education that remains significant at 10% level with the inclusion of controls is G3 sons' cognitive stimulation. The initial significant effect of maternal staying on in education on G3 female cognitive stimulation is knocked out once G2 development and achievement measures are controlled for and to one for emotional supportiveness when controlling for G2 school area level covariates.

Sensitivity analysis: age of mother

There are interesting findings when we separate the sample by the age of the mother. First, the point estimate for the effect of mother's staying on in education on cognitive stimulation and emotional support is larger for younger mothers than for

Table 2. Stepwise multilevel regression summary results for parenting outcomes: G3 gender

	Additional control sets					
	No controls	Family distal	Family Proximal	G2 Area	G2 School	G2 development & aspirations
DAUGHTERS – HOME: Cognitive Stimulation						
β	9.12***	6.50***	3.74***	4.28***	4.02***	0.46
se	(1.39)	(1.52)	(1.61)	(1.63)	(1.70)	(1.86)
N	915	915	915	915	915	915
R-sq	0.05	0.12	0.22	0.24	0.27	0.43
SONS – HOME: Cognitive Stimulation						
β	7.39***	5.30***	4.11***	4.36***	4.48***	2.91*
se	(1.31)	(1.41)	(1.43)	(1.45)	(1.49)	(1.71)
N	964	964	964	964	964	964
R-sq	0.04	0.11	0.20	0.23	0.25	0.39
DAUGHTERS – HOME: Emotional Support						
β	6.00***	4.51***	3.06*	2.51	2.25	–0.33
se	(1.50)	(1.68)	(1.71)	(1.76)	(1.81)	(1.97)
N	915	915	915	915	915	915
R-sq	0.02	0.05	0.12	0.14	0.17	0.33
SONS – HOME: Emotional Support						
β	3.42***	3.13*	2.24	2.63	1.82	0.91
se	(1.51)	(1.64)	(1.68)	(1.76)	(1.84)	(1.99)
N	964	964	964	964	964	964
R-sq	0.01	0.07	0.13	0.15	0.18	0.32
DAUGHTERS – HOME: Total						
β	9.14***	6.63***	4.00***	4.04***	3.71***	0.01
se	(1.42)	(1.57)	(1.62)	(1.65)	(1.71)	(1.86)
N	915	915	915	915	915	915
R-sq	0.04	0.10	0.20	0.22	0.24	0.42
SONS – HOME: Total						
β	6.83***	5.29***	4.01***	4.41***	4.04***	2.61
se	(1.37)	(1.49)	(1.53)	(1.58)	(1.64)	(1.80)
N	964	964	964	964	964	964
R-sq	0.03	0.11	0.20	0.22	0.24	0.39

Note. ***p<0.01; **p<0.05; *p<0.1.

older mothers. This suggests the additional benefits, i.e., an interaction effect, of staying on for younger mothers. Notice however, that the estimated effect is reversed once we introduced controls in the analysis. The last column of Table 3 indicates that the point estimate of the staying on decision is smaller for younger mothers than

Table 3. Stepwise multilevel regression summary results for parenting outcomes: age of G2 mother

