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Abstract

This paper shows that there are large differences in cognitive and socio-emotional development between children from rich and poor backgrounds at the age of 3, and that this gap widens by the age of 5. Children from poor backgrounds also face much less advantageous "early childhood caring environments" than children from better off families. For example we identify differences in poor children's and their mothers' health and well-being (e.g. birth-weight, breast-feeding, and maternal depression); family interactions (e.g. mother child closeness); the home learning environment (e.g. reading regularly to the child); parenting styles and rules (e.g. regular bed-times and meal-times), and experiences of childcare by ages 3 and 5. Differences in the home learning environment, particularly at the age of 3 have an important role to play in explaining *why* children from poorer backgrounds experience lower levels of cognitive development than children from better off families. However, a much larger proportion of the gap remains unexplained, or appears directly related to other aspects of family background (such as mothers' age, and family size) that are not mediated through the early childhood caring environment. When it comes to socio-emotional development, a greater proportion of the socio-economic gap does appear to be related to differences in the early childhood caring environment.

Key words: home learning environment, early child development, socio-economic gap

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1. Introduction

Children growing up in poor families emerge from our schools with substantially lower levels of educational attainment. These educational deficits emerge early in children's lives, even before entry into school, and widen throughout childhood. Here, we examine some of the routes through which family socio-economic position (SEP) affects cognitive development in the early years up to age 5. Our focus is on a range of parenting behaviours, health and well being factors and family interactions. We refer to these factors collectively as the "early childhood caring environment." These have seldom been measured together in large datasets, preventing comprehensive empirical analysis of their role as predictors and consequences of poor child outcomes. In order to conduct this analysis we will follow children over time within the Millennium Cohort Study (MCS), a recent and detailed study of children born at the turn of the millennium. We examine both cognitive outcome and socio-emotional development (measured at ages 3 and 5).

This working paper should be read in conjunction with three other working papers (Gregg et al (2010); Chowdry et al (2010); and Crawford et al (2010)) that seek to examine the routes through which SEP affects educational attainment at later ages: at ages 7-11 using the Avon Longitudinal Study of Parents and Children; ages 11-16 using the Longitudinal Study of Young People in England; and across generations using the British Cohort Study. We have attempted to make these working papers as consistent with one another as possible, such that one can draw out common themes and connect conclusions across time. However, there will naturally be some differences in focus across these four working papers since the relevance and relative importance of different factors will differ across childhood. For instance, the two studies of outcomes and influences later in childhood place a greater importance than we do on child attitudes and aspirations, and on the role of schools. Goodman and Gregg (2010) summarise the findings from all these working papers and seek to draw out common themes, conclusions and policy implications.

The rest of this working paper proceeds as follows. Section 2 describes our theoretical and empirical framework. Section 3 describes the data and summary statistics, including the socio-economic gradients in early child outcomes and the early childhood caring environment. In section 4, we use multivariate regression techniques to explain the socio-economic gaps in child outcomes, both in terms of cognitive and socio-emotional development. In section 5 we ask whether we can also use measures of the early childhood caring environment to explain gradients across other dimensions, such as by ethnicity and lone parent status. In section 6 we investigate the determinants of selected measures of the early childhood caring environment in terms of pre-determined family and childhood characteristics. Section 7 concludes.

2 Theory and Methodology

Theoretical Approach

There is a wealth of empirical research to suggest that family income and poverty have strong consequences for child development, though to varying degrees and across different contexts (Blow et al, 2006; Brooks-Gunn & Duncan, 1997; Duncan & Brooks-Gunn, 1997; Duncan & Brooks-Gunn, 2000; Gregg and Machin, 1998; Haverman and Wolfe, 1995; Mayer, 1997; Sylva et al, 2008). This paper focuses on the mechanisms by which social and economic disadvantage may

translate into child outcomes. As such, the quantitative analysis undertaken in this paper is informed by a number of theoretical literatures that hypothesise different routes through which advantage and disadvantage may be transmitted from parents to children.

The economics literature has generally focused on theories of parental investment. For instance, in the Becker-Tomes model parents invest in their children's education because they care about their children's future well-being, investing up until the point that marginal benefit equals marginal cost (Becker and Tomes, 1986). Under this simple optimising theory, parental income should not influence child outcomes under the assumption that there are no credit constraints. Given that it seems unlikely that all families will be able to borrow against future earnings, poorer families may well not be able to invest optimal amounts (for more information on credit constraints see Carneiro and Heckman, 2002). Beyond credit constraints, other economic models suggest that a lack of income may place significant strains on poorer families, preventing them from providing a rich home-learning environment or reducing the quality of parenting (for a review of such models see Mayer, 1997).

The developmental psychology literature provides a detailed conceptual framework for studying the effects of parental beliefs, attitudes and practices on children's cognitive and social emotional development. Bronfenbrenner & Morris, 1998 (p.996) state that, "Throughout the life course, human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving bio-psychological human organism and the persons, objects, and symbols in its immediate external environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of *time*. Such enduring forms of interaction in the immediate environment are referred to as *proximal processes."* They further state that these proximal processes vary systemically with individual characteristics and contexts.

The sociological literature examines how family beliefs, attitudes and practices can be construed as social and cultural capital. For example, Bourdieu's work examines the role played by social and cultural capital in reproducing patterns of social and economic advantage and disadvantage (Bourdieu 1977a, 1977b; Bourdieu and Passeron 1977). Under the social capital theory, social relationships and networks create a resource which families can draw upon (Croll, 2004). Cultural capital reflects the idea that "cultural experiences in the home facilitate children's adjustment to school and academic achievement, thereby transforming cultural resources into what [Bourdieu] calls cultural capital (Lareau, 1987, p 74)."

In the past the developmental psychological literature has relied on observation, questionnaire and interview methods. It usually relies on research with small samples of about 100 families, and rich datasets. The sociological and economic literatures have usually relied on secondary analysis of existing datasets, many of which contain information on a limited number of variables. The current study attempts to use the extremely rich MCS data to bridge these three theoretical approaches/literatures.

Empirical research that does exist is far from definitive, but a number of potential pathways are frequently discussed in the literature (e.g. the home environment, quality of child care, parent-child relationships etc.), many of which have been included in the present conceptual/analytical framework, as outlined below.

Several studies have found that differences in the home environment, as measured by the HOME scale (which includes items on household resources, such as reading materials and toys, and

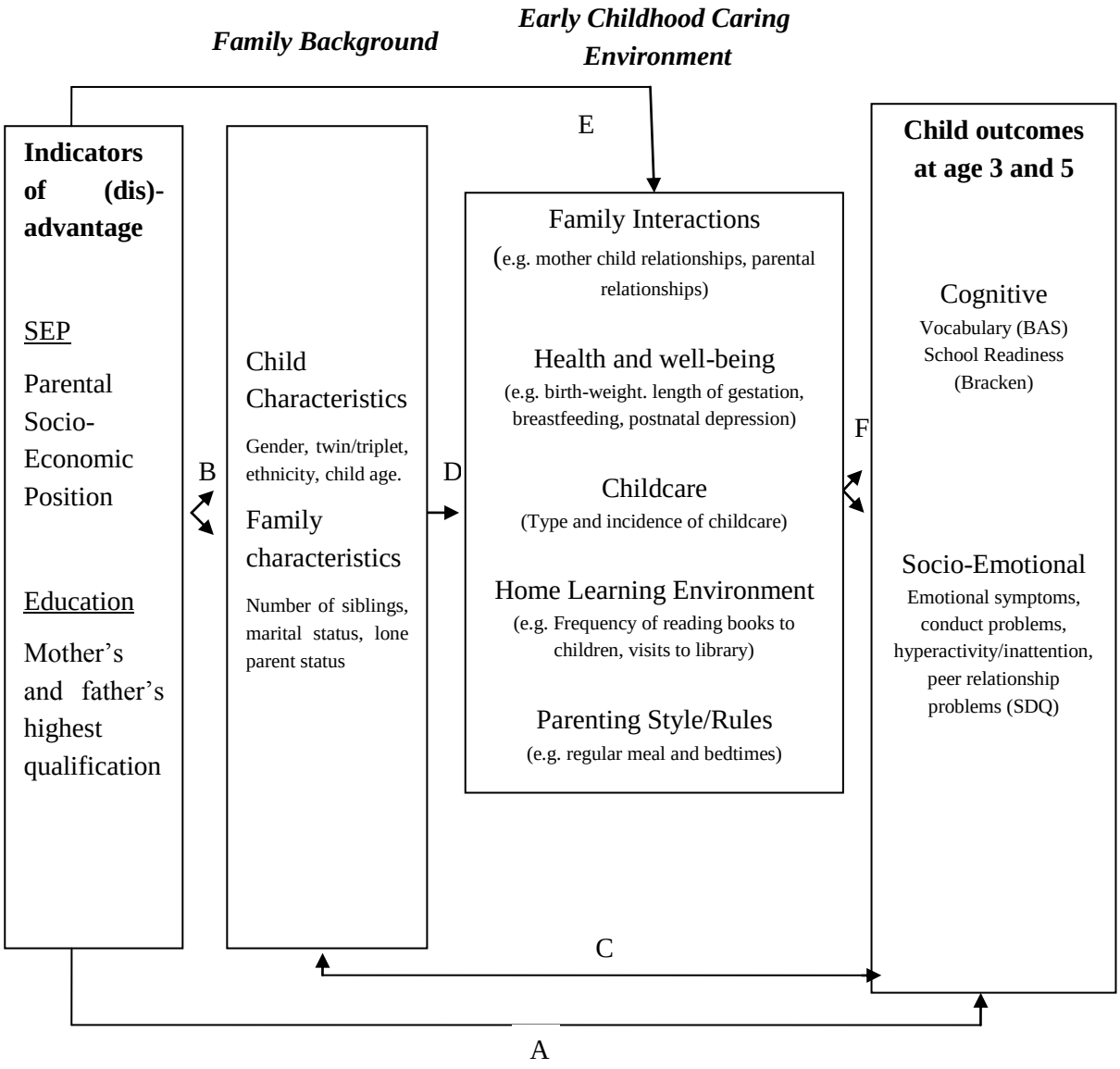
parental practices, such as discipline methods), account for a substantial portion of the effect of income on the cognitive development of preschool children and on the achievement scores of elementary school children (Bradley, 1995; Brooks-Gunn et al., 1993; Duncan, Brooks-Gunn & Klebanov, 1994; Korenman, Miller & Sjaastad, 1995). Similar findings have been obtained by the Effective Provision of Pre-school Education (EPPE) Project in the U.K., which found that although other family factors are also highly significant, the early years HLE (i.e. frequency of self-reported parental involvement in a range of activities, such as reading, library visits, playing with letters/numbers etc.) exerts a significant and independent influence on several cognitive (i.e. attainment at ages 3, 5 and 11) and behavioural (i.e. self-regulation, pro-social behaviour, and hyperactivity) outcomes. However, the EPPE HLE index is only moderately correlated (r=0.33) with family SES or mother's qualification levels (Sylva et al, 2008).

Another important pathway involves the health and well-being of the child and parents (e.g. birth-weight, gestation, breast-feeding patterns and indicators of post-natal depression). A 1990 analysis in the U.S. indicated that the poverty-related heath factors such as low birth weight, elevated blood lead levels, anaemia, and recurrent ear infections and hearing loss contributed to the differences in IQ scores between poor and nonpoor four-year- olds (Goldstein, 1990). The findings suggest that the cumulative health disadvantage experienced by poor children on these health measures may have accounted for as much as 13% to 20% of the difference in IQ between the poor and nonpoor children during the 1970s and 1980s (Goldstein, 1990). Parents who are poor are also likely to be less healthy themselves, both emotionally and physically (Adler, Boyce, Chesney, Folkman & Syme, 1993), and this could result in impaired parent-child interactions and fewer home learning experiences (Bornstein, 1995; Bradley, 1995). For example, a study conducted by the U.S. National Longitudinal Survey of Youth (NLSY) found that currently poor mothers spanked their children more often than nonpoor mothers, and this harsh behaviour was an important component of the effect of poverty on children's mental health (McLeod & Shanahan, 1993).

A third possible pathway is through the care young children receive outside the home, as much research has shown that high-quality, developmentally appropriate child care in the pre-school years is associated with enhanced social, emotional, and linguistic competence (Howes 1988; Hofferth & Phillips, 1991; NICHD Early Child Care Research Network, 1997, 1998; Ramey & Ramey, 1998). In addition, randomized trials have demonstrated that intensive early childhood programmes for poor children can increase verbal ability and reasoning skills through early elementary school (Belfield, Nores, Barnett and Schweinhart, 2006; Brooks-Gunn et al., 1994; Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; Garces, Thomas and Currie (2002); Lazar & Darlington, 1982; Ludwig and Miller (2007); Ramey & Ramey, 1998).

Our empirical research is based on a very simple model linking two indicators of potential financial (dis)advantage, namely socio-economic position and parental education, to child outcomes measured from age 3 to age 5 (see Figure 1). The starting point is the fact that there are strong socio-economic gradients in educational outcomes observed at all ages (three related papers show how this changes for older cohorts of children). The raw socio-economic gaps are represented by arrow A in the Figure 1.

Figure 1 Simple model linking financial position to early education outcomes



We then explore some of the potential pathways or 'mediating factors' through which child poverty and disadvantage may lead to poor child outcomes. We consider two important sets of potential mediating factors, the first of which are the "family background" variables that are commonly observed in many data sources. They include: characteristics of the child such as ethnicity, gender, and month of birth; and family characteristics such as number of siblings, mother's age at birth, parental employment and lone parent status. The effects of family background on child outcomes is shown as arrow (C) in the figure – the fact that there are arrows in both directions illustrates that the effects we identify might not be causal, but instead in some cases reflect reverse causation and work in the other direction in some cases. The mediation of the SEP gradient (A) works via the combination of the effect of SEP family background (B) and the effects of family background on child outcomes (C).

The second set of potential mediating factors is less commonly observed in datasets and we refer to these as measures of the early childhood caring environment. This includes the nature of family

interactions, health and well-being factors, childcare arrangements, the home learning environment (HLE), and parenting style and rules. These factors are interrelated, and seem to be the most likely to influence child development between birth and the age of five. Our choice of potential mediating factors reflects the diverse social science literature on the determinants of educational success, as well as by data availability.

The mediation of the SEP gradient by the early childhood caring environment is shown by arrow F, though the direction of causation might also be slightly unclear in this case. These factors will mediate the SEP gradient both via the effects of SEP on the early childhood caring environment (arrow E), and the early childhood caring environment on child outcomes (arrow F). However, these factors might also mediate the effects of family background (arrow C) via a combination of arrows D and F. We will briefly investigate the mediation of family background effects in section 5, and we will also show the effects of (pre-determined) family background characteristics on the early childhood caring environment (arrow D). However, the main part of the analysis will focus on the mediation of the socio-economic gradient (arrow A).

Empirical Approach

In this paper, we follow same approach as taken in Gregg et al (2010), Chowdry et al (2010) and Crawford et al (2010). We first set out the raw differences in each educational outcome according to socio-economic position of the parents, focusing on the gap between the top and bottom quintiles (top-bottom gap) as well as the gap between the middle and bottom quintiles (middle-bottom gap). As in the other three papers, all gaps are expressed in percentile point terms.

In order to explain these gaps, we will use two multivariate OLS regression techniques. In the first technique we start by showing the raw differences in each educational outcome and then track the coefficients on the middle and top socio-economic quintile. We then successively add to the model sets of potentially mediating variables, observing in each case how much the socio-economic gradient is reduced when these variables are added. In the final part of this analysis, we run a regression with all groups of variables included; this indicates the total amount of the socio-economic gaps that can be explained by our groups of factors considered together.

However, this method will suffer from an ordering bias. Observed reductions in the socio-economic gap following the addition of an individual group of factors, such as the home-learning environment, will measure both the effect of this factor and the effect of other factors with which it is correlated, e.g. parenting styles/rules. In order to avoid some of this bias, we control for family background characteristics and parental education before examining the role played by our set of potential mediating factors measuring the early childhood caring environment. This allows us to measure the extra effect of each set of mediating factor over and above the effects of parental education and demographics. Unfortunately, this creates a second problem in that we may attribute some of the role played by our measures of the early childhood caring environment to demographics and parental education instead.

We therefore use a second methodology that attempts to isolate the role of each factor in explaining the socio-economic gradient in child outcomes, after controlling for all observable characteristics. We decompose the raw gap in child outcomes into the amount explained by each variable. This is calculated as the coefficient on each variable (taken from a regression including all observable characteristics) multiplied by mean differences in that variable across quintiles of our socio-

economic position index. We group similar mediating factors together, but at a more detailed level than in our first methodology. The sum of the amount explained by all groups of potential mediating factors represents the total amount explained by observable characteristics; the rest of the raw gap is thus unexplained. It is important to note here that the amount explained by any given factor is conditional upon everything else included in the model. The amount explained by each factor (e.g. education) reflects by how much we predict the socio-economic gap would close if the rich-poor gap in solely this factor were equalised (e.g. equalising education levels, but not the home-learning environment, parental health or anything else in the model).

Furthermore, the relationships we estimate are unlikely to be causal. For example, for our estimates to be the causal impact of these factors, we would have to argue (among other things) that our measures of family characteristics, and in particular our mediating factors, cannot be affected by the child outcomes of interest. However, it is highly likely that factors, such as the child's home learning environment, are going to be influenced by the child's cognitive development. We do not attempt to take into account this possible simultaneity. Furthermore, we would also have to argue that there are no other unobserved characteristics of the child or family that influence these mediating factors as well as the child outcomes we measure. Again, this is unlikely to be true and this means that our estimates of the impact of different mediating factors are likely to be biased.[2]

While our work (along with most other work in this area) cannot robustly establish the presence of direct causal links between these factors, we are fortunate to have an extremely rich dataset at our disposal, that allow us to observe in great detail a wide range of family background variables, family health and well-being as well as parenting activities, relationships and behaviours, that serve as plausible transmission mechanisms between child poverty and poor early educational attainment. This should give us some clues as to possible policy responses to address the socio-economic gaps in early child outcomes, as well as avenues for future research.

3. Data and descriptive statistics

The Millennium Cohort Study MCS began as a longitudinal study of approximately 18,000 children born in the UK in 2000. The first sweep of the study was conducted when MCS children were about 9 months old. This over-sampled individuals from ethnic minorities and individuals living in disadvantaged areas of the country. Three further sweeps of data have since been collected when the children were aged about 36 months (sweep 2), when they were about 5 years old (sweep 3) and when they were 7 years old (sweep 4). Further sweeps of data will be collected at future key milestone ages. For our analysis, we chose to sample those who responded to the first three surveys and those where the mother is the main respondent[3]. We also excluded individuals who had

[2] Without the help of any experimental variation in SEP, parental income, or indeed any mediating factors of interest in this project, we cannot rule out that there are unobservable factors (such as genetics, or typically unobserved attributes such as motivation of parent) that instead explain low incomes, poor achievement, and the potential transmission pathways we have highlighted. Structural Equation Models or Instrumental Variables Methods could be used to correct for this. However, the assumptions they rely on (e.g. exclusion restrictions and non-linearities) are not credible in this context and it is easy to show that results are very sensitive to the particular assumptions made.

[3] At the time of writing, the fourth sweep has only very recently become available.

missing data for some key characteristics, such as education, measures of the home-learning environment, child outcomes and ethnicity. This left us with approximately 11,100 observations.

We proxy for each child's socio-economic background using two measures: a socio-economic position index and parent(s) highest educational qualifications. We construct our index of socio-economic position by performing principal-component analysis on a number of potential proxies for socio-economic background (equivalised income, mother's class, father's class, housing tenure, whether the family have experienced financial difficulties and a number of questions that measure the level of material deprivation experience by the family). We then take the first principal component and use this as an index of socio-economic position.

Child outcomes

In this paper, we focus on socio-economic differences in measures of both cognitive and non-cognitive development. In particular, we analyse three outcome measures for children's development: the British Ability Scales (Early Years version) Vocabulary Test, the Bracken Child Cognitive Assessment, and the Goodman "Strengths and Difficulties" Profile. These outcomes require a little bit more explanation and discussion.

The Bracken tests children's knowledge of colours, letters, the names of numbers, sizes and shape words such as "circles, square and triangle." On one level it is rather easy to increase because it assesses a small list of vocabulary or concept names that are deemed to be "important" in Early Years Education Provision.

The BAS test measures children's capacity to verbally name what they see in a picture. It is a test in children's productive vocabulary in English. Vocabulary is highly correlated with general intelligence, and represents knowledge closely aligned with the "cultural capital" of the child's environment. It is not easy to shift vocabulary up as it depends on weeks/months/years of conversations between adults and children and it also depends (probably) on adults reading to children. Children acquire a rich vocabulary through exposure to sophisticated English language and also through their own participation in conversations. Children are not "taught" vocabulary in the same way they can be "taught" the elements of the Bracken test.

We then use the measure of Strengths and Difficulties (SDQ) in sweeps 2 and 3 as our measure of non-cognitive development. The four subscales of the Goodman constitute an index of general "emotional behavioural problems". These are: emotional symptoms or "internal problems", conduct problems, hyperactivity, peer relationship problems. The fifth subscale is called pro-social behaviour and this was added later to the original scale which looked only at problem behaviours. We have combined the four sub-scales representing emotional behavioural problems into a single score, but have rescaled it such that higher scores represent better outcomes in some sense.

The BAS is generally recognised as an excellent measure of children's vocabulary, and thus is highly correlated with other language measures as well. It is also one of the best predictors of children's all-around intelligence- and, like IQ, it is not easy to drive up or down as there is a strong genetic component in it as well. On the other hand, the Bracken measures children's "school readiness" words and concepts and it's much easier to shift in positive direction through Early Childhood Education Programmes. The Goodman SDQ measure is a well recognised and valid assessment of children's behaviour problems, though the fifth positive subscale of pro-social

behaviour is rarely combined with the other four negative subscales. Again, for ease of interpretability we have converted all outcome measures into percentile ranks.

Socio-economic differences in child outcomes

To illustrate differences in these outcomes across measures of socio-economic position, we divide children into five equally sized quintiles of our socio-economic position index, those with lowest socio-economic status are in the bottom quintile and those with the highest socio-economic status are in the top quintile. The data is also weighted to take account of both the sampling design and non-response.

Figure 2 shows the average percentile rankings of cognitive child outcomes at age 3 (Bracken, BAS) and age 5 (BAS only) for these five SEP quintiles. It shows that those in the top SEP quintile have an average percentile Bracken ranking of 64, whilst the bottom quintile has an average percentile ranking of 34. The gap between the top and the bottom is thus just over 30 percentile points. The gap between the top and bottom quintiles for the BAS is lower at 23 percentile percentile points. By age 5, the gap between the top and bottom quintiles has widened for the BAS score, standing at around 25 percentile points.

Figure 3 shows the average percentile rankings for socio-emotional development (SDQs) at ages 3 and 5. It shows that the gap between the top and bottom quintiles at age 3 in terms of socio-emotional development is similar to the gap for BAS scores, standing at about 22 percentile points. By age 5 this has widened slightly to 23 percentile points.

In Table 1(a) – Cognitive ability at ages 3 and 5, by parents' SEP

Proportion of children:	SEP Q1	SEP Q2	SEP Q3	SEP Q4	SEP Q5
Bottom 40% at Age 3 (BAS)	59.0	48.7	38.7	32.0	26.4
Escape from bottom 40% by Age 5 (BAS)	25.7	25.7	32.8	42.4	53.0
Top 40% at Age 3 (BAS)	23.9	23.9	34.0	45.1	52.4
Drop out of top 40% by Age 5 (BAS)	57.0	57.0	49.2	40.7	33.8
Bottom 40% at Age 5 (BAS)	62.2	62.2	51.1	40.2	30.4
Top 40% at Age 5 (BAS)	21.9	21.9	31.0	41.5	52.2

Table 1(b) – Strengths and Difficulties at ages 3 and 5, by parents' SEP

Proportion of children:	SEP Q1	SEP Q2	SEP Q3	SEP Q4	SEP Q5
Bottom 40% at Age 3	58.6	46.2	36.2	30.8	24.6
Escape from bottom 40% by Age 5	20.2	26.0	28.9	33.5	39.1
Top 40% at Age 3	20.9	30.2	37.0	41.4	48.7
Drop out of top 40% by Age 5	59.6	46.3	40.2	35.0	29.9
Bottom 40% at Age 5	65.8	52.0	42.9	37.7	29.2
Top 40% at Age 5	19.5	29.8	36.4	41.3	50.2

we investigate the dynamics of the BAS (a) and SDQ (b) scores in a little bit more detail. As we would expect, children in lower SEP quintiles are much more likely than those in higher quintiles quintile to be in the bottom 40% of BAS scores at age 3. However, lower quintiles are also much less likely to escape the bottom 40% by age 5, only around 26% of children from the bottom quintile do so whilst over half of the top quintile do so. Again, as we would expect, children from

lower quintiles are less likely to be in the top 40% of BAS scores at age 3. Those who were in the top 40% at age 3, though, are more likely than higher quintiles to drop out of the top 40%[4]. So not only do children from lower SEP quintiles have lower average outcomes at age 3, but they are more likely to stay in the bottom 40% of achievers and more likely to drop out of the top 40%.

The same story can also be told for SDQ scores. Children from lower SEP quintiles are more likely than those from higher quintiles to be in the bottom 40% of SDQ scores at age 3 and to stay there by age 5, and less likely to be in the top 40% at age 3 and more likely to drop out of the top 40% by age 5 if they were there at age 3. The gaps by age 5 are also bigger than at age 3 in terms of the likelihood to be in the top 40% and the bottom 40%. In other words, for both SDQ and BAS scores, the socio-economic gaps widen over time, even in the short space of two years between ages 3 and 5. The aim of the rest of this paper is to try and explain the socio-economic gaps in child outcomes at age 3 and age 5, as well as to explain the widening of the gap between ages 3 and 5.

[4] Please note that the proportio of children in the "bottom 40%" is not exactly 40%. This is due to the fact that test scores are only semi-continuous.

