Childhood Circumstances and Young Adulthood Outcomes: The Role of Mothers' Financial Problems*

ANDREW E. CLARK
Paris School of Economics - CNRS

Andrew.Clark@ens.fr

CONCHITA D'AMBROSIO
Université du Luxembourg

conchita.dambrosio@uni.lu

MARTA BARAZZETTA
Université du Luxembourg

marta.barazzetta@gmail.com

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Abstract

We here consider the cognitive and non-cognitive consequences on young adults of growing up with a mother who reported experiencing major financial problems. We use UK data from the Avon Longitudinal Study of Parents and Children to show that early childhood financial problems are associated with worse adolescent cognitive and non-cognitive outcomes, controlling for both income and a set of standard variables, and in value-added models controlling for children's earlier age-5 outcomes. The estimated effect of financial problems is almost always larger in size than that of income. Around one-quarter to one-half of the effect of financial problems on the non-cognitive outcomes seems to transit through mother's mental health.

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1. Introduction

The Great Recession of 2008-2009 and EU sovereign-debt crisis of 2011-2013 put many European families at risk of poverty, material deprivation and social exclusion, worsening their material conditions and overall standard of living. One particular feature of this double-dip downturn is that it not only affected the poorest but rather a broad swathe of the population that has not fully recovered. The Quarterly Review on Employment and Social Developments in Europe published by the European Commission in December 2019 shows that the number of families who experienced financial distress, there defined as the need to draw on savings or run into debt to cover current expenditure, remains high. The European financial-distress figure is currently about 13% of the population, a figure far above that of a decade earlier, and has receded only gradually from 17%, its highest value at the end of 2013 (the last year of the sovereign-debt crisis). This rise in financial distress came about not only in the bottom quartile of the income distribution, but also in the 2nd and 3rd quartiles, namely the wider middle-class. As such, it is commonly-believed that economic instability affects a great many people's lives.

There is a very large literature on the relationship between income and financial resources, on the one hand, and adult outcomes on the other (See Appendix C1 for a short review). This has considered the impact of job loss, health shocks, inheritances, lottery wins and tax refunds, amongst other events. A smaller but still considerable set of contributions has focussed on potential effects on the children of the adults concerned. These have considered the intergenerational effect of parental job loss (Hilger, 2016, Oreopoulos *et al*., 2008, Rege *et al*., 2011, and Stevens and Schaller, 2011), parental income (Akee *et al*., 2010, Bastian and Michelmore, 2018, Dahl and Lochner, 2012, and Hoynes *et al*., 2016; Duncan *et al*., 2017, provide a meta-analysis) and parental health shocks (Persson and Rossin-Slater, 2018, and Matsumoto, 2018).

Our contribution is also in the realm of intergenerational correlations. The broad question we ask is whether income suffices as a measure of parental financial difficulties and, if not, how we can improve the analysis to better study intergenerational transmissions. In general, we need to know both financial resources and the demands that are made upon them in order to say whether individuals are in financial distress. As such, indicators of difficulty paying bills or having had financial problems may provide information over and above the income that individuals or

households receive.[1] We here ask whether the trace of parental financial problems, conditional on parental income, can be found in the adolescent cognitive (educational) and non-cognitive (health, subjective well-being, and behavioural problems) outcomes of their children. This kind of transmission has been suggested in work on the Great Depression of the 1930s (Elder, 1999). For the Commission on the Measurement of Economic Performance and Social Progress (see Stiglitz *et al*., 2009, p.198) "*This insecurity may generate stress and anxiety in the people concerned, and make it harder for families to invest in education and housing*." We are interested in children's adolescent cognitive and non-cognitive outcomes both in their own right as measures of how well young people are doing, and because they predict outcomes throughout adult life.[2]

One well-known contribution underlining the importance of financial distress is the executive summary of the *Shriver Report* (2014), written by Maria Shriver and the Center for American Progress. This report includes contributions from Beyoncé, Hillary Clinton and Eva Longoria, among others, and aims to convey the national crisis from women's point of view, in an era in which women constitute half of the American labour force and two-thirds of the primary or co-breadwinners in families.[3] This summary opens with a statement claiming that the most common shared story in today's America is family financial insecurity caused by financial problems. One in three women face financial difficulties: "*Forty-two million women, and the 28 million children who depend on them, are living one single incident—a doctor's bill, a late paycheck, or a broken-down car—away from economic ruin. Women make up nearly two-thirds of minimum-wage workers, the vast majority of whom receive no paid sick days. This is at a time when women earn most of the college and advanced degrees in this country, make most of the consumer spending decisions by far, and are more than half of the nation's voters*." The report describes these women facing financial insecurity, and proposes policies to improve their quality of life.

We use data from the Avon Longitudinal Study of Parents and Children (ALSPAC) in the UK, a large-scale birth-cohort that follows children over a period of more than two decades. The

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[1] In the spirit of Pradhan and Ravallion (2000), who use information on the perceived adequacy of household consumption to create poverty lines.

[2] Childhood emotional health is the most important predictor of life satisfaction at all adult ages in both the British Cohort Study (BCS) and the National Child Development Study (NCDS): see Clark *et al*. (2018), Layard *et al*. (2014) and Flèche *et al*. (2020).

[3] The US is no exception in this respect: 46.1 percent of those in work in the EU in 2018 were women, nearly 60 percent of EU university graduates are women and a majority of women with children (61 percent) are also breadwinners or co-breadwinners.

advantage of ALSPAC is that it contains information on not only income (as in much of the existing work) but also financial distress: in each of the child's first 11 years we know whether the mother had a major financial problem the previous year. This self-reported variable may be a better indicator of financial insecurity, and thus parental stress, than income on its own: this is the conclusion of a number of contributions in the developmental psychology literature (see Kalil, 2013, among many others, for an excellent survey).

The addition of financial distress will not advance our knowledge much if this is almost entirely determined by income. But if the former reflects both economic resources and the demands that are made on them, income on its own may tell only half of the story. Financial insecurity does not necessarily imply low or lower income (and we indeed only find a quite small correlation between financial problems and income in the ALSPAC data), but includes "*a doctor's bill, a late paycheck, or a broken-down car*", housing problems, the job loss of a family member, divorce, falling housing equity, and so on. During the recent Great Recession, these financial problems have arguably become more widespread than low income, and have hit the middle-class as well (as highlighted, for example, by Gauthier and Furstenberg, 2010, in relation to families with children).