	Additional control sets					
	No controls	Family distal	Family Proximal	G2 Area	G2 School	G2 development & aspirations
YOUNGER MUMS – HOME: Cognitive Stimulation						
β	8.80 ***	6.54 ***	3.78	3.78	3.28	1.23
se	(2.54)	(2.73)	(2.92)	(2.90)	(3.05)	(2.81)
N	934	934	934	934	934	934
R-sq	0.05	0.11	0.21	0.25	0.28	0.47
OLDER MUMS – HOME: Cognitive Stimulation						
β	6.20 ***	4.50 ***	2.96 ***	3.51 ***	3.52 ***	2.49*
se	(1.08)	(1.20)	(1.23)	(1.22)	(1.24)	(1.44)
N	945	945	945	945	945	945
R-sq	0.06	0.14	0.22	0.24	0.26	0.38
YOUNGER MUMS – HOME: Emotional Support						
β	5.15 ***	3.72	3.17	2.57	1.05	−1.05
se	(2.33)	(2.67)	(2.63)	(2.61)	(2.94)	(3.04)
N	934	934	934	934	934	934
R-sq	0.02	0.08	0.14	0.17	0.21	0.37
OLDER MUMS – HOME: Emotional Support						
β	3.30 ***	3.41 ***	1.94	1.98	1.75	0.91
se	(1.33)	(1.45)	(1.47)	(1.53)	(1.54)	(1.75)
N	945	945	945	945	945	945
R-sq	0.02	0.05	0.12	0.14	0.17	0.30
YOUNGER MUMS – HOME: Total						
β	8.71 ***	6.47 ***	4.39	4.06	2.91	0.53
se	(2.44)	(2.79)	(2.87)	(2.84)	(3.07)	(2.86)
N	934	934	934	934	934	934
R-sq	0.05	0.12	0.21	0.24	0.28	0.47
OLDER MUMS – HOME: Total						
β	5.82 ***	4.76 ***	2.91 ***	3.32 ***	3.20 ***	2.04
se	(1.18)	(1.31)	(1.34)	(1.35)	(1.37)	(1.52)
N	945	945	945	945	945	945
R-sq	0.06	0.12	0.21	0.22	0.24	0.38

Note. ***p<0.01; **p<0.05; *p<0.1.

for older mothers for both cognitive stimulation and emotional support. One must take this issue seriously, since failing to include proper controls in the analysis may mislead the interpretation of results.

Secondly, the stronger effect for older mothers, once we control for all factors, suggests a downwards bias in our estimates resulting from the sample selection. This point is reinforced by the fact that bias from failing to account from background variables is larger for younger mothers than for older mothers. For example, the estimated effect of staying on in education for cognitive stimulation is reduced by 87% for younger mothers and by 60% for older mothers. Therefore, if the sample were to include more older mothers we may expect the point estimate to increase and to be more robust to the inclusion of controls.

Discussion and conclusions

This paper focuses on the effects of mother's education on parenting as assessed by the HOME–SF. We have not attempted to model the complex processes or pathways involved or address questions relating to *how* education might affect parenting. Rather, we investigated one part of a pathway implicated in the inter-generational transmission of advantage. The aim of the analysis is to measure the extent of bias in the estimated effect of education from failing to account from background characteristics.

Analyses of the full sample shows that for cognitive stimulation the effects of mother's education (i.e., her decision to stay on in post-compulsory education) is robust to the inclusion of nearly 200 controls which attempt to reduce any bias caused by omitted variables and so the likely endogeneity of her education decision. The estimated effect is reduced by 73%. This reduction is very significant given that in the economic returns to education failing to include achievement and measures of social background introduce as much as a 48% upward bias on the estimated size of the education effect (Blundell *et al.*, 2003). For emotional supportiveness, the estimated bias is even larger and the point estimate not statistically significant once control sets for G2 school level factors are introduced.

It seems unsurprising that maternal education is important for the provision of a cognitively stimulating environment. As noted in our introduction and by Eccles and Davis-Kean (this volume), parental education may matter for parenting and parent–child interaction inasmuch as it provides parents with the cognitive resources, values and skills that enable them to better support and facilitate their child's learning and developmental environment. While the notion that increased education may similarly promote parental warmth and consistent parenting through enhanced efficacy and well-being is highly plausible, that we do not find causal pathways here does not mean that education is not important for these outcomes. Rather, it suggests that the current methodology might not be best placed to expound the intricacies of the processes involved in for this outcome.

