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Sons and Daughters: Parental Beliefs and Child Behaviour (Evidence from the UK Millennium Cohort Study)

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Abstract

An extensive literature exists exploring the determinants of child behaviour, with increasing interest in its links with parental characteristics and beliefs. In this paper we explore a particular aspect of this relationship by looking at the parents' beliefs regarding how to treat boys and girls. A question in the third wave of the UK Millennium Cohort Study asks both the mother and father of 5-year olds whether they agree to the statement: *'Sons in families should be given more encouragement than daughters to do well at school'.* We model both the determinants of parent's beliefs, as captured by this question; and the impact of these beliefs on the behaviour of 7 year old boys and girls, separately. The key findings of the paper suggest that parental agreement to the above statement does not have an impact on boys' behaviour; however, it has a detrimental impact on the behaviour of girls.

Key words: non-cognitive outcomes, parental beliefs, gender, ethnicity
JEL classification: J13, J16, I31

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1. Introduction

An extensive literature exists exploring the determinants of child behaviour, with increasing interest in how it may be related to parental characteristics and beliefs. In this paper we explore a particular aspect of this relationship by looking at whether parents believe sons should be encouraged more than daughters, taking into account possible endogeneity between such parental beliefs and child behaviour.

For our analysis we use the data from the UK Millennium Cohort Study (MCS), which is following about 19,000 children born in 2000-2001 (Hansen, 2012). In the third wave of the MCS (when the children were 5 years old) both the mother and father were asked about their beliefs regarding treating boys and girls differently. The study asks both the mother and father of 5-year olds whether they agree to the statement: *'Sons in families should be given more encouragement than daughters to do well at school'*. We model: (i) the determinants of parental response to this question; and (ii) the impact of these on the behaviour of children, boys and girls separately. Throughout, we pay special attention to the interaction between gender and ethnicity of the child.

The key findings of the paper suggest that parental agreement to the above statement does not have an impact on boys' behaviour across the spectrum, or at the abnormal end of the distribution; however, it has a detrimental impact on the behaviour of girls, both across the spectrum and at the abnormal end. The findings are robust to controls for a range of socio-economic and demographic information about the children and their families, including parenting activities.

The remainder of this paper is organised as follows. In the next section, we briefly review the relevant literature on child behaviour. Section 3 describes the data and the different variables we use in our analysis, specially the measures for child behaviour. Section 4 presents the empirical specification that we use to estimate the link between child behaviour and parental beliefs. Section 5 presents our main results, and section 6 draws some conclusions.

2. Background Literature

It is now widely accepted that the early years matter. Children from disadvantaged (often understood and interpreted as income poor) backgrounds have lower life-coping 'abilities' – they have a lower probability of completing their education, higher probability of being involved in crime and lower lifetime earnings potential (Currie and Thomas, 2001; Case and Paxson, 2008, 2010; Cunha and Heckman, 2008; Currie, 2009, 2011; Cunha, et al., 2010; Chetty, et al., 2011). These disadvantages are further transmitted across generations, resulting in intergenerational cycles of poverty and disadvantage (Hirsch, 2007; Blanden et al., 2013; Carneiro et al., 2013).

There is also an increasing recognition that abilities are multiple in nature, with non-cognitive (psychological and behavioural) abilities having an impact on social and economic life alongside the cognitive (Cunha et al., 2006 and 2008; Knudsen et al., 2006). A study by Feinstein (2000), using UK data, establishes the importance of children's non-cognitive abilities in predicting their adult labour market outcomes; and this relationship varies for boys and girls. In addition, there is a link between childhood mental (emotional) health and adult general health outcomes including mortality (Friedman, 2000; Currie, 2009). There is further evidence that parental aspirations and attitudes have considerable influence on children's educational achievement; and differences in the home learning environment and parents' aspirations can influence children's social and emotional wellbeing as early as age 3 years (Goodman and Gregg, 2010). Moreover, in a model allowing for interdependence of abilities, Cunha et al. (2010) find that while non-cognitive ability is important for the formation of cognitive ability, there is no evidence to suggest the reverse.

In this paper we look at non-cognitive abilities of children, specifically child behaviour. Numerous determinants of child behaviour have been discussed in the literature. George et al. (2007) use the data from the MCS to understand the determinants of child behaviour at age 3 years, with parental socio-economic status (SES) as the main focus. Their findings suggest that children from advantaged households (where advantage is defined across parental income, education and work status) show less behavioural problems[1]. Jones and Schoon (2008) update the results by George et al. (2007), by looking at the same (MCS) children at age 5, and find consistency in child behaviour at ages 3 and 5 years.

Another key determinant of child behaviour is maternal depression. In their study using the MCS data Kiernan and Huerta (2008) and Kiernan and Mensah (2009) find that maternal depression (net of other factors) was strongly related to children exhibiting behavioural problems (as reported by the mother). In a meta-analytical review Goodman et al. (2011) emphasise the importance of moderators: their review of 193 studies highlights that there exists a positive relationship between maternal depression and behavioural problems in children, but the strength of the relationship is moderated by the child's age (the effect is stronger for younger children), gender (effect is stronger for girls), and poverty (effect is stronger for children in poverty).

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[1] In the literature stress is often laid specifically on maternal education and employment status. Findings consistently show that higher maternal education is associated with less behavioural problems in children. For maternal employment, however, the evidence is mixed, with the impact differing based on maternal education and alternative child care available. There is little to no detrimental effect, on child outcomes, of maternal employment for highly educated mothers, whereas the children of low educated mothers benefit from maternal employment only if there is a provision of free universal pre-school facility. See Datta Gupta and Simonsen (2010) for details.

Other often discussed key determinants of child behaviour are gender of the child and single parenthood. Gender differences in behaviour are well established, with more behavioural problems being reported for boys (Meltzer et al., 2000; Else-Quest et al., 2006; Bertrand and Pan, 2013). With respect to single parenthood, findings by Kiernan and Huerta (2008), using the UK data, suggest that while the children in single parent households do not show higher behavioural problems when other factors are controlled for, the negative impact of maternal depression and economic deprivation on child behaviour is stronger for lone parent households relative to two-parent families (the incidence of maternal depression and economic deprivation is also higher among the lone parent households). Bertrand and Pan (2013) use US data and find differential impact of family structure by the gender of the child, where 'boys do especially poorly in broken families'; boys of single-mothers show significantly higher incidence of disruptive behaviour.

Child behaviour is often reported by parents, and there is evidence to suggest that this may lead to different reporting patterns and biases by parental characteristics such as maternal depression and ethnicity. While there exists evidence that maternal depression leads to higher behavioural problems in children, it is also noted in the literature that depressed mothers often report higher behavioural problems in their children; latter is referred to as the 'depression-distortion' hypothesis (Richters and Pellegrini, 1989). Gartstein et al. (2009) test the depression-distortion hypothesis by comparing the child behaviour, for a group of 10-14 year old US children, as reported by mothers, fathers, teachers and children themselves. Their findings suggest a significant effect of maternal depression on the reported child behaviour, with depressed mothers reporting more behavioural problems for their children.

In terms of differences in reporting of child behaviour according to ethnicity, in a UK study of 200 parents Hackett and Hackett (1993) find that Gujarati parents have a more stringent concept than English parents of what constitutes 'acceptable behaviour', which is not explained by differences in social class across the two groups. Atzaba-Poria et al. (2004), reporting on another UK based study of 125 children, find that Indian parents report relatively more behavioural problems (but their study does not control for any other factor). However, Goodman and Goodman (2011), using a large scale UK study of 18,415 children, report no significant differences in parent and teacher-reported child behaviour across ethnicities. Miner and Clarke-Stewart (2008), using US data, and Zwirs et al. (2006), a Dutch study, found differences across ethnicities in parent-reported child behavioural problems: these two studies control for parental SES.

There exist a few studies which look at the link between parental beliefs and child behaviour. Mulvaney et al. (2007) use US data to look at the impact of parental beliefs on the reported child

behaviour: their findings suggest that parents with traditional beliefs in parenting style tend to report higher behaviour problems.