Some supportive evidence on this point comes from Waves 1 to 18 (1991-2008) of the British Household Panel Survey (BHPS) data, the dataset often used to analyse income dynamics in the UK. In the BHPS individuals are asked "*Would you say that you yourself are better off or worse off financially than you were a year ago?*". Around one quarter say better-off, one quarter worse-off and almost exactly one half about the same. Starting in Wave 3 of the BHPS, respondents who reported being better or worse off were asked "*Why is that?*", with the answers to this open-ended question being reported verbatim.[4] Three response categories dominate for those whose financial position has worsened: a rise in expenses for almost exactly 50% of respondents, followed by a fall in income (28%) and "Other" (11%). None of the 18 other reasons that are coded are cited by more than 4% of respondents whose financial situation worsened. These figures are very similar for those who have children in the household, and for those who have children under age 12 in the household (at 47%, 33% and 12% respectively). Financial problems are thus more often caused by increased expenses than by lower income.

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[4] See the BHPS questionnaire. For example, this is question F6 in Wave 18:
https://www.iser.essex.ac.uk/bhps/documentation/pdf_versions/survey_docs/wave18/index.html.

Our analysis of mother's major financial problems shows that these are associated with worse cognitive and non-cognitive outcomes of their children up to 18 years later. This correlation persists when controlling for average family income during childhood, home-ownership, the number of years of falls in income that the mother reports and a set of standard variables (and is larger than the correlation between the child outcomes and income). Major financial problems in early (ages 0 to 5) and later (ages 6 to 11) childhood have broadly similar correlations with most of the adolescent outcomes. Last, the size of the correlation between financial problems and later adolescent outcomes continues when we control for child outcomes at around age 5, and only consider financial problems that appear between the ages of 6 and 11 in a value-added analysis. These findings suggest that economic downturns, such as the recent Great Recession, and the financial distress they engender not only affect the adults concerned, but also cast a long shadow over their children's outcomes for many decades.

The remainder of the paper is organised as follows. The dataset and methods are described in Section 2. The main results and a series of extensions appear in Section 3. Section 4 concludes.

2. Data and Methods

The ALSPAC survey, also known as "*The Children of the 90s*", is a long-term health research project that recruited over 14,000 pregnant women who were due to give birth between April 1991 and December 1992 in Bristol and its surrounding areas. These women and their families have been followed ever since, even if they move out of the original catchment area (See http:// www.bristol.ac.uk/alspac/).

The initial sample was composed of 14,541 pregnant women who enrolled in the ALSPAC study, resulting in a total of 14,062 live births of whom 13,988 were alive at the age of one year. Although the ALSPAC sample in Avon is richer and Whiter than the UK on average, the children are very similar to the UK average in terms of height and weight at birth, and at ages of one and two (see http://ije.oxfordjournals.org/content/early/2012/04/14/ije.dys064.full.pdf for a full description of the cohort profile). The study website contains a fully searchable data dictionary of all of the data that is available (http://www.bris.ac.uk/alspac/researchers/data-access/data-dictionary/).

2.1 Dependent Variables

We consider five types of child outcome during adolescence/early adulthood: subjective well-being (henceforth SWB), behaviour, emotional health, physical health and education.

Child SWB is measured via the Short Moods and Feelings Questionnaire (SMFQ), which is composed of a number of items reflecting how the child felt over the past two weeks, such as being miserable or unhappy, crying a lot, and feeling lonely: see Appendix B2 for the questionnaire. Each item is answered on a three-point scale (true (0), sometimes true (1), and not true (2)). The SMFQ is child-reported at ages 16 and 18, and carer-reported (most often the mother) at age 16. It consists of 17 items for the child-reported version at age 16 and 13 items for the other two versions. To make the results comparable over time, we use the 13 items that are common to both ages. The total SMFQ score, the sum of the answers to these 13 questions, ranges between 0 and 26, with higher numbers indicating better SWB.

Child antisocial behaviour at ages 11 and 16 is measured by the Troublesome Behaviours Score from the Development and Well-Being Assessment (DAWBA) questionnaire. The DAWBA is a long questionnaire assessing common emotional, behavioural and hyperactivity disorders among children aged 5 to 17 (it is not designed to assess severe disorders), and can be administered to children, teachers or the carer. It consists of several sections, each assessing a different type of child disorder (e.g. depression, hyperactivity, phobias, and self-harm). The troublesome behaviours section asks the carer and the teacher if over the last 12 months (over the past school year in the teacher's version) the child had exhibited a number of different behaviours. The carer- and teacher-reported versions of the questionnaire are slightly different, with the carer-reported questionnaire consisting of a list of 15 behaviours,[5] with possible answers of "No", "Perhaps" and "Definitely" (coded 0, 1 and 2) for seven minor troublesome behaviours, and "Yes" or "No" (coded 1 or 0) for eight more serious behaviours), and the teacher-reported version of 12 behaviours, with possible answers of "Not true", "Somewhat true", "Certainly true" (coded 0, 1 and 2). These behaviours include bullying people, fighting with other siblings, stealing from shops, and hurting or being physically cruel with someone. Despite the different number of questions, the total antisocial behaviour score in both versions ranges from 0 to 22, with higher scores indicating worse

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[5] The original list includes also "forcing someone into sexual activity against their will" among the possible antisocial behaviours: as this item resulted in zero affirmative cases we exclude it from the list.

behaviour (see Appendices B3 and B4). In ALSPAC the DAWBA questionnaire is administered to teachers when the child is aged 11 and to carers when the child is aged 16.

Both child emotional health and a second measure of behaviour come from the Strengths and Difficulties Questionnaire (henceforth SDQ). The SDQ is a behavioural-screening questionnaire for children about 3 to 16 years old and consists of 25 questions that are answered by an adult regarding the child's concentration span, temper tantrums, happiness, worries and fears, whether the child is obedient, often lies or cheats, and so on: see Appendix B5. The answers to these questions can be used to produce five well-being sub-scales (each consisting of five items) referring to emotional health, behavioural problems, hyperactivity/inattention, peer-relationship problems, and pro-social behaviour. Following Goodman *et al*. (2010), we use two broader sub-scales, as in low-risk samples such as the ALSPAC respondents the five finer sub-scales may not be able to detect distinct aspects of child well-being. The "internalising behaviour" score is the sum of the emotional and peer subscales, and can be argued to measure emotional health, while "externalising behaviour" is made up of the behavioural problems and hyperactivity subscales and refers to behaviour. Both internalising and externalising SDQ are scored on a 0-20 scale; we reverse this scale so that higher values indicate better outcomes. We have both carer- and teacher-reported SDQ at age 11.