Allowing for moderation by gender, the endogeneity bias of mother's staying on decision appears larger for mothers' daughters than for her sons. The estimated effect of mother's staying on decision on her parenting, assessed in terms of cognitive stimulation, remains significant for her sons at the 10% level. Analysis of the same data for children's cognitive outcomes finds effects of maternal education on

male PPVT-R scores robust ($p<0.01$) to the inclusion of all five control sets (Feinstein & Duckworth, in press). The significant effect of maternal education on cognitive stimulation for sons is therefore of particular interest. It could indicate that one potential pathway for the effect of mother's education on her son's development is through the provision of a cognitively stimulating environment. This interpretation of our results requires additional exploration using methods that allow modeling of the data and the pathways therein.

The results here also indicate that our estimates are sensitive to sample selection bias. Given the structure of the cohort data, our sample is biased towards younger mothers. If educational effects differ by the age of the mothers, and we believe that they do, then our estimated parameters are biased. We estimate, however, that our estimates are downwards biased and less robust to the inclusion of additional controls. Therefore, it might be possible to find larger effects and those that are statistically insignificant in the margin, to become significant.

It is interesting to note that across these findings the inclusion of controls for family proximal process, i.e., the parenting the G2 woman experienced growing up, knock out much of the education effect, particularly for measures of emotional supportiveness. The findings presented here may then, to some extent, also reflect an intergenerational transmission of parenting as well as education, again a consistent finding in the developmental literature (Scaramella & Conger, 2003).

Note too, that the statistical significance of the total HOME score is typically driven by significance in only one of the sub-scales. These results thus also highlight the importance of assessing parenting style using the subscales rather than aggregated totals. Relying on this overall measure of parenting quality is likely to lead to misrepresentation of the potential mediating and moderating processes of subtle group differences and the mechanisms involved.

In summary, this study presents some interesting, but complex findings. Although bias from failing to account from background characteristics is large, there appears to be a small effect of maternal education on parenting assessed on the cognitive stimulation sub-scale of the HOME inventory but only for males. However, our estimates suffer from sample selection bias so it is possible to find that the effects of the staying on decision on parenting remain statistically significant even after the inclusion of a rich set of covariates. Even though we control for as much confounding bias as possible, we remain cautious that some unobserved factors could remain a source of bias. Only with experimental designs or instrumental variables is possible to counter problems of endogeneity in the estimation of causal effects.

Furthermore, Dodge (2002) notes the difficulty inherent in attempting to isolate a parenting effect from all other potential sources of influence, particularly given the dynamic and corrective nature of the mechanisms implicated and the complexity of multiple interactions across development. Development does not occur in a vacuum and family contexts interact with childcare and school settings, neighbourhoods and peers. Parents learn to parent by parenting and thus it seems likely that their parenting will operate in adaptive and largely self correcting ways across time. Equally, children are active participants in their own family rather than passive

recipients of parenting and as such shape their proximal environment and the parenting within it.

But what is it that more educated parents are doing that promotes their children's academic achievement or positive behaviour? Only recently has research begun to systematically examine the multiple channels through which parent education may influence both parenting and child outcomes in order to address this question (Corwyn & Bradley, 2003; Davis-Kean, 2005). In studies that investigate the nature and impact of parenting on children's academic success, socio-emotional development and behavioural adjustment, it has become increasingly apparent that definitions of parenting comprise a complex array of skills and beliefs that shape children's development through diverse pathways (Collins *et al.*, 2000). Future research should continue to examine the pathways and the unique contribution that being educated affords families both in their ability to use resources, but also as a potential agent for helping families function better as a system.

Notes

1. For more information on Instrumental Variable techniques see Wooldridge (2002).
2. Methods for creating these draws were described by Schafer (1997).