The contribution of this paper is in exploring the role of parental beliefs in explaining the child's behaviour, specifically the effect of the variation in parents' beliefs about treating sons and daughters differently; and in looking at the interaction between gender and ethnicity of the child, when explaining the child's behaviour.

3. Data and key variables of interest

We use data from the first, third and fourth waves of the MCS. The first wave was carried out in the year 2001, when the 'cohort children' were under 1 year old; the third wave was in 2006, when these children were 5 years old; and the fourth wave was in 2008, when these children were 7 years old. The sample for analysis is 11,159 children from all four countries of the UK – these are the children who are present in all the three waves, and for whom complete information is available for all the relevant variables.[2] To correct for the sampling design of MCS, sample weights are used throughout in the analysis.

MCS contains detailed information about diverse topics such as: parenting; child behaviour and cognitive development; parents' employment and education; income and poverty; and household composition. For details of the data see Hansen (2012). Most of the information related to the cohort child is provided by the main carer of the child. In the analysis sample we use here the main respondent for almost all (98% across all waves) the children is the natural mother[3]; hence from now on we will refer to the main respondent as the 'mother' of the child. Information is also obtained (where applicable, i.e. where there are two resident parents in the household) from the main respondent's current partner, who is not necessarily the father of the cohort child. In the analysis sample we use, in 94% of the cases in wave 3[4] the partner is the natural father of the child, and in 4% of the cases it is the step-father of the child; from now on we will refer to the partner of the main respondent as the 'father' of the child.

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[2] MCS surveyed 18,552 households for the first sweep; of these only 11,721 (61%) were productive in all four sweeps. Refusing to participate is the biggest reason for attrition. The refusal rates are higher for the 'disadvantaged' and 'ethnic minority' families, relative to 'advantaged' families, across all the four countries of the UK. Ketende (2010) discusses in detail the response rates in MCS. Any further loss of observations is because of non-response on relevant covariates used in our analysis.

[3] The other options are: natural father of the child, adoptive parents (father/mother), step-parents (father/mother), foster parents (father/mother), grandparents, and other relatives.

[4] We refer only to wave 3, as this is the only wave from which we use information from the partner.

3.1 Parental Belief

The key variable we are interested in is the parents' belief about sons and daughters. In wave 3, the mother and father were asked to indicate whether they agreed or disagreed with the statement: *'Sons in families should be given more encouragement than daughters to do well at school'*. Self-completion responses were recorded on six categories: Strongly agree (SA); agree (A); neither agree or disagree (NAD); disagree (D); strongly disagree (SD); and Can't Say. Figures 1 and 2 give the distribution of the response of the mothers and fathers, respectively, to this question, by ethnicity.[5] A high proportion of parents strongly disagree with this statement (overall, 54% of mothers and 51% of fathers); however, there are ethnic differences, ranging from 42% (mothers of Black or Black British children) to 60% (mothers of Indian children). The percentages strongly disagreeing are lower for the fathers, ranging from 37% (fathers of Black or Black British children) to 55% (fathers of Indian children). A very small proportion of the parents strongly agree with the statement (overall, 3%): here too, there are ethnic differences, and the proportion is almost 5-6% (8-9%) of the mothers (fathers) of Pakistani and Bangladeshi and of Black or Black British children.

3.2 Child Behaviour

The key variable of interest is child behaviour at age 7. The MCS assesses behavioural problems in children using the Strength and Difficulty Questionnaire (SDQ) which can be filled out by the parents and teachers of 4- to 16-year-olds. SDQ is a well-established instrument used to identify childhood behavioural problems in community settings (Goodman et al., 2000). It has a set of 25 questions assessing the child on five different dimensions with five questions each: emotional problems, conduct problems, hyperactivity, peer problems and pro-social behaviour. All 25 questions can be answered as: 'certainly true' (score 2), 'somewhat true' (score 1), and 'not true' (score 0). The scores on the first four dimensions are added together to give the 'total difficulties score', also referred to as the 'behavioural problem index' (BPI); this is a continuous indicator, and can range from 0 to 40. The continuous scores can also be classified into three categories of behaviour: normal (NB), borderline (BB), and abnormal behaviour (AB). The cut-offs for each category of behaviour depends on who the informant is (i.e. parent or teacher), and are given in Table 1.

In the MCS the SDQ is filled out by the mother of the child at both age 5 and 7 years; we refer to this as 'mother-reported child behaviour'. At age 7, of the 14,043 children in wave 4 of the MCS, there is information on their schools for 12,655 children. A postal questionnaire was sent to these schools, which was to be completed by the teacher of the named child. Of these, 8,876 questionnaires were

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[5]Throughout we are using the child's ethnicity, as reported by mother. For 3% of the children in the sample used in this paper mother's ethnicity and child's ethnicity are different. Using mother's ethnicity instead of the child's ethnicity does not change the results in any significant way either qualitatively or quantitatively.

returned completed, including 7,277 corresponding to the 11,159 children in our sample of analysis. As a part of this survey the teachers were asked to fill in the Teacher's version of SDQ for the MCS children, which we refer to as 'teacher-reported child behaviour'.

Figures 3 and 4 give the histogram of mother-reported and teacher-reported BPI at age 7, respectively, by the gender of the child. Also marked on each histogram are the lines indicating the level of BPI above which the children are classified as having BB and AB.

Mother-reported behaviour for the whole sample

Table 2 gives the average scores of BPI, and the prevalence rates of BB and AB for the whole sample by gender and ethnicity of the child. Girls on average have lower BPI scores than boys; this difference is statistically significant at a 1% level. Looking across the ethnic groups, those with higher BPI scores relative to Whites of the same gender are: Pakistani and Bangladeshi boys and girls at both ages 5 and 7; girls of mixed ethnicity at ages 5 and 7; and Black or Black British girls at age 5. The prevalence of both BB and AB are statistically lower for girls, relative to boys across all age and gender groups. At age 5 Pakistani and Bangladeshi children have higher prevalence of BB and AB relative to White children of the same gender; by age 7, the difference is statistically significant only for BB in boys. At age 5 Black or Black British children have higher prevalence of BB relative to White children of the same gender; this gap is not significant at age 7.

Subsample where the teacher-reported behaviour is available

Given the evidence on potential patterns and biases in mother-reported child behaviour by maternal depression and ethnicity, we also look at the behaviour reported by the teachers on a subsample of the children. Table 3 summarises child behaviour for the children for whom teacher-reported data are available. The first three columns of Table 3 give the averages of the mother-reported BPI, BB, and AB by gender and ethnicity of the child. The mother-reported behaviour (BPI, BB, and AB) for this subsample is not very different from the whole sample of analysis (Table 2); the only statistically significant difference, at 10% level, is for white boys.

The last three columns of Table 3 give teacher-reported BPI, BB, and AB by gender and ethnicity of the child for these children. Comparing the teacher and mother-reported behaviour within the subsample for both boys and girls the teacher-reported average BPI is lower than the mother-reported. The prevalence of AB and BB is, however, statistically higher for the teacher-reported behaviour relative to the mother-reported behaviour for White boys and Black or Black British boys. Similarly for the White girls the prevalence of AB is significantly higher in the teacher-reported behaviour relative to mother-reported behaviour.

4. Empirical Specification

Parental Belief

We begin by modelling the determinants of parents' beliefs about sons and daughters. The six response options of the parental belief question are collapsed into three ordered categories (j). 'Disagree' and 'strongly disagree' are combined into one category ($j = 1$); 'can't say' is combined with 'neither agree or disagree' as $j = 2$; 'agree' and 'strongly agree' are combined as $j = 3$. We refer to the category 'agree or strongly agree' as *son bias* (however, this is not to indicate that the respondent has a preference for having sons over daughters). An ordered logit model (OLM) is used to look at the determinants of parents response (Y_i) to this question. The probability that the respondent will choose option j is given as:

$$P(Y_i = j | X_i) = P\left(c_{j-1} < X_i \beta + \varepsilon_i \leq c_j\right), \quad \text{for } j = 1, 2, 3 \tag{1}$$

where X_i is the vector of individual characteristics that we assume to have an effect on the beliefs of the mother of child i; βs are the parameters to be estimated; c_js are the choice-specific cut-off points, with $c_0 = -\infty$, $c_3 = +\infty$, and c_1 and c_2 are to be estimated; ε_i is stochastic error term which we assume follows a logistic distribution.