Children's physical health is measured by their BMI at ages 11, 13 and 16, compared to the distribution of BMI in other children of the same age by sex (calculated from within the ALSPAC survey). This measure is based on clinically-assessed height and weight. We construct a dummy variable for having "normal" BMI between the 5th and 85th percentiles. We will below consider some alternative child-health measures.

Last, our cognitive outcomes refer to the results of the GCSE qualifications or equivalent exams (Key Stage 4, or KS4), taken in the UK at the end of compulsory schooling (at age 16), matched in from the National Pupil Database.[6] The lowest GCSE exam grade of G is assigned 16 points, and the points for successive grades rise in steps of 6 up to the top grade of A* with 58 points.[7] At the pupil-level, KS4 outcomes are given in five mutually-exclusive groups: level 2 (five

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[6] The National Pupil Database (NPD) contains information on pupils' educational attainments in England, including test and exam results at different key stages. To date, information on key-stage results is available for each ALSPAC study child at ages 7, 11, 14 and 16. The definition of the different key stages can be found at https://www.gov.uk/national-curriculum/overview.

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/517106/Key_stage_4_average_grade_per_qualification_2015.pdf.

or more A*-C GCSEs or equivalent); level 1 (five or more A*-G GCSEs or equivalent); one or more level-1 standard qualifications (1 or more A*-G GCSEs or equivalent, but not five or more); only entry-level qualifications (GCSEs with grades below G); and no passes. We consider a dummy for achieving the highest level (level 2), and average GCSE points (total exam points divided by the total number of entries).

The summary statistics for all of the different child-outcome variables are presented in Appendix Table A1.

2.2 Explanatory Variables

We wish to relate the above dependent variables to the financial resources that were available to the household when the child was growing up. Household income is measured in ALSPAC when the child is aged 3, 4, 7, 8, and 11. The question "*On average, about how much is the take home family income each week (include social benefits etc.)?*"is answered using a scale of five income bands at ages 3, 4, 7 and 8, and ten income bands at age 11. We convert these ALSPAC band values at each wave to income figures using data from the Family Resources Survey (FRS) on the distribution of net household income in the South West region. We are careful to match this distribution by year of birth (for 1991 births at age 3, we use the 1994 income distribution, but the 1995 income distribution for 1992 births, and so on). At each year we then deflate income to 2008 prices. The original income bands and the resulting 2008 FRS net household income figures appear in Appendix Table A2, along with the percentage of households in each of the income bands.[8]

As in most survey data, we are confronted with missing values. When the dependent variable is missing, the case is dropped. For missing values on control variables we appeal to the missing indicator approach (as used in Layard *et al.*, 2014). Family income is calculated as the household-level mean over all of the childhood waves in which income information is reported. When any income observations are missing for a given child, we insert a missing-value flag. If only some observations are missing, we calculate the mean over all of the valid responses; if all of the income observations are missing we replace the value by the overall sample mean and again insert a missing-value flag. About 30% of mothers reported income information in all five waves, while 23% have missing information in all waves. Our final weekly take-home income figure has a mean of £424 and a standard deviation of £150. Family income will be entered in logs in the empirical

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[8] Section 3.2 below will test some of the assumptions underpinning the conversion of income bands to income figures.

analyses, to account for the fact that an extra £50 of income (say) likely makes more difference to a family on £300 a week than to one on £700 per week.[9]

Our second (and more novel) financial variable relates to the major financial problems (MFPs) reported by the child's mother. The MFP variable may capture financial insecurity over and above traditional income indicators, in the sense that experiencing financial problems is not limited to the poor. Almost every year parents are asked: "*Listed below are a number of events which may have brought changes in your life. Have any of these occurred since your study child's XXX birthday?*". One of these events is "*You had a major financial problem*": see Appendix B1 for further details. We count the number of years from birth to age 11 in which the mother reported a MFP; this question was not asked when the child was aged seven, so that the maximum number of MFPs is ten.[10]

About 37% of mothers answer the MFP question in all ten waves. Another 30% have missing values for one to five waves, 21% have missing values for six to nine waves, while 12% of mothers never replied to this question. When information in some waves is missing, we replace it by the mother's MFP count in the available waves, multiplied by the ratio of the total number of waves to the observed number of waves, and include a missing-value flag.[11] When the information is not available in any wave, we replace the missing value with the total sample mean and again introduce a missing-value flag as a right-hand side variable.[12]

The distribution of MFP after imputation appears in Figure 1. Overall, just under one half of children grew up in households with at least one MFP over the child's first 11 years, 17% at least two, and 12% at least three, up to a maximum figure of ten.[13] The annual incidence of MFP is correlated with the South-West regional unemployment rate (with a correlation coefficient of

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[9] Our main results regarding the size of the relationship between childhood MFP and adolescent outcomes are very little changed if we instead enter income as a quadratic or as a set of tertile dummies.

[10] We would ideally like to have information on the relationship between needs and resources. There is only very intermittent information in ALSPAC on spending that may affect children. When the child is aged around seven, mothers report the difficulty they have in affording various items, including things needed for the children, clothing (in general), education, and childcare. We can show that the reported difficulties in these four domains are significantly positively correlated with the number of MFPs up to child age seven (results available on request).

[11] With ten potential waves of MFP information, someone who reports eight values (of 0 or 1), will then have their count over these eight years multiplied by 10/8.

[12] We use the same missing-value strategy for the other control variables that are measured similarly (i.e. counting the number of times during childhood the events occurred), namely number of house moves and the number of years the mother worked. Our detailed regression results in the Appendix reveal that the income and MFP missing-value flags actually attract insignificant estimated coefficients in the vast majority of our regressions.

[13] We have checked that all of our results also apply when using a dummy for having had at least one MFP during the first eleven years of childhood.

0.16). However, at the household level the correlation between number of MFPs and income is, as expected, negative but not particularly large at -0.16. In particular, financial problems seem to spread up into the middle class. While those in the bottom income quartile (from the average figure over the child's first 11 years) report an average of 1.7 financial problems, the figures in the second and third income quartile are 1.0 and 0.9 (dropping to 0.5 for the top quartile).

The correlation matrix between all of the explanatory variables appears in Appendix Table D1. The first column of this matrix reveals the expected correlations with MFPs: these fall with parental education, but rise with job loss, illness, parental separation and income drops. All of these bivariate correlations survive in a multivariate probit regression of the correlates of MFP. Appendix Table D2 shows the correlation coefficients between all of the child outcomes.