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Appendix 1

Table A1: summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
G3 child gender	1879	0.49	0.50	0.00	1.00
Outcome variables					
HOME: cognitive stimulation	1879	100.79	15.91	24.00	140.64
HOME: emotional supportiveness	1879	100.06	16.24	16.42	140.96
HOME: total	1879	100.62	16.04	15.00	141.61
Education variable					
Staying on decision at 16	1879	0.17	0.37	0.00	1.00
G1 Family distal factors					
Mother stayed on at age 16	1879	0.20	0.41	−0.98	1.29
Father stayed on at age 16	1879	0.20	0.41	−0.89	1.67
Family size	1879	1.39	0.78	−0.68	4.35
Mother less than 20 at CM's birth	1879	0.04	0.24	−0.84	1.00
Father less than 20 at CM's birth	1879	0.01	0.08	−0.20	1.00
Age 7: No indoor lavatory	1879	0.13	0.36	−0.91	1.18
Age 7: Persons per room	1879	1.59	0.96	−0.87	6.00
Had free school meals, at 11	1879	0.11	0.31	−0.67	1.04
Age 7: Experienced financial hardship	1879	0.08	0.27	−0.46	1.00
Age 11: Experienced financial hardship	1879	0.12	0.33	−0.76	1.22
Age 16: Experienced financial hardship	1879	0.10	0.30	−0.80	1.08
Father: SES1	1879	0.03	0.19	−0.60	1.00
Father: SES2	1879	0.15	0.35	−0.80	1.36
Father: SES3NM	1879	0.07	0.29	−0.97	1.00
Father: SES3M	1879	0.46	0.51	−1.05	1.81
Father: SES4	1879	0.23	0.41	−0.88	1.48
Father: SES5	1879	0.06	0.24	−0.64	1.00
Age 11: n/hood amenities: Has park	1879	0.88	0.33	−0.13	1.95
Age 11: n/hood amenities: Has playground	1879	0.58	0.50	−1.01	2.13
Age 11: n/hood amenities: Has swimming pool	1879	0.79	0.41	−0.50	2.16
Age 11: n/hood amenities: Has indoor play centre	1879	0.87	0.33	−0.23	1.91
Age 11: n/hood amenities: Has cinema	1879	0.75	0.44	−0.53	2.12
Age 11: n/hood amenities: Has library	1879	0.95	0.22	0.00	1.57
Age 7: No father	1879	0.03	0.16	0.00	1.00
Age 7: English not first language	1879	0.01	0.09	0.00	1.00
Ever experienced single parenthood	1879	0.11	0.31	0.00	1.00
Age 7: Family has 1 social difficulty	1879	0.11	0.32	0.00	1.00
Age 7: Family has 2 social difficulties	1879	0.04	0.19	0.00	1.00
Age 7: Family has 3 social difficulties	1879	0.05	0.22	0.00	1.00

Table A1: (*Continued*)

Variable	Obs	Mean	Std. Dev.	Min	Max
G1 Family proximal factors					
Age 7: Teacher rated: Low parents' interest in education	1879	0.17	0.37	−0.86	1.34
Age 7: Teacher rated: Medium parents' interest in education	1879	0.46	0.50	−1.23	1.96
Age 7: Teacher rated: High parents' interest in education	1879	0.35	0.48	−1.01	1.77
Age 7: Teacher rated: Very high parents' interest in education	1879	0.02	0.15	−0.44	1.00
Age 11: Teacher rated: Low parents' interest in education	1879	0.18	0.37	−0.73	1.31
Age 11: Teacher rated: Medium parents' interest in education	1879	0.41	0.50	−1.08	1.88
Age 11: Teacher rated: High parents' interest in education	1879	0.38	0.49	−1.19	1.89
Age 11: Teacher rated: Very high parents' interest in education	1879	0.03	0.17	−0.45	1.00
Age 16: Teacher rated: Low parents' interest in education	1879	0.30	0.44	−0.93	1.88
Age 16: Teacher rated: Medium parents' interest in education	1879	0.35	0.48	−1.14	1.91
Age 16: Teacher rated: High parents' interest in education	1879	0.34	0.48	−1.17	1.58
Age 16: Teacher rated: Very high parents' interest in education	1879	0.01	0.12	−0.34	1.00
Age 7: Mother reads newspaper	1879	0.71	0.45	−0.56	1.89
Age 7: Father reads newspaper	1879	0.80	0.39	−0.55	1.81
Age 7: Mother reads book	1879	0.53	0.50	−1.11	1.80
Age 7: Father reads book	1879	0.67	0.47	−0.83	1.96
Age 7: Mother reads to child	1879	0.84	0.37	−0.30	1.85
Age 7: Father reads to child	1879	0.69	0.47	−1.00	2.04
Age 7: Goes on outings with mother	1879	0.94	0.24	0.00	1.64
Age 7: Goes on outings with father	1879	0.87	0.32	−0.13	1.72
Age 16: How anxious are parents that child does well in school	1879	0.25	0.45	−1.27	1.53
Age 11: n/hood amenities: Uses park	1879	0.79	0.40	−0.46	1.96
Age 11: n/hood amenities: Uses playground	1879	0.44	0.50	−1.09	1.82
Age 11: n/hood amenities: Uses swimming pool	1879	0.74	0.44	−0.61	2.01
Age 11: n/hood amenities: Uses indoor play centre	1879	0.50	0.51	−1.00	1.97
Age 11: n/hood amenities: Uses cinema	1879	0.53	0.50	−0.91	1.94
Age 11: n/hood amenities: Uses library	1879	0.71	0.45	−0.73	1.88
Age 7: Parent want child to stay on after min SLA: No	1879	0.26	0.44	0.00	1.00