Figure 2 – Cognitive Child Outcomes by SEP Quintile

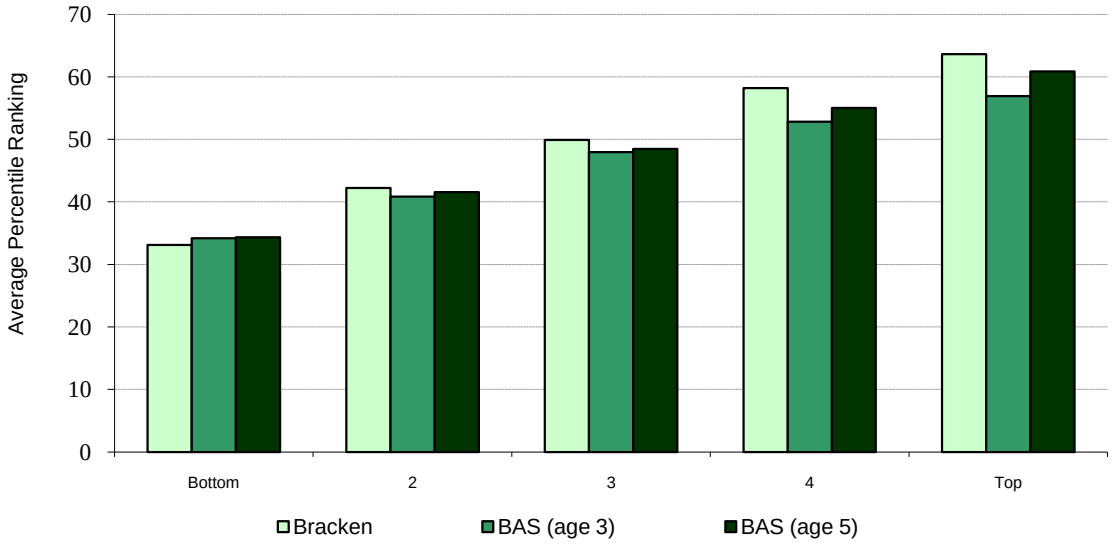
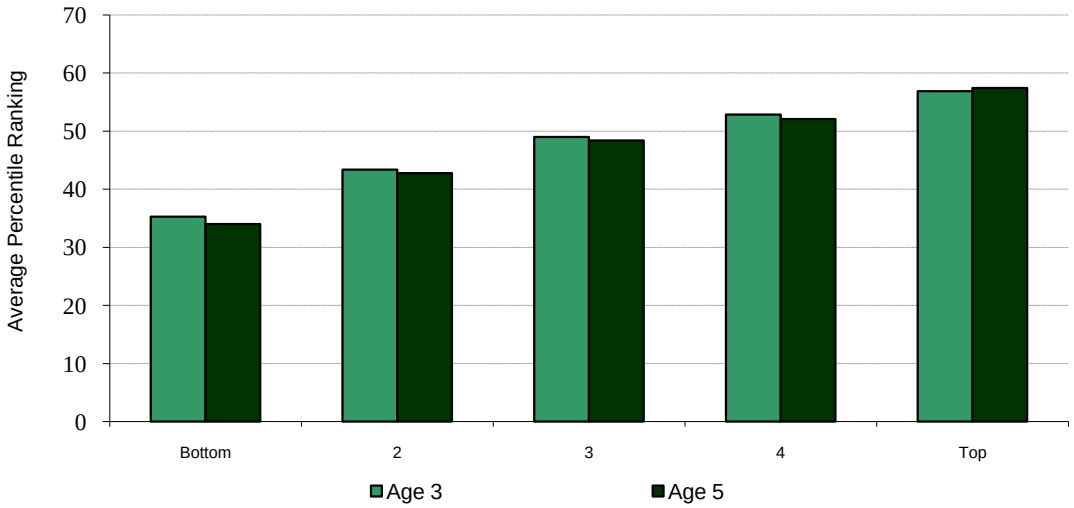


Figure 3 – Socio-emotional Development by SEP Quintile



Potential Mediating Factors

Here we describe the groups of variables that we have chosen to examine as potential mediating factors of the socio-economic gradient.

Parental Education consists of variables that measure parent(s) highest educational qualification. We measure this as the highest equivalent NVQ level for both mothers and, where present, fathers. Dummy variables are included for other qualifications that could not be categorised into an NVQ level.

Family Background consists of variables pertaining to characteristics of the child and the family. We frequently separate them out into child and family characteristics. Child characteristics include: the sex of the child; their age; whether they are a twin or triple; whether the child was in special care unit just after birth; and their ethnicity. Characteristics of the rest of the family include: mother's age at birth (plus a quadratic term); a separate teenage mother dummy; parental employment at sweeps 1, 2 and 3; whether only English is spoken in the household at sweep 1;

marital status and partnering of the parents at sweeps 1, 2 and 3; the number of siblings and older siblings at sweeps 2 and 3.

The next groups of variables are those we collectively refer to as measure of the early childhood caring environment.

Family Interactions are measured by degree of parental harmony at sweeps 1 and 2 (based on principal-component analysis of a shortened version of the Golombok Rust Inventory of Marital State); interviewer assessed measure of mother-child closeness at sweep 2 (defined by number of items where mother and child appeared close); mother-child relationship and conflict problems measured as the number of problems identified on 15-item sub-scales of the Pianta index (the parent-child relationship scale and the parent-child conflicts scale); and whether mothers and fathers felt that they spent plenty of time with their children at the second sweep.

Health and Well-Being is measured by the number of cigarettes smoked by the mother per day whilst pregnant; units of alcohol mothers reported drinking whilst pregnant; length of gestation (days); birth-weight (kg); did the mother try to breast-feed; age at which breast-feeding ceased (0-26 weeks); still breast-feeding after 26 weeks; whether the mother was suffering from post-natal depression during the child's early infancy; infant temperament (mood, regularity and adaptability); the mother's height, weight and body mass index before birth; and the father's height, weight and body mass index at sweep 1.

(Non-Maternal) Childcare is constructed from sweeps 2 and 3 information to create nursery school/class, playgroup, pre-school or childminder use by the ages of 3 (sweep 2) and 5 (sweep 3).

Home Learning Environment is constructed from the home learning environment index (frequency of reading to child, library visits, play with ABCs/letters, teaches numbers/shapes, songs/nursery rhymes, drawing/painting) and divided into quintiles in our sample. We also separately control for self-reported parenting competency; frequency of reading to child (which is also included in HLE index). Including frequency of reading in addition to the overall HLE index allows us to see whether reading has a differential effect to the others elements. All measures are available at both sweeps 2 and 3.

Parenting styles/rules measures whether: the parents have lots of rules (at sweep 2); parents strictly enforce rules (sweep 2); children have regular bed-times (sweeps 2 and 3); children have regular meal times (sweeps 2 and 3); family eats breakfast together (sweep 3); children watch more than 3 hours of TV a day (sweeps 2 and 3); children play computer for more than 1 hour per day (sweep 3).

Table then shows socio-economic differences in parental education, family background and measures of the early childhood caring environment.

As one might expect, mothers and fathers in the bottom quintile are less highly qualified than those from higher quintiles. For example, less than 7% of mothers in the bottom quintile have educational qualifications equivalent to NVQ level 4 or higher (i.e. university or equivalent), as compared with over 70% of the highest quintile).

Children from higher SEP quintiles are slightly more likely to be twins or triplets and to have been in a special care unit shortly after birth. Children from lower SEP quintiles are also more likely to be from ethnic minorities (though Indian children are most likely to come from the middle SEP quintile). There are bigger differences across the SEP quintiles when we move on to examine differences in characteristics of the rest of the family. Mothers in the lowest SEP quintile were, on average, younger at the time of birth than those from higher quintiles. Mothers (and fathers, where present) are more likely to have been in employment across the three sweeps of the MCS. Nearly three quarters of mothers from the richest SEP quintile were in work at the time of the third sweep, as compared with less than 30% of the poorest quintile. Children from the poorest quintile are less likely to speak only English at home as compared with richest quintile.

Looking at measures of family size and structure, we observe that children in the bottom SEP quintile are more likely to have come from lone-parent families than those from higher quintiles at the first MCS sweep (about 37%, as compared with just under 1% of the top SEP quintile). If two parents are present, parents in the bottom SEP quintile are also more likely to be cohabiting than those from higher quintiles (about a third at the first sweep, as compared with a little over 12% of the richest quintile). Children from the bottom SEP quintile, on average, also have a greater number of siblings (numbers shown in table are for the third sweep).

The table then moves on to examine differences in our measures of the early childhood caring environment. The first panel relates to family interactions. Lower SEP quintiles seem to experience more mother-child relationship and conflict problems than richer SEP quintiles. Where they are together, there is also less parental harmony amongst parents in poorer SEP quintiles than in the richest SEP quintile.

Mothers in the richest SEP quintile are more likely to try breast-feeding than those from poorer quintiles (90% of the richest quintile compared with 52% of the poorest quintile). If they do breast-feed, mothers from the richest SEP quintile are likely to breast-feed for longer as well. However, mothers in the bottom quintile do not, on average, report consuming more units of alcohol during and after pregnancy Mothers in the bottom quintile are, however, more likely to smoke during and prior to pregnancy. Mothers from the poorest quintile also have a shorter length of gestation and their children have lower birth-weights[5]. There are also differences in infant temperament, in terms of mood, regularity and adaptability. It is also noteworthy than whilst 7% of mothers from the richest quintile suffered from maternal depression during early infancy, about 22% of mothers from the poorest quintile did so. Parents from the richest quintile also report being taller at birth than parents from the poorest quintile, and report being slightly heavier. However, when we look at the proportion classed as over-weight or obese, there is less of a clear pattern.

[5] This may be related to ethnic differences in birth weight. Dearden, Mesnard and Shaw (2006) show that ethnic minorities tend to have lower birth weights.

Examining childcare patterns up to sweep 2, we find that children from the poorest SEP quintile are more likely to have been to a nursery school or class than those from richer SEP quintile, but less likely to have been to a pre-school, childminder, day nursery or crèche. Children from the middle SEP quintile are those most likely to have been to a playgroup. These patterns continue up to sweep 3, though (as we would expect) noticeably more children have been to a nursery school or class between sweeps 2 and 3.

The next part of the table examines socio-economic differences in the home-learning environment. We find that children from the poorest SEP quintiles are least likely to be in the richest quintile of our HLE index at sweeps 2 and 3. They are less likely to be read to every day at sweeps 2 and 3. Nearly 80% of children in the richest SEP quintile are read to every day at sweep 2, compared with 42% of the poorest SEP quintile.

The last block of the table shows that children from the richest quintile are more likely to have lots of rule and for these to be strictly enforced at sweep 2. They are also the most likely to have regular bed-times or meal times at sweep 2 (about 92% of these children have a regular bed-time compared with around 68% of those from the poorest SEP quintile). These differences continue up to sweep 3, though are less dramatic. Children from the poorest SEP quintile are also more likely to watch more than 3 hours of TV a day at sweeps 2 and 3 than those from higher quintiles, are more likely to play more than one hour of computer a day at sweep 3.

Therefore, there are a wide variety of socio-economic differences across a range of factors, from number of siblings, birth-weight and reading frequency to regularity of bedtimes, mother's age at birth and childcare patterns. But which of these factors explain the socio-economic gaps in child outcomes at ages 3 and 5 that we saw earlier. This is the focus of the next section.

4. Explaining socio-economic gradients in child outcomes

The aim of this section is to see how much observed socio-economic differences in child cognitive and socio-emotional development at the ages of 3 and 5 can be explained by differences in parental education and family background characteristics, and how much can then be explained by the wider measures of the early childhood caring environment, including: family interactions; health and well-being; (non-maternal) childcare; the home-learning environment; and parenting style and rules.

We begin by using the two methodologies to account for socio-economic differences BAS scores at age 3. We then focus on the results of the second methodology for all other outcomes and specifications. It is important to remember here again that the amount explained by each factor is conditional on all other factors remaining constant.

Cognitive Ability

Age 3 - BAS (Vocabulary)

In column (1) of Table 3 we show the raw gap at age 3 in BAS average percentile ranks between the top and bottom quintiles of our index of socio-economic position (22.7 ppts), as well as the gap between the middle and bottom quintiles (13.8 ppts). Both are statistically significant at the 1% level. We refer to the former as the top-bottom gap and the latter as the middle-bottom gap.

Column (2) shows how much of these estimated gaps remain after controlling for parental education, both in average percentile ranks terms and as a percentage of their raw value. According to this methodology, nearly 35% of observed gaps in socio-economic differences can be accounted for by differences parental education. Column (3) then shows that a further 25% of the gap can be accounted for by differences in family background characteristics such as ethnicity, number of older siblings, lone-parent status and mother's age. Considered together, parental education and family background characteristics explain nearly 60% of the raw gap in BAS scores at age 3.

Columns (4) to (8) shows how much this gradient is reduced after we control for each element of the early childhood caring environment. Column (9) shows how much the socio-economic gaps remain after we control for all observable characteristics. Taken together, all factors reduce the middle-bottom gap by nearly 69%, with 31% of the initial gap remaining; they reduce the top-bottom gap by 66%, with 34% of the raw gap remaining. The factors which explain the largest proportion of the gaps are parental education and family background characteristics, with a further small role played by the home-learning environment and health and well-being factors – around 5% each. The full regression results in column (9) are shown in

Table 7 - Explaining socio-economic gaps in non-cognitive ability at age 3 (SDQ)

	Percentile point gap		As % total gap	
	Q5-Q1	Q3-Q1	Q5-Q1	Q3-Q1
Raw Gap	**21.57**	**13.70**	**100%**	**100%**
Total: Explained	**17.74**	**10.34**	**82%**	**75%**
Total: Unexplained	**3.84**	**3.36**	**18%**	**25%**
Amount Explained by Groups of Factors:				
Parental Education	***3.74***	***1.39***	***17%***	***10%***
Family Background	***3.36***	***2.33***	***16%***	***17%***
Gender	-0.06	-0.04	0%	0%
Age of Child	-0.26	-0.22	-1%	-2%
Twin/Triplet	0.02	0.01	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%
Ethnicity	-0.22	-0.23	-1%	-2%
Only English spoken at home	0.06	0.05	0%	0%
Country of residence	-0.06	0.00	0%	0%
Mother works	0.18	0.15	1%	1%
Father works	-0.67	-0.60	-3%	-4%
Mother's age at birth	3.75	2.61	17%	19%
Marital/Partner Status	0.75	0.60	3%	4%
Siblings	-0.12	0.00	-1%	0%
Family Interactions	***3.05***	***2.30***	***14%***	***17%***
Mother-child closeness	2.65	2.13	12%	16%
Parental Harmony	0.57	0.27	3%	2%
Parental time	-0.17	-0.11	-1%	-1%
Health and Well-Being	***3.73***	***2.22***	***17%***	***16%***
Breast-feeding	1.36	0.67	6%	5%
Alcohol consumption	0.07	0.01	0%	0%
Smoking before pregnancy	0.41	0.29	2%	2%
Smoking during pregnancy	0.75	0.59	3%	4%
Gestation Length	0.02	0.01	0%	0%
Birth weight	0.22	0.17	1%	1%
Infant Temperament	1.01	0.80	5%	6%
Maternal Depression	0.30	0.21	1%	2%
Parental height/weight	-0.40	-0.53	-2%	-4%
Childcare	***0.13***	***-0.10***	***1%***	***-1%***
Home-Learning Environment	***1.88***	***1.01***	***9%***	***7%***
HLE and Reading at Age 3	0.70	0.43	3%	3%
Self-reported parental competence	1.18	0.58	5%	4%
Parenting Style/Rules	***1.97***	***1.24***	***9%***	***9%***
Amount/strictness of rules	0.21	0.08	1%	1%
Regular bed times at age 3	0.61	0.36	3%	3%
Regular meal times at age 3	0.53	0.38	2%	3%
Watches lots of TV at age 3	0.62	0.42	3%	3%
Missing Dummies	***-0.14***	***-0.06***	***-1%***	***0%***

Table 8 - Explaining socio-economic gaps in non-cognitive ability at age 5 (SDQ)

	Levels				'Value-added'			
	Percentile point gap		As % total gap		Percentile point gap		As % total gap	
	Q5-Q1	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**
Raw Gap	**23.40**	**14.37**	**100%**	**100%**	**23.40**	**14.37**	**100%**	**100%**
Total Explained	**19.04**	**12.09**	**81%**	**84%**	**21.05**	**13.79**	**90%**	**96%**
Total Unexplained	**4.37**	**2.28**	**19%**	**16%**	**2.36**	**0.58**	**10%**	**4%**
Amount Explained by Groups of Factors:								
Prior Cognitive Ability					***1.99***	***1.17***	***9%***	***8%***
Prior Non-Cognitive Ability					***9.17***	***6.21***	***39%***	***43%***
Parental Education	***4.90***	***2.55***	***21%***	***18%***	***3.32***	***1.96***	***14%***	***14%***
Family Background	***4.59***	***3.32***	***20%***	***23%***	***2.07***	***1.47***	***9%***	***10%***
Gender	-0.08	-0.05	0%	0%	-0.05	-0.03	0%	0%
Age of Child	-0.03	-0.15	0%	-1%	-0.03	-0.15	0%	-1%
Twin/Triplet	0.02	0.01	0%	0%	0.03	0.01	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%	0.00	0.00	0%	0%
Ethnicity	0.24	0.12	1%	1%	0.31	0.22	1%	2%
Only English spoken at home	0.02	0.02	0%	0%	-0.03	-0.03	0%	0%
Country of residence	0.01	0.01	0%	0%	0.04	0.01	0%	0%
Mother works	0.69	0.65	3%	5%	0.49	0.47	2%	3%
Father works	0.59	0.39	3%	3%	0.54	0.37	2%	3%
Mother's age at birth	1.82	1.10	8%	8%	-0.01	-0.19	0%	-1%
Marital/Partner Status	1.69	1.35	7%	9%	1.29	1.02	6%	7%
Siblings	-0.38	-0.13	-2%	-1%	-0.51	-0.23	-2%	-2%
Family Interactions	***2.47***	***1.66***	***11%***	***12%***	***0.96***	***0.54***	***4%***	***4%***
Mother-child closeness	1.55	1.25	7%	9%	0.30	0.25	1%	2%
Parental Harmony	1.40	0.68	6%	5%	1.11	0.54	5%	4%
Parental time	-0.48	-0.27	-2%	-2%	-0.45	-0.25	-2%	-2%
Health and Well-Being	***1.81***	***0.97***	***8%***	***7%***	***0.38***	***0.15***	***2%***	***1%***
Breast-feeding	0.84	0.39	4%	3%	0.17	0.06	1%	0%
Alcohol consumption	-0.13	-0.07	-1%	-1%	-0.16	-0.08	-1%	-1%
Smoking before pregnancy	0.76	0.53	3%	4%	0.75	0.51	3%	4%
Smoking during pregnancy	0.06	0.05	0%	0%	-0.35	-0.27	-1%	-2%
Gestation Length	0.04	0.04	0%	0%	0.04	0.03	0%	0%
Birth weight	0.27	0.21	1%	1%	0.16	0.13	1%	1%
Infant Temperament	0.91	0.71	4%	5%	0.47	0.38	2%	3%
Maternal Depression	0.56	0.40	2%	3%	0.40	0.28	2%	2%
Parental height/weight	-1.51	-1.28	-6%	-9%	-1.10	-0.89	-5%	-6%
Childcare	***-0.27***	***-0.14***	***-1%***	***-1%***	***-0.44***	***-0.18***	***-2%***	***-1%***
Home-Learning Environment	***2.34***	***1.26***	***10%***	***9%***	***1.52***	***0.83***	***7%***	***6%***
HLE and Reading at Age 3	0.49	0.35	2%	2%	0.03	0.05	0%	0%
HLE and Reading at Age 5	0.39	0.12	2%	1%	0.46	0.18	2%	1%
Self-reported parental competence	1.47	0.80	6%	6%	1.03	0.59	4%	4%

Parenting Style/Rules	***2.21***	***1.51***	***9%***	***11%***	***1.20***	***0.85***	***5%***	***6%***
Amount/strictness of rules	-0.03	-0.02	0%	0%	-0.08	-0.04	0%	0%
Regular bed times at age 3	0.17	0.10	1%	1%	-0.05	-0.03	0%	0%
Regular bed times at age 5	0.68	0.43	3%	3%	0.57	0.36	2%	3%
Regular meal times	1.01	0.73	4%	5%	0.58	0.41	2%	3%
Watches lots of TV/Computer	0.37	0.27	2%	2%	0.19	0.15	1%	1%
Missing Data	***1.00***	***0.95***	***4%***	***7%***	***0.85***	***0.80***	***4%***	***6%***

Table 9 – Full Specification Regression Results for BAS, Bracken and SDQ (age 3, MCS2)

	BAS	Bracken	SDQ
SEP Quintile			
2nd SEP quintile	0.979	2.302**	1.601*
3rd SEP quintile	4.325***	4.501***	3.359***
4th SEP quintile	6.244***	8.332***	3.865***
Top SEP quintile	7.645***	8.976***	3.837***
Parental Education			
Mother NVQ level 1	1.874	1.443	1.99
Mother NVQ level 2	3.332***	2.628**	1.469
Mother NVQ level 3	3.324***	2.497**	2.120*
Mother NVQ level 4/5	5.423***	5.130***	4.910***
Mother, Other Qualifications	0.891	2.977	5.024
Father NVQ level 1	-0.103	0.682	-2.072
Father NVQ level 2	0.556	-0.33	-0.519
Father NVQ level 3	1.179	2.787**	0.462
Father NVQ level 4/5	1.47	4.907***	1.548
Father Other Qualifications	7.862**	-15.179**	-20.649
Child Characteristics			
Male Child	-6.572***	-4.842***	-3.974***
Child's Age (months/100)	2.613***	0.978***	0.378***
Multiple Birth	-0.722	-3.434	2.465
Special Care Unit	-1.801	-1.437	-0.903
MCS1 Indian Child	-5.079*	0.795	-3.409
MCS1 Pakistani Child	-8.867***	-5.373***	0.019
MCS1 Bangladeshi Child	-11.380***	-5.453	4.744
MCS1 Black Caribbean Child	-8.142***	-4.408*	-0.625
MCS1 Black African/Other Child	-3.47	2.749	6.307**
MCS1 Other Ethnicity Child	-9.801***	6.944*	4.702
MCS1 Mixed Ethnicity Child	-0.575	2.518	1.523
Family Characteristics			
Only English at Home	11.444***	6.809***	1.332
Lives in Wales	0.72	-0.999	1.462**
Lives in Scotland	4.608***	2.704**	0.629
Lives in Northern Ireland	4.924***	-2.522*	4.032***
Mother worked at one of waves	1.1	0.932	0.363
Father worked at one of waves	3.279**	2.620**	-1.504
Mother's Age at birth	1.280***	2.131***	1.538***
Mother's Age at birth squared	-0.015*	-0.028***	-0.019**
Lone Parent at MCS1	1.325	-1.959	-2.576
Had baby in teens	0.17	0.737	-0.322
Two Cohabiting Parents at MCS1	1.396*	0.358	0.007
Got Married by MCS2	-0.271	-0.026	-2.140*
Split up by MCS2	-2.200*	-0.959	0.414
New partner by MCS2	-1.456	-3.820**	1.907
Number of Siblings at MCS2	0.221	0.469	-1.337**
Number of Older Siblings at MCS2	-3.699***	-5.339***	1.525**
Family Interactions			

Mother-child relationship problems (#)	-2.533***	-2.269***	-4.060***
Mother-child conflict problems (#)	-0.524***	-0.726***	-6.346***
Interviewer assessed measure of closeness	0.816***	0.733***	0.265
Parental Harmony 1 (scale)	-0.002	0.052	1.137***
Mother spends plenty of time with child - MCS2	0.65	-1.028*	0.677
Father spends plenty of time with child - MCS2	-0.659	0.294	-0.332
Health and Well-Being			
Tried to Breast-Feed Child	1.132	0.239	-0.046
Age at which breast-feeding stopped (weeks)	-0.004	0.076	0.119**
Still breast-feeding at MCS1	0.921	0.248	0.715
Mother alcohol consumption during pregnancy (units)	0.161	0.216	-0.101
Mother alcohol consumption (small amount)	0.651	0.79	-0.271
Mother alcohol consumption at Wave 1 (units)	0.022	0.03	0.054
Number of cigarettes smoked by Mother during pregnancy	-0.274*	-0.334**	-0.206
Above Squared	0.006	0.008	0.002
Number of cigarettes smoked by mother before pregnancy	0.203	0.187	-0.026
Above Squared	-0.004	-0.004	-0.002
Gestation Length in Days	0.579*	0.235	0.500*
Gestation Length in Days (squared)	-0.001**	0	-0.001*
Birth Weight (kg)	2.927***	0.809	1.130*
Infant Temperament Mood - MCS1	-0.652**	-0.614**	1.237***
Infant Temperament Regularity - MCS1	-0.236	0.358	0.966***
Infant Temperament Adaptability - MCS1	0.738***	0.22	1.506***
Mother Suffered Post-Natal Depression	0.692	1.434	-1.988**
Mother Height at Birth (cm)	-0.031	0.04	0.028
Father Height at Birth (cm)	-0.031	-0.041**	0.005
Mother Weight at Birth (kg)	0.015	-0.089*	-0.072
Father Weight at Birth (kg)	0.07	0.063	-0.006
Father Under-Weight	-1.684	0.461	4.275
Father Over-Weight	-2.052**	-2.829***	-1.361*
Father Obese	-2.581	-3.017*	-1.522
Mother Under-Weight	-0.886	-1.598	0.038
Mother Over-Weight	-1.584	-1.147	-0.619
Mother Obese	-0.866	0.298	-0.342
Childcare			
Has Been to Nursery School/Class	0.181	1.214*	0.009
Has Been to Playgroup	0.983	-0.517	-1.341**
Has Been to Pre-School	2.427***	2.804***	-1.177
HAS Been to Child minder	1.062	-0.412	0.601
Has Been to Day Nursery or Crèche	-0.712	2.439**	1.239*
Home-Learning Environment			
2nd HLE Quintile at MCS2	1.840**	3.646***	-0.085
3rd HLE Quintile at MCS2	3.086***	5.086***	0.758
4th HLE Quintile at MCS2	4.186***	7.230***	1.320*
5th HLE Quintile at MCS2	5.589***	10.835***	2.488***
Read to Everyday at MCS2	7.240***	7.903***	1.291
Read to Some Days at MCS2	2.464*	4.005***	0.191
Mother rates herself as good parent - MCS2	2.168***	2.351***	4.545***
Mother rates herself as very good parent - MCS2	0.775	0.487	6.898***
Father rates himself as good parent - MCS2	1.220*	2.215***	0.173

Father rates himself as very good parent - MCS2	1.217*	0.35	0.974
Parenting Style/Rules			
Lots of Rules	-0.813	-0.434	-0.049
Strictly Enforced Rules	0.446	1.431***	1.421**
Regular Bed-times at MCS2	1.906***	2.654***	2.603***
Regular Meal-times at MCS2	-0.398	1.549	4.062***
Watches more than 3 hours of TV per day at MCS2	2.119***	0.519	-2.603***
Observations	11054	11054	11054
R-Squared	0.25	0.29	0.36

Table 10 – Full Specification Regression Results for BAS and SDQ (age 5, MCS3)