The specific variables that we include in vector X_i are as follows: a dummy for a girl child; birth order of the child; a dummy for an elder male sibling in the family; a series of dummies for the child's ethnicity; interaction terms between the girl dummy and the ethnicity dummies; a dummy for families in poverty (defined by MCS as equivalised family income less than 60% of the median income); a dummy mothers with higher educational qualifications (NVQ 4 or 5 or higher); a dummy for 'sibling type' where the child has either no siblings or only natural siblings in the household; a dummy for single parent households. Since all of the single-parent households are basically single mothers, we refer to them from now on as 'single mother households'. For the dual parent households where information of the father is available we also include a dummy variable for the father's education, defined similarly as the mother's; a dummy for whether or not the father works; and two dummies for father's response to the belief question.

Four separate specifications are run: for all mothers, for single parent mothers ('single mothers'), for mothers in dual parent homes ('dual parent mothers'); and for fathers in dual parent homes ('dual parent fathers'). The single parent dummy is only used in the first specification. The dummies related to the father are only used in the third and fourth specification.

Child Behaviour

For child behaviour we estimate a value added model of ability formation (Todd and Wolpin, 2007) where current child behaviour (non-cognitive ability) depends on past behaviour, any parental investment made in the child, and other covariates (past and present) which might impact on this behaviour. In general terms the relationship we wish to estimate is given by:

$$CB_t = f(CB_{t-1}, PI_{t-1}, PB_{t-1}, X_0, X_{t-1}, X_t) \qquad (2)$$

where CB_t is behaviour of the child at time t, which for our analysis is at age 7; and CB_{t-1} is behaviour of the child at time $t-1$, which for our analysis is at age 5.

PI is the vector of parental investment in the child. While we want to model the causal relationship from parental investment to child behaviour, child behaviour itself may affect parental investment, leading to a potential endogeneity problem.[6] Furthermore, the effect of parental investment translating into child behaviour is unlikely to be instantaneous. Therefore, lagged parental investment from age 5 (PI_{t-1}) is used to model child behaviour at age 7 (CB_t). There are numerous variables available in MCS to capture parental investment in children. These are mainly divided into 'the home learning environment' (for example, the mother reading to the child, or helping with counting/maths) and 'social and routine' activities (for example, regular bed times, or regular meal times). The home learning environment is found to be significant for cognitive development (Melhuish et al., 2008), while social and routine activities have been found to be important for both cognitive and non-cognitive development (Kelly et al, 2011). In our analysis since we are modelling only child behaviour, related to non-cognitive development, we include social and routine activities to capture parental investment in the child, specifically: regular bed times, regular meal times, and TV watching.

X_0 is the vector of variables which captures initial conditions and includes the following: birth weight, mother's education, and child's ethnicity. Birth weight is included as a proxy for genetic endowments and prenatal resources (Del Bono et al., 2012); mother's education is included to capture both the impact it has on reported child behaviour and to capture any early socio-economic disadvantage the child may face (see section 2); and child's ethnicity is included to capture the differential outcomes at birth (gestation and birth weight), by ethnicity (Dearden et al., 2006).

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[6] See Todd and Wolpin (2007) for full discussion of the endogeneity issue.

X_{t-1} is a vector of further variables that can have an impact on child behaviour, and we include these with a lag to address possible endogeneity. These include dummies for: poor households; sibling type; and single mother households (all variables defined as in the parental belief model above). In addition, maternal depression, measured by the Kessler psychological distress scale (Kessler et al., 2002 and 2010), is included. The scale ranges from 0 to 24, with a score of 12 or more considered as 'high risk' of depression. X_t contains two dummy variables one for sibling type and another for single mother household. These two variables are included at both time t and t-1 to capture family stability, as changes in family composition and dynamics can have a significant impact on child behaviour, controlling for everything else.

PB is the vector of pre-determined parental beliefs regarding the treatment of sons and daughters. This is captured by two dummies: one for 'neither agree or disagree' (NAD) and the other for 'agree or strongly agree' (A+SA), i.e. son bias; the omitted (base) category is 'disagree or strongly disagree'. The parental belief question is only asked in wave 3. Potential endogeneity between parental beliefs and reported child behaviour is addressed by including lagged parental beliefs from $t-1$. Beliefs are slow changing (Armstrong, 2012), and we hypothesise that reverse causality from child behaviour prior to wave 3 to parental beliefs at wave 3 is negligible compared to the effect of parental belief at wave 3 on child behaviour at wave 4. This is an empirical question, but cannot be tested in the MCS.

To address the issue of reporter bias we model the behaviour of the children both as reported by the mother and by the teachers.[7] We thus estimate relationship (2) using CB_t as reported by mothers for the whole sample of analysis; and then the analysis is repeated using CB_t as reported by teachers for the subsample where this is available. In all cases CB_{t-1} is always mother-reported. Two different specifications of equation (2) are estimated. One is a linear regression with continuous BPI as the dependent variable. The second specification converts the continuous BPI into a categorical indicator (CBPI) of child behaviour. CBPI takes three values: $k = 0$ for normal behaviour; $k = 1$ for borderline behaviour; and $k = 2$ for abnormal behaviour; it is estimated using the OLM (similar to the model described in equation (1)). In each case the analysis is done separately for boys and girls.

All variable definitions are given in Appendix, Table A1. Descriptive statistics for control variables of interest are reported in Table 4; the first column reports the descriptive statistics for the whole sample and the second column reports the descriptive statistics for sample for which we have teacher-reported

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[7]If we believe parental beliefs not only impacts on child behaviour but also results in a bias in parent reported behavior then looking at the impact of parental beliefs on teacher-reported behaviour will address the reporter bias arising from parental beliefs as well.

statistics; the descriptive statistics are not statistically different across the two samples. The majority of the cohort children we use in our analysis are first born (about 42%), which explains the low average of the variable birth order, while 35% of the children have an elder male sibling; about 42% of the children have mothers and fathers (where present) with high education; 22% of the cohort children live in poor households; 16% of the children are from single-mother households; and 94% of the fathers (where present) work.

5. Results

5.1. Determinants of Parent's Beliefs

Table 5 reports the model of the mother's and father's beliefs (equation 1). The first three columns are for the mother's beliefs: all mothers (column 1), single mothers (column 2), and dual parent mothers (column 3). The fourth column is for father's beliefs for fathers in dual parent households.

The Mother's Beliefs

A positive coefficient represents a higher probability of son bias. The table shows that the girl coefficient is significant and negative through all three models controlling for ethnicity: i.e. mothers of White girls are less likely to agree to the statement compared to mothers of White boys regardless of her couple status. Amongst mothers of boys, none of the ethnic groups are robustly significantly different from White boys across the mother's status. Single mothers of mixed ethnicity boys are more likely, while dual parent mothers of Pakistani and Bangladeshi (and Other) boys are less (more) likely, to agree with the statement. None of ethnic minority groups have robust boy/girl differences across the mother's status. Single mothers of mixed ethnicity girls are significantly less likely to agree with the statement, relative to mothers of a boy of the same ethnic group, whereas dual parent mothers with a Pakistani and Bangladeshi or Black girl are more likely to agree with the statement, relative to mothers of a boy of the same ethnic group. The whole sample shows that poor, less educated, or single mothers are more likely to agree with the statement than those who are not. Amongst dual parent mothers, those living with a better-educated partner are less likely to agree with the statement.