2.3 Specifications

We have three specifications for each child outcome: the first with household income, the second with the number of MFP years, and the third with both together. All regressions include controls for gender, a first-born dummy, mother's age at the child's birth, the number of children in the household, single-adult household, parents divorced/separated, parents' education, child ethnicity, mother born in a non-European country, private school, number of years in which the mother worked, number of house moves, home ownership, and parental time investments (divided into the early, pre-school and in-school periods).[14] For all of these other control variables, we replace missing values by the overall sample mean for that variable, and add a missing indicator flag to the regression. The summary statistics of the control variables after imputation, as they appear in the regression analysis, are presented in Appendix Table A3.

Cohort data suffers from attrition, which increases with child age to reach about 40 percent after child age 16. Attrition is more concentrated in lower-income and less-educated families, producing an over-representation of the middle and upper class. This is taken into account in our estimations via inverse probability weighting. We use observable pre-birth information (child's gender, and mother's education, age at birth, ethnicity, marital status, employment status, financial problems and mental health) to predict the attrition probability at each child outcome wave, and correct our final estimates using the inverse of the predicted probabilities ($1/p$) as weights.

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[14] These investments are measured as the sum of the frequency with which each parent carries out a certain list of activities with the child, such as bathing her, making things with her, singing to her, reading, playing and active play and preparing food for her. We calculate the average score for the father and the mother.

To make the results easier to compare across equations, all continuous variables, both dependent and explanatory, are standardised. We also balance the sample within each child-outcome table, so that the estimated coefficients in each column refer to the same children. All of the equations are estimated linearly. We estimate the following baseline model:

$$CO_i = \alpha + \beta MFP_i^{0-11} + \gamma lnY_i^{0-11} + \delta X_i + \varepsilon_i \qquad (1)$$

where CO_i is the outcome of child i, MFP_i is the number of years the mother reported a major financial problem, lnY_i is the log of net household income and X_i are the control variables as described above.

3. Results

This section presents our main results: we broadly show that the correlation between child non-cognitive outcomes and financial problems is larger than that with income (which is mostly insignificant), while for cognitive outcomes the correlations with financial problems and income are of equal size. The full tables of regression coefficients appear in Appendix A (Tables A4 to A7): the correlations with the other control variables are discussed in Appendix C1.

3.1 Baseline Results

Our main results regarding MFP and income in the specifications that include both at the same time are summarised in Figure 2.

The number of mother's MFP years is significantly correlated with child-reported SWB at both ages 16 and 18 (Appendix Table A4). The estimated coefficient is remarkably similar for the well-being reported by the child at ages 16 and 18 (columns 1 through 6) and by the carer at age 16 (columns 7 through 9). This similarity helps alleviate any common-method variance concerns regarding MFP and child well-being that are reported by the same person, the carer (although up to fifteen years apart), and thus might be subject to some common reporting style. A one standard-deviation rise in MFP (corresponding to 1.2 MFPs, from Table A3) is associated with SWB that is lower by about 0.15 standard deviations. On the contrary, household real income is only significantly correlated with adolescent SWB in the specification without MFP. Mothers' financial problems during childhood are then persistently correlated with the well-being of their children during adolescence and early adulthood, as reported by both carers and the adolescents themselves.

We care about the latter both as a measure of adolescent well-being in itself, and because this well-being is the most important predictor of life satisfaction throughout adult life.

MFP also significantly predicts child antisocial behaviour (reported by the mother in the DAWBA questionnaire at child age 16) in Appendix Table A5.1, columns 1 to 3, with a standardised coefficient of 0.13 that does not change when we include income. The conclusions from the analysis of age-11 externalising SDQ child behaviour in the middle panel are almost identical. Family income is never significantly correlated with child behaviour once we control for MFP. The right-hand panel of Appendix Table A5.1 turns to child emotional health at age 11 (internalising SDQ): here both MFP and income have separate significant effects.

Appendix Table A5.2 is the teacher-reported version of the child-behaviour analysis in Appendix Table A5.1 (with all outcome variables now being measured at child age 11). The results are qualitatively similar to those for the carer-reported outcomes, but with estimated coefficients on MFP and income that are now insignificant for DAWBA antisocial behaviour at age 11.

The results for our physical-health measure, BMI, appear in Appendix Table A6. Only few variables are correlated with child BMI, one of which is mother's MFP. The correlation is negative and significant for BMI at all ages, reducing the probability of normal child BMI by about five percentage points (compared to the baseline incidence of normal BMI of around 80%). Family income is not significantly correlated with child BMI except at age 11, where it is significant at the 10 percent level.

Last, Appendix Table A7 contains our education results. As in existing UK evidence, family income is positively correlated with child cognitive outcomes. A one standard-deviation rise in income is associated with 0.04 standard-deviation higher average GCSE points at age 16. This effect size is somewhat higher than that of MFP, which is however correlated in its own right with child GCSE points. At the upper tail of the GCSE distribution (the probability of achieving Level 2), MFP and income attract similar significant estimated coefficients. The MFP coefficients for education are in general smaller in size than those for the non-cognitive outcomes discussed above. One reason why family income is less significant for achieving Level 2 is that one of our controls, home ownership, is the strongest predictor of both of the educational outcomes. Section 3.2.2 describes how all of our estimation results are affected by dropping home ownership as a control variable. Here excluding home ownership produces an estimated family-income coefficient that rises from 0.02 to 0.04 for achieving Level 2, with the MFP coefficient being unaffected.

The principal conclusion from these regression tables, as summarised in Figure 2, is that children growing up in families where the mother reports having financial problems have significantly worse cognitive and non-cognitive outcomes during adolescence, controlling for family income. MFP is a stronger predictor of children's non-cognitive outcomes than is family income (the average standardised absolute-value MFP coefficient for the non-cognitive outcomes being 0.10), with family income not being significant most of the time. On the contrary, both family income and MFP are significantly correlated with the child's cognitive outcomes at age 16.

3.2   Extensions to the Baseline Results[15]

3.2.1 Channels

The family-process channel in Appendix C1 emphasised the mediating role of parental stress. One aspect of this stress (but far from the only one) is mother's mental health. In ALSPAC this latter is measured by the Edinburgh Post-natal Depression Scale, developed by Cox *et al.* (1987). This is composed of ten items referring to the feelings of the mother over the past week (see Appendix B6). The score ranges from 0 to 30, and is reversed so that higher values indicate better mental health. Although this measure was developed for use with puerperal women, none of the items is specifically related to the post-natal experience, and it has been validated for use during pregnancy, post-partum and early parenthood. Mother's mental health is measured at child ages of 8, 21, 33, 61, 73, 97 and 134 months. We calculate the average of these seven figures.