	Levels		Value-Added	
	BAS	SDQ	BAS	SDQ
Prior Ability				
Bracken (age 3)	n/a	n/a	6.816***	1.308***
BAS (age 3)	n/a	n/a	7.989***	0.753**
SDQ (age 3)	n/a	n/a	0.339	11.373***
SEP Quintile				
2nd SEP quintile	0.727	0.119	-0.17	0.428
3rd SEP quintile	1.878*	-0.08	-0.163	0.578
4th SEP quintile	4.079***	0.917	0.6	0.324
Top SEP quintile	6.074***	2.327*	2.206*	2.357*
Parental Education				
Mother NVQ level 1	1.405	0.877	0.522	2.568**
Mother NVQ level 2	2.474**	1.662*	0.89	3.255***
Mother NVQ level 3	2.024	1.42	0.308	3.636***
Mother NVQ level 4/5	5.825***	4.221***	2.910***	4.870***
Mother, Other Qualifications	1.43	0.982	1.144	4.53
Father NVQ level 1	1.399	0.363	1.024	1.211
Father NVQ level 2	2.001*	1.104	1.946*	1.657*
Father NVQ level 3	3.648***	2.055**	2.833***	1.211
Father NVQ level 4/5	5.618***	3.449***	4.016***	1.912**
Father Other Qualifications	-10.874	-8.906	-9.171	-3.993
Child Characteristics				
Male Child	-0.562	-5.108***	2.430***	-3.097***
Child's Age (months/100)	-0.551*	1.732***	-0.470*	1.758***
Multiple Birth	-3.677	3.329	-2.267	5.054**
Special Care Unit	-0.401	-0.814	0.115	-0.088
MCS1 Indian Child	1.732	-2.743	2.979	-1.31
MCS1 Pakistani Child	-3.271	-6.404***	2.082	-5.488**
MCS1 Bangladeshi Child	-0.508	0.024	6.233	-1.243
MCS1 Black Caribbean Child	-6.457**	-6.211**	-2.596	-6.042***
MCS1 Black African/Other Child	-5.712**	3.539	-5.534**	0.177
MCS1 Other Ethnicity Child	-3.139	-2.012	-1.781	-3.801
MCS1 Mixed Ethnicity Child	-0.402	0.268	-0.99	-0.615
Family Characteristics				
Mother's Age at birth	1.658***	-0.138	0.950**	-0.965**
Mother's Age at birth squared	-0.020***	0.007	-0.011*	0.018**
Only English at Home	13.165***	0.407	8.142***	-0.677
Lives in Wales	-2.831***	-0.684	-3.492***	-1.470***
Lives in Scotland	2.800**	0.055	0.346	-0.585
Lives in Northern Ireland	0.942	0.183	-0.654	-1.374
Mother worked at one of waves	1.238	-0.411	0.807	-0.481
Mother worked at wave 3	0.983	1.538*	-0.513	1.195
Father worked at one of waves	0.353	-0.771	-0.601	-0.422
Father worked at Wave 3	-0.198	1.994***	0.037	1.625**
Lone Parent at MCS1	-2.825	-3.363	-2.581	-2.224
Had baby in teens	0.114	-1.163	-0.418	-0.769
Two Cohabiting Parents at MCS1	-0.969	-0.555	-1.582**	-0.668

Got Married by MCS2	1.276	-1.234	1.223	-0.371
Split up by MCS2	-1.957	0.28	-2.690*	0.264
New partner by MCS2	0.383	0.54	1.923	0.327
Split up by MCS3	-1.849	-2.485	-0.203	-2.249
New partner by MCS3	1.122	-0.841	0.205	-1.641
Number of Siblings at MCS3	-0.455	-0.859	-0.226	-0.403
Number of Older Siblings at MCS3	-4.006***	1.632***	-2.103***	1.482***
Family Interactions				
Mother-child relationship problems (#)	10.636**	2.306	7.174*	4.37
Mother-child conflict problems (#)	-0.546	-7.477**	1.357	-6.195**
Interviewer assessed measure of closeness	1.977	3.894	2.559	2.633
Parental Harmony 1 (scale)	-2.856***	-2.196***	-1.408***	0.147
Parental Harmony 2 (scale)	-0.143	-4.007***	0.271	-1.370***
Mother spends plenty of time with child - MCS2	-3.455*	-2.179	-3.215*	-2.089
Father spends plenty of time with child - MCS2	-0.214	1.311	-1.006	-1.407
Health and Well-Being				
Tried to Breast-Feed Child	0.332	-0.585	-0.047	-0.764
Age at which breast-feeding stopped (weeks)	0.082	0.105*	0.068	0.043
Still breast-feeding at MCS1	0.206	0.051	-0.251	0.107
Mother alcohol consumption during pregnancy (units)	-0.014	0.239	-0.117	0.232*
Mother alcohol consumption (small amount)	1.688***	-1.108*	1.387**	-1.227**
Mother alcohol consumption at Wave 1 (units)	-0.023	0.003	-0.028	-0.008
Number of cigarettes smoked by Mother during pregnancy	-0.2	0.01	-0.082	0.134
Number of cigarettes smoked by mother before pregnancy	0.276**	-0.094	0.165	-0.123
Gestation Length in Days	0.493	0.352	0.22	0.177
Gestation Length in Days (squared)	-0.001*	-0.001	-0.001	0
Birth Weight (kg)	1.632**	1.390**	0.653	0.831
Infant Temperament Mood - MCS1	-0.372	0.724***	-0.126	0.315
Infant Temperament Regularity - MCS1	0.578**	1.052***	0.523**	0.619**
Infant Temperament Adaptability - MCS1	0.366	1.053***	0.041	0.442*
Mother Suffered Post-Natal Depression	0.426	-3.710***	-0.131	-2.634***
Mother Height at Birth (cm)	0.016	0.032	0.006	0.038
Father Height at Birth (cm)	-0.033*	-0.028	-0.009	-0.026
Mother Weight at Birth (kg)	-0.023	-0.084*	-0.002	-0.063
Father Weight at Birth (kg)	0.042	0.038	0.001	0.035
Father Under-Weight	2.339	3.714	2.596	2.221
Father Over-Weight	-2.450***	-1.341	-1.119	-0.62
Father Obese	-0.782	-2.459*	0.889	-1.474
Mother Under-Weight	-0.489	-1.865	0.536	-1.727
Mother Over-Weight	-0.158	-1.575*	0.208	-1.131
Mother Obese	1.292	0.603	1.303	1.236
Childcare				
Has Been to Nursery School/Class (MCS2)	-0.408	-0.278	-2.104***	-1.073*
Has Been to Playgroup (MCS2)	-1.469*	-1.684**	-2.175***	-1.234*
Has Been to Pre-School (MCS2)	-0.859	-0.017	-2.173**	0.306
Has Been to Childminder (MCS2)	1.706	-1.081	1.049	-1.207
Has Been to Day Nursery or Crèche (MCS2)	1.622	-0.015	0.393	-0.608
Has Been to Nursery School/Class (MCS3)	-1.178	0.816	-0.165	1.444**
Has Been to Playgroup (MCS3)	1.258	1.824**	2.028**	1.775**
Has Been to Pre-School (MCS3)	0.707	0.171	0.743	-0.018

Has Been to Childminder (MCS3)	1.777	0.441	2.653*	0.513
Has Been to Day Nursery or Crèche (MCS3)	-1.866	-0.679	-0.391	-0.56
Home-Learning Environment				
2nd HLE Quintile at MCS2	1.177	1.311	-0.455	1.254
3rd HLE Quintile at MCS2	1.389	-0.123	-0.713	-0.509
4th HLE Quintile at MCS2	2.311**	0.688	-0.644	0.014
5th HLE Quintile at MCS2	3.822***	1.714*	-0.553	0.476
Read to Everyday at MCS2	5.420***	1.918	0.747	0.426
Read to Some Days at MCS2	1.533	1.35	-1.11	0.482
2nd HLE Quintile at MCS3	0.318	0.446	0.775	0.641
3rd HLE Quintile at MCS3	0.498	1.292	1.119	1.249
4th HLE Quintile at MCS3	-1.246	2.157**	-0.779	1.649*
5th HLE Quintile at MCS3	-0.087	2.763***	1.291	2.184**
Read to Everyday at MCS3	-0.178	1.668	-0.112	2.580**
Read to Some Days at MCS3	-1.094	1.031	-1.003	1.635
Mother rates herself as good parent - MCS3	1.365*	4.152***	0.17	2.436***
Mother rates herself as very good parent - MCS3	-1.434*	5.259***	-2.031***	2.991***
Father rates himself as good parent - MCS3	-0.367	0.956	-0.981	0.848
Father rates himself as very good parent - MCS3	-1.046	2.089***	-1.218*	1.874***
Parenting Style/Rules				
Lots of Rules - MCS2	-0.347	-0.458	-0.06	-0.234
Strictly Enforced Rules - MCS2	1.117*	0.039	0.631	-0.443
Regular Bed-times at MCS2	1.186	0.716	0.139	-0.225
Regular Meal-times at MCS2	0.852	2.646***	0.264	0.585
Watches > 3 hours TV a day - MCS2	0.375	-1.938**	-0.196	-1.182
Watches > 3 hours TV a day - MCS3	0.211	-1.326	-0.045	-0.881
Plays Computer > 1 hour a day - MCS3	-1.092	1.300**	-1.149*	1.013*
Regular Bed-times at MCS3	2.643**	5.530***	2.979***	4.621***
Regular Meal-times at MCS3	1.09	3.475***	0.101	2.381**
Eat Breakfast Together at MCS3	1.019	3.501***	0.247	2.816***
Observations	11054	11054	11054	11054
R-Squared	0.21	0.36	0.29	0.4

Table 11 – Mediation of other characteristics (BAS, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	2.066**	1.610*	1.564*	2.017**	1.503*	1.951**	0.979
3rd SEP quintile	5.767***	5.239***	5.016***	5.646***	4.921***	5.637***	4.325***
4th SEP quintile	7.867***	7.280***	7.054***	7.802***	6.778***	7.664***	6.244***
Top SEP quintile	9.629***	8.956***	8.609***	9.642***	8.347***	9.349***	7.645***
Parental Education							
Mother NVQ level 1	3.155**	2.813**	2.578**	2.998**	2.721**	3.031**	1.874
Mother NVQ level 2	5.677***	4.972***	4.647***	5.471***	4.625***	5.413***	3.332***
Mother NVQ level 3	6.748***	5.916***	5.323***	6.547***	4.956***	6.380***	3.324***
Mother NVQ level 4/5	9.220***	8.620***	7.481***	9.047***	7.004***	8.804***	5.423***
Mother, Other Quals.	2.955	2.642	2.562	2.926	1.662	2.919	0.891
Father NVQ level 1	0.211	-0.109	0.874	0.069	-0.393	0.217	-0.103
Father NVQ level 2	0.645	0.466	1.079	0.464	0.371	0.563	0.556
Father NVQ level 3	1.679	1.525	1.966*	1.55	0.991	1.475	1.179
Father NVQ level 4/5	2.770***	2.556***	2.639**	2.681***	1.617*	2.559***	1.47
Father Other Quals.	5.975*	5.225	6.651*	6.404*	7.678***	7.058**	7.862**
Child Characteristics							
Male Child	-6.944***	-6.749***	-7.448***	-6.881***	-6.188***	-6.953***	-6.572***
Child's Age (months)	2.591***	2.611***	2.607***	2.555***	2.617***	2.584***	2.613***
Multiple Birth	-4.562**	-4.039*	-2.091	-4.605**	-2.781	-4.859**	-0.722
Special Care Unit	-3.532***	-3.353***	-2.071*	-3.551***	-3.362***	-3.518***	-1.801
Indian Child	-8.613***	-8.108***	-6.909**	-8.164***	-7.186***	-8.224***	-5.079*
Pakistani Child	-12.068***	-11.213***	-10.275***	-11.547***	-11.358***	-11.642***	-8.867***
Bangladeshi Child	-16.046***	-15.226***	-14.432***	-15.454***	-13.891***	-15.699***	-11.380***
Black Caribbean Child	-6.990**	-6.645*	-7.078**	-6.446*	-4.428	-6.073*	-3.47
Black African Child	-10.554***	-10.222***	-10.047***	-10.153***	-9.378***	-10.093***	-8.142***
Other Ethnicity Child	-11.919***	-11.256***	-10.945***	-11.486***	-11.050***	-11.737***	-9.801***
Mixed Ethnicity Child	-1.438	-1.572	-1.207	-1.244	-1.044	-1.228	-0.575
Family Characteristics							
Only English at Home	12.651***	11.773***	12.851***	12.667***	11.996***	12.530***	11.444***
Mother worked (MCS1/ 2)	0.674	0.882	0.788	0.749	0.84	0.686	1.1
Father worked (MCS1/ 2)	4.548***	3.853***	3.776***	4.391***	4.391***	4.496***	3.279**
Mother's Age at birth	1.345***	1.311***	1.365***	1.278**	1.288***	1.299***	1.280***
Mother's Age at birth Sq	-0.016*	-0.015*	-0.017*	-0.015*	-0.015*	-0.015*	-0.015*
Lone Parent (MCS1)	2.274	1.551	1.315	2.328	2.623	2.117	1.325
Had baby in teens	0.262	0.799	0.148	0.101	0.081	0.257	0.17
Cohabiting Parents (MCS1)	1.126	1.269	1.326	1.198	1.189	1.257	1.396*
Siblings (MCS2)	-0.087	0.178	-0.188	-0.145	0.195	-0.218	0.221
Older Siblings (MCS2)	-4.047***	-4.327***	-3.928***	-3.969***	-3.644***	-3.846***	-3.699***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.22	0.22	0.22	0.22	0.24	0.22	0.25

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 12 – Mediation of other characteristics (Bracken, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	3.590***	3.071***	3.009***	3.601***	2.974***	3.236***	2.302**
3rd SEP quintile	6.533***	5.800***	5.613***	6.391***	5.601***	5.966***	4.501***
4th SEP quintile	10.771***	9.869***	9.816***	10.580***	9.609***	10.013***	8.332***
Top SEP quintile	12.055***	10.953***	10.864***	11.729***	10.739***	11.142***	8.976***
Parental Education							
Mother NVQ level 1	2.944**	2.603**	2.259*	2.775**	2.306*	2.772**	1.443
Mother NVQ level 2	5.512***	4.754***	4.294***	5.375***	4.085***	4.889***	2.628**
Mother NVQ level 3	6.931***	6.035***	5.172***	6.786***	4.477***	6.050***	2.497**
Mother NVQ level 4/5	10.583***	9.892***	8.160***	10.317***	7.631***	9.523***	5.130***
Mother, Other Quals.	4.732	4.376	4.43	4.76	3.158	4.936	2.977
Father NVQ level 1	0.007	-0.413	2.026	-0.104	-0.904	0.004	0.682
Father NVQ level 2	-1.397	-1.565	0.35	-1.483	-1.892**	-1.534	-0.33
Father NVQ level 3	2.320**	2.240**	3.907***	2.201**	1.304	1.958*	2.787**
Father NVQ level 4/5	5.599***	5.539***	6.549***	5.502***	3.918***	5.154***	4.907***
Father Other Quals.	-20.200**	-20.936**	-17.645*	-19.696**	-17.663***	-18.464**	-15.179**
Child Characteristics							
Male Child	-6.116***	-5.884***	-6.212***	-6.037***	-4.913***	-6.107***	-4.842***
Child's Age (months)	1.021***	1.022***	1.032***	0.948***	1.053***	1.002***	0.978***
Multiple Birth	-7.266***	-6.730***	-5.206**	-7.269***	-5.140**	-7.323***	-3.434
Special Care Unit	-3.582***	-3.431***	-1.723*	-3.608***	-3.333***	-3.571***	-1.437
Indian Child	-1.66	-1.427	-0.982	-1.302	-0.035	-0.757	0.795
Pakistani Child	-7.945***	-7.205***	-6.791***	-7.751***	-7.032***	-6.894***	-5.373***
Bangladeshi Child	-9.584**	-8.790**	-9.456**	-9.255**	-6.584*	-8.518**	-5.453
Black Caribbean Child	-1.495	-1.365	-1.611	-1.463	2.035	0.204	2.749
Black African Child	-6.782**	-6.638**	-6.230**	-6.651**	-5.351*	-6.276**	-4.408*
Other Ethnicity Child	5.106	5.74	5.395	5.335	6.238*	5.959	6.944*
Mixed Ethnicity Child	2.188	1.949	1.97	2.366	2.593	2.398	2.518
Family Characteristics							
Only English at Home	7.408***	6.562***	8.141***	7.332***	6.631***	7.416***	6.809***
Mother worked (MCS1/ 2)	1.114*	0.799	1.342**	0.943	1.301**	1.107*	0.932
Father worked (MCS1/ 2)	3.456**	3.047**	2.711*	3.406**	3.343**	3.265**	2.620**
Mother's Age at birth	2.201***	2.176***	2.309***	2.116***	2.117***	2.100***	2.131***
Mother's Age at birth Sq	-0.029***	-0.029***	-0.031***	-0.028***	-0.028***	-0.027***	-0.028***
Lone Parent (MCS1)	0.893	0.559	-1.648	0.691	1.171	0.438	-1.959
Had baby in teens	0.826	1.388	0.789	0.753	0.5	0.961	0.737
Cohabiting Parents (MCS1)	0.392	0.519	0.324	0.416	0.434	0.597	0.358
Siblings (MCS2)	0.155	0.493	-0.044	0.072	0.525	0.029	0.469
Older Siblings (MCS2)	-5.968***	-6.377***	-5.549***	-5.803***	-5.518***	-5.752***	-5.339***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.23	0.24	0.25	0.24	0.27	0.24	0.29

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 13 – Mediation of other characteristics (SDQ, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	5.206***	2.935***	3.464***	5.271***	4.375***	4.546***	1.601*
3rd SEP quintile	8.558***	5.521***	5.440***	8.624***	7.666***	7.396***	3.359***
4th SEP quintile	10.671***	6.875***	6.893***	10.740***	9.167***	9.169***	3.865***
Top SEP quintile	12.645***	7.437***	8.298***	12.635***	10.792***	10.947***	3.837***
Parental Education							
Mother NVQ level 1	1.304	2.167	1.18	1.408	1.116	1.103	1.99
Mother NVQ level 2	2.078	2.744**	0.904	2.227*	1.43	1.122	1.469
Mother NVQ level 3	3.321**	4.281***	1.676	3.504**	2.195	1.972	2.120*
Mother NVQ level 4/5	6.003***	7.994***	3.930***	6.181***	4.713***	4.334***	4.910***
Mother, Other Quals.	6.089*	4.93	6.070*	6.132*	5.536	6.438*	5.024
Father NVQ level 1	-1.086	-2.394	-0.811	-0.994	-1.506	-1.158	-2.072
Father NVQ level 2	0.102	-0.651	0.004	0.228	-0.178	-0.042	-0.519
Father NVQ level 3	1.361	0.688	1.273	1.456	0.721	0.922	0.462
Father NVQ level 4/5	2.545**	2.502***	1.776	2.616**	2.056**	1.908*	1.548
Father Other Quals.	-15.065	-21.802	-19.318	-15.226	-10.257	-12.804	-20.649
Child Characteristics							
Male Child	-4.810***	-4.179***	-4.919***	-4.839***	-4.003***	-4.753***	-3.974***
Child's Age (months)	0.468***	0.389***	0.477***	0.463***	0.461***	0.440***	0.378***
Multiple Birth	-1.438	-2.455	1.009	-1.384	4.196*	-1.498	2.465
Special Care Unit	-3.409***	-2.465***	-1.28	-3.416***	-3.112***	-3.422***	-0.903
Indian Child	-1.532	-4.517*	-0.446	-1.809	-1.048	-0.264	-3.409
Pakistani Child	-0.54	-0.776	0.619	-0.861	-0.406	0.966	0.019
Bangladeshi Child	6.47	5.834	5.38	6.088	5.718	8.148*	4.744
Black Caribbean Child	10.012**	5.734*	8.821**	9.643**	9.861**	12.626***	6.307**
Black African Child	0.628	-1.1	1.618	0.358	0.332	1.389	-0.625
Other Ethnicity Child	4.666	4.684	5.1	4.39	4.534	6.235*	4.702
Mixed Ethnicity Child	2.361	1.122	2.62	2.222	2.994*	2.536	1.523
Family Characteristics							
Only English at Home	-1.048	0.638	-0.509	-1.045	-2.115	-0.853	1.332
Mother worked (MCS1/ 2)	0.787	0.377	0.659	0.802	0.926	0.727	0.363
Father worked (MCS1/ 2)	0.399	-0.827	-1.111	0.531	-0.018	0.045	-1.504
Mother's Age at birth	1.318**	1.459***	1.363***	1.338**	1.350**	1.184**	1.538***
Mother's Age at birth Sq	-0.016*	-0.017**	-0.017*	-0.016*	-0.017*	-0.013	-0.019**
Lone Parent (MCS1)	-1.356	-2.133	-1.419	-1.313	-0.952	-2.128	-2.576
Had baby in teens	-2.639	-0.461	-2.058	-2.553	-2.863	-2.319	-0.322
Cohabiting Parents (MCS1)	-1.636*	-0.135	-0.712	-1.664*	-1.613*	-1.365	0.007
Siblings (MCS2)	-1.443**	-1.127*	-1.913***	-1.417**	-1.248*	-1.447**	-1.337**
Older Siblings (MCS2)	2.104***	0.716	2.881***	2.070***	2.386***	2.246***	1.525**
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.11	0.32	0.16	0.11	0.15	0.12	0.36

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 14 – Mediation of the effect of other characteristics (BAS, MCS3)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	1.603*	1.308	1.314	1.491	1.302	1.228	0.727
3rd SEP quintile	3.041***	2.616**	2.805**	2.871***	2.444**	2.467**	1.878*
4th SEP quintile	5.492***	4.977***	5.301***	5.222***	4.838***	4.685***	4.079***
Top SEP quintile	7.580***	7.032***	7.334***	7.341***	6.863***	6.652***	6.074***
Parental Education							
Mother NVQ level 1	2.650**	2.042	2.148	2.636**	2.312*	2.345*	1.405
Mother NVQ level 2	4.908***	3.952***	3.993***	4.802***	4.044***	4.249***	2.474**
Mother NVQ level 3	5.615***	4.505***	4.330***	5.378***	4.137***	4.706***	2.024
Mother NVQ level 4/5	10.120***	9.124***	8.469***	9.743***	8.238***	9.061***	5.825***
Mother, Other Quals.	2.615	2.368	2.707	2.6	1.465	2.572	1.43
Father NVQ level 1	0.434	0.163	2.034	0.472	0.062	0.456	1.399
Father NVQ level 2	0.589	0.465	2.291**	0.565	0.493	0.475	2.001*
Father NVQ level 3	2.645**	2.578**	4.220***	2.566**	2.277**	2.342**	3.648***
Father NVQ level 4/5	5.511***	5.395***	6.616***	5.432***	4.609***	5.159***	5.618***
Father Other Quals.	-13.081	-12.678	-11.12	-14.297	-11.465	-12.841	-10.874
Child Characteristics							
Male Child	-0.972	-0.811	-1.235**	-0.941	-0.482	-0.833	-0.562
Child's Age (months)	-0.568*	-0.504	-0.602*	-0.635**	-0.587*	-0.513	-0.551*
Multiple Birth	-5.484***	-5.172*	-4.439**	-5.501***	-4.587**	-5.703***	-3.677
Special Care Unit	-0.895	-0.81	-0.534	-0.896	-0.739	-0.848	-0.401
Indian Child	-2.105	-1.459	-0.649	-1.861	-0.406	-1.213	1.732
Pakistani Child	-7.248***	-6.255***	-5.097**	-6.856***	-6.709***	-6.222***	-3.271
Bangladeshi Child	-4.945	-3.97	-3.718	-4.437	-3.277	-4	-0.508
Black Caribbean Child	-9.998***	-9.240***	-9.937***	-9.795***	-7.473***	-8.231***	-5.712**
Black African Child	-9.377***	-8.803***	-9.205***	-9.075***	-7.810***	-8.536***	-6.457**
Other Ethnicity Child	-6.252*	-5.341	-5.083	-5.847*	-5.480*	-5.42	-3.139
Mixed Ethnicity Child	-1.027	-1.078	-1.224	-0.763	-0.743	-0.691	-0.402
Family Characteristics							
Only English at Home	14.227***	13.154***	14.448***	14.105***	13.818***	14.313***	13.165***
Mother worked (MCS1/ 2)	1.399	1.208	1.573*	1.154	1.546*	1.366	1.238
Father worked (MCS1/ 2)	-0.012	-0.202	0.703	0.599	0.803	0.59	0.983
Mother worked (MC3)	1.266	0.766	0.848	1.037	1.092	1.099	0.353
Mother worked (MC3)	0.619	0.711	-0.008	-0.111	0.024	-0.006	-0.198
Mother's Age at birth	1.801***	1.771***	1.712***	1.840***	1.722***	1.728***	1.658***
Mother's Age at birth Sq	-0.022***	-0.022***	-0.021***	-0.023***	-0.021***	-0.021***	-0.020***
Lone Parent (MCS1)	0.489	-0.078	-1.933	0.204	0.006	0.358	-2.825
Had baby in teens	-0.117	0.11	0.029	-0.097	-0.211	-0.117	0.114
Cohabiting Parents (MCS1)	-0.969	-0.944	-1.09	-0.976	-0.882	-0.757	-0.969
Siblings (MCS3)	-0.447	-0.323	-0.552	-0.464	-0.319	-0.633	-0.455
Older Siblings (MCS3)	-4.453***	-4.581***	-4.336***	-4.481***	-4.064***	-4.132***	-4.006***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.18	0.19	0.19	0.19	0.2	0.19	0.21