The results are unaffected by a series of robustness checks (results not reported here). First, we included two dummy variables taking the value 1 if the mother works part-time (or full time) and 0 otherwise. The coefficients were not statistically significant, and dropping them from the analysis does not alter any other coefficients. Second, including the father's beliefs in the regressions as a control variable for the dual parent mothers' subsample does not change the reported results. (However, there is a positive association between the mother's and the father's beliefs.) Third, the specifications were estimated on the subsample of children for whom teacher-reported behaviour at age 7 is available, and the results are qualitatively similar to those reported in Table 5. Fourth, a generalised ordered logit

model was carried out instead of the OLM, the model does not violate the parallel lines assumptions, indicating that the OLM has the correct fit.

The Father's Beliefs

Column 4 of Table 5 reports the coefficients for the model estimated for the father's beliefs. This is the sub-sample of dual parent households where the father's answers are available. The girl coefficient is significant and negative: i.e. fathers of White girls are less likely to agree with the statement compared to fathers of White boys. Fathers of Black boys are more likely to agree with the statement, relative to fathers of White boys. Fathers from poor households, fathers who are less educated, or who do not work are more likely to agree with the statement than those who are not. Unlike the result above, where mothers living with educated fathers are less likely to agree with the statement, the mother's education seems to have no impact on the father's beliefs.

The results are unaffected by a series of robustness checks (results not reported here). First, including the mother's beliefs in the regressions as a control variable for the dual parent fathers' subsample does not change the results. Second, the specifications were estimated on the subsample of children for whom teacher-reported behaviour at age 7 is available, and the results are qualitatively similar to those reported in Table 4. Third, a generalised ordered logit model was carried out instead of the OLM: the model does not violate the parallel lines assumptions, indicating that the OLM has the correct fit.

5.2 Determinants of child behaviour
Mother-reported behaviour

Table 6 reports the model of child behaviour at age 7 as reported by the mother (equation 2). The sample is broken up by the gender of the child and two separate models are run for each: an OLS model using BPI; and an OLM model using CBPI. In all four models, a higher value of the dependent variable indicates worse behaviour. Thus, positive coefficients for OLS and coefficients that are larger than 1 in the OLM imply association with worse behaviour.

Across all four models, the coefficient for past child behaviour (i.e. behaviour at age 5) is highly significant and indicates a persistence in child behaviour. A child with problematic behaviour at age 5 is highly likely to have problematic behaviour at age 7. In line with the literature, both poverty and maternal depression have a highly significant and detrimental effect on the behaviour of the children. Children from poor households and with depressed mothers are more likely to have higher BPI and more likely to exhibit borderline and abnormal behaviour (BB and AB). Higher birth weight is associated with fewer behavioural problems, though it is not significant for girls. Boys with better educated mothers are less likely to exhibit behaviour problems. Positive parental inputs (i.e. regular bed

times and meal times, and less TV watching), though not always significant, are associated with better child behaviour. Having siblings has a mixed effect, depending on the timing (although not all parameters are significant): having no siblings or only natural siblings (sibling type =1) at age 5 followed by =0 at age 7 is associated with the highest level of behavioural problems at age 7, whilst the opposite (=0 at age 5 and =1 at age 7) has a lower level than the baseline (=0 at both ages). Single parenthood status of the mother, when the child is age 7, has a significant, detrimental, impact on only the BPI reported for girls.

When we model child behaviour as a categorical variable (CBPI) i.e. using the OLM, none of the ethnicity coefficients are significant. For the continuous indicator (BPI) relative to White children of the same gender: boys from Mixed, Black, and Pakistani and Bangladeshi ethnic groups on average have a lower BPI; and Other girls on average have lower BPI.

The mother's beliefs have no impact on the behaviour of the boys, but have a significantly detrimental effect on the behaviour of the girls. If the mother of a girl is in the NAD or A+SA group with respect to the statement, her daughter will have a significantly higher BPI, and be significantly more likely to have borderline or abnormal behaviour, relative to mothers in the baseline group (D+SD).

Teacher-reported behaviour

Table 7 reports the results for the model of child behaviour, as reported by the teachers. The first two columns concern BPI. As with the mother-reported behaviour (Table 5), there is a significant persistence in the behaviour of the child over time, although much less when age 7 behaviour is teacher-reported: this could be due to the fact that behaviour at age 5 is mother-reported. Higher birth weight is associated with lower behavioural problems, and is now significant for both boys and girls. Poverty has a detrimental impact on the behaviour of both boys and girls, whereas maternal depression is associated with worse behaviour in boys only. Regarding the mother's beliefs, the dummies for NAD and A+SA are not significant in teacher-reported behaviour for boys. For girls only the A+SA dummy is significantly associated with higher BPI.

For the prevalence of BB and AB (last two columns of Table 7): as with the mother-reported behaviour, there is a significant persistence in the teacher-reported behaviour over time; and higher birth weight is associated with lower behavioural problems for both boys and girls. Poverty has a detrimental impact on the behaviour of both boys and girls, whereas maternal depression is associated with worse behaviour in boys only. Regarding the mother's beliefs, as before, the dummies for NAD and A+SA are not significant for boys; for girls only the A+SA dummy is significantly associated with higher probability of BB and AB behaviour.

Like the mother-reported behaviour, for the continuous indicator (BPI), relative to White children of the same gender: boys from Indian and Pakistani and Bangladeshi ethnic groups on average have a lower BPI; and Pakistani and Bangladeshi girls on average have lower BPI. When we model child behaviour as a categorical variable (CBPI), unlike the mother-reported behaviour where none of the ethnicity coefficients were significant, we now find significant ethnicity coefficients. Teachers report a significantly lower incidence of BB and AB for Indian and Pakistani and Bangladeshi boys and Pakistani and Bangladeshi girls, relative to White children of the same gender.

Comparing mother-reported child behaviour for the sample of children for whom there are teacher-reported data with that for the wider sample, the results are qualitatively similar across the samples (results available from authors).

Robustness checks

The results are unaffected by a series of robustness checks (results not reported here). First, a generalised ordered logit model (GOLM) was carried out instead of the OLM for modelling CBPI; in all cases the GOLM was rejected in favour of the OLM. Second, regular meal times, regular bed times, and TV watching were treated as separate categorical variables, instead of treating them as continuous variables; this did not change the results in any way. Third, we estimate the model with a much larger set of parental investments, by including the proxies for 'home learning environments'; this does not change the results presented here and the impact of these variables are largely insignificant. Fourth, the above models (for mother-reported behaviour) were re-estimated using dummies for the father's beliefs instead of the mother's beliefs. Whether we control for the father's beliefs only or for both the father's and the mother's beliefs, the dummies for the father's beliefs remained insignificant. We still observe the persistence in child behaviour; negative impact of poverty and maternal depression; and less behavioural problems in children where sibling type = 1 when age 7.

6. Conclusion

This paper has used the MCS data to examine the relationship between son bias in the parents' beliefs and problem behaviour in their children. We first model the determinants of parental belief when the child is aged 5 using an ordered logit model, and second, the determinants of child behaviour when the child is aged 7. Child behaviour across the range is captured as a continuous variable (BPI) and at the severe end as a categorical variable (CBPI). For a subset of children, teacher-reported behaviour is also modelled. The teacher-reported child behaviour was modelled as a measure that is independent of parent characteristics.

For parental beliefs we find: poor, less educated, and single mothers are more likely to agree to the statement than those who are not; similarly, fathers who are poor, less educated, and do not work are more likely to agree to the statement than other fathers. Looking across the gender and ethnicity of the child, the only robust finding is that parents (both mothers and fathers) of White girls are less likely to report son bias compared to parents of White boys.

For mother-reported child behaviour, our findings suggest there is significant persistence in child behaviour: a child with behavioural problems at age 5 on average has more behavioural problems (higher BPI) and more likely to exhibit borderline or abnormal behaviours (BB and AB) at age 7. Consistent with the literature we also find that poor and depressed mothers report higher behavioural problems; and better initial endowments, as captured by birth weight and mother's education, are associated with lower behavioural problems for boys only. Girls with single mothers on an average have more behavioural problems, but it has no significant impact on borderline and abnormal behavioural; and ethnicity has no significant effect on child behaviour.