Table A1: (*Continued*)

Variable	Obs	Mean	Std. Dev.	Min	Max
Age 7: Parent want child to stay on after min SLA: Yes	1879	0.70	0.46	0.00	1.00
Age 11: Parent want child to stay on after min SLA: No	1879	0.06	0.23	0.00	1.00
Age 11: Parent want child to stay on after min SLA: Yes	1879	0.63	0.48	0.00	1.00
Not toilet trained by age 3	1879	0.04	0.18	−0.44	1.00
Not toilet trained by age 4	1879	0.01	0.09	−0.23	1.00
Not toilet trained by age 5	1879	0.09	0.30	−0.74	1.01
Talks at 2	1879	0.96	0.21	0.00	1.56
Walks at 18 months	1879	0.97	0.15	0.00	1.38
Rated happy at 7	1879	0.94	0.23	0.00	1.65
Bullied at 7	1879	0.06	0.22	−0.53	1.00
Backward at 7	1879	0.12	0.31	−0.69	1.10
Difficult at 7	1879	0.09	0.28	−0.69	1.01
Bristol Social Adjustment Guide aged 7 total	1879	7.76	8.50	−13.26	63.00
Age 7: Maths	1879	−0.04	0.99	−3.08	2.52
Age 7: Reading	1879	−0.03	1.00	−3.61	2.31
Age 7: Teacher ability rating	1879	0.04	1.00	−2.65	3.33
Age 7: Draw-a-man score	1879	−0.02	1.00	−3.19	3.08
Bristol Social Adjustment Guide aged 11 total	1879	7.40	8.30	−12.20	50.00
Age 11: Maths	1879	−0.05	0.98	−2.83	2.36
Age 11: Reading	1879	−0.06	0.98	−3.24	2.66
Age 11: Overall teacher ability rating	1879	0.05	0.93	−2.66	2.85
Age 11: Copying designs	1879	−0.03	1.00	−5.88	2.77
Age 11: Reads books (not school/hwk)	1879	1.26	0.72	−1.43	2.44
Age 11: Reads newspapers, mags and comics	1879	1.31	0.70	−1.22	2.78
Age 11: Listens to music (not "pop") outside school	1879	0.49	0.81	−2.54	2.38
Age 11: Goes to clubs outside school	1879	0.59	0.92	−2.78	2.28
Age 11: Goes to school clubs	1879	0.25	0.72	−2.47	2.00
Age 11: Collects stamps	1879	0.46	0.84	−2.77	2.30
Age 11: Makes models outside school	1879	0.15	0.61	−2.15	2.00
Age 11: Looks after animals	1879	1.20	0.88	−1.92	2.75
Age 11: Plans on leaving school: get job	1879	0.18	0.38	0	1
Age 11: Plans on leaving school: full-time study	1879	0.25	0.43	0	1
Age 11: Streamed in high ability group	1879	0.13	0.35	−0.99	1.10
Age 11: Streamed in low ability group	1879	0.09	0.28	−0.72	1.00
Age 11: No. of activities outside school	1879	10.99	4.74	0	18
G2 Child factors (continued…)					
Age 16: Maths	1879	−0.06	0.98	−2.73	2.95
Age 16: Reading	1879	−0.05	1.00	−3.71	2.30
Age 16: Teacher ability rating: mathematics	1879	1.74	1.14	−1.25	4.47