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 15 – Mediation of other characteristics (SDQ, MCS3)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	4.565***	2.773***	2.988***	4.610***	3.586***	3.827***	1.418
3rd SEP quintile	6.902***	4.523***	4.059***	7.003***	5.843***	5.533***	2.282**
4th SEP quintile	8.374***	5.355***	5.136***	8.528***	6.684***	6.513***	2.451**
Top SEP quintile	11.793***	7.616***	7.968***	12.058***	9.607***	9.887***	4.365***
Parental Education							
Mother NVQ level 1	4.075***	3.910***	3.721***	4.148***	3.995***	3.346**	3.348***
Mother NVQ level 2	6.084***	5.876***	4.883***	6.128***	5.285***	4.562***	4.125***
Mother NVQ level 3	7.312***	7.227***	5.806***	7.459***	6.000***	5.380***	4.761***
Mother NVQ level 4/5	9.623***	10.363***	7.610***	9.884***	8.028***	7.511***	7.072***
Mother, Other Quals.	7.035**	6.426**	7.541**	7.030**	6.431**	7.430**	6.890**
Father NVQ level 1	-0.368	-1.24	1.056	-0.383	-0.983	-0.369	0.083
Father NVQ level 2	0.892	0.11	1.958	0.907	0.591	0.602	1.233
Father NVQ level 3	1.278	0.488	2.273*	1.43	0.623	0.681	1.318
Father NVQ level 4/5	2.495**	2.194**	3.037***	2.616**	1.925*	1.708*	2.481**
Father Other Quals.	-11.156	-12.137	-12.149*	-11.275	-8.694	-11.852	-11.919*
Child Characteristics							
Male Child	-5.441***	-5.101***	-5.538***	-5.495***	-4.815***	-5.499***	-5.108***
Child's Age (months)	1.717***	1.814***	1.700***	1.673***	1.706***	1.732***	1.732***
Multiple Birth	0.565	-0.086	3.15	0.438	5.756**	0.05	3.329
Special Care Unit	-3.494***	-2.617***	-1.288	-3.530***	-3.204***	-3.459***	-0.814
Indian Child	-3.474	-3.901	-2.232	-3.717	-2.844	-2.112	-2.743
Pakistani Child	-9.310***	-7.854***	-7.691***	-9.445***	-8.823***	-7.544***	-6.404***
Bangladeshi Child	-1.789	-1.025	-1.365	-1.819	-2.124	0.249	0.024
Black Caribbean Child	-7.779**	-8.187***	-6.079**	-7.691**	-7.844***	-6.694**	-6.211**
Black African Child	3.502	1.502	3.306	3.634	3.304	6.669*	3.539
Other Ethnicity Child	-4.288	-1.803	-3.94	-4.333	-4.559	-2.384	-2.012
Mixed Ethnicity Child	-0.485	-0.379	0.007	-0.625	0.226	-0.131	0.268
Family Characteristics							
Only English at Home	0.201	-0.114	0.314	0.13	-0.841	0.746	0.407
Mother worked (MCS1/ 2)	-0.348	-0.514	-0.296	-0.092	-0.401	-0.444	-0.411
Father worked (MCS1/ 2)	2.019***	1.932***	2.332**	2.200**	2.535***	1.975***	1.994***
Mother's Age at birth	0.654	-0.036	-0.96	0.656	0.544	0.42	-0.771
Mother's Age at birth Sq	2.235**	1.462	1.573**	2.130***	2.070**	2.169**	1.538*
Lone Parent (MCS1)	-0.353	-0.122	-0.407	-0.375	-0.38	-0.402	-0.138
Had baby in teens	0.01	0.007	0.01	0.01	0.01	0.011	0.007
Cohabiting Parents (MCS1)	-1.732	-2.899	-3.174	-1.389	-0.973	-1.774	-3.363
Siblings (MCS2)	-2.349	-0.89	-1.877	-2.335	-2.965	-2.121	-1.163
Older Siblings (MCS2)	-2.364**	-0.69	-1.649*	-2.243**	-2.391***	-1.986**	-0.555
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.13	0.25	0.17	0.13	0.17	0.15	0.29

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table16 –Mediation of the effect of other characteristics (BAS value added, MCS3)

	(1) Education, Family Background and Prior Ability Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
BAS Score (Age 3)	8.042***	7.983***	8.004***	8.128***	7.995***	8.028***	7.989***
Bracken (Age 3)	6.926***	6.893***	6.861***	6.953***	6.849***	6.872***	6.816***
SDQ Score (Age 3)	0.112	0.437	0.115	0.116	0.215	-0.017	0.339
SEP Quintile							
2nd SEP quintile	0.135	0.071	0.129	0.011	0.119	-0.056	-0.17
3rd SEP quintile	0.063	-0.071	0.266	-0.032	-0.08	-0.21	-0.163
4th SEP quintile	1.006	0.838	1.256	0.754	0.917	0.61	0.6
Top SEP quintile	2.425**	2.314*	2.744**	2.263*	2.327*	1.967	2.206*
Parental Education							
Mother NVQ level 1	0.834	0.488	0.727	0.895	0.877	0.665	0.522
Mother NVQ level 2	1.809*	1.329	1.544	1.728*	1.662*	1.484	0.89
Mother NVQ level 3	1.76	1.197	1.363	1.542	1.42	1.287	0.308
Mother NVQ level 4/5	4.721***	4.114***	4.207***	4.387***	4.221***	4.190***	2.910***
Mother, Other Quals.	1.391	1.277	1.582	1.431	0.982	1.284	1.144
Father NVQ level 1	0.362	0.351	1.064	0.441	0.363	0.331	1.024
Father NVQ level 2	0.999	0.986	1.917*	1.023	1.104	0.928	1.946*
Father NVQ level 3	1.996**	1.991**	2.880***	2.004**	2.055**	1.853**	2.833***
Father NVQ level 4/5	3.648***	3.601***	4.287***	3.626***	3.449***	3.485***	4.016***
Father Other Quals.	-9.146	-8.327	-7.995	-10.845	-8.906	-9.453	-9.171
Child Characteristics							
Male Child	2.456***	2.518***	2.342***	2.457***	2.420***	2.549***	2.430***
Child's Age (months)	-0.473*	-0.468	-0.497*	-0.564**	-0.446	-0.424	-0.470*
Multiple Birth	-2.282	-1.3	-2.585	-2.35	-2.635	-2.417	-2.267
Special Care Unit	0.709	0.724	0.062	0.764	0.756	0.714	0.115
Indian Child	0.883	1.35	1.562	0.833	1.765	1.401	2.979
Pakistani Child	0.077	0.582	1.232	0.183	0.188	0.473	2.082
Bangladeshi Child	4.478	4.879	4.903	4.743	4.95	4.809	6.233
Black Caribbean Child	-7.604***	-7.141***	-7.752***	-7.580***	-6.531***	-6.562***	-5.534**
Black African Child	-4.282*	-3.934	-4.567*	-4.098	-3.292	-3.718	-2.596
Other Ethnicity Child	-3.603	-3.113	-2.982	-3.317	-3.313	-3.206	-1.781
Mixed Ethnicity Child	-1.277	-1.217	-1.52	-1.158	-1.182	-1.061	-0.99
Family Characteristics							
Only English at Home	8.579***	8.127***	8.728***	8.368***	8.603***	8.663***	8.142***
Mother worked (MCS1/ 2)	0.985	0.844	1.07	0.733	1.114	0.958	0.807
Father worked (MCS1/ 2)	-0.453	-0.193	-0.229	-0.539	-0.453	-0.433	-0.513
Mother worked (MC3)	-0.346	-0.46	-0.292	-0.617	-0.359	-0.403	-0.601
Mother worked (MC3)	-0.299	-0.552	-0.396	-0.305	-0.146	-0.294	0.037
Mother's Age at birth	1.053***	1.006**	0.964**	1.139***	0.993**	1.041***	0.950**
Mother's Age at birth Sq	-0.013**	-0.012*	-0.011*	-0.014**	-0.012*	-0.012*	-0.011*
Lone Parent (MCS1)	-0.576	-0.815	-1.662	-0.936	-1.082	-0.613	-2.581
Had baby in teens	-0.606	-0.65	-0.45	-0.579	-0.578	-0.603	-0.418

Cohabiting Parents (MCS1)	-1.531**	-1.572**	-1.637**	-1.555**	-1.498**	-1.435*	-1.582**
Siblings (MCS3)	-0.231	-0.162	-0.252	-0.206	-0.192	-0.344	-0.226
Older Siblings (MCS3)	-2.154***	-2.199***	-2.196***	-2.264***	-2.037***	-1.955***	-2.103***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.34	0.34	0.35	0.35	0.35	0.34	0.36

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 17–Mediation of the effect of other characteristics (SDQ value added, MCS3)

	(1) Education, Family Background and Prior Ability Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
BAS Score (Age 3)	0.841**	0.771**	0.827**	0.860**	0.712**	0.870***	0.753**
Bracken (Age 3)	1.554***	1.523***	1.472***	1.618***	1.370***	1.424***	1.308***
SDQ Score (Age 3)	13.848***	12.083***	13.184***	13.850***	13.196***	13.576***	11.373***
SEP Quintile							
2nd SEP quintile	1.486*	1.088	0.942	1.495*	1.086	1.229	0.428
3rd SEP quintile	2.064**	1.616*	1.004	2.167**	1.714*	1.54	0.578
4th SEP quintile	2.307**	1.659*	1.205	2.430**	1.686	1.566	0.324
Top SEP quintile	4.806***	3.778***	3.461***	5.106***	3.926***	4.126***	2.357*
Parental Education							
Mother NVQ level 1	3.020**	2.858**	2.875**	3.053**	3.070***	2.605**	2.568**
Mother NVQ level 2	4.056***	4.070***	3.670***	4.029***	3.822***	3.348***	3.255***
Mother NVQ level 3	4.565***	4.703***	4.145***	4.621***	4.168***	3.687***	3.636***
Mother NVQ level 4/5	5.610***	6.222***	5.013***	5.777***	5.142***	4.738***	4.870***
Mother, Other Quals.	3.685	3.921	4.332	3.686	3.564	3.941	4.53
Father NVQ level 1	0.755	0.314	1.626	0.686	0.408	0.748	1.211
Father NVQ level 2	1.296	0.796	2.075**	1.264	1.14	1.122	1.657*
Father NVQ level 3	0.85	0.354	1.647	0.978	0.584	0.568	1.211
Father NVQ level 4/5	1.388	1.201	2.090**	1.492*	1.246	1.053	1.912**
Father Other Quals.	-3.634	-2.725	-3.518	-3.757	-3.775	-5.203	-3.993
Child Characteristics							
Male Child	-2.524***	-2.840***	-2.691***	-2.561***	-2.492***	-2.678***	-3.097***
Child's Age (months)	1.753***	1.810***	1.759***	1.694***	1.760***	1.741***	1.758***
Multiple Birth	1.804	3.536	3.097	1.641	4.304**	1.459	5.054**
Special Care Unit	-1.334*	-1.141	-0.31	-1.331*	-1.273*	-1.359*	-0.088
Indian Child	-2.292	-1.619	-1.741	-2.508	-2.124	-1.699	-1.31
Pakistani Child	-7.394***	-6.089**	-6.537***	-7.489***	-7.320***	-6.722***	-5.488**
Bangladeshi Child	-3.715	-2.294	-2.731	-3.657	-3.902	-2.878	-1.243
Black Caribbean Child	-1.496	-1.142	-0.957	-1.245	-1.74	-0.012	0.177
Black African Child	-7.754***	-7.534***	-6.537***	-7.595***	-7.799***	-7.296***	-6.042***
Other Ethnicity Child	-6.399	-3.529	-6.099	-6.367	-6.636*	-5.478	-3.801
Mixed Ethnicity Child	-1.97	-1.124	-1.47	-2.087	-1.513	-1.77	-0.615
Family Characteristics							
Only English at Home	-0.035	-0.89	-0.204	-0.129	-0.487	0.297	-0.677
Mother worked (MCS1/ 2)	-0.643	-0.598	-0.618	-0.402	-0.677	-0.69	-0.481
Father worked (MCS1/ 2)	1.446*	1.171	1.089*	1.385**	1.388	1.265**	1.195
Mother worked (MC3)	0.067	-0.006	-0.663	-0.018	0.13	0.043	-0.422
Mother worked (MC3)	1.269**	1.478**	1.496*	1.405	1.638**	1.452*	1.625**
Mother's Age at birth	1.053***	1.006**	0.964**	1.139***	0.993**	1.041***	0.950**
Mother's Age at birth Sq	-0.013**	-0.012*	-0.011*	-0.014**	-0.012*	-0.012*	-0.011*
Lone Parent (MCS1)	-0.576	-0.815	-1.662	-0.936	-1.082	-0.613	-2.581
Had baby in teens	-0.606	-0.65	-0.45	-0.579	-0.578	-0.603	-0.418
Cohabiting Parents (MCS1)	-1.531**	-1.572**	-1.637**	-1.555**	-1.498**	-1.435*	-1.582**

Siblings (MCS3)	-0.107	-0.328	-0.192	-0.052	-0.048	-0.26	-0.403
Older Siblings (MCS3)	1.119**	1.094**	1.233**	1.004**	1.498***	1.326***	1.482***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.36	0.38	0.37	0.36	0.37	0.36	0.4

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 18–Determinants of Mediating Factors at age 3

	Large Family (3+ siblings)	Mother's age at birth	Mother-child relationship problems	Highest HLE Quintile at age 3	Parents reads every day at age 3	Regular bed times at age 3
SEP Quintile						
2nd SEP quintile	-0.100***	1.786***	-0.020**	0.025	0.063***	0.034***
3rd SEP quintile	-0.181***	3.155***	-0.033***	0.036**	0.123***	0.054***
4th SEP quintile	-0.229***	3.910***	-0.045***	0.03	0.154***	0.087***
Top SEP quintile	-0.269***	4.680***	-0.041***	0.005	0.177***	0.106***
Parental Education						
Mother NVQ level 1	-0.069***	-0.923***	-0.009	0.028	0.041	0.030*
Mother NVQ level 2	-0.091***	-0.678***	-0.027***	0.041**	0.098***	0.053***
Mother NVQ level 3	-0.130***	-1.729***	-0.031***	0.104***	0.156***	0.080***
Mother NVQ level 4/5	-0.146***	0.014	-0.032***	0.107***	0.228***	0.114***
Mother, Other Quals.	-0.058	1.728***	-0.017	0.046	0.194***	-0.007
Father NVQ level 1	-0.003	-1.872***	-0.012	0.037	0.043	-0.007
Father NVQ level 2	-0.013	-0.492**	0.008	0.019	-0.003	0.004
Father NVQ level 3	0.001	-0.802***	0.002	0.037**	0.049**	0.046***
Father NVQ level 4/5	0.011	-0.052	-0.006	0.055***	0.115***	0.066***
Father Other Quals.	-0.153	-2.397	0	-0.105	0.12	-0.105
Child Characteristics						
Male Child	0.005	0.018	0.021***	-0.088***	-0.033***	0
Multiple Birth	-0.059**	1.870***	-0.013	-0.055**	-0.049	0.110***
Special Care Unit	-0.045***	0.193	0.012	-0.002	0.012	0.006
Indian Child	0.048	-1.559***	-0.037*	0.016	-0.249***	-0.109***
Pakistani Child	0.199***	-2.624***	0.031	0.036	-0.082*	-0.068*
Bangladeshi Child	0.268***	-2.362***	0.052	-0.045	-0.212***	-0.086
Black Caribbean Child	0.036	2.091***	-0.001	-0.051	-0.204***	-0.125***
Black African Child	0.071	3.437***	0.025	-0.107***	-0.360***	-0.242***
Other Ethnicity Child	-0.026	0.597	-0.021	0.066	-0.117*	-0.061
Mixed Ethnicity Child	0.009	0.472	-0.016	-0.011	-0.046	-0.031
Family Characteristics						
Only English at Home	0.029	-0.044	0.014	0.013	0.047	0.027
Mother's Age at birth	0.074***		0	0.001	-0.011	0.006
Mother's Age at birth Sq	-0.001***		0	0	0	0
Lone Parent (MCS1)	-0.078***	-0.953***	-0.008	0.050**	0.028	-0.003
Had baby in teens	-0.047	-9.125***	0.031	0.021	0.013	-0.016
Cohabiting Parents (MCS1)	-0.060***	-2.502***	-0.002	0.01	0	-0.038***
Observations	11054	11054	11054	11054	11054	11054

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 19–Determinants of Health and Well Being Factors

	Mother depressed	Birth weight	Birth weight (+gestation)
SEP Quintile			
2nd SEP quintile	-0.044***	0.041**	0.028*
3rd SEP quintile	-0.065***	0.070***	0.039**
4th SEP quintile	-0.078***	0.060**	0.032
Top SEP quintile	-0.098***	0.080***	0.044**
Parental Education			
Mother NVQ level 1	0.021	0.046	0.016
Mother NVQ level 2	0.012	0.053**	0.033
Mother NVQ level 3	0.028*	0.073***	0.029
Mother NVQ level 4/5	0.014	0.065**	0.024
Mother, Other Quals.	0.072	0.086	0.03
Father NVQ level 1	-0.003	0.012	0.001
Father NVQ level 2	-0.002	0.028	0.012
Father NVQ level 3	-0.019	0.044*	0.028
Father NVQ level 4/5	-0.016	0.051**	0.042**
Father Other Quals.	0	0.316	0.187
Child Characteristics			
Male Child	0.006	0.140***	0.138***
Multiple Birth	-0.004	-0.896***	-0.438***
Special Care Unit	0.028**	-0.536***	-0.065***
Indian Child	0.059*	-0.388***	-0.326***
Pakistani Child	0.03	-0.226***	-0.200***
Bangladeshi Child	-0.001	-0.249***	-0.272***
Black Caribbean Child	0.018	-0.255***	-0.115**
Black African Child	-0.076**	-0.015	-0.024
Other Ethnicity Child	-0.031	-0.233***	-0.181***
Mixed Ethnicity Child	-0.016	-0.137***	-0.113***
Family Characteristics			
Only English at Home	-0.017	0.028	0.038
Mother's Age at birth	-0.010*	-0.005	0.002
Mother's Age at birth Sq	0.000*	0	0
Lone Parent (MCS1)	0.017	-0.077***	-0.090***
Had baby in teens	0.002	-0.025	-0.027
Cohabiting Parents (MCS1)	0.014	-0.068***	-0.073***
Gestation			
Gestation length (days)			0.066***
Above Squared			-0.000***
Observations	11054	11054	11054

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

9.

However, as already stated, this method may be subject to an ordering bias, e.g. some of the role played by the home-learning environment could be falsely attributed to parental education if these two factors are correlated, as seems likely. Table shows the results of our second methodology for explaining socio-economic differences in BAS scores at age 3, simultaneously controlling for all

observable characteristics, which is not subject to the same ordering bias as methodology 1 and allows us to present results at a more detailed level. It is based on the full regression results shown in Table 9.

We begin by showing the raw top-bottom and middle-bottom gaps in percentile ranks terms again, and then show the amount that can be explained by all observable characteristics, both in average percentile terms and as a percentage of the raw gap. It shows that 69% of the socio-economic gaps in BAS scores at age 3 can be explained by differences in observable characteristics; whilst 31% remains unexplained (this is necessarily equal to the total amount explained in the first methodology). It then decomposes the 69% explained by all observable characteristics into how much is explained by parental education, family background characteristics and our five groups of variables representing the early childhood caring environment (as well as a separate group for missing dummy variables). These results will not necessarily equal those found under the first methodology. Within each group, we also further decompose the amount explained by each group into the amount explained by individual (or very similar) variables. We observe that:

- **Parental Education** explains about one sixth of the socio-economic gaps in BAS scores, less than under the first methodology. This reflects differences in parental education correlated with socio-economic position that cannot be explained by other factors in the model. Also, part of the role we ascribed to parental education under the first methodology should actually have been ascribed to family background characteristics, or measures of the early childhood caring environment, that are correlated with parental education.
- **Family Background** characteristics explain 25-28% of the socio-economic gaps in BAS scores at age 3, *more* than was the case under the first methodology (probably because some of its role was falsely ascribed to parental education). Looking at the detailed results, we see that 14-16% of the gaps are explained by the fact that mothers of children from higher quintiles are, on average, older than those from lower quintiles. Similarly, the fact that the top quintiles contains greater proportions of working fathers and that these children have fewer siblings explain 6-9% and 6-7% of the socio-economic gaps. The age of children explains -8% to -11% of the gaps, which means that the poorer children must have been tested at slightly later ages, since age has a positive effect on BAS percentiles.
- **Family Interactions** explain 4-5% of the socio-economic gaps, with the largest single amount being explained by greater levels of mother-child closeness among families in higher quintile.
- **Health and Well-Being** factors only explain about 2-3% of the gaps, with some positive contributions (breast-feeding and birth-weight) being offset by some negative factors (smoking before pregnancy and parental height/weight)
- **Childcare** patterns only explain about 1-2% of the socio-economic gaps
- **The Home-Learning Environment** explains one sixth of the socio-economic gaps, most of which is done by the HLE index and reading frequency at age 3. This is much larger than seemed to be the case under the first methodology and must result from some of its role being falsely ascribed to parental education and/or family background.
- In net terms**, Parental Style/Rules** explains very little of the socio-economic gaps at age 3 in BAS percentile ranks.

Therefore, this decomposition shows that over a quarter of the socio-economic gaps in BAS scores at age 3 can be explained by differences in family background characteristics, mostly down to the fact that in higher quintiles mothers are older, children have fewer siblings and fathers are more likely to be in work. A sixth can be explained by differences remains related to parental education and a further sixth by richer home-learning environments in higher quintile.

Age 3 - Bracken

Table 5 shows the results of our decomposition for Bracken scores (the full regression results are shown in Table 9). It shows that all observable characteristics can explain 73% of the middle-bottom gap and 71% of the top-bottom gap. In terms of the individual groups of variables, we observe that:

- **Parental Education** still explains 15% of the middle-bottom gap and 20% of the top-bottom gap. This is similar to the amount of the BAS socio-economic gaps explained by parental education.
- **Family Background** characteristics explain 37% of the middle-bottom gap and 30% of the top-bottom gap. Similarly to the BAS, the most important individual variables are found to be the age of the mother at birth, number of siblings and whether the father was in work.
- **Family Interactions** explain 4-6% of the socio-economic gaps in Bracken scores, with the most important variables being those related to mother-child closeness.
- **Health and Well-Being** factors explain very little of the socio-economic gaps in Bracken scores, with some small positive contributions (breast-feeding, smoking during pregnancy) and some small negative contributions (smoking before pregnancy, parental height/weight).
- **Childcare** only seems to explain about 2% of the socio-economic differences in the Bracken score.
- **The Home-Learning Environment** explains around 15% of the socio-economic differences in Bracken scores, with the HLE index and reading frequency explaining the most.
- **Parental Style/Rules** explain a further 3%, with regular bed time at age 3 playing the largest individual role.

Therefore, the results of the decomposition suggest that 30% of the middle-bottom gap and over a third of the top-bottom gap can be explained by differences in family background characteristics; the most important individual variables being mother's age, number of siblings and whether the father works. Differences in parental education and the home-learning environment each explain a further 15-20% of the socio-economic gaps in the Bracken. This pattern of results is qualitatively similar to that found for the BAS, with family background playing the largest role, followed by parental education and the home-learning environment. The specific variables found to be important are almost identical as well.

Age 5- BAS (Vocabulary) – Static model

Table 6 shows the results of our decomposition methodology for analysing the socio-economic differences in BAS scores at age 5 (the full regression results are shown in Table 10). The four columns under the heading "No controls for prior ability" show the results of our static decomposition. Specifically, it shows that 87% of the middle-bottom gap and 77% of top-bottom gap can be accounted for by differences in observable characteristics. The specific amounts explained by different variables are as follows:

- **Parental Education** explains about a quarter of the socio-economic gaps. This is more than parental education explained in terms of BAS scores at age 3 under the decomposition methodology.
- **Family Background** characteristics explain a further 38% of the top-bottom gap, but 50% of the middle-bottom gap. The most important individual variables were mother's age (15-20% of the gaps), number of siblings (8%), whether the father was in work (3-4%) and marital/partner status (6-9%). Only the latter was not important in explaining gaps at age 3.
- **Family Interactions** explain about 3-5% of the socio-economic gaps in BAS scores at age 5, with the most important variables being those related to mother-child closeness. Again, this is similar to what we found for BAS scores at age 3.
- **Health and Well-Being** factors explain a negative amount of the gap (i.e. they increase it) with positive contributions (from breast-feeding patterns) more than offset against negative ones (smoking before pregnancy and parental height/weight).
- **Childcare** only explains about 2% of the socio-economic gaps.
- **The Home-Learning Environment** explains 8-9% of the socio-economic gaps. Interestingly, this is solely down to differences in the home-learning environment and reading frequency at age 3. The differences at age 5 are found to be unimportant.
- **Parenting Style/Rules** make a further small contribution of 4-5%, with small contributions from all of the individual variables.

Age 5 - BAS (Vocabulary) – Value added model

The last four columns of Table 6 show the results of our decomposition methodology when we also include controls for prior cognitive ability and socio-emotional development (specifically, the Strengths and Difficulties questionnaire). The full regression results on which this decomposition is based are shown in Table 10. This shows that observable characteristics explain 92% of the top-bottom gap and fully explain the middle-bottom gap. Specifically:

- **Prior cognitive ability** explains the majority of both socio-economic gaps. It explains 51% of the middle-bottom gap and 57% of the top-bottom gap.
- **Prior socio-emotional development**, however, only explains 1% of the gaps.
- **Parental Education** explains a further 14-17% of the socio-economic gaps.
- **Family Background** characteristics explain a further 21% of the top-bottom gap and 27% of the middle-bottom gap. The individual variables making the largest contributions are mother's age at birth, marital/partner status and number of siblings. However, the importance of mother's age at birth and number of siblings are halved as compared with the static decomposition at age 5, suggesting that part of their impact at age 5 is via higher levels of cognitive ability at age 3.
- **Family Interactions** only explain a further 1% of the socio-economic gaps.
- **Health and Well-Being** factors make a small negative contribution, overall. There are positive contributions from breast-feeding patterns, but negative ones from smoking before pregnancy and parental height/weight.
- **Childcare** only contributes a further 1% to the socio-economic gap
- **The Home-Learning Environment** hardly contributes anything at all. Since it was important in the static decomposition, this suggests that differences in the home-learning environment only explain gaps at age 5 via improving cognitive ability at age 3.

- **Parenting Style/Rules** explain a further 3-4% of the gap, though no one variable appears to be particularly important.

Socio-emotional development

We now move on to explaining socio-economic differences in a measure of socio-emotional development, namely Strength and Difficulties (SDQ) scores. Again, we look at these both at ages 3 and 5.

Age 3

Table 7 shows the results of our decomposition methodology for explaining the socio-economic gaps in SDQ scores at age 3 (the full regression results are shown in Table 9). It shows that the total amount explained by all observable characteristics is 82% for the top-bottom gap and 75% for the middle-bottom gap. Looking at the individual groups of factors, in sum and in detail, we find that:

- **Parental Education** explains a sixth of the top-bottom gap and about a tenth of the middle-bottom gap.
- **Family Background** characteristics explain a further sixth of the socio-economic gaps in SDQ scores. Similarly to the decompositions for cognitive outcomes, we find that the largest contribution from a single variable comes from mother's age at birth. The next largest contribution comes from martial/partner status.
- **Family Interactions** explain 14-17% of the socio-economic gaps, with the largest single contribution coming from measures of mother-child closeness.
- **Health and Well-Being** factors explain a similar amount of 12-16%, with the largest individual contributions coming from differences in breast-feeding patterns, smoking during pregnancy and infant temperament at nine months.
- **Childcare** again explains very little of the socio-economic gaps.
- **The Home-Learning Environment** explains a little under a tenth of the socio-economic gaps with similar contributions from the home-learning environment index and reading frequency, and self-reported parental competency.
- **Parenting Style/Rules** explains a further tenth of the socio-economic gaps in SDQ scores, with largely equal contributions from each of the individual factors.

Therefore, the largest single contribution to the socio-economic gaps in socio-emotional development at age 3 is found to be family background characteristics, mother's age at birth in particular. This is similar to what was found for cognitive outcomes. However, measures of the early childhood caring environment play a larger role in explaining socio-economic gaps in socio-emotional development than for cognitive outcomes, family interactions and health and well-being in particular, though parenting style/rules and the home-learning environment also play a noticeable role.