It is commonplace in the existing literature to find that low income, debt and financial insecurity among adults reduce their subjective well-being. Some examples are Clark *et al.* (2016) regarding poverty, Brown *et al.* (2005) and Gathergood (2012) for debt, Kopasker *et al.* (2018) with respect to insecurity, and Deaton (2012) and Wahlbeck and McDaid (2012) for financial crises. We do indeed find a correlation in ALSPAC data between mother's mental health and both MFP and income.

When we add mother's mental health to the regressions described in Section 3.1 above, we find that this plays a significant mediating role for most non-cognitive outcomes, as summarised in Table 1. The first two columns show our baseline estimated coefficients (those in Figure 2) for income and financial problems; columns 3 and 4 then present these same coefficients controlling

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[15] A number of other extensions appear in Appendix C2.

for mother's mental health, with the last two columns showing the percentage change in the two estimated coefficients.

Children whose mothers have better mental health have better outcomes on all measures bar BMI, with the correlation with the cognitive outcomes being the smallest. Controlling for mother's mental health reduces the MFP coefficient by about one-quarter to one-half for well-being, behaviour and emotional health, although the estimated MFP coefficient mostly continues to be negative and significant in its own right. By way of contrast, mother's mental health makes little difference to the estimated MFP coefficients for child BMI and education. Mediation via mother's mental health is then more salient for non-cognitive outcomes.[16]

There is more than one interpretation here. Perhaps the most obvious is that of a mediator: income and financial problems affect mother's mental health, which in turn affects child outcomes. In this light, one quarter to one half of the effect of MFP on well-being, behaviour and emotional health works via mother's distress (from column 5 of Table 1). Alternatively, we could think that reported financial problems are themselves partly determined by mother's mental health, in the sense that more "anxious" mothers are more likely to report problems. In this respect the emphasis is now more on the third column of the table, showing that MFP continues to have an effect conditional on mother's mental health.

There are a number of other possible mediators via which MFP could affect child outcomes. We have seven potential candidates that are controlled for in our baseline regressions: living in a single-adult household, parental separation,[17] parental time investments, mother's work, house moves, home ownership, and child private-school attendance. We evaluate mediation by re-running the regressions in column 3 of each panel of the regression tables in the Appendix, excluding each of these seven variables in turn. This exercise produces only very marginal changes in the estimated MFP coefficients: these variables are not behind the effect of MFP on child and adolescent outcomes.

Last, we can tackle this issue in the opposite direction, and add more control variables that may be behind MFP to the baseline regression. Following the significant bivariate correlations in

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[16] The mediating effect of mother's mental health on the estimated income coefficients in the last column is perhaps of less interest, because only few of the latter were significant to start with (see Figure 2). The inclusion of mother's mental health turns out to have only little effect on the significant income coefficients.

[17] One of the main drivers of falling into poverty is changes in family structure, such as the end of a partnership and the birth of an additional child.

Appendix D, we thus add controls for the experience of mother's illness, mother's job loss and partner's job loss over the child's first eleven years (calculated in the same way as our variable of experience of MFP). The results appear in Appendix Table A8. For completeness, the first column shows the estimated MFP coefficient in the baseline specification (in column 1 of Table 1) and the second column that holding mother's mental health constant (from column 3 of Table 1). Columns 3 through 5 separately add the new mediators of mother's illness, mother's job loss, and partner's job loss to the baseline regression respectively. Last, column 6 introduces all four mediators at the same time.

The comparison of the estimated MFP coefficients across the rows of Table A8 reveals that the only channel producing any significant change in the MFP coefficient for non-cognitive outcomes is mother's mental health. The MFP coefficient in column 6 (controlling for all four mediators) is very similar to that in column 2 (controlling for mother's mental health only). The reduction in the estimated MFP coefficient for cognitive outcomes from these new mediators is somewhat larger: parental job loss and illness may play a more important role for adolescent exam results than they do for non-cognitive outcomes. In general, there is much more behind MFP (in terms of its consequences on adolescent outcomes) than is picked up by this array of early-life events.

3.2.2 Income and wealth

All of our results above concerning income and MFP come from regressions which condition on a range of control variables, including home ownership. This latter is often considered as a measure of wealth. To check whether any correlation between wealth and income (or indeed between wealth and MFP) is affecting our conclusions, we have re-run our regressions dropping home ownership. This makes almost no difference to the estimated MFP coefficients that are summarised in Table 1. It also does not affect our conclusions regarding the correlation between income and child non-cognitive outcomes. Where it does make a difference is for income and cognitive outcomes. Home ownership is one of the strongest predictors of both of our educational outcomes (see Table A7), and its exclusion from the child-education regressions leads to estimated income coefficients that are almost double the size of those in Table 1.

3.2.3 Issues in imputation

Both the income and financial-problems variables in the regressions contain some imputed values. The distribution of financial problems including imputed values in Figure 1 shows a slight uptick at the maximum value of 10. This almost never reflects a respondent reporting problems ten times, but rather someone who is interviewed four times (say), reports a financial problem each time, and then has an imputed value of 10 (as 4 x 10/4). All of our results are robust to dropping this maximum category in our adolescent-outcome regressions.

Along the same lines, it might be thought that imputing missing values produces an over-estimation of the incidence of financial problems. As an experiment, we instead replace all missing MFP values by zero, including the financial-problems score of those who are missing at every wave with respect to this variable: this undoubtedly produces an under-estimate of incidence. Note that there is no MFP missing-value dummy in this new specification, as all missing MFP observations have now been replaced by zero. The "missing as zero" estimation results reveal smaller estimated coefficients on financial problems, all of which remain significant and continue to be mostly larger than those on income (which hardly change).

Our approach to missing income information was to calculate the average of the five reported values over childhood. If fewer than five were reported, we took the average over the reported figures only (which amounts to replacing the missing information by the individual-level mean). If all five were missing, we replaced by the sample mean and created a missing income flag. Around 23% of observations were missing income at all waves. We first check that our results remain unchanged when we simply drop this 23% group. This produces estimated coefficients on income that are sometimes larger than those in our main results, but broadly does not change their pattern. Notably the income coefficients for cognitive outcomes are now considerably larger than those on financial problems (although all estimated coefficients remain significant at the five per cent level or better).

We have also changed the imputation approach for all variables from missing indicator to multiple imputation.[18] The estimated results again remain similar (although, as above, the estimated income coefficients in the cognitive-outcome regressions are notably larger).

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[18] Multiple imputation was performed using chained equations with ten imputations, assuming that missing observations are missing at random (MAR) given the known characteristics of the individuals for which observations are missing. Estimates from the ten imputed datasets are then combined using Rubin's rule. This approach has already been used in other papers based on ALSPAC (see e.g. Washbroook *et al*., 2014).