Teacher-reported behaviour on an average is lower than mother-reported behaviour. Similar to the mother-reported behaviour, for the teacher-reported behaviour we find persistence in child behaviour; higher birth weight is associated with lower behavioural problems; poverty has a detrimental impact on the behaviour of both boys and girls; and maternal depression is associated with worse behaviour (in boys only). However, there are differences as well: maternal education has no impact on teacher-reported behaviour; single motherhood has a detrimental effect on the behaviour of boys, both across the spectrum and in terms of borderline/abnormal behaviour; and Pakistani and Bangladeshi Indian children have lower behavioural problems.

The mother's beliefs have no impact on the behaviour of the boys, but have a detrimental effect on the behaviour of the girls. If the mother of a girl is in the NAD or A+SA group with respect to the statement, her daughter will have a significantly more behavioural problems, and be significantly more likely to have borderline or abnormal behaviour, relative to mothers in the baseline group (D+SD). This finding is robust to both mother-reported and teacher-reported behaviour.

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FIGURE 1: The mother's belief by ethnicity
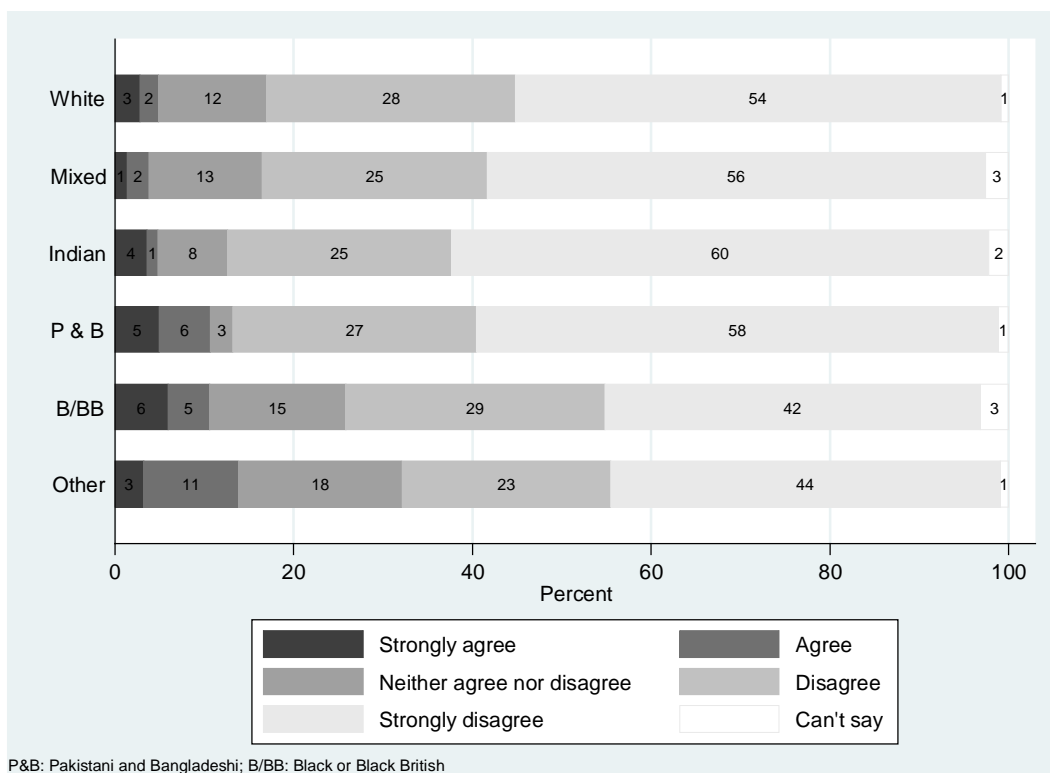
P&B: Pakistani and Bangladeshi; B/BB: Black or Black British

Notes: In wave 3, the mother and father were asked to indicate whether they agreed or disagreed with the statement: *'Sons in families should be given more encouragement than daughters to do well at school'*. The figure above gives the response of the mother, by ethnicity of the child.

FIGURE 2: The father's belief by ethnicity
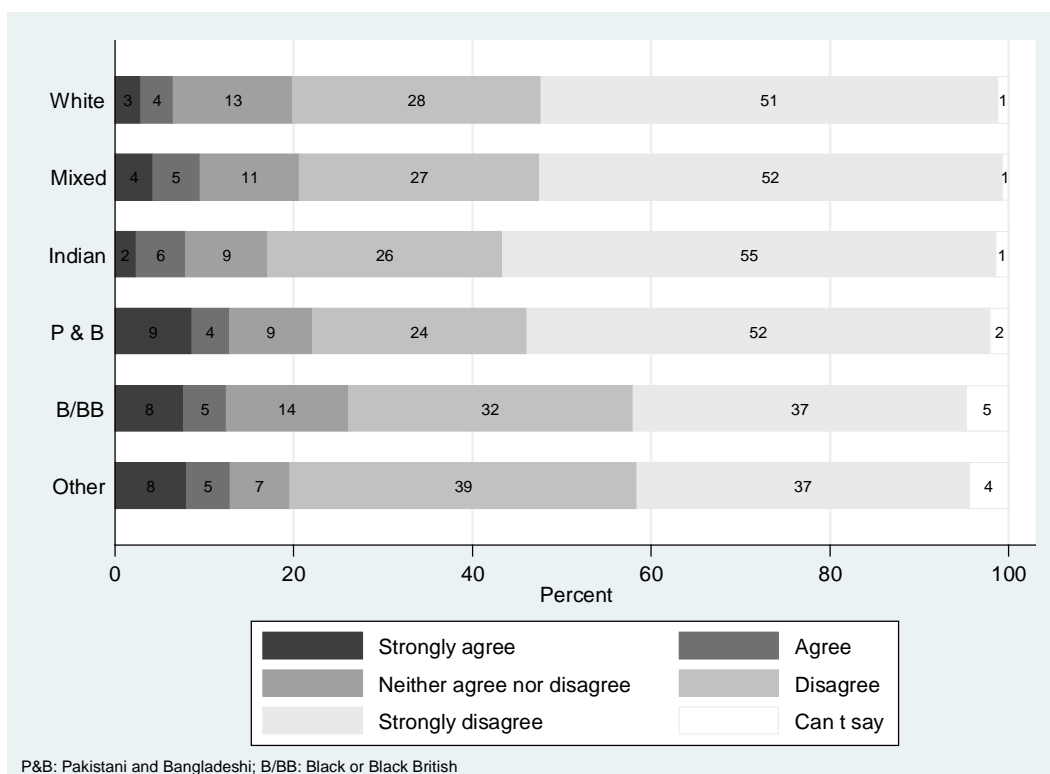
P&B: Pakistani and Bangladeshi; B/BB: Black or Black British

Notes: In wave 3, the mother and father were asked to indicate whether they agreed or disagreed with the statement: *'Sons in families should be given more encouragement than daughters to do well at school'*. The figure above gives the response of the father, by ethnicity of the child.