Age 5 - Static model

Table 8 then shows the results of the results of our decomposition methodology for explaining differences in socio-emotional development at age 5 (the full regression results are shown in Table 10). This is shown in the first four columns without controls for prior cognitive and socio-emotional development. Taken together, all observable characteristics explain 84% of the middle-bottom gap and 81% of the top-bottom gap. Looking at factors individually, we find that:

- **Parental Education** still explain about a fifth of the socio-economic gaps.
- **Family Background** characteristics explain around a fifth of the socio-economic gaps. The individual variables that contribute the most are mother's age, marital/partner status and parental working patterns.
- **Family Interactions** contribute a little over one tenth, with contributions from both mother-child closeness and parental harmony measures.
- **Health and Well-Being Factors** contribute a little under a tenth, with the largest contributions coming from breast-feeding patterns, smoking before pregnancy and infant temperament.

- **Childcare** make very little difference to the estimated socio-economic gaps
- **The Home-Learning Environment** is estimated to explain about 10% of the socio-economic gaps, with the largest contribution coming from self-reported parenting competency.
- **Parenting Style/Rules** is also estimated to contribute about 10% towards the socio-economic gaps, with the largest contributions coming from regular bed times at age 5 and regular meal times.

Age 5 - Value-added model

In the last four columns of Table 8 we add controls for prior cognitive and socio-emotional development (the full regression results are shown in Table 10). It shows that observable characteristics explain 96% of the middle-bottom gap and 90% of the top-bottom gap. The following summarises the results for specific groups of variables:

- **Prior Cognitive Ability** explains less than a tenth of the socio-economic gaps.
- **Prior Socio-emotional Development** explains around two-fifths of the socio-economic gaps.
- **Parental Education** explains a further 14% of the socio-economic gaps, which is less than the 15-19% without controls for prior ability in the static model.
- **Family Background** characteristics explain around a tenth of the socio-economic gaps in non-cognitive ability at age 5, with controls for prior ability. The largest single contribution occurs via marital/partner status.
- **Family Interactions** now explains only 4% of the socio-economic gap in the value-added model as compared with 11-12% in the static model. The largest contribution comes from the parental harmony variables.
- **Health and Well-Being** factors now explain only a very small portion of the socio-economic gap in the value-added model, as compared with the tenth in the static model.
- **Childcare** still explains very little
- **The Home-Learning Environment** explains 6-7% of the socio-economic gaps, compared with 9-10% in the static model. The largest contribution here again comes from self-reported parenting competency.
- **Parenting Style/Rules** explains 5-6% in this value-added model, as compared with 9-11% in the static model. Similarly though, the largest contributions come from regular bed times at age 5 and regular meal times.

The pattern of the result is very similar to the static model, with family background characteristics playing the largest role, followed by remaining effects of parental education. The measures of the early childhood caring environment then explain a small portion each. However, all of the contributions are reduced as compared with the static model. This suggests that a large element of their effect on socio-economic gaps at age 5 works via differences in cognitive ability and socio-emotional development at age 3, most likely via the latter given its relatively high importance in explaining differences at age 5.

Summary of Results

Across both cognitive outcomes at age 3 and age 5, it is family background factors that explain the largest portion of socio-economic differences. Looking at individual family background factors, it is

differences in mother's age, number of sibling and working patterns that are found to explain the largest element of these socio-economic differences. The next largest contribution comes from differences in parental education – this reflects the effects of parental education that do not work through the early childhood caring environment, or anything else in the model. This is followed by differences in the home-learning environment and reading frequency. Other factors, like family interactions and parenting style/rules, only explain a small proportion of the socio-economic gaps. In total, observable characteristics explain about 65-75% of the socio-economic gaps at age 3, and 77-87 % of socio-economic differences in cognitive outcomes at age 5.

When we also condition on prior cognitive ability and socio-emotional development, we find that prior cognitive outcomes explain over 50% of the socio-economic differences at age 5, whilst prior socio-emotional development explains very little, if anything. The only other factors that explain a large proportion of the socio-economic gaps, after controlling for prior ability, are remaining effects of parental education and family background (again, mother's age, number of siblings and marital/partner status being most important). The influence of these items is much reduced compared with the static model suggesting some of their impact occurs via their effect on cognitive ability at age 3. The home-learning environment is found to be unimportant in this decomposition, suggesting that it only explains age 5 outcomes through its influence on age 3 cognitive outcomes.

As was the case for cognitive ability, family background factors are estimated to make the largest contribution to the socio-economic gaps in socio-emotional development at ages 3 and 5, with mother's age at birth appearing to be the most important single variable again. The remaining effects of parental education are the next most important factor in explaining socio-economic differences. However, there is a also estimated to be a larger role for the measures of the early childhood caring environment than there was for cognitive ability, with similar contributions at ages 3 and 5 from family interactions, health and well-being factors, the home-learning environment and parenting style/rules. This suggests that the influences on socio-economic differences in socio-emotional development are wider than they are for cognitive ability.

In the value-added model, prior socio-emotional development plays the biggest role in explaining socio-economic differences, as might be expected. The contributions of the other factors are much reduced, suggesting that some of their influence works via affecting prior socio-emotional development and cognitive ability, though the influence of the latter is relatively small.

5. Mediation of other effects

In this section we briefly discuss the mediation of the gradient in child outcomes across other characteristics, which include: parental education; child characteristics, such as gender and ethnicity; and family characteristics, such as working patterns, mother's age at birth and lone parent status. We do not investigate the mediation of these gradients in as much detail as we did for socio-economic position.

The upper panel of

Table 11 shows the mediation of the gradient across quintiles of our socio-economic position index for BAS scores at age 3. It is the same as that shown in Table 33, except that it starts at column (3) where family background characteristics are included and shows the coefficients on all SEP quintiles (a part from the omitted category, the bottom quintile).

Table 11 also shows the mediation of the coefficients on parental education, child and family characteristics. Table 12 to Table 17 then show the same for the other cognitive and socio-emotional development at age 3 and 5

Parental education

Looking at the second panel of

Table 1, we observe that the gradient across mother's education, in terms of BAS scores at age 3, evolves in a similar way as that across SEP quintiles as different groups of variables are added. The biggest reductions in the gradient across mother's education is seen when measures of the home-learning environment are added, though the reduction in the gradient is larger for mother's education than it is for SEP quintiles. The next largest reductions are observed for health and well-being factors. This pattern is then repeated for Bracken scores in Table 12, with the home-learning environment reducing the gradient by most and by more than was the case for the SEP quintiles. When we look at SDQ scores at age 3 in Table 13, the biggest reduction in the gradient across mother's education occurs when health and well-being factors are controlled for, followed by the home-learning environment and parenting style/rules. This is a slight contrast to the SEP gradient, where the biggest reductions were observed when family interactions were added.

Table 14 then shows the gradients in BAS scores age 5. Here, we observe the biggest reductions when we control for the home-learning environment and health and well-being factors (the same as at age 3), whilst the biggest reductions in the SEP gradient occurs when the home-learning environment and parenting style/rules are controlled for. There is a small reduction in the BAS value-added gradient (Table 16) across mother's education when all groups of factors are added, but the reductions tend to be small in value. When we look at SDQ scores at age 5 in Table 15, the gradient across mother's education changes very little as different factors are controlled for. However, in the value-added specification (Table 17), there is a noticeable reduction when parenting style/rules are controlled for.

We can then go back to look at the evolving gradient across father's education as we control for different groups of factors. For both cognitive outcomes at age 3, the pattern is similar to that for mother's education, the biggest reductions in the coefficients on father's education result from the addition of the home-learning environment and health and well-being factors. The pattern is again similar for SDQ scores at age 3, with the biggest reductions occurring when we control for health and well-being factors, followed by the home-learning environment and parenting style/rules.

There is slight difference with mother's education when looking at BAS scores at age 5, the home-learning environment still reduces the gradient by the most, but health and well-being factors actually slightly increase the gradient in father's education, as opposed to the reductions for mother's education. The gradient in father's education in BAS value-added scores is little affected by our groups of variables. Neither is there much change in the gradient for father's education in terms of SDQ scores at age 5, both for the static and value-added specification.

Therefore, the gradient in parental education for cognitive outcomes at ages 3 and 5 is most reduced by the addition of the home-learning environment – it also reduces the gradient in terms of SDQ scores at age 3. Health and well-being factors reduce the gradient across cognitive outcomes at age 3 for both mother's and father's education. There is little change in the parental education gradients when we examine SDQ scores at age 5.

Child Characteristics

Table 2 to Table 14 show that boys tend to have worse child outcomes at age 3 in terms of cognitive outcomes and socio-emotional development. A part from a slight reduction when we control for the home-learning environment, there is little change in this gap between boys and girls as we control for different groups of factors. There is hardly any change at all in the effect of child's age either. However, the negative effect of being a twin or triplet is reduced when we control for the home-learning environment for both cognitive and non-cognitive outcomes. It is also reduced for cognitive outcomes when we control for health and well-being factors. As might be expected, the negative effect on child outcomes of having been in a special care unit just after birth is reduced by controlling for health and well-being factors (critically including length of gestation and birth-weight).

Moving on to examine child outcomes at age 5, we observe that the gap between boys and girls in terms of BAS scores is much smaller than at age 3 and is statistically insignificant in all but one specification. The value-added specification shows that this catch-up by boys cannot be readily explained any of the groups of variables. However, boys do have lower SDQ scores than girls at age 5, which is slightly reduced when we control for the home-learning environment. Again, the effect of child age is not readily explained by the groups of factors we control for. Similar to what we saw at age 3, the negative effect of being a twin or triplet on BAS scores at age 5 is reduced when we control for the home-learning environment and health and well-being factors. There is no significant difference between the SDQ scores of single and multiple births at age 5. There is no significant effect of being in a special care unit on child BAS scores at age 5. However, there is a significant and negative effect on SDQ scores, which is reduced most by health and well-being factors.

Dearden and Sibieta (2010) examine the ethnic gradients in child outcomes at age 3 and 5 using the same data. They find that "there are quite large ethnic gaps in early child cognitive development, the gap to white children is particularly large for Pakistani and Bangladeshi children. However, they also say that "once we take account of differences "traditional" mediating factors, such as family background and individual demographics, these ethnic gaps in outcomes are much reduced. For example, children from ethnic minority backgrounds seem to live in poorer households and have parents that are less well educated and as a result have lower levels of cognitive development." They also find, as can be observed from the tables, that there is a role for other mediating factors, particularly poor home-learning environments amongst Black African families.

Family Characteristics

The bottom panels of

Table to

Table show the mediation of other family characteristics as we control for different groups of variables. It shows that children from households where only English is spoken at home have significantly better cognitive outcomes at age 3. This gap is slightly reduced by the addition of family interaction variables and measures of the home-learning environment. The same pattern emerges age 5, though none of the variables explain the gaps in BAS value-added between ages 3 and 5. However, there is no significant gap in SDQ scores at age 3 or 5.

When looking at the effect of mother's working patterns up to age 3, we find few significant effects on child outcomes at ages 3 and 5. In contrast, we find that having a father in work over the same period has a positive effect on cognitive outcomes at age 3 (conditional on having a father in the house). This positive effect is slightly reduced when we control for family interactions and health and well-being factors, but is otherwise unchanged. There is then no significant effect of father's working patterns on SDQ scores at age 3. Looking at age 5 outcomes, there is no significant effect of father's working patterns on BAS scores at age 5, though there is a small, yet significant, positive effect on SDQ scores at age 5. This is largely unchanged by the inclusion of other factors.

As we already knew, mother's age (at birth) is estimated to have a positive effect on all child outcomes at ages 3 and 5. The negative and significant quadratic term in mother's age indicates that the positive effect of mother's age is diminishing. Interestingly, the coefficients on mother's age are largely unchanged when we control for other groups for all child outcomes at ages 3 and 5. This means that the positive estimated effects of mother's age on child outcome occur via mechanisms that are unobservable in the MCS data, which include: the richness of the home-learning environment; length of gestation and birth-weight; regularity of bed or meal times; maternal depression; and other factors. The effects of mother's age instead seem to be occurring via other, unobservable mechanisms. This was also suggested by the relative importance of mother's age in the decomposition analysis.

When we have controlled for socio-economic position, parental education and family background, there is no significant effect of lone-parent status on any child outcomes at ages 3 or 5. This is an important finding, it strongly suggests that the worse raw outcomes observed for children from lone-parent families can largely be explained by their lower socio-economic position and their parent's lower levels of education. The same is true of teen mother status, though we are controlling for mother's age, meaning that there is no extra effect of being a teen-mother over and above the effect of mother's age. There is also no significant effect of being a cohabiting couple on cognitive outcomes at age 3, though there is a small, negative and significant effect on SDQ scores at age 3 (mostly explained by differences in family interactions). There is no significant estimated effect of cohabitation status in terms of BAS scores at age 5 either, though there is again a small, negative and significant effect on SDQ scores at age 5. Goodman and Greaves (2010) further investigate the effects of cohabitation on child outcomes at ages 3 and 5.

Finally, we also estimate there to be a negative effect of the number of older siblings on cognitive outcomes at age 3, the effect of younger siblings is not statistically significant. This older sibling effect is slightly reduced by the richness of the home-learning environment, but otherwise is largely unchanged as we control for different groups of factors. We also estimate there to be a negative effect of older siblings on SDQ scores, though this is largely explained by differences in family interactions. This pattern of results is mirrored at age 5 for both cognitive and non-cognitive outcomes.

6. Determinants of factors

In this section we briefly discuss the determinants of some of the mediating factors that were found to be important in explaining the socio-economic gradient in child outcomes.

Table 18 shows the determinants of these mediating factors at age 3 in terms of socio-economic position, parental education and family background characteristics. We focus on pre-determined factors at birth, thus we exclude child's age, parental working patterns and number of siblings at later ages. In all cases, we simultaneously control for these pre-determined factors. Health and well-being factors are examined separately in

Table19 with extra controls for length of gestation when examining the determinants of birth-weight.

The first column of

Table 18 examines which factors predict whether a child lives in a large family (defined as three or more siblings), simultaneously controlling for pre-determined factors. Socio-economic position itself is estimated to reduce this probability, as is mother's highest qualification level (though not father's education). Being a twin or triplet is estimated to reduce the probability of a child being in a large family, as is being in a special care unit just after birth. Pakistani and Bangladeshi children are more likely to live in a large family, controlling for other factors. Children with older mothers at birth are less likely to come from large families, as are the children of lone parents and those from cohabiting families.

The determinants of mother's age at birth are shown in the second column. Socio-economic position and mother's education are both estimated to increase mother's age at birth. Father's education is estimated to be negatively correlated with mother's age at birth, but only up to NVQ level 3. Twins or triplets are more likely to have older mothers at birth – likely to be a case of reverse causation. Indian, Pakistani and Bangladeshi children are less likely to have older mothers at birth, whilst Black African and Black Caribbean children are more likely to have older mothers. Lone parents and cohabiting couples are also estimated to be younger. Naturally, the dummy for being a teenage mother is estimated to reduce mother's age.

Column (3) shows the determinants of the probability of having one or more mother-child relationship problem. It shows that socio-economic position is estimated to reduce this probability, as is mother's education (though, again, not father's education). Male children are estimated to have a greater chance of mother-child relationship problems. Indian children are estimated to have a lower chance of developing a mother-child relationship problem, as compared with white children. There are no significant differences for all other ethnic minorities as compared with white children.

We show the determinants of being in the richest quintile of the home-learning environment (HLE) index in Column (4). Here, socio-economic position is not estimated to significantly affect this probability, controlling for other factors. However, more educated mothers are much more likely to provide a rich HLE; father's education is estimated is also estimated to have a significant, positive effect, though smaller. We also observe that boys are less likely to have a rich HLE, though it is not clear in which direction causation runs in this case. Twins and triplets are also less likely to have a rich HLE. Black African children are the only ethnic minority to have a lower probability of having a rich HLE, as compared with white children. And lone parents are estimated to provide a richer HLE than two-parent families.

In column (5) we focus on the determinants of reading to children every day. Here we observe that both socio-economic position and mother's education increase the probability that children are read to every day, as does father's education to a lesser extent. As with the overall HLE index, boys are less likely to be read to every day. Indian, Bangladeshi, Black African and Black Caribbean are all less likely to be read to every day than are white children.

The final column of

Table 18 shows factors than explain having regular bed times at age 3. Similarly to being read to every day, socio-economic position and mother's education all have positive effect on the probability of having regular bed times. Father's education is also estimated to have a positive effect. Twins and triplets are also more likely to have a regular bed time at age 3. Indian, Pakistani, Black African and Black Caribbean are also less likely to have a regular bed time than white children. The children of cohabiting couple are also slightly less likely to be have regular bed times at age 3.

In

Table19 we investigate the determinants of health and well-being factors. In column (1) we examine the factors that explain the likelihood that mothers experience depression shortly after birth. It shows that socio-economic position reduces this probability, but that there is little effect of parental education. Mothers are also more likely to be depressed if their child was in a special care unit shortly after birth. Mothers of Indian children are more likely to be depressed than those of white children, though the mothers of Black African children are less likely. Older mothers are less likely to be depressed, but the negative effects of age are diminishing.

In column (2) we investigate the predictors of birth-weight without controlling for length of gestation, which is then added in column (3). We observe that socio-economic position is estimated to increase birth-weights, with the effect being halved once we control for length of gestation. Mother's education is only estimated to increase birth-weight when we don't control for gestation length, thus the effects of mother's education work via length of gestation. Fathers education has a small, positive effect with and without controls for gestation. Boys have higher birth-weights with and without control for length of gestation. Twins and triplets have lower birth-weights without controls for length of gestation, but the effect is halved once we do so – again, the effect of being a twin or triplet on birth-weight partly works via length of gestation. Children who were in a special care unit shortly after birth have lower birth-weights, though most of this can be largely explained via length of gestation.

We then observe that all children from ethnic minorities have significantly lower birth-weights than white children, the only exception is Black African children. When we control for length of gestation most of these gaps are very slightly reduced, but are much reduced for Black Caribbean children. We also find a negative effect of lone-parent status and cohabiting status, neither of which can be explained by length of gestation.

7. Conclusions

In conclusion, we have confirmed that there are substantial differences in cognitive and socio-emotional development between children from rich and poor backgrounds even at the age of 3, and that this gap widens by the age of 5. Children from poor backgrounds also face much less advantageous "early childhood caring environments" than children from better off families. For example we have observed significant differences in poor children's and their mothers' health and well-being and the home learning environment.

We also find that differences in the home learning environment at age 3 have an important role to play in explaining why children from poorer backgrounds have lower levels of cognitive development than children from better off families, explaining about a sixth of the gap. However, a much a much bigger proportion of the socio-economic gap appears directly related to other aspects of family background (such as parental education, mothers' age, and family size) that are not mediated through the early childhood caring environment, and a significant element remains explained.

It is noteworthy that it is the home-learning environment measured at age 3 that is found to be important in explaining outcomes at ages 3 and 5, the latter working through its impact on cognitive ability at age 3. The home-learning environment measured at age 5 is not estimated to impact on cognitive outcomes at age 5, or thus the gap in cognitive outcomes at age 5. This stresses the importance of early intervention. However, it is difficult to know with certainty whether

policymakers can, a) change the home-learning environment, and (b) whether any shifts in the home-learning environment will reduce the gap in early child outcomes. This is partly because it is difficult to put a definite causal interpretation to our finding and because the malleability of the home-learning environment to outside policy intervention is currently unknown. We therefore believe it to be essential that different methods of shifting the home-learning environment at early ages are trialled and evaluated in the UK at the earliest opportunity.

However, it is also worth noting that pre-determined factors explain the largest element of the socio-economic divides in cognitive outcomes at age 3 and age 5. The most important factors being mother's age at birth, number of siblings, parental education and prior cognitive development (at age 3). With a view to closing socio-economic gaps in cognitive outcomes, these results underline the importance of early intervention, at least before age 3 and perhaps even prior to birth if one believed the results that would suggest encouraging poorer mothers to delay the birth of their first child might narrow some of the socio-economic gap in early cognitive development.

Taken together, our findings suggest that policies to improve parenting skills and home learning environments in isolation cannot possibly eliminate the child outcomes gap between rich and poor young children, though such policies could go some way towards reducing it. On the other hand, many aspects of the early childhood caring environment do have a positive effect on children's social and emotional development, suggesting that policies aimed at improving health, parenting skills and the home-learning environment could have other important short- and long-term pay-offs.

References

Adler, N. E., Boyce, W. T., Chesney, M. A., Folkman S., and Syme, S. L. (1993), "Socioeconomic inequalities in health: No easy solution", *Journal of the American Medical Association*, 269, 3140-3145.

Becker, G. and N. Tomes, (1986), "Human capital and the rise and fall of families", *Journal of Labor Economics*, 4(3), S1-S39.

Belfield, C.R., Nores, M., Barnett, S. and Schweinhart, L. (2006), "The High/Scope Perry Preschool Program: Cost–Benefit Analysis Using Data from the Age-40 Followup," *Journal of Human Resources*, University of Wisconsin Press, vol. 41(1).

Bornstein, M. (Ed.). (1995). Handbook of parenting. Hillsdale, NJ: Erlbaum.
Bradley, RH. Home environment and parenting. In Handbook of parenting. M. Bornstein, ed. Hillsdale, NJ: Erlbaum, 1995.

Brooks-Gunn, J., & Duncan, G. (1997), "The effects of poverty on children and youth", *The Future of Children*, 7, 55- 71.

Brooks-Gunn,J., Duncan, GJ., Klebanov, P.K, and Sealand, N. (1993), "Do neighborhoods influence child and adolescent behavior?" *American Journal of Sociology* , 99,2:335-95.

Brooks-Gunn, J., McCarton, C., Casey, P., McCormick, M., Bauer, C., Bernbaum, J., Tyson, J., Swanson, M., Bennett, F., Scott, D., Tonascia, J., & Meinert, C. (1994), "Early intervention in low birth weight, premature infants: Results through age 5 years from the Infant Health and Development Program", *Journal of the American Medical Association*, 272(16), 1257-1262.

Burchinal, M. R., Campbell, F. A., Bryant, D. M., Wasik, B. H., & Ramey, C. T. (1997), "Early intervention and mediating processes in cognitive performance of children of low-income African-American families", *Child Development*, 68(5), 935-954.

Carneiro, P. and J.J. Heckman, (2002), "The evidence on credit constraints in post-secondary schooling", *Economic Journal*, 112(482), 705-734.

Chowdry, H., Crawford, C. and Goodman, A. (2010), "The role of attitudes and behaviours in explaining socio-economic differences in attainment at age 16", IFS Working Paper W10/15.

Crawford, C., Goodman, A. and Joyce, R. (2010), "Explaining the socio-economic gradient in child outcomes: the intergenerational transmission of cognitive skills", IFS Working Papers , W10/16.

Dearden, L., Mesnard, A. and Shaw, J. (2006), "Ethnic differences in birth outcomes in England", *Fiscal Studies*, Vol. 27, No. 1, March 2006, pp. 17-46.

Duncan, G., & Brooks-Gunn, J. (Eds.). (1997), "Consequences of growing up poor", New York: Russell Sage Foundation.

Duncan, G., & Brooks-Gunn, J. (2000), "Family Poverty, Welfare Reform, and Child Development", *Child Development*, 71, 188-196.

Duncan, GJ., Brooks-Gunn, J., and Klebanov, P.K. (1994), "Economic deprivation and early-childhood development", *Child Development*, 65,2:296-318.

Garces, E., Thomas, D. and Currie, J. (2002), "Longer-Term Effects of Head Start," *American Economic Review*, American Economic Association, vol. 92(4), pp 999-1012.

Goldstein, N. (1990), "Explaining socioeconomic differences in children's cognitive test scores",Working Paper No. H-90-1. Cambridge, MA: Malcolm Wiener Center for Social Policy, John F Kennedy School of Government, Harvard University, 1990.

Goodman, A. and Gregg. P. (eds) (2010), "Poorer children's educational attainment: how important are attitudes and behaviour?", Joseph Rowntree Foundation

Gregg, P. and S. Machin, (1998), "Childhood disadvantage and success or failure in the youth labour market" Centre for Economic Performance Discussion Paper 397.

Gregg, P. and Washbrook, E. (2010), "The socio-economic gradient in child outcomes: the role of attitudes, behaviours and beliefs. The primary school years'", CMPO Working Paper

Haveman, R. and B. Wolfe, (1995), "The determinants of children's attainments: A review of methods and findings", *Journal of Economic Literature*, 23, 1829-1878.

Hofferth, S., & Phillips, D. A. (1991), "Childcare policy research", *Journal of Social Issues*, 47(2), 1-13.

Howes, C. (1988), "Relations between early child care and schooling", *Developmental Psychology*, 24(1), 53-57.

Korenman, S., Miller,J.E., and Sjaastad,J.E. Long-term poverty and child development in the United States: Results from the National Longitudinal Survey of Youth. Children and Youth Services Review (1995) 17,1/2:127-51.

Lazar, I., & Darlington, R. B. (1982), "Lasting effects of early education: A report from the consortium for longitudinal studies", Monographs of the Society for Research in Child Development, 47(2-3, Serial No. 195).

Ludwig, J. and Miller, D.L. (2007), "Does Head Start Improve Children's Life Chances? Evidence from a Regression Discontinuity Design," *Quarterly Journal of Economics*, MIT Press, vol. 122(1), pp 159-208.

Mayer, S. (1997). What money can't buy: The effect of parental income on children's outcomes. Cambridge, MA: Harvard University Press.

McLeod,J.D., and Shanahan, MJ, (1993), "Poverty, parenting and children's mental health", *American Sociological Review* (June 1993) 58,3:351-66.

NICHD Early Child Care Research Network. (1997), "The effects of infant child care on infant-mother attachment security: Results of the NICHD study of early child care", *Child Development*, 68, 860-879.

NICHD Early Child Care Research Network. (1998), "Relations between family predictors and child outcomes: Are they weaker for children in child care?" *Developmental Psychology*, 34(5), 1119-1128.\

Ramey, C. T., & Ramey, S. L. (1998), "Prevention of intellectual disabilities: Early interventions to improve cognitive development", *Preventive Medicine*, 27, 224-232.

Sylva, K, Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2008), "Effective Pre-school and Primary Education 3-11 Project (EPPE 3-11): Final Report from the Primary Phase: Pre-school, School and Family Influences on Children's Development during Key Stage 2 (Age 7-11)", London: Department for children, schools and families.