3.2.4 Falls in income and major financial problems

Our main results refer to financial problems and the level of household income, and we in general underline the importance of the former over the latter (at least for the non-cognitive outcomes). Although the level of income and MFP are only correlated at 0.16, we might imagine that falls in income are a key cause of MFP. Due to the banded (and infrequent) nature of the ALSPAC income variable, we cannot observe these income drops directly. However, we do have annual information on whether the mother reported a fall in income over the past year. As part of the same set of questions in which the mother reports financial problems, she is also asked whether "Your income was reduced". We count the number of years with an income drop. This count is correlated with the MFP variable at 0.5.

Regressions with income, MFP and income drops produce estimated coefficients on the first two variables that are very similar to those summarised in Figure 2. For the non-cognitive outcomes, income remains significant only for the two internalising SDQ variables at age 11, while MFP remains significant for almost all non-cognitive outcomes with estimated coefficients that are attenuated by only 10-20%. The results for the cognitive outcomes are not at all affected. The income-drop variable itself is significantly correlated with all three well-being variables, the carer and teacher-reported anti-social behaviour variables, and carer-reported child behaviour and emotional health. The estimated coefficient on the (standardised) income-drop variable is always smaller than that on standardised MFP.[19]

A second approach to the falls in income that might be associated with MFP is to carry out a calibration exercise. Due to the banded nature of the income variable (shown in Appendix Table A2) a household could have a financial shock that reduced its income from £299 to £200 (say), without reporting any change in their banded income. We establish the potential consequences of this correlation by assigning the lowest-possible income figure to a household that reports an MFP in the recent period (where the latter is all years since the previous income measurement). For example, a household that reported an MFP in years one to three, and an income of £300 to £399 in year three will then not be assigned the figure of £347.74 from Table A2 but rather £300.

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[19] We also considered interacting MFP with the income-drop dummy, and so emphasising households that report financial problems and income drops at the same time. The interaction attracted only two significant estimated coefficients at the five per cent level out of 14.

Equally, a household that reported an MFP in years nine through eleven and an income of £240 to £289 will not be assigned £265.64 from Table A2 but rather £240.[20]

This assignment of the lowest-possible income in the band to those households with recent MFPs makes virtually no difference to the results. Out of our 14 estimated income coefficients, one that was insignificant now becomes significant, with one of the 14 MFP coefficients moving in the other direction. In neither case is the change in the coefficient significant at conventional levels. We conclude that unobserved low income that is associated with MFP does not lie behind our baseline results.

3.3   Endogeneity Concerns

Our main results above related child outcomes at ages 16 or 18 to the financial problems reported by their mothers between child ages 0 and 11. We here consider the evidence for this relationship being causal. It will not be so if there is an omitted variable that predicts both MFP at earlier ages and later child outcomes: this could perhaps be local socio-economic conditions or parenting style.

A first point is that our regressions do control for a wide range of background characteristics. In itself, this does not of course prove that there are no other omitted variables. Unfortunately, we do not have any particularly good candidate variables with which to instrument MFP, especially as we would need to do so over an eleven-year period. We cannot appeal to geographical variation as the data come from relatively small area. Given the nature of the birth-cohort data we use here, we also cannot sensibly use a family/sibling difference model, in which family fixed effects pick up time-invariant family characteristics that are common to siblings (e.g. Ermisch *et al*., 2004; Björklund and Sundström, 2006).[21] We do have a few twins, but they are not helpful in this context as they are of course exposed to the same MFP when growing up. There are in addition a very few families with two births over the 18-month initial data-collection period, but not enough for any sensible analysis (and these siblings, being born so close together, will have "almost" the same childhood MFP exposure).

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[20] In the bottom income bands, the lowest bound is zero, which might be thought unlikely. We here assign the median of the lowest band: £50 in Waves 3, 4, 7 and 8, and £60 in Wave 11.

[21] The intuition here is that we can compare the test scores of siblings who experience different levels of MFP while growing up.

We do however believe that we can make progress here by splitting childhood up into separate time periods (0-5 years old and 6-11 years old), and estimating a value-added specification. The worry is that all childhood outcomes are predicted by an unobserved variable, Z, which is also correlated with MFP. In order to help turn this channel off, we will add earlier child outcomes to our main estimation equation: we estimate child adolescent outcomes controlling now for child outcomes at ages 4-5 and the MFPs that the child experienced between the ages of 6 and 11.

If there is an omitted variable of this kind, or if indeed there is reverse causality, whereby a shock to earlier child outcomes (that are serially correlated over time) produces later major financial problems, then we will be able to predict MFP between ages 6 and 11 from young child outcomes. The regression results (available on request) show that both internalizing and externalizing SDQ at age 4 are significant predictors of MFP between the ages of 6 and 11: worse scores in both dimensions are associated with more MFPs later in childhood. The same conclusion is found for the child's Key Stage One scores (at age 6), but neither for their poor health at age 5 (carer-reported) nor for the number of health symptoms at the same age.

To evaluate whether our correlations in Figure 2 entirely reflect reverse causality or an omitted variable, we then re-estimate our child outcomes (that are mostly at age 16/18), as a function of MFPs aged 6-11 and Child Outcomes at ages 4 or 5 in a value-added model. The intuitive argument is that any omitted variables, Z, that predict both child outcomes and parental MFP will be picked up by the earlier child outcomes. The equation we estimate here is as follows:

$$CO_i = \alpha + \beta MFP_i^{6-11} + \gamma lnY_i^{6-11} + \theta CO_i^{4-5} + \delta X_i + \varepsilon_i. \qquad (2)$$

The results appear in Table 2. There were 14 original estimated MFP coefficients, as summarised in Figure 2 (and which re-appear in column 1 of Table 2). Of these, 13 were significant and of the "correct" sign. Column 3 of Table 2 shows the analogous estimates from the estimation of equation (2) above. Of these 14 new estimated coefficients, 10 are of the correct sign and significant (even though we lose statistical power, as there is less variation in MFP between ages 6-11 than in MFP ages 0-11). In particular, the results for the three well-being variables and carer-reported behaviour and emotional health all continue to hold. The results for the two teacher-reported behaviours are even a little stronger in this new specification. We lose significance for

teacher-reported emotional health at age 11 and one of the two education outcomes (that which was the least significant in Figure 2). In addition, only one of the three BMI outcomes remains significant.