FIGURE 3: Mother-reported child behaviour by the gender of the child, Age 7
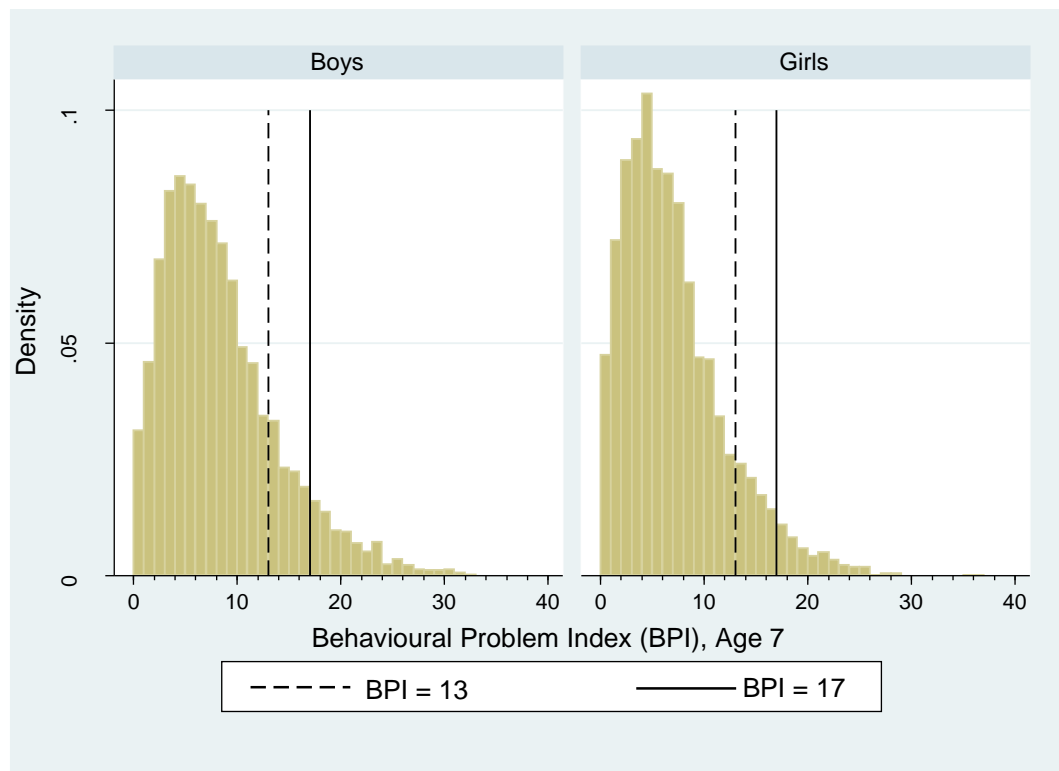
Notes: Child behaviour is assessed using the Strength and Difficulty Questionnaire (SDQ). Borderline Behaviour (BB): mother-reported BPI > 13; Abnormal Behaviour (AB): mother-reported BPI > 17

FIGURE 4: Teacher-reported child behaviour by the gender of the child, Age 7
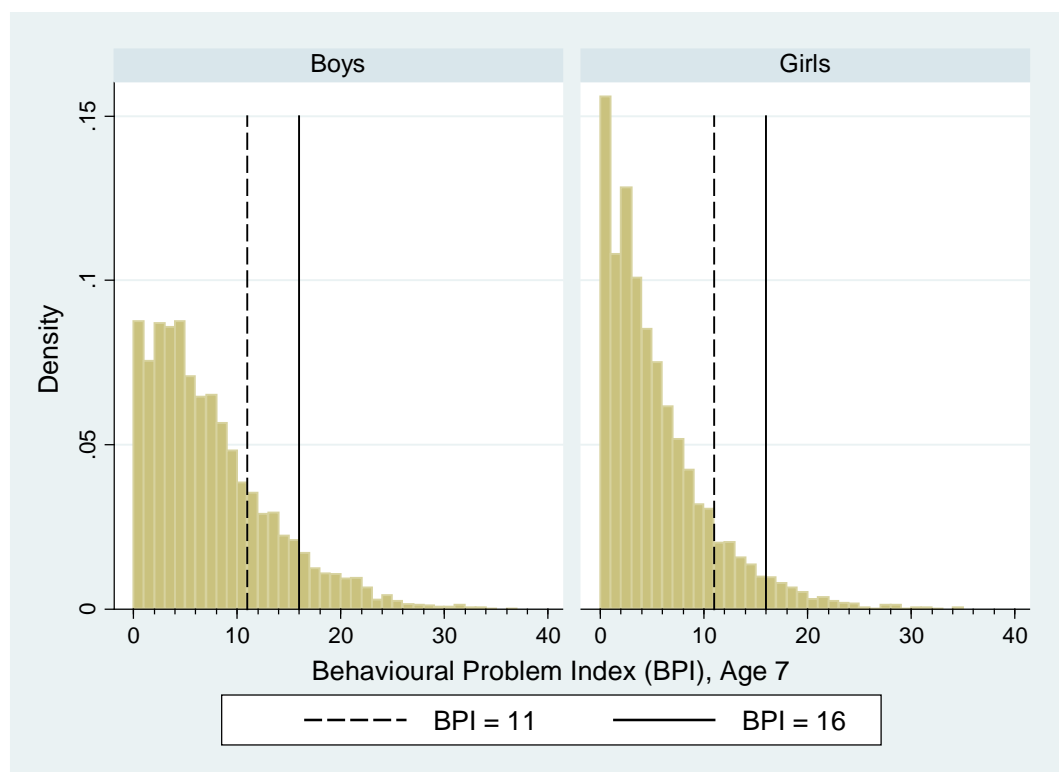
Notes: Child behaviour is assessed using the Strength and Difficulty Questionnaire (SDQ). Borderline Behaviour (BB): teacher-reported BPI > 11; Abnormal Behaviour (AB): teacher-reported BPI > 16

TABLE 1: SDQ scoring and cut-offs

	Normal Behaviour (NB)	Borderline Behaviour (BB)	Abnormal Behaviour (AB)
Parent Completed	0-13	14-16	17-40
Teacher Completed	0-11	12-15	16-40

Notes: Cut-off points have been taken from: 'Scoring the Informant-Related Strength and Difficulties Questionnaire' www.sdqinfo.com. Abnormal scores can be used to identify likely "cases" with mental health disorders. (Emphasis on "cases" is in original.)

TABLE 2: Descriptive statistics for mother-reported child behaviour by ethnicity and gender

| | Age 5 | | | Age 7 | | | |
	BPI	% BB	% AB	BPI	% BB	% AB	N (%)
Panel A: All Children [1]							
Total Boys	7.27	5.44	5.36	7.62	6.23	7.43	5,639 (100)
	(4.93)			(5.47)			
Total Girls	6.33***	4.08***	3.01***	6.38***	5.41*	4.03***	5,520 (100)
	(4.36)			(4.78)			
Panel B: Boys by Ethnicity [2]							
White	7.20	5.16	5.17	7.59	6.06	7.47	5028 (89)
	(4.90)			(5.49)			
Mixed	7.71	6.56	6.46	7.50	8.35	6.05	129 (2)
	(5.15)			(5.29)			
Indian	7.74	6.07	4.43	7.85	6.65	4.86	123 (2)
	(4.67)			(4.75)			
Pakistani and Bangladeshi	9.40***	10.8***	10.8**	8.94**	12.97***	6.45	180 (3)
	(5.41)			(5.14)			
Black or Black British	7.75	12.07***	6.98	7.45	3.84	10.13	130 (2)
	(5.35)			(5.75)			
Other Ethnic groups	8.21	7.41	10.36	8.38	9.42	8.05	49 (1)
	(5.73)			(4.71)			
Panel C: Girls by Ethnicity [3]							
White	6.24	3.74	2.91	6.32	5.29	3.88	4880 (88)
	(4.31)			(4.74)			
Mixed	6.99**	3.89	4.89	7.27**	8	5.86	154 (3)
	(4.37)			(5.28)			
Indian	6.52	5.79	2.4	5.89	5.98	4.58	116 (2)
	(4.80)			(5.60)			
Pakistani and Bangladeshi	8.69***	11.83***	6.97**	7.92***	7.14	5.21	206 (4)
	(5.27)			(4.61)			
Black or Black British	7.08*	12.14***	0.8	6.84	6.35	6.08	117 (2)
	(4.37)			(4.89)			
Other Ethnic groups	6.68	5.14	2.47	5.69	0.98	6.95	47 (1)
	(5.37)			(5.08)			

Notes: ( ) Standard deviation

BPI = Behavioural Problem Index; BB = Borderline Behaviour; AB = Abnormal Behaviour.

1. *** $p<0.01$, ** $p<0.05$, * $p<0.1$: these are for the significance levels for the difference between the mother-reported behaviour for boys and girls; where the null hypothesis is of no difference.

2. *** $p<0.01$, ** $p<0.05$, * $p<0.1$: these are for the significance levels for the difference between the mother-reported behaviour for boys of non-white ethnicity and White boys; where the null hypothesis is of no difference.

3. *** $p<0.01$, ** $p<0.05$, * $p<0.1$: these are for the significance levels for the difference between the mother-reported behaviour for girls of non-white ethnicity and White girls; where the null hypothesis is of no difference.