Tables and Figures

Table 1(a) – Cognitive ability at ages 3 and 5, by parents' SEP

Proportion of children:	SEP Q1	SEP Q2	SEP Q3	SEP Q4	SEP Q5
Bottom 40% at Age 3 (BAS)	59.0	48.7	38.7	32.0	26.4
Escape from bottom 40% by Age 5 (BAS)	25.7	25.7	32.8	42.4	53.0
Top 40% at Age 3 (BAS)	23.9	23.9	34.0	45.1	52.4
Drop out of top 40% by Age 5 (BAS)	57.0	57.0	49.2	40.7	33.8
Bottom 40% at Age 5 (BAS)	62.2	62.2	51.1	40.2	30.4
Top 40% at Age 5 (BAS)	21.9	21.9	31.0	41.5	52.2

Table 1(b) – Strengths and Difficulties at ages 3 and 5, by parents' SEP

Proportion of children:	SEP Q1	SEP Q2	SEP Q3	SEP Q4	SEP Q5
Bottom 40% at Age 3	58.6	46.2	36.2	30.8	24.6
Escape from bottom 40% by Age 5	20.2	26.0	28.9	33.5	39.1
Top 40% at Age 3	20.9	30.2	37.0	41.4	48.7
Drop out of top 40% by Age 5	59.6	46.3	40.2	35.0	29.9
Bottom 40% at Age 5	65.8	52.0	42.9	37.7	29.2
Top 40% at Age 5	19.5	29.8	36.4	41.3	50.2

Table 2 - Socio-economic differences in family and child characteristics/behaviours

	SEP Q1 (Low)	SEP Q3 (Middle)	SEP Q5 (High)	Gap (High – low)
Parental Education (MCS1)				
Mother - no qualifications	32.8%	6.6%	0.9%	-31.9 ppts
Mother NVQ level 1	15.8%	6.6%	1.1%	-14.7 ppts
Mother NVQ level 2	35.0%	36.9%	14.0%	-21.0 ppts
Mother NVQ level 3	9.8%	19.4%	11.5%	1.7 ppts
Mother NVQ level 4/5	6.6%	30.4%	72.6%	65.9 ppts
Mother, Other Qualifications	3.7%	1.4%	0.6%	-3.1 ppts
Father - no qualifications	48.5%	18.6%	2.0%	-46.6 ppts
Father NVQ level 1	11.7%	6.8%	1.3%	-10.4 ppts
Father NVQ level 2	23.3%	31.2%	12.2%	-11.2 ppts
Father NVQ level 3	10.4%	18.6%	11.6%	1.2 ppts
Father NVQ level 4/5	6.0%	24.8%	73.0%	66.9 ppts
Father Other Qualifications	0.0%	0.1%	0.0%	0.0 ppts
Child Characteristics				
Male	48.4%	49.3%	49.9%	1.6 ppts
Child's Age at MCS3 (years)	5.21	5.19	5.21	-0.01
Multiple Birth	2.2%	2.5%	2.9%	0.7 ppts
Special Care Unit	9.0%	9.0%	9.8%	0.8 ppts
MCS1 White	84.2%	92.6%	94.5%	10.2 ppts
MCS1 Indian	1.0%	1.9%	1.4%	0.4 ppts
MCS1 Pakistani	3.6%	1.7%	0.2%	-3.4 ppts
MCS1 Bangladeshi	1.4%	0.2%	0.0%	-1.4 ppts
MCS1 Black Caribbean	2.0%	0.3%	0.3%	-1.7 ppts
MCS1 Black African/Other	2.0%	0.5%	0.3%	-1.7 ppts
MCS1 Other Ethnicity	0.7%	0.7%	0.7%	0.0 ppts
MCS1 Mixed	5.1%	2.1%	2.6%	-2.5 ppts
Family Characteristics				
Mother Age at MCS1 (years)	25.0	29.6	32.2	7.2
Mother worked at MCS1 or MCS2	31.5%	74.1%	80.9%	49.4 ppts
Mother worked at MCS3	29.5%	70.9%	74.2%	44.7 ppts
Father worked at MCS1 or MCS2	77.8%	98.9%	99.8%	22.0 ppts
Father worked at MCS3	47.6%	82.9%	93.9%	46.2 ppts
Only English Spoken at Home	90.0%	93.9%	94.8%	4.7 ppts
Lone parent at MCS1	36.8%	6.7%	0.9%	-35.9 ppts
Teenage Mother	14.3%	1.3%	0.0%	-14.3 ppts
Cohabiting at MCS1	33.8%	23.1%	12.3%	-21.5 ppts
Lone Parent at MCS2	42.2%	8.8%	2.0%	-40.2 ppts
Cohabiting at MCS2	24.4%	16.5%	8.0%	-16.5 ppts
Lone Parent at MCS3	41.4%	11.3%	3.9%	-37.6 ppts
Number of Siblings at MCS3	1.59	1.30	1.14	-0.45
Number of Older Siblings at MCS3	1.09	0.85	0.62	-0.47
Family Interactions				
Mother-child relationship problems (#)	0.21	0.09	0.06	-0.14
Mother-child conflict problems (#)	2.04	1.80	1.74	-0.30
Interviewer assessed measure of closeness (#)	4.78	5.24	5.40	0.62

Parental Harmony 1 (scale)	-0.25	-0.01	0.25	0.50 sds
Parental Harmony 2 (scale)	-0.24	0.00	0.25	0.49 sds
Mother spends plenty of time with child - MCS2	78.9%	62.8%	51.5%	-27.3 ppts
Father spends plenty of time with child - MCS2	32.9%	19.9%	13.6%	-19.3 ppts
Health and Well-Being				
Tried to Breast-Feed Child	51.8%	74.0%	89.8%	38.0 ppts
Age at which breast-feeding stopped (weeks)	9.90	13.48	16.77	6.88
Still breast-feeding at MCS1	11.0%	25.2%	38.6%	27.7 ppts
Mother alcohol consumption in pregnancy (units)	0.49	0.39	0.50	0.01
Mother alcohol consumption at wave 1 (units)	2.05	2.23	3.97	1.93
Number of cigarettes smoked by Mother during pregnancy	4.55	1.15	0.29	-4.27
Number of cigarettes smoked by mother before pregnancy	8.53	3.42	1.17	-7.36
Gestation Length in Days	276.1	277.5	277.5	1.4
Birth Weight (kg)	3.25	3.40	3.45	0.20
Infant Temperament Mood - MCS1	-0.03	0.05	-0.06	-0.03 sds
Infant Temperament Regularity – MCS1	-0.33	0.10	0.19	0.52 sds
Infant Temperament Adaptability - MCS1	-0.19	0.00	0.17	0.36 sds
Mother Suffered Post-Natal Depression	21.7%	11.0%	6.5%	-15.2 ppts
Mother Height at Birth (cm)	163.13	164.20	165.46	2.33
Father Height at Birth (cm)	177.04	178.30	179.77	2.73
Mother Weight at Birth (kg)	62.72	64.95	64.11	1.39
Father Weight at Birth (kg)	79.70	83.69	83.90	4.19
Father Under-Weight	1.8%	0.3%	0.3%	-1.4 ppts
Father Normal-Weight	35.7%	34.1%	41.4%	5.7 ppts
Father Over-Weight	24.9%	41.7%	47.3%	22.4 ppts
Father Obese	10.2%	11.7%	9.2%	-1.0 ppts
Mother Under-Weight	8.9%	3.5%	2.5%	-6.5 ppts
Mother Normal-Weight	55.3%	63.4%	71.7%	16.4 ppts
Mother Over-Weight	17.8%	20.0%	17.4%	-0.4 ppts
Mother Obese	9.5%	10.0%	6.0%	-3.5 ppts
Childcare				
Has Been to Nursery School/Class MCS2	27.0%	22.3%	23.5%	-3.5 ppts
Has Been to Playgroup MCS2	24.9%	30.2%	26.0%	1.1 ppts
Has Been to Pre-School MCS2	9.5%	18.6%	18.0%	8.4 ppts
Has Been to Childminder MCS2	3.4%	7.6%	11.1%	7.7 ppts
Has Been to Day Nursery or Crèche MCS2	7.0%	11.5%	22.9%	15.9 ppts
Has Been to Nursery School/Class MCS3	66.4%	53.3%	49.2%	-17.3 ppts
Has Been to Playgroup MCS3	20.7%	25.5%	21.8%	1.1 ppts
Has Been to Pre-School MCS2	13.9%	28.5%	30.4%	16.4 ppts
Has Been to Childminder MCS3	2.8%	5.5%	5.4%	2.6 ppts
Has Been to Day Nursery or Crèche MCS3	6.2%	10.4%	20.0%	13.9 ppts
Home-Learning Environment				
Bottom HLE Quintile at MCS2	31.7%	23.0%	17.5%	-14.2 ppts
2nd HLE Quintile at MCS2	17.8%	18.2%	16.4%	-1.4 ppts
3rd HLE Quintile at MCS2	19.0%	21.2%	23.0%	4.0 ppts
4th HLE Quintile at MCS2	17.0%	16.4%	20.8%	3.8 ppts
Top HLE Quintile at MCS2	14.4%	21.2%	22.3%	7.8 ppts
Read to Everyday at MCS2	42.0%	63.7%	79.0%	36.9 ppts
Read to Some Days at MCS2	46.2%	32.6%	19.8%	-26.5 ppts
Bottom HLE Quintile at MCS3	27.7%	24.4%	18.5%	-9.3 ppts

2nd HLE Quintile at MCS3	17.4%	19.5%	18.1%	0.7 ppts
3rd HLE Quintile at MCS3	20.0%	21.2%	22.0%	2.0 ppts
4th HLE Quintile at MCS3	15.9%	17.3%	21.4%	5.4 ppts
Top HLE Quintile at MCS3	18.9%	17.6%	20.1%	1.2 ppts
Read to Everyday at MCS3	42.5%	51.9%	62.4%	19.9 ppts
Read to Some Days at MCS3	48.4%	43.5%	36.3%	-12.1 ppts
Mother rates herself as good parent - MCS2	15.4%	24.9%	36.9%	21.4 ppts
Mother rates herself as very good parent - MCS2	27.1%	27.2%	27.4%	0.2 ppts
Father rates himself as good parent - MCS2	16.6%	26.0%	36.8%	20.1 ppts
Father rates himself as very good parent - MCS2	26.5%	30.7%	30.6%	4.1 ppts
Parenting Style/Rules				
Lots of Rules - MCS2	27.2%	31.5%	34.3%	7.1 ppts
Strictly Enforced Rules - MCS2	42.3%	48.4%	57.4%	15.1 ppts
Regular Bed-times at MCS2	68.4%	82.1%	91.9%	23.5 ppts
Regular Meal-times at MCS2	85.0%	94.4%	97.9%	13.0 ppts
Watches > 3 hours TV a day - MCS2	30.1%	14.1%	6.2%	-23.9 ppts
Watches > 3 hours TV a day - MCS3	21.6%	13.0%	8.1%	-13.5 ppts
Plays Computer > 1 hour a day - MCS3	31.8%	20.4%	11.0%	-20.8 ppts
Regular Bed-times at MCS3	84.0%	91.8%	96.4%	12.4 ppts
Regular Meal-times at MCS3	88.2%	95.1%	97.3%	9.1 ppts
Eat Breakfast Together at MCS3	87.1%	93.8%	97.2%	10.1 ppts

Table 3 - Explaining the socio-economic gradient in cognitive ability at age 3 (BAS)

Remaining gap between bottom SEP quintile and:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Middle SEP quintile	13.793***	8.940***	5.767***	5.239***	5.016***	5.646***	4.921***	5.637***	4.325***
As % of column (1)	*100%*	*65%*	*42%*	*38%*	*36%*	*41%*	*36%*	*41%*	*31%*
Top SEP quintile	22.723***	14.900***	9.629***	8.956***	8.609***	9.642***	8.347***	9.349***	7.645***
As % of column (1)	*100%*	*66%*	*42%*	*39%*	*38%*	*42%*	*37%*	*41%*	*34%*
Observations	11054	11054	11054	11054	11054	11054	11054	11054	11054
R-squared	0.08	0.1	0.22	0.22	0.22	0.22	0.24	0.22	0.25
Controls:									
Parental education		√	√	√	√	√	√	√	√
Family Background			√	√	√	√	√	√	√
Family Interactions				√					√
Health and Well-being					√				√
Childcare						√			√
Home-Learning Environment							√		√
Parental Style/Rules								√	√

Models also contain dummy variables for the second and fourth SEP quintiles (not shown).

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 4 - Explaining socio-economic gaps in cognitive ability at age 3 (BAS)

	Percentile point gap		As % total gap	
	Q5-Q1	Q3-Q1	Q5-Q1	Q3-Q1
Raw Gap	**22.72**	**13.79**	**100%**	**100%**
Total: Explained	**15.08**	**9.47**	**66%**	**69%**
Total: Unexplained	**7.64**	**4.33**	**34%**	**31%**
Amount Explained by Groups of Factors:				
Parental Education	***3.68***	***1.97***	***16%***	***14%***
Family Background	***5.69***	***3.90***	***25%***	***28%***
Gender	-0.10	-0.06	0%	0%
Age of Child	-1.83	-1.53	-8%	-11%
Twin/Triplet	0.00	0.00	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%
Ethnicity	0.64	0.45	3%	3%
Only English spoken at home	0.54	0.45	2%	3%
Country of residence	-0.06	0.00	0%	0%
Mother works	0.54	0.47	2%	3%
Father works	1.45	1.30	6%	9%
Mother's age at birth	3.24	2.25	14%	16%
Marital/Partner Status	-0.37	-0.24	-2%	-2%
Siblings	1.64	0.81	7%	6%
Family Interactions	***0.88***	***0.70***	***4%***	***5%***
Mother-child closeness	1.02	0.80	5%	6%
Parental Harmony	0.00	0.00	0%	0%
Parental time	-0.14	-0.10	-1%	-1%
Health and Well-Being	***0.76***	***0.30***	***3%***	***2%***
Breast-feeding	0.64	0.36	3%	3%
Alcohol consumption	0.12	0.02	1%	0%
Smoking before pregnancy	-0.89	-0.60	-4%	-4%
Smoking during pregnancy	0.78	0.60	3%	4%
Gestation Length	-0.03	-0.04	0%	0%
Birth weight	0.58	0.44	3%	3%
Infant Temperament	0.16	-0.01	1%	0%
Maternal Depression	-0.11	-0.07	0%	-1%
Parental height/weight	-0.49	-0.41	-2%	-3%
Childcare	***0.18***	***0.28***	***1%***	***2%***
Home-Learning Environment	***3.69***	***2.19***	***16%***	***16%***
HLE and Reading at Age 3	2.72	1.66	12%	12%
Self-reported parental competence	0.97	0.53	4%	4%
Parenting Style/Rules	***-0.10***	***-0.12***	***0%***	***-1%***
Amount/strictness of rules	0.01	-0.01	0%	0%
Regular bed times at age 3	0.45	0.26	2%	2%
Regular meal times at age 3	-0.05	-0.04	0%	0%
Watches lots of TV at age 3	-0.51	-0.34	-2%	-2%
Missing Dummies	***0.30***	***0.26***	***1%***	***2%***

Table 5 - Explaining socio-economic gaps in cognitive ability at age 3 (Bracken)

	Percentile point gap		As % total gap	
	Q5-Q1	Q3-Q1	Q5-Q1	Q3-Q1
Raw Gap	**30.54**	**16.82**	**100%**	**100%**
Total: Explained	**21.56**	**12.31**	**71%**	**73%**
Total: Unexplained	**8.98**	**4.50**	**29%**	**27%**
Amount Explained by Groups of Factors:				
Parental Education	***6.04***	***2.50***	***20%***	***15%***
Family Background	***9.05***	***6.23***	***30%***	***37%***
Gender	-0.08	-0.05	0%	0%
Age of Child	-0.69	-0.57	-2%	-3%
Twin/Triplet	-0.02	-0.01	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%
Ethnicity	0.22	0.12	1%	1%
Only English spoken at home	0.32	0.26	1%	2%
Country of residence	0.03	-0.01	0%	0%
Mother works	0.46	0.40	2%	2%
Father works	1.16	1.04	4%	6%
Mother's age at birth	4.34	3.09	14%	18%
Marital/Partner Status	1.01	0.83	3%	5%
Siblings	2.30	1.13	8%	7%
Family Interactions	***1.29***	***0.95***	***4%***	***6%***
Mother-child closeness	1.00	0.78	3%	5%
Parental Harmony	0.03	0.01	0%	0%
Parental time	0.26	0.16	1%	1%
Health and Well-Being	***-0.60***	***-0.86***	***-2%***	***-5%***
Breast-feeding	0.92	0.46	3%	3%
Alcohol consumption	0.16	0.02	1%	0%
Smoking before pregnancy	-0.87	-0.59	-3%	-4%
Smoking during pregnancy	0.91	0.70	3%	4%
Gestation Length	0.08	0.08	0%	0%
Birth weight	0.16	0.12	1%	1%
Infant Temperament	0.28	0.15	1%	1%
Maternal Depression	-0.22	-0.15	-1%	-1%
Parental height/weight	-2.02	-1.65	-7%	-10%
Childcare	***0.54***	***0.26***	***2%***	***2%***
Home-Learning Environment	***4.28***	***2.56***	***14%***	***15%***
HLE and Reading at Age 3	3.13	1.98	10%	12%
Self-reported parental competence	1.15	0.58	4%	3%
Parenting Style/Rules	***0.89***	***0.49***	***3%***	***3%***
Amount/strictness of rules	0.19	0.07	1%	0%
Regular bed times at age 3	0.62	0.36	2%	2%
Regular meal times at age 3	0.20	0.15	1%	1%
Watches lots of TV at age 3	-0.12	-0.08	0%	0%
Missing Dummies	***0.08***	***0.17***	***0%***	***1%***

Table 6 - Explaining socio-economic gaps in cognitive ability at age 5 (BAS)

	No controls for prior ability				Controlling for prior ability			
	Percentile point gap		As % total gap		Percentile point gap		As % total gap	
	Q5-Q1	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**
Raw Gap	**26.53**	**14.16**	**100%**	**100%**	**26.53**	**14.16**	**100%**	**100%**
Total Explained	**20.45**	**12.28**	**77%**	**87%**	**24.32**	**14.32**	**92%**	**101%**
Total Unexplained	**6.07**	**1.88**	**23%**	**13%**	**2.21**	**-0.16**	**8%**	**-1%**
Amount Explained by Groups of Factors:								
Prior Cognitive Ability					***13.62***	***8.13***	***51%***	***57%***
Prior Non-Cognitive Ability					***0.27***	***0.18***	***1%***	***1%***
Parental Education	***7.00***	***3.21***	***26%***	***23%***	***4.40***	***2.01***	***17%***	***14%***
Family Background	***9.96***	***7.05***	***38%***	***50%***	***5.61***	***3.91***	***21%***	***28%***
Gender	-0.01	-0.01	0%	0%	0.04	0.02	0%	0%
Age of Child	0.01	0.05	0%	0%	0.01	0.04	0%	0%
Twin/Triplet	-0.02	-0.01	0%	0%	-0.01	-0.01	0%	0%
Special care unit after birth	0.00	0.00	0%	0%	0.00	0.00	0%	0%
Ethnicity	0.34	0.29	1%	2%	0.02	0.08	0%	1%
Only English spoken at home	0.62	0.51	2%	4%	0.39	0.32	1%	2%
Country of residence	0.05	0.03	0%	0%	0.08	0.04	0%	0%
Mother works	0.52	0.44	2%	3%	0.17	0.13	1%	1%
Father works	0.75	0.59	3%	4%	-0.24	-0.22	-1%	-2%
Mother's age at birth	4.09	2.84	15%	20%	2.56	1.77	10%	12%
Marital/Partner Status	1.52	1.23	6%	9%	1.51	1.18	6%	8%
Siblings	2.09	1.08	8%	8%	1.09	0.56	4%	4%
Family Interactions	***0.82***	***0.64***	***3%***	***5%***	***0.15***	***0.14***	***1%***	***1%***
Mother-child closeness	0.73	0.57	3%	4%	0.14	0.11	1%	1%
Parental Harmony	0.01	0.01	0%	0%	-0.02	0.00	0%	0%
Parental time	0.08	0.06	0%	0%	0.03	0.03	0%	0%
Health and Well-Being	***-1.29***	***-1.15***	***-5%***	***-8%***	***-1.04***	***-0.83***	***-4%***	***-6%***
Breast-feeding	1.00	0.50	4%	4%	0.59	0.28	2%	2%
Alcohol consumption	0.16	0.07	1%	1%	0.11	0.07	0%	0%
Smoking before pregnancy	-1.33	-0.90	-5%	-6%	-0.82	-0.56	-3%	-4%
Smoking during pregnancy	0.30	0.22	1%	2%	-0.04	-0.05	0%	0%
Gestation Length	-0.07	-0.08	0%	-1%	-0.08	-0.09	0%	-1%
Birth weight	0.32	0.25	1%	2%	0.13	0.10	0%	1%
Infant Temperament	0.45	0.30	2%	2%	0.29	0.23	1%	2%
Maternal Depression	-0.06	-0.05	0%	0%	0.02	0.01	0%	0%
Parental height/weight	-2.05	-1.46	-8%	-10%	-1.24	-0.82	-5%	-6%
Childcare	***0.44***	***0.29***	***2%***	***2%***	***0.20***	***0.13***	***1%***	***1%***
Home-Learning Environment	***2.10***	***1.22***	***8%***	***9%***	***0.17***	***0.02***	***1%***	***0%***
HLE and Reading at Age 3	2.02	1.25	8%	9%	0.48	0.26	2%	2%
HLE and Reading at Age 5	0.04	0.03	0%	0%	0.10	0.04	0%	0%
Self-reported parental competence	0.04	-0.06	0%	0%	-0.41	-0.28	-2%	-2%

Parenting Style/Rules	***1.17***	***0.69***	***4%***	***5%***	***0.85***	***0.50***	***3%***	***4%***
Amount/strictness of rules	0.14	0.05	1%	0%	0.09	0.04	0%	0%
Regular bed times at age 3	0.28	0.16	1%	1%	0.03	0.02	0%	0%
Regular bed times at age 5	0.33	0.21	1%	1%	0.37	0.23	1%	2%
Regular meal times	0.31	0.22	1%	2%	0.07	0.05	0%	0%
Watches lots of TV/Computer	0.11	0.05	0%	0%	0.29	0.17	1%	1%
Missing Data	***0.26***	***0.32***	***1%***	***2%***	***0.09***	***0.12***	***0%***	***1%***

Table 7 - Explaining socio-economic gaps in non-cognitive ability at age 3 (SDQ)

	Percentile point gap		As % total gap	
	Q5-Q1	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**
Raw Gap	**21.57**	**13.70**	**100%**	**100%**
Total: Explained	**17.74**	**10.34**	**82%**	**75%**
Total: Unexplained	**3.84**	**3.36**	**18%**	**25%**
Amount Explained by Groups of Factors:				
Parental Education	***3.74***	***1.39***	***17%***	***10%***
Family Background	***3.36***	***2.33***	***16%***	***17%***
Gender	-0.06	-0.04	0%	0%
Age of Child	-0.26	-0.22	-1%	-2%
Twin/Triplet	0.02	0.01	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%
Ethnicity	-0.22	-0.23	-1%	-2%
Only English spoken at home	0.06	0.05	0%	0%
Country of residence	-0.06	0.00	0%	0%
Mother works	0.18	0.15	1%	1%
Father works	-0.67	-0.60	-3%	-4%
Mother's age at birth	3.75	2.61	17%	19%
Marital/Partner Status	0.75	0.60	3%	4%
Siblings	-0.12	0.00	-1%	0%
Family Interactions	***3.05***	***2.30***	***14%***	***17%***
Mother-child closeness	2.65	2.13	12%	16%
Parental Harmony	0.57	0.27	3%	2%
Parental time	-0.17	-0.11	-1%	-1%
Health and Well-Being	***3.73***	***2.22***	***17%***	***16%***
Breast-feeding	1.36	0.67	6%	5%
Alcohol consumption	0.07	0.01	0%	0%
Smoking before pregnancy	0.41	0.29	2%	2%
Smoking during pregnancy	0.75	0.59	3%	4%
Gestation Length	0.02	0.01	0%	0%
Birth weight	0.22	0.17	1%	1%
Infant Temperament	1.01	0.80	5%	6%
Maternal Depression	0.30	0.21	1%	2%
Parental height/weight	-0.40	-0.53	-2%	-4%
Childcare	***0.13***	***-0.10***	***1%***	***-1%***
Home-Learning Environment	***1.88***	***1.01***	***9%***	***7%***
HLE and Reading at Age 3	0.70	0.43	3%	3%
Self-reported parental competence	1.18	0.58	5%	4%
Parenting Style/Rules	***1.97***	***1.24***	***9%***	***9%***
Amount/strictness of rules	0.21	0.08	1%	1%
Regular bed times at age 3	0.61	0.36	3%	3%
Regular meal times at age 3	0.53	0.38	2%	3%
Watches lots of TV at age 3	0.62	0.42	3%	3%
Missing Dummies	***-0.14***	***-0.06***	***-1%***	***0%***

Table 8 - Explaining socio-economic gaps in non-cognitive ability at age 5 (SDQ)

	Levels				'Value-added'			
	Percentile point gap		As % total gap		Percentile point gap		As % total gap	
	Q5-Q1	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**	**Q5-Q1**	**Q3-Q1**
Raw Gap	**23.40**	**14.37**	**100%**	**100%**	**23.40**	**14.37**	**100%**	**100%**
Total Explained	**19.04**	**12.09**	**81%**	**84%**	**21.05**	**13.79**	**90%**	**96%**
Total Unexplained	**4.37**	**2.28**	**19%**	**16%**	**2.36**	**0.58**	**10%**	**4%**
Amount Explained by Groups of Factors:								
Prior Cognitive Ability					***1.99***	***1.17***	***9%***	***8%***
Prior Non-Cognitive Ability					***9.17***	***6.21***	***39%***	***43%***
Parental Education	***4.90***	***2.55***	***21%***	***18%***	***3.32***	***1.96***	***14%***	***14%***
Family Background	***4.59***	***3.32***	***20%***	***23%***	***2.07***	***1.47***	***9%***	***10%***
Gender	-0.08	-0.05	0%	0%	-0.05	-0.03	0%	0%
Age of Child	-0.03	-0.15	0%	-1%	-0.03	-0.15	0%	-1%
Twin/Triplet	0.02	0.01	0%	0%	0.03	0.01	0%	0%
Special care unit after birth	-0.01	0.00	0%	0%	0.00	0.00	0%	0%
Ethnicity	0.24	0.12	1%	1%	0.31	0.22	1%	2%
Only English spoken at home	0.02	0.02	0%	0%	-0.03	-0.03	0%	0%
Country of residence	0.01	0.01	0%	0%	0.04	0.01	0%	0%
Mother works	0.69	0.65	3%	5%	0.49	0.47	2%	3%
Father works	0.59	0.39	3%	3%	0.54	0.37	2%	3%
Mother's age at birth	1.82	1.10	8%	8%	-0.01	-0.19	0%	-1%
Marital/Partner Status	1.69	1.35	7%	9%	1.29	1.02	6%	7%
Siblings	-0.38	-0.13	-2%	-1%	-0.51	-0.23	-2%	-2%
Family Interactions	***2.47***	***1.66***	***11%***	***12%***	***0.96***	***0.54***	***4%***	***4%***
Mother-child closeness	1.55	1.25	7%	9%	0.30	0.25	1%	2%
Parental Harmony	1.40	0.68	6%	5%	1.11	0.54	5%	4%
Parental time	-0.48	-0.27	-2%	-2%	-0.45	-0.25	-2%	-2%
Health and Well-Being	***1.81***	***0.97***	***8%***	***7%***	***0.38***	***0.15***	***2%***	***1%***
Breast-feeding	0.84	0.39	4%	3%	0.17	0.06	1%	0%
Alcohol consumption	-0.13	-0.07	-1%	-1%	-0.16	-0.08	-1%	-1%
Smoking before pregnancy	0.76	0.53	3%	4%	0.75	0.51	3%	4%
Smoking during pregnancy	0.06	0.05	0%	0%	-0.35	-0.27	-1%	-2%
Gestation Length	0.04	0.04	0%	0%	0.04	0.03	0%	0%
Birth weight	0.27	0.21	1%	1%	0.16	0.13	1%	1%
Infant Temperament	0.91	0.71	4%	5%	0.47	0.38	2%	3%
Maternal Depression	0.56	0.40	2%	3%	0.40	0.28	2%	2%
Parental height/weight	-1.51	-1.28	-6%	-9%	-1.10	-0.89	-5%	-6%
Childcare	***-0.27***	***-0.14***	***-1%***	***-1%***	***-0.44***	***-0.18***	***-2%***	***-1%***
Home-Learning Environment	***2.34***	***1.26***	***10%***	***9%***	***1.52***	***0.83***	***7%***	***6%***
HLE and Reading at Age 3	0.49	0.35	2%	2%	0.03	0.05	0%	0%
HLE and Reading at Age 5	0.39	0.12	2%	1%	0.46	0.18	2%	1%
Self-reported parental competence	1.47	0.80	6%	6%	1.03	0.59	4%	4%