Table A1: (*Continued*)

Variable	Obs	Mean	Std. Dev.	Min	Max
Age 16: Teacher ability rating: english	1879	2.21	1.12	−0.98	5.03
Age 16: Teacher ability rating: modern languages	1879	1.36	1.35	−2.86	4.80
Age 16: Teacher ability rating: science	1879	1.61	1.21	−2.22	5.21
Age 16: Teacher ability rating: practical sub	1879	2.02	1.12	−1.40	5.37
Age 16: Teacher ability rating: social studies	1879	1.87	1.18	−1.40	4.75
Aged 16: Rutter externalising problems	1879	1.24	0.33	0.46	3.00
Aged 16: Rutter internalising problems aged 16	1879	1.26	0.34	0.27	3.00
Age 16: cautious – impulsive	1879	2.87	0.94	0.28	5.94
Age 16: moody – even-tempered	1879	3.35	1.28	−0.39	6.78
Age 16: timid – aggressive	1879	2.97	0.81	0.43	5.99
Age 16: flexible – rigid	1879	2.84	0.79	0.59	5.24
Age 16: sociable – withdrawn	1879	2.33	1.02	−0.64	5.31
Age 16: lazy – hardworking	1879	3.16	1.22	−0.81	6.34
Age 16 medical: general motor handicap	1879	0.01	0.08	0	1
Age 16 medical: general physical abnormality	1879	0.01	0.08	0	1
Age 16 medical: mental retardation	1879	0.02	0.13	0	1
Age 16 medical: emotional, behavioural proble	1879	0.02	0.14	0	1
Age 16 medical: abnormality head and neck	1879	0.01	0.09	0	1
Age 16 medical: abnormality of upper limbs	1879	0.01	0.08	0	1
Age 16 medical: abnormality of lower limbs	1879	0.02	0.15	0	1
Age 16 medical: abnormality of spine-summary	1879	0.01	0.08	0	1
Age 16 medical: abnormality of respiratory s	1879	0.02	0.14	0	1
Age 16 medical: abnormality of alimentary sy	1879	0.01	0.07	0	1
Age 16 medical: abnormality of urogenital sy	1879	0.01	0.12	0	1
Age 16 medical: abnormality of heart	1879	0.01	0.11	0	1
Age 16 medical: haematological abnormality	1879	0.00	0.02	0	1
Age 16 medical: abnormality of skin	1879	0.12	0.33	0	1
Age 16 medical: epilepsy	1879	0.00	0.06	0	1
Age 16 medical: cns condition, other than epi	1879	0.00	0.05	0	1
Age 16 medical: abnormal eye condition	1879	0.10	0.30	0	1
Age 16 medical: hearing defect	1879	0.03	0.17	0	1
Age 16 medical: speech defect	1879	0.01	0.09	0	1
Age 16 medical: any other abnormal condition	1879	0.02	0.14	0	1
Age 16: Child attitudes to school: School is a waste of time	1879	3.97	1.10	1	5
Age 16: Child attitudes to school: I am quiet in class and gt on with my work	1879	2.75	0.97	1	5
Age 16: Child attitudes to school: I think homework is a bore	1879	2.69	1.23	1	5
Age 16: Child attitudes to school: I find it difficult to keep my ind on work	1879	3.19	1.22	1	5
Age 16: Child attitudes to school: I never take my work seriously	1879	3.81	1.14	1	5