As in Appendix C2.5, we can replace BMI as a health outcome by either carer-reported poor child health at ages 11 and 13, or the number of physical health symptoms at age 11. For the first two of these, the child-outcome regression controls for poor child health at age 5, while for the latter it is the number of health problems at age 5. The results at the bottom of the non-cognitive panel of Table 2 show that MFP between 6 and 11 continue to predict later child health outcomes even controlling for child health at age 5.

In the estimation of equation (2) we treat income analogously to MFP, and replace its value over the whole of childhood with its value from ages 6 through 11 only. The estimated coefficients on income in later childhood appear in column 4 of Table 2: these are to be compared to those in the initial analysis in column 2 of Table 1. There is no effect on the significance of the first six outcome variables (for which only one estimated coefficient is significant). For the teacher-reported behavioural and emotional outcomes, again only one of the three estimated coefficients is significant (although not the same one), while for BMI none of the three income coefficients is significant.

The biggest change relative to Table 1 regards the correlation between childhood income and adolescent cognitive outcomes. The correlations in Table 1 were both positive and significant, and especially so for average GCSE points. Once we control for Key Stage 1 outcomes at age 6, there is no additional effect of income between ages 6 and 11 on the child's age-16 exam outcomes.

The finding that income plays little role in the determination of cognitive outcomes is worthy of comment. One interpretation is that income (as opposed to MFP) only matters in early childhood, although this was not evident at the bottom of Table A9a. Another is that income does continue to affect child cognitive outcomes, but only for certain groups. To investigate, we interacted income between child ages 6 and 11 with a dummy variable for having below median income at ages 0-5. There is almost no evidence of a moderated effect of income at ages 6-11 on any of the non-cognitive outcomes. The results for the two cognitive outcomes at age 16 however reveal a significant effect for income at ages 6-11 on the cognitive outcomes of children whose household income at ages 0-5 was below the median. As in Akee *et al.* (2018), the effect of income on child outcomes may be much more striking in relatively-deprived households.

The overall picture here then is similar to that in our initial analysis: controlling for income, childhood financial problems are significantly correlated with adolescent outcomes (and these adolescent outcomes are major predictors of well-being throughout the life course: see Clark *et al*., 2018).

4. Conclusion

Financial insecurity and stress are central determinants of well-being. We here use large-scale long-run birth-cohort data to make two central contributions in this context. We first extend the typical contemporaneous analysis by relating parental financial insecurity experienced during childhood to a range of cognitive and non-cognitive outcomes experienced by the children during the intermediate period of adolescence. Second, we do not limit ourselves to income as the sole measure of financial stress, but also consider the incidence of financial problems as reported by the mother. Our broad premise is that income alone may not provide complete information on the sufficiency of economic resources.

This premise is borne out in the empirical results. All of our adolescent non-cognitive outcomes are significantly correlated with childhood financial problems, but few are correlated with childhood income. On the contrary, adolescent cognitive outcomes are correlated with both financial problems and income. While we then agree with Duncan and Brooks-Gunn (1997) that non-cognitive outcomes are less sensitive to family income than are cognitive outcomes, we notably find exactly the opposite ordering with respect to family financial problems.

Our results underline that childhood financial problems are significantly correlated with most adolescent outcomes, even after controlling for family income. This correlation does not seem to be subject to contamination by mood, as the reports of financial problems and child outcomes are separated by a period of up to 17 years. In addition, we find correlations not only with mother's reports of adolescent outcomes but also with those reported by the adolescent him/herself and by teachers. Last, our results continue to hold in value-added regressions controlling for children's initial outcomes at around age 5.

In the recent Great Recession, the types of financial problems that we analyse here have arguably become more widespread than low income, and have spilled over to the middle-class as well (as highlighted, for example, by Gauthier and Furstenberg, 2010, in relation to families with children). In the Federal Reserve's Report on the Economic Well-Being of U.S. Households in

2014, 24% of individuals had experienced some form of financial hardship over the past year, and 47% could not cover an unexpected expense of $400. In a December 2015 survey by Bankrate,[22] 63% of Americans had no emergency savings for a $1000 emergency-room visit or a $500 car repair, and a July 2016 UK survey by the housing charity Shelter[23] that 37% of working families would be unable to cover their housing expenses were one of the partners to lose their jobs. This widespread financial insecurity undoubtedly has sharp effects on the well-being of the individuals concerned; our work also suggests that it may cast a long shadow over the outcomes of their children many years in the future.

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[22] Bankrate: http://www.bankrate.com/finance/consumer-index/money-pulse-1215.aspx.
[23] Shelter: http://www.bbc.com/news/uk-england-37017254.