Parenting Style/Rules	***2.21***	***1.51***	***9%***	***11%***	***1.20***	***0.85***	***5%***	***6%***
Amount/strictness of rules	-0.03	-0.02	0%	0%	-0.08	-0.04	0%	0%
Regular bed times at age 3	0.17	0.10	1%	1%	-0.05	-0.03	0%	0%
Regular bed times at age 5	0.68	0.43	3%	3%	0.57	0.36	2%	3%
Regular meal times	1.01	0.73	4%	5%	0.58	0.41	2%	3%
Watches lots of TV/Computer	0.37	0.27	2%	2%	0.19	0.15	1%	1%
Missing Data	***1.00***	***0.95***	***4%***	***7%***	***0.85***	***0.80***	***4%***	***6%***

Table 9 – Full Specification Regression Results for BAS, Bracken and SDQ (age 3, MCS2)

	BAS	Bracken	SDQ
SEP Quintile			
2nd SEP quintile	0.979	2.302**	1.601*
3rd SEP quintile	4.325***	4.501***	3.359***
4th SEP quintile	6.244***	8.332***	3.865***
Top SEP quintile	7.645***	8.976***	3.837***
Parental Education			
Mother NVQ level 1	1.874	1.443	1.99
Mother NVQ level 2	3.332***	2.628**	1.469
Mother NVQ level 3	3.324***	2.497**	2.120*
Mother NVQ level 4/5	5.423***	5.130***	4.910***
Mother, Other Qualifications	0.891	2.977	5.024
Father NVQ level 1	-0.103	0.682	-2.072
Father NVQ level 2	0.556	-0.33	-0.519
Father NVQ level 3	1.179	2.787**	0.462
Father NVQ level 4/5	1.47	4.907***	1.548
Father Other Qualifications	7.862**	-15.179**	-20.649
Child Characteristics			
Male Child	-6.572***	-4.842***	-3.974***
Child's Age (months/100)	2.613***	0.978***	0.378***
Multiple Birth	-0.722	-3.434	2.465
Special Care Unit	-1.801	-1.437	-0.903
MCS1 Indian Child	-5.079*	0.795	-3.409
MCS1 Pakistani Child	-8.867***	-5.373***	0.019
MCS1 Bangladeshi Child	-11.380***	-5.453	4.744
MCS1 Black Caribbean Child	-8.142***	-4.408*	-0.625
MCS1 Black African/Other Child	-3.47	2.749	6.307**
MCS1 Other Ethnicity Child	-9.801***	6.944*	4.702
MCS1 Mixed Ethnicity Child	-0.575	2.518	1.523
Family Characteristics			
Only English at Home	11.444***	6.809***	1.332
Lives in Wales	0.72	-0.999	1.462**
Lives in Scotland	4.608***	2.704**	0.629
Lives in Northern Ireland	4.924***	-2.522*	4.032***
Mother worked at one of waves	1.1	0.932	0.363
Father worked at one of waves	3.279**	2.620**	-1.504
Mother's Age at birth	1.280***	2.131***	1.538***
Mother's Age at birth squared	-0.015*	-0.028***	-0.019**
Lone Parent at MCS1	1.325	-1.959	-2.576
Had baby in teens	0.17	0.737	-0.322
Two Cohabiting Parents at MCS1	1.396*	0.358	0.007
Got Married by MCS2	-0.271	-0.026	-2.140*
Split up by MCS2	-2.200*	-0.959	0.414
New partner by MCS2	-1.456	-3.820**	1.907
Number of Siblings at MCS2	0.221	0.469	-1.337**
Number of Older Siblings at MCS2	-3.699***	-5.339***	1.525**
Family Interactions			

Mother-child relationship problems (#)	-2.533***	-2.269***	-4.060***
Mother-child conflict problems (#)	-0.524***	-0.726***	-6.346***
Interviewer assessed measure of closeness	0.816***	0.733***	0.265
Parental Harmony 1 (scale)	-0.002	0.052	1.137***
Mother spends plenty of time with child - MCS2	0.65	-1.028*	0.677
Father spends plenty of time with child - MCS2	-0.659	0.294	-0.332
Health and Well-Being			
Tried to Breast-Feed Child	1.132	0.239	-0.046
Age at which breast-feeding stopped (weeks)	-0.004	0.076	0.119**
Still breast-feeding at MCS1	0.921	0.248	0.715
Mother alcohol consumption during pregnancy (units)	0.161	0.216	-0.101
Mother alcohol consumption (small amount)	0.651	0.79	-0.271
Mother alcohol consumption at Wave 1 (units)	0.022	0.03	0.054
Number of cigarettes smoked by Mother during pregnancy	-0.274*	-0.334**	-0.206
Above Squared	0.006	0.008	0.002
Number of cigarettes smoked by mother before pregnancy	0.203	0.187	-0.026
Above Squared	-0.004	-0.004	-0.002
Gestation Length in Days	0.579*	0.235	0.500*
Gestation Length in Days (squared)	-0.001**	0	-0.001*
Birth Weight (kg)	2.927***	0.809	1.130*
Infant Temperament Mood - MCS1	-0.652**	-0.614**	1.237***
Infant Temperament Regularity - MCS1	-0.236	0.358	0.966***
Infant Temperament Adaptability - MCS1	0.738***	0.22	1.506***
Mother Suffered Post-Natal Depression	0.692	1.434	-1.988**
Mother Height at Birth (cm)	-0.031	0.04	0.028
Father Height at Birth (cm)	-0.031	-0.041**	0.005
Mother Weight at Birth (kg)	0.015	-0.089*	-0.072
Father Weight at Birth (kg)	0.07	0.063	-0.006
Father Under-Weight	-1.684	0.461	4.275
Father Over-Weight	-2.052**	-2.829***	-1.361*
Father Obese	-2.581	-3.017*	-1.522
Mother Under-Weight	-0.886	-1.598	0.038
Mother Over-Weight	-1.584	-1.147	-0.619
Mother Obese	-0.866	0.298	-0.342
Childcare			
Has Been to Nursery School/Class	0.181	1.214*	0.009
Has Been to Playgroup	0.983	-0.517	-1.341**
Has Been to Pre-School	2.427***	2.804***	-1.177
HAS Been to Child minder	1.062	-0.412	0.601
Has Been to Day Nursery or Crèche	-0.712	2.439**	1.239*
Home-Learning Environment			
2nd HLE Quintile at MCS2	1.840**	3.646***	-0.085
3rd HLE Quintile at MCS2	3.086***	5.086***	0.758
4th HLE Quintile at MCS2	4.186***	7.230***	1.320*
5th HLE Quintile at MCS2	5.589***	10.835***	2.488***
Read to Everyday at MCS2	7.240***	7.903***	1.291
Read to Some Days at MCS2	2.464*	4.005***	0.191
Mother rates herself as good parent - MCS2	2.168***	2.351***	4.545***
Mother rates herself as very good parent - MCS2	0.775	0.487	6.898***
Father rates himself as good parent - MCS2	1.220*	2.215***	0.173

Father rates himself as very good parent - MCS2	1.217*	0.35	0.974
Parenting Style/Rules			
Lots of Rules	-0.813	-0.434	-0.049
Strictly Enforced Rules	0.446	1.431***	1.421**
Regular Bed-times at MCS2	1.906***	2.654***	2.603***
Regular Meal-times at MCS2	-0.398	1.549	4.062***
Watches more than 3 hours of TV per day at MCS2	2.119***	0.519	-2.603***
Observations	11054	11054	11054
R-Squared	0.25	0.29	0.36

Table 10 – Full Specification Regression Results for BAS and SDQ (age 5, MCS3)

	Levels		Value-Added	
	BAS	SDQ	BAS	SDQ
Prior Ability				
Bracken (age 3)	n/a	n/a	6.816***	1.308***
BAS (age 3)	n/a	n/a	7.989***	0.753**
SDQ (age 3)	n/a	n/a	0.339	11.373***
SEP Quintile				
2nd SEP quintile	0.727	0.119	-0.17	0.428
3rd SEP quintile	1.878*	-0.08	-0.163	0.578
4th SEP quintile	4.079***	0.917	0.6	0.324
Top SEP quintile	6.074***	2.327*	2.206*	2.357*
Parental Education				
Mother NVQ level 1	1.405	0.877	0.522	2.568**
Mother NVQ level 2	2.474**	1.662*	0.89	3.255***
Mother NVQ level 3	2.024	1.42	0.308	3.636***
Mother NVQ level 4/5	5.825***	4.221***	2.910***	4.870***
Mother, Other Qualifications	1.43	0.982	1.144	4.53
Father NVQ level 1	1.399	0.363	1.024	1.211
Father NVQ level 2	2.001*	1.104	1.946*	1.657*
Father NVQ level 3	3.648***	2.055**	2.833***	1.211
Father NVQ level 4/5	5.618***	3.449***	4.016***	1.912**
Father Other Qualifications	-10.874	-8.906	-9.171	-3.993
Child Characteristics				
Male Child	-0.562	-5.108***	2.430***	-3.097***
Child's Age (months/100)	-0.551*	1.732***	-0.470*	1.758***
Multiple Birth	-3.677	3.329	-2.267	5.054**
Special Care Unit	-0.401	-0.814	0.115	-0.088
MCS1 Indian Child	1.732	-2.743	2.979	-1.31
MCS1 Pakistani Child	-3.271	-6.404***	2.082	-5.488**
MCS1 Bangladeshi Child	-0.508	0.024	6.233	-1.243
MCS1 Black Caribbean Child	-6.457**	-6.211**	-2.596	-6.042***
MCS1 Black African/Other Child	-5.712**	3.539	-5.534**	0.177
MCS1 Other Ethnicity Child	-3.139	-2.012	-1.781	-3.801
MCS1 Mixed Ethnicity Child	-0.402	0.268	-0.99	-0.615
Family Characteristics				
Mother's Age at birth	1.658***	-0.138	0.950**	-0.965**
Mother's Age at birth squared	-0.020***	0.007	-0.011*	0.018**
Only English at Home	13.165***	0.407	8.142***	-0.677
Lives in Wales	-2.831***	-0.684	-3.492***	-1.470***
Lives in Scotland	2.800**	0.055	0.346	-0.585
Lives in Northern Ireland	0.942	0.183	-0.654	-1.374
Mother worked at one of waves	1.238	-0.411	0.807	-0.481
Mother worked at wave 3	0.983	1.538*	-0.513	1.195
Father worked at one of waves	0.353	-0.771	-0.601	-0.422
Father worked at Wave 3	-0.198	1.994***	0.037	1.625**
Lone Parent at MCS1	-2.825	-3.363	-2.581	-2.224
Had baby in teens	0.114	-1.163	-0.418	-0.769
Two Cohabiting Parents at MCS1	-0.969	-0.555	-1.582**	-0.668

Got Married by MCS2	1.276	-1.234	1.223	-0.371
Split up by MCS2	-1.957	0.28	-2.690*	0.264
New partner by MCS2	0.383	0.54	1.923	0.327
Split up by MCS3	-1.849	-2.485	-0.203	-2.249
New partner by MCS3	1.122	-0.841	0.205	-1.641
Number of Siblings at MCS3	-0.455	-0.859	-0.226	-0.403
Number of Older Siblings at MCS3	-4.006***	1.632***	-2.103***	1.482***
Family Interactions				
Mother-child relationship problems (#)	10.636**	2.306	7.174*	4.37
Mother-child conflict problems (#)	-0.546	-7.477**	1.357	-6.195**
Interviewer assessed measure of closeness	1.977	3.894	2.559	2.633
Parental Harmony 1 (scale)	-2.856***	-2.196***	-1.408***	0.147
Parental Harmony 2 (scale)	-0.143	-4.007***	0.271	-1.370***
Mother spends plenty of time with child - MCS2	-3.455*	-2.179	-3.215*	-2.089
Father spends plenty of time with child - MCS2	-0.214	1.311	-1.006	-1.407
Health and Well-Being				
Tried to Breast-Feed Child	0.332	-0.585	-0.047	-0.764
Age at which breast-feeding stopped (weeks)	0.082	0.105*	0.068	0.043
Still breast-feeding at MCS1	0.206	0.051	-0.251	0.107
Mother alcohol consumption during pregnancy (units)	-0.014	0.239	-0.117	0.232*
Mother alcohol consumption (small amount)	1.688***	-1.108*	1.387**	-1.227**
Mother alcohol consumption at Wave 1 (units)	-0.023	0.003	-0.028	-0.008
Number of cigarettes smoked by Mother during pregnancy	-0.2	0.01	-0.082	0.134
Number of cigarettes smoked by mother before pregnancy	0.276**	-0.094	0.165	-0.123
Gestation Length in Days	0.493	0.352	0.22	0.177
Gestation Length in Days (squared)	-0.001*	-0.001	-0.001	0
Birth Weight (kg)	1.632**	1.390**	0.653	0.831
Infant Temperament Mood - MCS1	-0.372	0.724***	-0.126	0.315
Infant Temperament Regularity - MCS1	0.578**	1.052***	0.523**	0.619**
Infant Temperament Adaptability - MCS1	0.366	1.053***	0.041	0.442*
Mother Suffered Post-Natal Depression	0.426	-3.710***	-0.131	-2.634***
Mother Height at Birth (cm)	0.016	0.032	0.006	0.038
Father Height at Birth (cm)	-0.033*	-0.028	-0.009	-0.026
Mother Weight at Birth (kg)	-0.023	-0.084*	-0.002	-0.063
Father Weight at Birth (kg)	0.042	0.038	0.001	0.035
Father Under-Weight	2.339	3.714	2.596	2.221
Father Over-Weight	-2.450***	-1.341	-1.119	-0.62
Father Obese	-0.782	-2.459*	0.889	-1.474
Mother Under-Weight	-0.489	-1.865	0.536	-1.727
Mother Over-Weight	-0.158	-1.575*	0.208	-1.131
Mother Obese	1.292	0.603	1.303	1.236
Childcare				
Has Been to Nursery School/Class (MCS2)	-0.408	-0.278	-2.104***	-1.073*
Has Been to Playgroup (MCS2)	-1.469*	-1.684**	-2.175***	-1.234*
Has Been to Pre-School (MCS2)	-0.859	-0.017	-2.173**	0.306
Has Been to Childminder (MCS2)	1.706	-1.081	1.049	-1.207
Has Been to Day Nursery or Crèche (MCS2)	1.622	-0.015	0.393	-0.608
Has Been to Nursery School/Class (MCS3)	-1.178	0.816	-0.165	1.444**
Has Been to Playgroup (MCS3)	1.258	1.824**	2.028**	1.775**
Has Been to Pre-School (MCS3)	0.707	0.171	0.743	-0.018

Has Been to Childminder (MCS3)	1.777	0.441	2.653*	0.513
Has Been to Day Nursery or Crèche (MCS3)	-1.866	-0.679	-0.391	-0.56
Home-Learning Environment				
2nd HLE Quintile at MCS2	1.177	1.311	-0.455	1.254
3rd HLE Quintile at MCS2	1.389	-0.123	-0.713	-0.509
4th HLE Quintile at MCS2	2.311**	0.688	-0.644	0.014
5th HLE Quintile at MCS2	3.822***	1.714*	-0.553	0.476
Read to Everyday at MCS2	5.420***	1.918	0.747	0.426
Read to Some Days at MCS2	1.533	1.35	-1.11	0.482
2nd HLE Quintile at MCS3	0.318	0.446	0.775	0.641
3rd HLE Quintile at MCS3	0.498	1.292	1.119	1.249
4th HLE Quintile at MCS3	-1.246	2.157**	-0.779	1.649*
5th HLE Quintile at MCS3	-0.087	2.763***	1.291	2.184**
Read to Everyday at MCS3	-0.178	1.668	-0.112	2.580**
Read to Some Days at MCS3	-1.094	1.031	-1.003	1.635
Mother rates herself as good parent - MCS3	1.365*	4.152***	0.17	2.436***
Mother rates herself as very good parent - MCS3	-1.434*	5.259***	-2.031***	2.991***
Father rates himself as good parent - MCS3	-0.367	0.956	-0.981	0.848
Father rates himself as very good parent - MCS3	-1.046	2.089***	-1.218*	1.874***
Parenting Style/Rules				
Lots of Rules - MCS2	-0.347	-0.458	-0.06	-0.234
Strictly Enforced Rules - MCS2	1.117*	0.039	0.631	-0.443
Regular Bed-times at MCS2	1.186	0.716	0.139	-0.225
Regular Meal-times at MCS2	0.852	2.646***	0.264	0.585
Watches > 3 hours TV a day - MCS2	0.375	-1.938**	-0.196	-1.182
Watches > 3 hours TV a day - MCS3	0.211	-1.326	-0.045	-0.881
Plays Computer > 1 hour a day - MCS3	-1.092	1.300**	-1.149*	1.013*
Regular Bed-times at MCS3	2.643**	5.530***	2.979***	4.621***
Regular Meal-times at MCS3	1.09	3.475***	0.101	2.381**
Eat Breakfast Together at MCS3	1.019	3.501***	0.247	2.816***
Observations	11054	11054	11054	11054
R-Squared	0.21	0.36	0.29	0.4

Table 11 – Mediation of other characteristics (BAS, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	2.066**	1.610*	1.564*	2.017**	1.503*	1.951**	0.979
3rd SEP quintile	5.767***	5.239***	5.016***	5.646***	4.921***	5.637***	4.325***
4th SEP quintile	7.867***	7.280***	7.054***	7.802***	6.778***	7.664***	6.244***
Top SEP quintile	9.629***	8.956***	8.609***	9.642***	8.347***	9.349***	7.645***
Parental Education							
Mother NVQ level 1	3.155**	2.813**	2.578**	2.998**	2.721**	3.031**	1.874
Mother NVQ level 2	5.677***	4.972***	4.647***	5.471***	4.625***	5.413***	3.332***
Mother NVQ level 3	6.748***	5.916***	5.323***	6.547***	4.956***	6.380***	3.324***
Mother NVQ level 4/5	9.220***	8.620***	7.481***	9.047***	7.004***	8.804***	5.423***
Mother, Other Quals.	2.955	2.642	2.562	2.926	1.662	2.919	0.891
Father NVQ level 1	0.211	-0.109	0.874	0.069	-0.393	0.217	-0.103
Father NVQ level 2	0.645	0.466	1.079	0.464	0.371	0.563	0.556
Father NVQ level 3	1.679	1.525	1.966*	1.55	0.991	1.475	1.179
Father NVQ level 4/5	2.770***	2.556***	2.639**	2.681***	1.617*	2.559***	1.47
Father Other Quals.	5.975*	5.225	6.651*	6.404*	7.678***	7.058**	7.862**
Child Characteristics							
Male Child	-6.944***	-6.749***	-7.448***	-6.881***	-6.188***	-6.953***	-6.572***
Child's Age (months)	2.591***	2.611***	2.607***	2.555***	2.617***	2.584***	2.613***
Multiple Birth	-4.562**	-4.039*	-2.091	-4.605**	-2.781	-4.859**	-0.722
Special Care Unit	-3.532***	-3.353***	-2.071*	-3.551***	-3.362***	-3.518***	-1.801
Indian Child	-8.613***	-8.108***	-6.909**	-8.164***	-7.186***	-8.224***	-5.079*
Pakistani Child	-12.068***	-11.213***	-10.275***	-11.547***	-11.358***	-11.642***	-8.867***
Bangladeshi Child	-16.046***	-15.226***	-14.432***	-15.454***	-13.891***	-15.699***	-11.380***
Black Caribbean Child	-6.990**	-6.645*	-7.078**	-6.446*	-4.428	-6.073*	-3.47
Black African Child	-10.554***	-10.222***	-10.047***	-10.153***	-9.378***	-10.093***	-8.142***
Other Ethnicity Child	-11.919***	-11.256***	-10.945***	-11.486***	-11.050***	-11.737***	-9.801***
Mixed Ethnicity Child	-1.438	-1.572	-1.207	-1.244	-1.044	-1.228	-0.575
Family Characteristics							
Only English at Home	12.651***	11.773***	12.851***	12.667***	11.996***	12.530***	11.444***
Mother worked (MCS1/ 2)	0.674	0.882	0.788	0.749	0.84	0.686	1.1
Father worked (MCS1/ 2)	4.548***	3.853***	3.776***	4.391***	4.391***	4.496***	3.279**
Mother's Age at birth	1.345***	1.311***	1.365***	1.278**	1.288***	1.299***	1.280***
Mother's Age at birth Sq	-0.016*	-0.015*	-0.017*	-0.015*	-0.015*	-0.015*	-0.015*
Lone Parent (MCS1)	2.274	1.551	1.315	2.328	2.623	2.117	1.325
Had baby in teens	0.262	0.799	0.148	0.101	0.081	0.257	0.17
Cohabiting Parents (MCS1)	1.126	1.269	1.326	1.198	1.189	1.257	1.396*
Siblings (MCS2)	-0.087	0.178	-0.188	-0.145	0.195	-0.218	0.221
Older Siblings (MCS2)	-4.047***	-4.327***	-3.928***	-3.969***	-3.644***	-3.846***	-3.699***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.22	0.22	0.22	0.22	0.24	0.22	0.25

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 12 – Mediation of other characteristics (Bracken, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	3.590***	3.071***	3.009***	3.601***	2.974***	3.236***	2.302**
3rd SEP quintile	6.533***	5.800***	5.613***	6.391***	5.601***	5.966***	4.501***
4th SEP quintile	10.771***	9.869***	9.816***	10.580***	9.609***	10.013***	8.332***
Top SEP quintile	12.055***	10.953***	10.864***	11.729***	10.739***	11.142***	8.976***
Parental Education							
Mother NVQ level 1	2.944**	2.603**	2.259*	2.775**	2.306*	2.772**	1.443
Mother NVQ level 2	5.512***	4.754***	4.294***	5.375***	4.085***	4.889***	2.628**
Mother NVQ level 3	6.931***	6.035***	5.172***	6.786***	4.477***	6.050***	2.497**
Mother NVQ level 4/5	10.583***	9.892***	8.160***	10.317***	7.631***	9.523***	5.130***
Mother, Other Quals.	4.732	4.376	4.43	4.76	3.158	4.936	2.977
Father NVQ level 1	0.007	-0.413	2.026	-0.104	-0.904	0.004	0.682
Father NVQ level 2	-1.397	-1.565	0.35	-1.483	-1.892**	-1.534	-0.33
Father NVQ level 3	2.320**	2.240**	3.907***	2.201**	1.304	1.958*	2.787**
Father NVQ level 4/5	5.599***	5.539***	6.549***	5.502***	3.918***	5.154***	4.907***
Father Other Quals.	-20.200**	-20.936**	-17.645*	-19.696**	-17.663***	-18.464**	-15.179**
Child Characteristics							
Male Child	-6.116***	-5.884***	-6.212***	-6.037***	-4.913***	-6.107***	-4.842***
Child's Age (months)	1.021***	1.022***	1.032***	0.948***	1.053***	1.002***	0.978***
Multiple Birth	-7.266***	-6.730***	-5.206**	-7.269***	-5.140**	-7.323***	-3.434
Special Care Unit	-3.582***	-3.431***	-1.723*	-3.608***	-3.333***	-3.571***	-1.437
Indian Child	-1.66	-1.427	-0.982	-1.302	-0.035	-0.757	0.795
Pakistani Child	-7.945***	-7.205***	-6.791***	-7.751***	-7.032***	-6.894***	-5.373***
Bangladeshi Child	-9.584**	-8.790**	-9.456**	-9.255**	-6.584*	-8.518**	-5.453
Black Caribbean Child	-1.495	-1.365	-1.611	-1.463	2.035	0.204	2.749
Black African Child	-6.782**	-6.638**	-6.230**	-6.651**	-5.351*	-6.276**	-4.408*
Other Ethnicity Child	5.106	5.74	5.395	5.335	6.238*	5.959	6.944*
Mixed Ethnicity Child	2.188	1.949	1.97	2.366	2.593	2.398	2.518
Family Characteristics							
Only English at Home	7.408***	6.562***	8.141***	7.332***	6.631***	7.416***	6.809***
Mother worked (MCS1/ 2)	1.114*	0.799	1.342**	0.943	1.301**	1.107*	0.932
Father worked (MCS1/ 2)	3.456**	3.047**	2.711*	3.406**	3.343**	3.265**	2.620**
Mother's Age at birth	2.201***	2.176***	2.309***	2.116***	2.117***	2.100***	2.131***
Mother's Age at birth Sq	-0.029***	-0.029***	-0.031***	-0.028***	-0.028***	-0.027***	-0.028***
Lone Parent (MCS1)	0.893	0.559	-1.648	0.691	1.171	0.438	-1.959
Had baby in teens	0.826	1.388	0.789	0.753	0.5	0.961	0.737
Cohabiting Parents (MCS1)	0.392	0.519	0.324	0.416	0.434	0.597	0.358
Siblings (MCS2)	0.155	0.493	-0.044	0.072	0.525	0.029	0.469
Older Siblings (MCS2)	-5.968***	-6.377***	-5.549***	-5.803***	-5.518***	-5.752***	-5.339***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.23	0.24	0.25	0.24	0.27	0.24	0.29