TABLE 3: Descriptive Statistics for teacher-reported child behaviour by ethnicity and gender

Child's Ethnicity	Age 7 – Mother-Reported			Age 7 – Teacher-Reported			N (%)
	BPI	% BB	% AB	BPI	% BB	% AB	
Panel A: All Children							
Total Boys	7.43	5.39	7.31	6.78***	9.78***	8.44***	3667
	(5.43)			(5.67)			(100)
Total Girls	6.27	5.45	4	4.93***	5.58*	5	3610
	(4.70)			(4.93)			(100)
Panel B: Boys by Ethnicity							
White	7.40	5.26	7.32	6.81***	9.91***	8.54***	3322
	(5.46)			(5.68)			(91)
Mixed	7.77	6.73	6.69	6.75	3.55	10.92	84
	(4.99)			(6.10)			(2)
Indian	7.04	3.94	5.26	4.54***	4.9	1.32	72
	(4.55)			(4.30)			(2)
Pakistani and Bangladeshi	8.94	14.46	6.2	6.27***	11.92	3.74	93
	(5.30)			(4.78)			(3)
Black or Black British	7.28	4.45	8.93	8.11	16.86**	12.77	72
	(5.24)			(6.33)			(2)
Other Ethnic groups	8.25	3.28	12.86	5.30***	1.32	0*	24
	(4.51)			(3.68)			(1)
Panel B: Girls by Ethnicity							
White	6.22	5.34	3.41	4.93***	5.53*	4.48	3275
	(4.66)			(4.95)			(91)
Mixed	7.64	11.9	7.47	5.25***	7.68	6.9	80
	(5.40)			(5.05)			(2)
Indian	6.01	7.8	3.29	4.09***	2.4	0.61	66
	(5.58)			(3.81)			(2)
Pakistani and Bangladeshi	7.67	2.89	5.25	4.98***	8.33	4.95	99
	(4.54)			(4.91)			(3)
Black or Black British	5.99	4.3	1.54	4.87	7.64	3.82	61
	(4.29)			(4.70)			(2)
Other Ethnic groups	6.27	0	7.78	5.12**	1.06	9.2	29
	(4.80)			(4.55)			(1)

( ) Standard deviation

BPI = Behavioural Problem Index; BB = Borderline Behaviour; AB = Abnormal Behaviour.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$: these are for the difference between the teacher-reported and mother-reported behaviour; where the null hypothesis is of no difference.

TABLE 4: Sample means (SD) for all variables

Variables	All	Sample with teacher-reported behaviour at age 7
Wave 1 (age 9 months)		
Birth weight	3.40 (0.56)	3.41 (0.56)
Birth order	0.87 (0.97)	0.86 (0.97)
Elder male sibling	0.35	0.35
Mother education	0.42	0.43
Father education[1]	0.43	0.44
Child's ethnicity		
Mixed	0.03	0.02
Indian	0.02	0.01
P&B	0.02	0.02
Black	0.02	0.01
Other	0.01	0.01
Wave 3 (age 5 years)		
Poverty	0.22	0.20
Maternal depression	2.96 (3.56)	2.85 (3.45)
Sibling type	0.86	0.86
Single mother	0.16	0.15
Reg bed time	2.53	2.54
Reg meal time	2.54	2.55
TV watching	1.90	1.90
Father work[1]	0.94	0.94
Parental Belief		
Mother NAD	0.13	0.13
Mother A+SA	0.05	0.05
Father NAD[2]	0.14	0.14
Father A+SA[2]	0.07	0.07
Wave 4 (age 7 years)		
Sibling Type	0.84	0.84
Single parent	0.17	0.17
N	**11159**	**7277**

1. Sample size = 8659 for All, 5744 for sample with teacher-reported behaviour, and 2915 for sample with no teacher-reported behaviour.
2. Sample size = 7824 for All, 5242 for sample with teacher-reported behaviour, and 2582 for sample with no teacher-reported behaviour.

See Table A1 in Appendix for variable definitions.

TABLE 5: Determinants of Parents Beliefs, Ordered Logit Model

	(1) Mothers: All	(2) Mothers: Single	(3) Mothers: Duals	(4) Fathers: Duals
Girl	-0.400***	-0.314**	-0.417***	-0.333***
	(0.062)	(0.135)	(0.071)	(0.067)
Birth order	-0.028	0.058	-0.040	-0.039
	(0.038)	(0.078)	(0.044)	(0.045)
Elder male sibling	0.117	-0.038	0.144*	0.075
	(0.075)	(0.165)	(0.086)	(0.087)
Child's ethnicity				
Mixed	0.251	0.715**	-0.081	0.263
	(0.213)	(0.326)	(0.320)	(0.285)
Indian	-0.361	-0.023	-0.422	0.110
	(0.318)	(0.797)	(0.354)	(0.320)
P&B	-0.543**	0.132	-0.819***	-0.266
	(0.255)	(0.565)	(0.311)	(0.379)
Black	0.176	0.441	-0.006	0.594*
	(0.226)	(0.299)	(0.398)	(0.356)
Other	1.192***	0.262	1.421***	0.584
	(0.364)	(0.805)	(0.403)	(0.544)
Interaction between dummy for girl and child's ethnicity				
G*Mixed	-0.546	-1.029*	-0.133	-0.524
	(0.343)	(0.535)	(0.480)	(0.473)
G*Indian	0.418	-0.101	0.562	-0.495
	(0.468)	(1.160)	(0.506)	(0.519)
G*P&B	0.461	-0.594	0.797**	0.810
	(0.347)	(0.999)	(0.401)	(0.496)
G*Black	0.799**	0.011	1.173**	0.036
	(0.344)	(0.442)	(0.554)	(0.599)
G*Other	-0.954*	-0.749	-0.933	-0.952
	(0.543)	(1.205)	(0.605)	(0.771)
Poverty	0.287***	0.022	0.337***	0.310***
	(0.075)	(0.139)	(0.098)	(0.098)
Mother education	-0.275***	-0.540***	-0.174**	0.033
	(0.064)	(0.170)	(0.075)	(0.073)
Sibling type	0.040	0.063	0.020	-0.153
	(0.086)	(0.159)	(0.106)	(0.101)
Single mother	0.261***			
	(0.081)			
Father education			-0.179**	-0.141*
			(0.076)	(0.073)
Father work			-0.127	-0.362***
			(0.128)	(0.127)
Cut 1	1.401***	0.977***	1.237***	0.687***
	(0.102)	(0.206)	(0.173)	(0.166)
Cut 2	2.830***	2.519***	2.639***	2.005***
	(0.109)	(0.223)	(0.180)	(0.169)
N	11,159	2,017	8,659	7,824

Dependent variable: 1 = disagree and strongly disagree; 2 = neither agree nor disagree (NAD); 3 = strongly agree and agree (A+SA).

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

See Table A1 in Appendix for variable definitions.