Table A1: (*Continued*)

Variable	Obs	Mean	Std. Dev.	Min	Max
Age 16: Child attitudes to school: I don't like school	1879	3.34	1.36	1	5
Age 16: Child attitudes to school: I think there is no point in planning for the future	1879	3.70	1.38	1	5
Age 16: Child attitudes to school: I am always willing to help the teacher	1879	2.54	1.02	1	5
Age 16: Ability self perception: Maths	1879	2.82	0.57	2	4
Age 16: Ability self perception: English	1879	3.11	0.49	2	4
Age 16: Ability self perception: Science	1879	2.63	0.58	2	4
Age 16: Ability self perception: Art	1879	2.72	0.64	2	4
Age 16: Ability self perception: Music	1879	2.55	0.60	2	4
Age 16: Ability self perception: Practical subjects	1879	2.94	0.56	2	4
Age 16: Ability self perception: Sports and games	1879	2.95	0.56	2	4
G2 School factors					
% males aged 15 studying for GCE 'o' level only	1879	20.05	29.63	−73.10	118.81
% females aged 15 studying for GCE 'o' level only	1879	22.44	32.16	−68.65	133.71
% males aged 15 studying for CSE only	1879	31.34	27.77	−47.28	115.77
% females aged 15 studying for CSE only	1879	30.87	27.88	−53.24	106.45
% males aged 15 studying for both GCE 'o' level & CSE	1879	23.51	23.80	−47.56	108.85
% females aged 15 studying for for both GCE 'o' level & CSE	1879	25.66	25.01	−46.07	108.76
Number of males in last yr obtained at least 2 A-Level (or equiv) passes	1879	12.41	18.56	−49.20	109.96
Number of females in last yr obtained at least 2 A-Level (or equiv) passes	1879	12.10	18.54	−39.48	110.00
Number of males in last yr gone on to f/t fe	1879	8.11	13.15	−33.63	78.26
Number of females in last yr gone on to f/t fe	1879	5.87	10.14	−24.15	82.00
In last yr % males stayed on past min SLA	1879	56.83	27.19	−22.57	136.42
In last yr % females stayed on past min SLA	1879	57.78	27.70	−18.26	130.20
% pupils in school under 16 with fathers in non-manual occupations	1879	3.90	2.25	−2.09	11.49
% pupils in class with SES 1/2 fathers	1879	20.83	22.56	−44.10	115.18
% pupils in class with unskilled/manual fathers	1879	21.23	21.20	−48.33	100.20
No. children whose paretns have seen teacher to discuss child in last yr	1879	0.50	0.33	−0.50	3.00
% of 11 yr olsds consider able to pass 5 or more GCE 'o' level subjects	1879	25.30	16.39	−15.86	99.25
Age 7: indepent school	1879	0.03	0.17	−0.37	1.00
Age 11: indepent school	1879	0.04	0.19	−0.42	1.01
Age 16: Private school	1879	0.04	0.20	−0.58	1.00
G2 Area factors					
Region: North West	1879	0.12	0.32	0	1
Region: North West	1879	0.08	0.26	0	1

Table A1: (*Continued*)

Variable	Obs	Mean	Std. Dev.	Min	Max
Region: Yorks	1879	0.08	0.27	0	1
Region: NMid	1879	0.07	0.26	0	1
Region: East	1879	0.08	0.27	0	1
Region: London & South East	1879	0.16	0.37	0	1
Region: South	1879	0.06	0.24	0	1
Region: South West	1879	0.06	0.24	0	1
Region: Midlands	1879	0.08	0.27	0	1
Region: Wales	1879	0.05	0.23	0	1
Region: Scotland	1879	0.11	0.31	0	1
Region: New	1879	0.04	0.21	0	1