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 13 – Mediation of other characteristics (SDQ, MCS2)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	5.206***	2.935***	3.464***	5.271***	4.375***	4.546***	1.601*
3rd SEP quintile	8.558***	5.521***	5.440***	8.624***	7.666***	7.396***	3.359***
4th SEP quintile	10.671***	6.875***	6.893***	10.740***	9.167***	9.169***	3.865***
Top SEP quintile	12.645***	7.437***	8.298***	12.635***	10.792***	10.947***	3.837***
Parental Education							
Mother NVQ level 1	1.304	2.167	1.18	1.408	1.116	1.103	1.99
Mother NVQ level 2	2.078	2.744**	0.904	2.227*	1.43	1.122	1.469
Mother NVQ level 3	3.321**	4.281***	1.676	3.504**	2.195	1.972	2.120*
Mother NVQ level 4/5	6.003***	7.994***	3.930***	6.181***	4.713***	4.334***	4.910***
Mother, Other Quals.	6.089*	4.93	6.070*	6.132*	5.536	6.438*	5.024
Father NVQ level 1	-1.086	-2.394	-0.811	-0.994	-1.506	-1.158	-2.072
Father NVQ level 2	0.102	-0.651	0.004	0.228	-0.178	-0.042	-0.519
Father NVQ level 3	1.361	0.688	1.273	1.456	0.721	0.922	0.462
Father NVQ level 4/5	2.545**	2.502***	1.776	2.616**	2.056**	1.908*	1.548
Father Other Quals.	-15.065	-21.802	-19.318	-15.226	-10.257	-12.804	-20.649
Child Characteristics							
Male Child	-4.810***	-4.179***	-4.919***	-4.839***	-4.003***	-4.753***	-3.974***
Child's Age (months)	0.468***	0.389***	0.477***	0.463***	0.461***	0.440***	0.378***
Multiple Birth	-1.438	-2.455	1.009	-1.384	4.196*	-1.498	2.465
Special Care Unit	-3.409***	-2.465***	-1.28	-3.416***	-3.112***	-3.422***	-0.903
Indian Child	-1.532	-4.517*	-0.446	-1.809	-1.048	-0.264	-3.409
Pakistani Child	-0.54	-0.776	0.619	-0.861	-0.406	0.966	0.019
Bangladeshi Child	6.47	5.834	5.38	6.088	5.718	8.148*	4.744
Black Caribbean Child	10.012**	5.734*	8.821**	9.643**	9.861**	12.626***	6.307**
Black African Child	0.628	-1.1	1.618	0.358	0.332	1.389	-0.625
Other Ethnicity Child	4.666	4.684	5.1	4.39	4.534	6.235*	4.702
Mixed Ethnicity Child	2.361	1.122	2.62	2.222	2.994*	2.536	1.523
Family Characteristics							
Only English at Home	-1.048	0.638	-0.509	-1.045	-2.115	-0.853	1.332
Mother worked (MCS1/ 2)	0.787	0.377	0.659	0.802	0.926	0.727	0.363
Father worked (MCS1/ 2)	0.399	-0.827	-1.111	0.531	-0.018	0.045	-1.504
Mother's Age at birth	1.318**	1.459***	1.363***	1.338**	1.350**	1.184**	1.538***
Mother's Age at birth Sq	-0.016*	-0.017**	-0.017*	-0.016*	-0.017*	-0.013	-0.019**
Lone Parent (MCS1)	-1.356	-2.133	-1.419	-1.313	-0.952	-2.128	-2.576
Had baby in teens	-2.639	-0.461	-2.058	-2.553	-2.863	-2.319	-0.322
Cohabiting Parents (MCS1)	-1.636*	-0.135	-0.712	-1.664*	-1.613*	-1.365	0.007
Siblings (MCS2)	-1.443**	-1.127*	-1.913***	-1.417**	-1.248*	-1.447**	-1.337**
Older Siblings (MCS2)	2.104***	0.716	2.881***	2.070***	2.386***	2.246***	1.525**
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.11	0.32	0.16	0.11	0.15	0.12	0.36

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 14 – Mediation of the effect of other characteristics (BAS, MCS3)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	1.603*	1.308	1.314	1.491	1.302	1.228	0.727
3rd SEP quintile	3.041***	2.616**	2.805**	2.871***	2.444**	2.467**	1.878*
4th SEP quintile	5.492***	4.977***	5.301***	5.222***	4.838***	4.685***	4.079***
Top SEP quintile	7.580***	7.032***	7.334***	7.341***	6.863***	6.652***	6.074***
Parental Education							
Mother NVQ level 1	2.650**	2.042	2.148	2.636**	2.312*	2.345*	1.405
Mother NVQ level 2	4.908***	3.952***	3.993***	4.802***	4.044***	4.249***	2.474**
Mother NVQ level 3	5.615***	4.505***	4.330***	5.378***	4.137***	4.706***	2.024
Mother NVQ level 4/5	10.120***	9.124***	8.469***	9.743***	8.238***	9.061***	5.825***
Mother, Other Quals.	2.615	2.368	2.707	2.6	1.465	2.572	1.43
Father NVQ level 1	0.434	0.163	2.034	0.472	0.062	0.456	1.399
Father NVQ level 2	0.589	0.465	2.291**	0.565	0.493	0.475	2.001*
Father NVQ level 3	2.645**	2.578**	4.220***	2.566**	2.277**	2.342**	3.648***
Father NVQ level 4/5	5.511***	5.395***	6.616***	5.432***	4.609***	5.159***	5.618***
Father Other Quals.	-13.081	-12.678	-11.12	-14.297	-11.465	-12.841	-10.874
Child Characteristics							
Male Child	-0.972	-0.811	-1.235**	-0.941	-0.482	-0.833	-0.562
Child's Age (months)	-0.568*	-0.504	-0.602*	-0.635**	-0.587*	-0.513	-0.551*
Multiple Birth	-5.484***	-5.172*	-4.439**	-5.501***	-4.587**	-5.703***	-3.677
Special Care Unit	-0.895	-0.81	-0.534	-0.896	-0.739	-0.848	-0.401
Indian Child	-2.105	-1.459	-0.649	-1.861	-0.406	-1.213	1.732
Pakistani Child	-7.248***	-6.255***	-5.097**	-6.856***	-6.709***	-6.222***	-3.271
Bangladeshi Child	-4.945	-3.97	-3.718	-4.437	-3.277	-4	-0.508
Black Caribbean Child	-9.998***	-9.240***	-9.937***	-9.795***	-7.473***	-8.231***	-5.712**
Black African Child	-9.377***	-8.803***	-9.205***	-9.075***	-7.810***	-8.536***	-6.457**
Other Ethnicity Child	-6.252*	-5.341	-5.083	-5.847*	-5.480*	-5.42	-3.139
Mixed Ethnicity Child	-1.027	-1.078	-1.224	-0.763	-0.743	-0.691	-0.402
Family Characteristics							
Only English at Home	14.227***	13.154***	14.448***	14.105***	13.818***	14.313***	13.165***
Mother worked (MCS1/ 2)	1.399	1.208	1.573*	1.154	1.546*	1.366	1.238
Father worked (MCS1/ 2)	-0.012	-0.202	0.703	0.599	0.803	0.59	0.983
Mother worked (MC3)	1.266	0.766	0.848	1.037	1.092	1.099	0.353
Mother worked (MC3)	0.619	0.711	-0.008	-0.111	0.024	-0.006	-0.198
Mother's Age at birth	1.801***	1.771***	1.712***	1.840***	1.722***	1.728***	1.658***
Mother's Age at birth Sq	-0.022***	-0.022***	-0.021***	-0.023***	-0.021***	-0.021***	-0.020***
Lone Parent (MCS1)	0.489	-0.078	-1.933	0.204	0.006	0.358	-2.825
Had baby in teens	-0.117	0.11	0.029	-0.097	-0.211	-0.117	0.114
Cohabiting Parents (MCS1)	-0.969	-0.944	-1.09	-0.976	-0.882	-0.757	-0.969
Siblings (MCS3)	-0.447	-0.323	-0.552	-0.464	-0.319	-0.633	-0.455
Older Siblings (MCS3)	-4.453***	-4.581***	-4.336***	-4.481***	-4.064***	-4.132***	-4.006***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.18	0.19	0.19	0.19	0.2	0.19	0.21

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 15 – Mediation of other characteristics (SDQ, MCS3)

	(1) Education & Family Background Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
SEP Quintile							
2nd SEP quintile	4.565***	2.773***	2.988***	4.610***	3.586***	3.827***	1.418
3rd SEP quintile	6.902***	4.523***	4.059***	7.003***	5.843***	5.533***	2.282**
4th SEP quintile	8.374***	5.355***	5.136***	8.528***	6.684***	6.513***	2.451**
Top SEP quintile	11.793***	7.616***	7.968***	12.058***	9.607***	9.887***	4.365***
Parental Education							
Mother NVQ level 1	4.075***	3.910***	3.721***	4.148***	3.995***	3.346**	3.348***
Mother NVQ level 2	6.084***	5.876***	4.883***	6.128***	5.285***	4.562***	4.125***
Mother NVQ level 3	7.312***	7.227***	5.806***	7.459***	6.000***	5.380***	4.761***
Mother NVQ level 4/5	9.623***	10.363***	7.610***	9.884***	8.028***	7.511***	7.072***
Mother, Other Quals.	7.035**	6.426**	7.541**	7.030**	6.431**	7.430**	6.890**
Father NVQ level 1	-0.368	-1.24	1.056	-0.383	-0.983	-0.369	0.083
Father NVQ level 2	0.892	0.11	1.958	0.907	0.591	0.602	1.233
Father NVQ level 3	1.278	0.488	2.273*	1.43	0.623	0.681	1.318
Father NVQ level 4/5	2.495**	2.194**	3.037***	2.616**	1.925*	1.708*	2.481**
Father Other Quals.	-11.156	-12.137	-12.149*	-11.275	-8.694	-11.852	-11.919*
Child Characteristics							
Male Child	-5.441***	-5.101***	-5.538***	-5.495***	-4.815***	-5.499***	-5.108***
Child's Age (months)	1.717***	1.814***	1.700***	1.673***	1.706***	1.732***	1.732***
Multiple Birth	0.565	-0.086	3.15	0.438	5.756**	0.05	3.329
Special Care Unit	-3.494***	-2.617***	-1.288	-3.530***	-3.204***	-3.459***	-0.814
Indian Child	-3.474	-3.901	-2.232	-3.717	-2.844	-2.112	-2.743
Pakistani Child	-9.310***	-7.854***	-7.691***	-9.445***	-8.823***	-7.544***	-6.404***
Bangladeshi Child	-1.789	-1.025	-1.365	-1.819	-2.124	0.249	0.024
Black Caribbean Child	-7.779**	-8.187***	-6.079**	-7.691**	-7.844***	-6.694**	-6.211**
Black African Child	3.502	1.502	3.306	3.634	3.304	6.669*	3.539
Other Ethnicity Child	-4.288	-1.803	-3.94	-4.333	-4.559	-2.384	-2.012
Mixed Ethnicity Child	-0.485	-0.379	0.007	-0.625	0.226	-0.131	0.268
Family Characteristics							
Only English at Home	0.201	-0.114	0.314	0.13	-0.841	0.746	0.407
Mother worked (MCS1/ 2)	-0.348	-0.514	-0.296	-0.092	-0.401	-0.444	-0.411
Father worked (MCS1/ 2)	2.019***	1.932***	2.332**	2.200**	2.535***	1.975***	1.994***
Mother's Age at birth	0.654	-0.036	-0.96	0.656	0.544	0.42	-0.771
Mother's Age at birth Sq	2.235**	1.462	1.573**	2.130***	2.070**	2.169**	1.538*
Lone Parent (MCS1)	-0.353	-0.122	-0.407	-0.375	-0.38	-0.402	-0.138
Had baby in teens	0.01	0.007	0.01	0.01	0.01	0.011	0.007
Cohabiting Parents (MCS1)	-1.732	-2.899	-3.174	-1.389	-0.973	-1.774	-3.363
Siblings (MCS2)	-2.349	-0.89	-1.877	-2.335	-2.965	-2.121	-1.163
Older Siblings (MCS2)	-2.364**	-0.69	-1.649*	-2.243**	-2.391***	-1.986**	-0.555
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.13	0.25	0.17	0.13	0.17	0.15	0.29

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table16 –Mediation of the effect of other characteristics (BAS value added, MCS3)

	(1) Education, Family Background and Prior Ability Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
BAS Score (Age 3)	8.042***	7.983***	8.004***	8.128***	7.995***	8.028***	7.989***
Bracken (Age 3)	6.926***	6.893***	6.861***	6.953***	6.849***	6.872***	6.816***
SDQ Score (Age 3)	0.112	0.437	0.115	0.116	0.215	-0.017	0.339
SEP Quintile							
2nd SEP quintile	0.135	0.071	0.129	0.011	0.119	-0.056	-0.17
3rd SEP quintile	0.063	-0.071	0.266	-0.032	-0.08	-0.21	-0.163
4th SEP quintile	1.006	0.838	1.256	0.754	0.917	0.61	0.6
Top SEP quintile	2.425**	2.314*	2.744**	2.263*	2.327*	1.967	2.206*
Parental Education							
Mother NVQ level 1	0.834	0.488	0.727	0.895	0.877	0.665	0.522
Mother NVQ level 2	1.809*	1.329	1.544	1.728*	1.662*	1.484	0.89
Mother NVQ level 3	1.76	1.197	1.363	1.542	1.42	1.287	0.308
Mother NVQ level 4/5	4.721***	4.114***	4.207***	4.387***	4.221***	4.190***	2.910***
Mother, Other Quals.	1.391	1.277	1.582	1.431	0.982	1.284	1.144
Father NVQ level 1	0.362	0.351	1.064	0.441	0.363	0.331	1.024
Father NVQ level 2	0.999	0.986	1.917*	1.023	1.104	0.928	1.946*
Father NVQ level 3	1.996**	1.991**	2.880***	2.004**	2.055**	1.853**	2.833***
Father NVQ level 4/5	3.648***	3.601***	4.287***	3.626***	3.449***	3.485***	4.016***
Father Other Quals.	-9.146	-8.327	-7.995	-10.845	-8.906	-9.453	-9.171
Child Characteristics							
Male Child	2.456***	2.518***	2.342***	2.457***	2.420***	2.549***	2.430***
Child's Age (months)	-0.473*	-0.468	-0.497*	-0.564**	-0.446	-0.424	-0.470*
Multiple Birth	-2.282	-1.3	-2.585	-2.35	-2.635	-2.417	-2.267
Special Care Unit	0.709	0.724	0.062	0.764	0.756	0.714	0.115
Indian Child	0.883	1.35	1.562	0.833	1.765	1.401	2.979
Pakistani Child	0.077	0.582	1.232	0.183	0.188	0.473	2.082
Bangladeshi Child	4.478	4.879	4.903	4.743	4.95	4.809	6.233
Black Caribbean Child	-7.604***	-7.141***	-7.752***	-7.580***	-6.531***	-6.562***	-5.534**
Black African Child	-4.282*	-3.934	-4.567*	-4.098	-3.292	-3.718	-2.596
Other Ethnicity Child	-3.603	-3.113	-2.982	-3.317	-3.313	-3.206	-1.781
Mixed Ethnicity Child	-1.277	-1.217	-1.52	-1.158	-1.182	-1.061	-0.99
Family Characteristics							
Only English at Home	8.579***	8.127***	8.728***	8.368***	8.603***	8.663***	8.142***
Mother worked (MCS1/ 2)	0.985	0.844	1.07	0.733	1.114	0.958	0.807
Father worked (MCS1/ 2)	-0.453	-0.193	-0.229	-0.539	-0.453	-0.433	-0.513
Mother worked (MC3)	-0.346	-0.46	-0.292	-0.617	-0.359	-0.403	-0.601
Mother worked (MC3)	-0.299	-0.552	-0.396	-0.305	-0.146	-0.294	0.037
Mother's Age at birth	1.053***	1.006**	0.964**	1.139***	0.993**	1.041***	0.950**
Mother's Age at birth Sq	-0.013**	-0.012*	-0.011*	-0.014**	-0.012*	-0.012*	-0.011*
Lone Parent (MCS1)	-0.576	-0.815	-1.662	-0.936	-1.082	-0.613	-2.581
Had baby in teens	-0.606	-0.65	-0.45	-0.579	-0.578	-0.603	-0.418
Cohabiting Parents (MCS1)	-1.531**	-1.572**	-1.637**	-1.555**	-1.498**	-1.435*	-1.582**

Siblings (MCS3)	-0.231	-0.162	-0.252	-0.206	-0.192	-0.344	-0.226
Older Siblings (MCS3)	-2.154***	-2.199***	-2.196***	-2.264***	-2.037***	-1.955***	-2.103***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.34	0.34	0.35	0.35	0.35	0.34	0.36

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 17–Mediation of the effect of other characteristics (SDQ value added, MCS3)

	(1) Education, Family Background and Prior Ability Only	(2) (1) plus Family Interactions	(3) (1) plus Health & well-being	(4) (1) plus Childcare	(5) (1) plus HLE	(6) (1) plus Parenting Style/Rules	(7) All Controls
BAS Score (Age 3)	0.841**	0.771**	0.827**	0.860**	0.712**	0.870***	0.753**
Bracken (Age 3)	1.554***	1.523***	1.472***	1.618***	1.370***	1.424***	1.308***
SDQ Score (Age 3)	13.848***	12.083***	13.184***	13.850***	13.196***	13.576***	11.373***
SEP Quintile							
2nd SEP quintile	1.486*	1.088	0.942	1.495*	1.086	1.229	0.428
3rd SEP quintile	2.064**	1.616*	1.004	2.167**	1.714*	1.54	0.578
4th SEP quintile	2.307**	1.659*	1.205	2.430**	1.686	1.566	0.324
Top SEP quintile	4.806***	3.778***	3.461***	5.106***	3.926***	4.126***	2.357*
Parental Education							
Mother NVQ level 1	3.020**	2.858**	2.875**	3.053**	3.070***	2.605**	2.568**
Mother NVQ level 2	4.056***	4.070***	3.670***	4.029***	3.822***	3.348***	3.255***
Mother NVQ level 3	4.565***	4.703***	4.145***	4.621***	4.168***	3.687***	3.636***
Mother NVQ level 4/5	5.610***	6.222***	5.013***	5.777***	5.142***	4.738***	4.870***
Mother, Other Quals.	3.685	3.921	4.332	3.686	3.564	3.941	4.53
Father NVQ level 1	0.755	0.314	1.626	0.686	0.408	0.748	1.211
Father NVQ level 2	1.296	0.796	2.075**	1.264	1.14	1.122	1.657*
Father NVQ level 3	0.85	0.354	1.647	0.978	0.584	0.568	1.211
Father NVQ level 4/5	1.388	1.201	2.090**	1.492*	1.246	1.053	1.912**
Father Other Quals.	-3.634	-2.725	-3.518	-3.757	-3.775	-5.203	-3.993
Child Characteristics							
Male Child	-2.524***	-2.840***	-2.691***	-2.561***	-2.492***	-2.678***	-3.097***
Child's Age (months)	1.753***	1.810***	1.759***	1.694***	1.760***	1.741***	1.758***
Multiple Birth	1.804	3.536	3.097	1.641	4.304**	1.459	5.054**
Special Care Unit	-1.334*	-1.141	-0.31	-1.331*	-1.273*	-1.359*	-0.088
Indian Child	-2.292	-1.619	-1.741	-2.508	-2.124	-1.699	-1.31
Pakistani Child	-7.394***	-6.089**	-6.537***	-7.489***	-7.320***	-6.722***	-5.488**
Bangladeshi Child	-3.715	-2.294	-2.731	-3.657	-3.902	-2.878	-1.243
Black Caribbean Child	-1.496	-1.142	-0.957	-1.245	-1.74	-0.012	0.177
Black African Child	-7.754***	-7.534***	-6.537***	-7.595***	-7.799***	-7.296***	-6.042***
Other Ethnicity Child	-6.399	-3.529	-6.099	-6.367	-6.636*	-5.478	-3.801
Mixed Ethnicity Child	-1.97	-1.124	-1.47	-2.087	-1.513	-1.77	-0.615
Family Characteristics							
Only English at Home	-0.035	-0.89	-0.204	-0.129	-0.487	0.297	-0.677
Mother worked (MCS1/ 2)	-0.643	-0.598	-0.618	-0.402	-0.677	-0.69	-0.481
Father worked (MCS1/ 2)	1.446*	1.171	1.089*	1.385**	1.388	1.265**	1.195
Mother worked (MC3)	0.067	-0.006	-0.663	-0.018	0.13	0.043	-0.422
Mother worked (MC3)	1.269**	1.478**	1.496*	1.405	1.638**	1.452*	1.625**
Mother's Age at birth	1.053***	1.006**	0.964**	1.139***	0.993**	1.041***	0.950**
Mother's Age at birth Sq	-0.013**	-0.012*	-0.011*	-0.014**	-0.012*	-0.012*	-0.011*
Lone Parent (MCS1)	-0.576	-0.815	-1.662	-0.936	-1.082	-0.613	-2.581
Had baby in teens	-0.606	-0.65	-0.45	-0.579	-0.578	-0.603	-0.418
Cohabiting Parents (MCS1)	-1.531**	-1.572**	-1.637**	-1.555**	-1.498**	-1.435*	-1.582**

Siblings (MCS3)	-0.107	-0.328	-0.192	-0.052	-0.048	-0.26	-0.403
Older Siblings (MCS3)	1.119**	1.094**	1.233**	1.004**	1.498***	1.326***	1.482***
Observations	11054	11054	11054	11054	11054	11054	11054
R-squared	0.36	0.38	0.37	0.36	0.37	0.36	0.4

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 18–Determinants of Mediating Factors at age 3

	Large Family (3+ siblings)	Mother's age at birth	Mother-child relationship problems	Highest HLE Quintile at age 3	Parents reads every day at age 3	Regular bed times at age 3
SEP Quintile						
2nd SEP quintile	-0.100***	1.786***	-0.020**	0.025	0.063***	0.034***
3rd SEP quintile	-0.181***	3.155***	-0.033***	0.036**	0.123***	0.054***
4th SEP quintile	-0.229***	3.910***	-0.045***	0.03	0.154***	0.087***
Top SEP quintile	-0.269***	4.680***	-0.041***	0.005	0.177***	0.106***
Parental Education						
Mother NVQ level 1	-0.069***	-0.923***	-0.009	0.028	0.041	0.030*
Mother NVQ level 2	-0.091***	-0.678***	-0.027***	0.041**	0.098***	0.053***
Mother NVQ level 3	-0.130***	-1.729***	-0.031***	0.104***	0.156***	0.080***
Mother NVQ level 4/5	-0.146***	0.014	-0.032***	0.107***	0.228***	0.114***
Mother, Other Quals.	-0.058	1.728***	-0.017	0.046	0.194***	-0.007
Father NVQ level 1	-0.003	-1.872***	-0.012	0.037	0.043	-0.007
Father NVQ level 2	-0.013	-0.492**	0.008	0.019	-0.003	0.004
Father NVQ level 3	0.001	-0.802***	0.002	0.037**	0.049**	0.046***
Father NVQ level 4/5	0.011	-0.052	-0.006	0.055***	0.115***	0.066***
Father Other Quals.	-0.153	-2.397	0	-0.105	0.12	-0.105
Child Characteristics						
Male Child	0.005	0.018	0.021***	-0.088***	-0.033***	0
Multiple Birth	-0.059**	1.870***	-0.013	-0.055**	-0.049	0.110***
Special Care Unit	-0.045***	0.193	0.012	-0.002	0.012	0.006
Indian Child	0.048	-1.559***	-0.037*	0.016	-0.249***	-0.109***
Pakistani Child	0.199***	-2.624***	0.031	0.036	-0.082*	-0.068*
Bangladeshi Child	0.268***	-2.362***	0.052	-0.045	-0.212***	-0.086
Black Caribbean Child	0.036	2.091***	-0.001	-0.051	-0.204***	-0.125***
Black African Child	0.071	3.437***	0.025	-0.107***	-0.360***	-0.242***
Other Ethnicity Child	-0.026	0.597	-0.021	0.066	-0.117*	-0.061
Mixed Ethnicity Child	0.009	0.472	-0.016	-0.011	-0.046	-0.031
Family Characteristics						
Only English at Home	0.029	-0.044	0.014	0.013	0.047	0.027
Mother's Age at birth	0.074***		0	0.001	-0.011	0.006
Mother's Age at birth Sq	-0.001***		0	0	0	0
Lone Parent (MCS1)	-0.078***	-0.953***	-0.008	0.050**	0.028	-0.003
Had baby in teens	-0.047	-9.125***	0.031	0.021	0.013	-0.016
Cohabiting Parents (MCS1)	-0.060***	-2.502***	-0.002	0.01	0	-0.038***
Observations	11054	11054	11054	11054	11054	11054

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.

Table 19–Determinants of Health and Well Being Factors

	Mother depressed	Birth weight	Birth weight (+gestation)
SEP Quintile			
2nd SEP quintile	-0.044***	0.041**	0.028*
3rd SEP quintile	-0.065***	0.070***	0.039**
4th SEP quintile	-0.078***	0.060**	0.032
Top SEP quintile	-0.098***	0.080***	0.044**
Parental Education			
Mother NVQ level 1	0.021	0.046	0.016
Mother NVQ level 2	0.012	0.053**	0.033
Mother NVQ level 3	0.028*	0.073***	0.029
Mother NVQ level 4/5	0.014	0.065**	0.024
Mother, Other Quals.	0.072	0.086	0.03
Father NVQ level 1	-0.003	0.012	0.001
Father NVQ level 2	-0.002	0.028	0.012
Father NVQ level 3	-0.019	0.044*	0.028
Father NVQ level 4/5	-0.016	0.051**	0.042**
Father Other Quals.	0	0.316	0.187
Child Characteristics			
Male Child	0.006	0.140***	0.138***
Multiple Birth	-0.004	-0.896***	-0.438***
Special Care Unit	0.028**	-0.536***	-0.065***
Indian Child	0.059*	-0.388***	-0.326***
Pakistani Child	0.03	-0.226***	-0.200***
Bangladeshi Child	-0.001	-0.249***	-0.272***
Black Caribbean Child	0.018	-0.255***	-0.115**
Black African Child	-0.076**	-0.015	-0.024
Other Ethnicity Child	-0.031	-0.233***	-0.181***
Mixed Ethnicity Child	-0.016	-0.137***	-0.113***
Family Characteristics			
Only English at Home	-0.017	0.028	0.038
Mother's Age at birth	-0.010*	-0.005	0.002
Mother's Age at birth Sq	0.000*	0	0
Lone Parent (MCS1)	0.017	-0.077***	-0.090***
Had baby in teens	0.002	-0.025	-0.027
Cohabiting Parents (MCS1)	0.014	-0.068***	-0.073***
Gestation			
Gestation length (days)			0.066***
Above Squared			-0.000***
Observations	11054	11054	11054

***, **, and * indicate significance at the 1, 5 and 10% levels respectively.