TABLE 6: Determinants of mother-reported child behaviour

| VARIABLES | BPI age 7, OLS | | CBPI‡ age 7, Ordered Logit | |
	Boys	Girls	VARIABLES — Girls	Boys
	Estimated coefficients		*Odds ratios*	
CB_{t-1}				
BPI, age 5	0.751***	0.721***		
	(0.011)	(0.012)		
BB, age 5			8.190***	12.53***
			(1.189)	(2.170)
AB, age 5			24.31***	27.96***
			(3.821)	(5.898)
X_0				
Birth weight	-0.195**	-0.078	0.791***	0.852
	(0.089)	(0.086)	(0.067)	(0.093)
Mother education	-0.180*	-0.053	0.809*	0.918
	(0.109)	(0.101)	(0.093)	(0.136)
Child's ethnicity				
Mixed	-0.596*	0.199	0.819	1.279
	(0.328)	(0.279)	(0.251)	(0.459)
Indian	-0.205	-0.588	0.772	1.121
	(0.417)	(0.375)	(0.301)	(0.699)
P&B	-0.749*	-0.429	0.636	0.591
	(0.387)	(0.333)	(0.200)	(0.215)
Black	-0.841**	-0.455	0.595	0.753
	(0.390)	(0.375)	(0.199)	(0.285)
Other	-0.343	-1.105*	0.690	0.918
	(0.629)	(0.580)	(0.553)	(0.510)
X_{t-1}				
Poverty	0.674***	0.475***	1.553***	1.325*
	(0.144)	(0.129)	(0.196)	(0.211)
Maternal depression	0.062***	0.054***	1.057***	1.079***
	(0.016)	(0.014)	(0.013)	(0.015)
Sibling type, age 5	0.651**	0.382	1.342	1.572
	(0.305)	(0.294)	(0.332)	(0.478)
Single mother, age 5	-0.131	-0.208	0.895	0.994
	(0.209)	(0.185)	(0.159)	(0.208)
PI_{t-1}				
Reg bed time	-0.073	0.054	1.043	0.862**
	(0.072)	(0.064)	(0.066)	(0.063)
Reg meal time	-0.016	-0.137*	0.869*	0.916
	(0.080)	(0.076)	(0.065)	(0.077)
TV watching	0.320***	0.035	1.284***	1.120
	(0.083)	(0.073)	(0.110)	(0.103)
X_t				
Sibling type, age 7	-0.992***	-0.572**	0.609**	0.520**
	(0.287)	(0.281)	(0.138)	(0.149)
Single mother, age 7	0.300	0.611***	1.217	1.220
	(0.189)	(0.173)	(0.197)	(0.248)
PB_{t-1}				
NAD	0.155	0.635***	1.231	1.652***
	(0.141)	(0.153)	(0.168)	(0.312)
A+SA	0.062	0.458**	1.159	1.404*
	(0.225)	(0.217)	(0.249)	(0.279)
Constant	2.446***	1.998***		
	(0.461)	(0.429)		
Cut1			7.124***	8.809***
			(2.990)	(4.550)
Cut2			17.96***	29.99***
			(7.566)	(15.57)
Observations	5,639	5,520	5,639	5,520
R-squared	0.526	0.493		

‡ Categorical Behavioural Problem Index (CBPI): 0 = normal behaviour (NB); 1 = borderline behaviour (BB); 2 = abnormal behaviour (AB). Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. See Table A1 in Appendix for variable definitions.

TABLE 7: Determinants of teacher-reported child behaviour

VARIABLES	BPI age 7, OLS		VARIABLES	CBPI‡ age 7, Ordered Logit
	Boys	Girls		Boys
	Estimated coefficients			*Odds ratios*
CB_{t-1}				
BPI, age 5	0.356***	0.270***		
	(0.0200)	(0.0199)		
BB, age 5				2.905***	2.905***
				(0.533)	(0.716)
AB, age 5				3.741***	3.167***
				(0.711)	(0.832)
X_0				
Birth weight	-0.448***	-0.531***		0.800***	0.663***
	(0.155)	(0.147)		(0.069)	(0.090)
Mother education	-0.186	-0.173		0.947	0.914
	(0.186)	(0.170)		(0.108)	(0.139)
Child's ethnicity				
Mixed	-0.745	-0.346		0.578	1.157
	(0.573)	(0.517)		(0.193)	(0.428)
Indian	-2.299***	-0.982		0.236**	0.234**
	(0.745)	(0.643)		(0.158)	(0.138)
P&B	-1.911***	-1.117*		0.436**	0.851
	(0.732)	(0.633)		(0.150)	(0.296)
Black	0.149	-1.070		1.026	0.697
	(0.738)	(0.727)		(0.314)	(0.298)
Other	-2.136*	-0.507		0.043***	0.804
	(1.268)	(1.064)		(0.045)	(0.864)
X_{t-1}				
Poverty	0.675**	0.836***		1.283*	1.466**
	(0.263)	(0.224)		(0.168)	(0.261)
Maternal depression	0.0536*	0.030		1.047***	1.023
	(0.0276)	(0.024)		(0.014)	(0.016)
Sibling type, age 5	0.008	0.551		0.981	1.403
	(0.533)	(0.517)		(0.263)	(0.570)
Single mother, age 5	0.432	0.880***		1.170	1.372
	(0.382)	(0.321)		(0.233)	(0.325)
PI_{t-1}				
Reg bed time	-0.064	-0.217*		0.908	0.892
	(0.128)	(0.111)		(0.0580)	(0.080)
Reg meal time	-0.271**	-0.016		0.871*	0.899
	(0.137)	(0.130)		(0.065)	(0.086)
TV watching	0.033	-0.029		1.086	0.958
	(0.142)	(0.125)		(0.093)	(0.099)
X_t				
Sibling type, age 7	-0.792	-0.527		0.720	0.764
	(0.501)	(0.498)		(0.176)	(0.303)
Single mother, age 7	1.007***	0.262		1.589**	1.049
	(0.344)	(0.300)		(0.294)	(0.248)
PB_{t-1}				
NAD	-0.392	0.0374		0.889	1.148
	(0.242)	(0.265)		(0.123)	(0.240)
A+SA	0.235	1.114***		0.988	2.042***
	(0.390)	(0.376)		(0.205)	(0.511)
Constant	6.983***	5.269***			
	(0.809)	(0.734)			
cut1				1.531	1.881
				(0.653)	(1.190)
cut2				4.006***	4.654**
				(1.693)	(2.989)
Observations	3,667	3,610		3,667	3,610
R-squared	0.152	0.108			

‡ Categorical Behavioural Problem Index (CBPI): 0 = normal behaviour (NB); 1 = borderline behaviour (BB); 2 = abnormal behaviour (AB). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See Table A1 in Appendix for variable definitions.

TABLE A1: Variable definition

Variable	Definition
Wave 1 (age 9 months)	
Birth weight	Birth weight of the child in kilos
Birth order	Social birth order of the child
Elder male sibling	Dummy variable; takes value 1 if there is an elder male sibling in the family, 0 otherwise
Mother education	Dummy variable; takes value 1 if mother has NVQ 4 or 5 or higher, 0 otherwise
Father education	Dummy variable; takes value 1 if father has NVQ 4 or 5 or higher, 0 otherwise
Child's ethnicity	
Mixed	Dummy variable; takes value 1 if child is Mixed, 0 otherwise
Indian	Dummy variable; takes value 1 if child is Indian, 0 otherwise
P&B	Dummy variable; takes value 1 if child is Pakistani or Bangladeshi, 0 otherwise
Black	Dummy variable; takes value 1 if child is Black or Black British, 0 otherwise
Other	Dummy variable; takes value 1 if child is from some other ethnicity, 0 otherwise
Wave 3 (age 5 years)	
Poverty	Dummy variable; takes value 1 if the family is in poverty, defined as equivalised family income less than 60% of the median income, 0 otherwise
Maternal depression	Measured by Kessler psychological distress scale, the scale ranges from 0 to 24.
Sibling type	Dummy variable; takes value 1 if the 'sibling type' is such that the child has either no siblings or only natural siblings in the household, 0 otherwise
Single mother	Dummy variable; takes value 1 if it is a single mother household, 0 otherwise
Reg bed time	Question: Regular bedtime on term-time weekdays Categorical variable: 0 = never or almost never (4%); 1 = sometimes (4%); 2 = usually (27%); 3 = Always (65%)
Reg meal time	Question: Eats at regular times Categorical variable: 0 = never or almost never (2%); 1 = sometimes (3%); 2 = usually (33%); 3 = Always (61%)
TV watching	Question: Hours per term-time weekday watching tv/dvd Categorical variable: 0 = none (2%); 1 = up to one hour (20%); 2 = one to three hours (65%); 3 = more than 3 hours (13%)
Father work	Dummy variable; takes value 1 if father works, 0 otherwise
Parental Belief	
Mother NAD	Neither Agree or Disagree
Mother A+SA	Agree or Strongly Agree
Father NAD	Neither Agree or Disagree
Father A+SA	Agree or Strongly Agree
Wave 4 (age 7 years)	
Sibling Type	Same as above
Single parent	Same as above