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Figure 1 – The Distribution of Major Financial Problems after Imputation
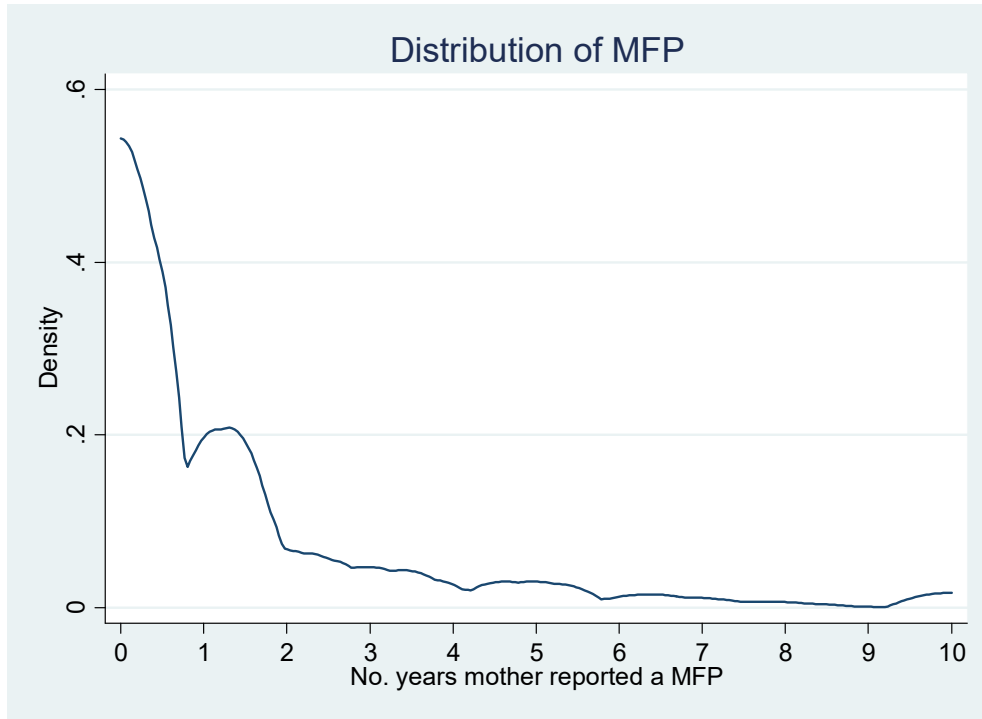
Figure 2 –MFP, Income and Child Outcomes: Summary Figure
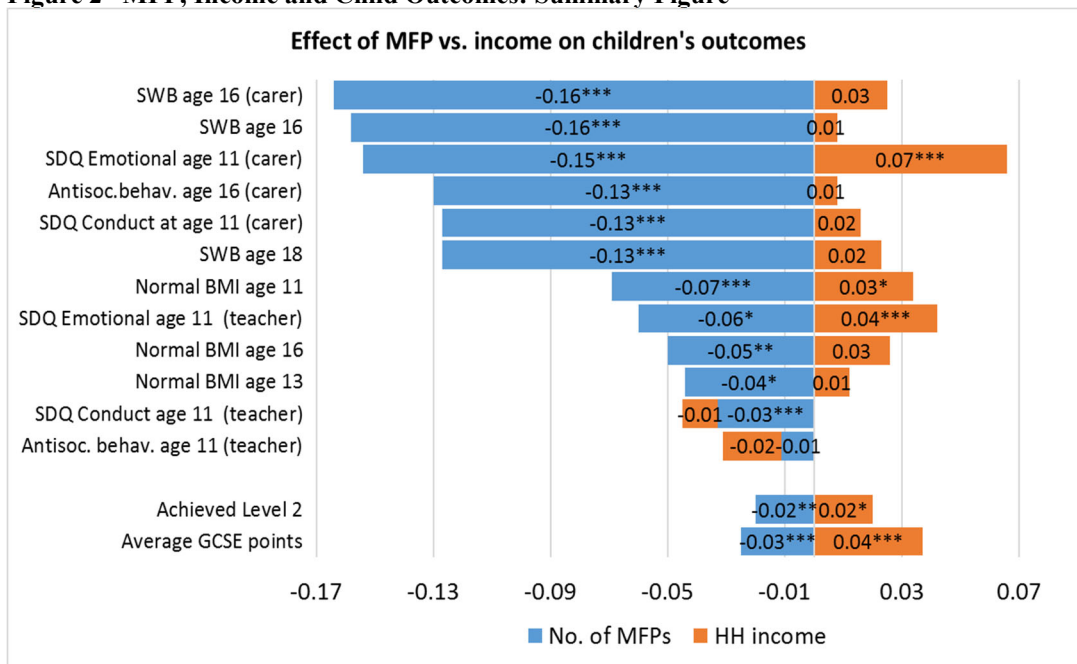
*Note: The coefficients for antisocial behaviour age 16 (carer-reported) and antisocial behaviour age 11 (teacher-reported) are reversed compared to the estimation table for ease of exposition, so that positive numbers always refer to better outcomes. Significance levels: ***p<0.01; **p<0.05; *p<0.10.*

Table 1 – Summary Table for Overall Childhood

Child's outcome	No. of MFP	Net household income (ln)	No. of MFP | mother's MH	Net household income (ln) | mother's MH	*Effect of mother's MH as mediator for MFP*	*Effect of mother's MH as mediator for income*
Non-cognitive outcomes						
Table A4						
SWB at age 16 (SMFQ)	-0.158***	0.008	-0.115***	-0.003	*27.2%*	*n.s.*
SWB at age 18 (SMFQ)	-0.127***	0.023	-0.078**	0.011	*38.6%*	*n.s.*
SWB at age 16 (SMFQ, carer-reported)	-0.164***	0.025	-0.072*	0.001	*56.1%*	*n.s.*
Table A5.1 (Carer-reported)						
Antisocial behaviours at age 16	0.130***	-0.008	0.102***	-0.003	*21.5%*	*n.s.*
SDQ behaviour at age 11	-0.127***	0.016	-0.059**	0.003	*53.5%*	*n.s.*
SDQ emotional at age 11	-0.154***	0.066***	-0.074***	0.050**	*51.9%*	*24.2%*
Table A5.2 (Teacher-reported)						
Antisocial behaviours at age 11	0.011	0.020	0.004	0.022	*n.s.*	*n.s.*
SDQ behaviour at age 11	-0.033**	-0.012	-0.023*	-0.014	*30.3%*	*n.s.*
SDQ emotional at age 11	-0.060***	0.042***	-0.049***	0.039**	*18.3%*	*7.1%*
Table A6						
Normal BMI at age 11	-0.069***	0.034*	-0.067***	0.034*	*2.9%*	*0.0%*
Normal BMI at age 13	-0.044*	0.012	-0.047**	0.012	*-6.8%*	*n.s.*
Normal BMI at age 16	-0.051**	0.026	-0.058**	0.027	*-13.7%*	*n.s.*
Cognitive outcomes						
Table A7						
Achieved Level 2	-0.020**	0.020*	-0.016	0.018*	*n.s.*	*10.0%*
Average GCSE points	-0.025***	0.037***	-0.022**	0.036***	*12.0%*	*2.7%*

Notes: The estimates in columns 1 and 2 refer to the specification including both MFP and household income in Tables A4 through A7. Significance levels: ***p<0.01; **p<0.05; *p<0.10. These are weighted estimates using IPW. All the models include controls and missing values flags. Controls: gender, child's ethnicity, mother born outside Europe, first born, mother's age at birth, parents' education, single-adult household, no. children in the household, no. years the mother worked, no. house moves, parents divorced or separated, parental time investments, home ownership and private school. The estimates in columns 3 and 4 come from regressions controlling for mother's mental health, and the figures in column 5 (6) show the percentage change between the estimated coefficients in columns 1 and 3 (2 and 4), but only when the initial estimated coefficient was significant.

Table 2 – Value-added Estimations

Child's outcome	MFP$_{0-11}$ Coefficient from Table 1	Child outcome at age 4/5 Coefficient	MFP$_{6-11}$ Coefficient	Income$_{6-11}$ Coefficient
Non-cognitive outcomes				
Table A4				
SWB at age 16 (SMFQ)	-0.158***	0.033	-0.092***	0.005
SWB at age 18 (SMFQ)	-0.127***	0.033	-0.066**	0.017
SWB at age 16 (SMFQ, carer)	-0.164***	0.149***	0.134***	-0.002
Table A5.1 (Carer-reported)				
Antisocial behaviours at age 16	0.130***	-0.135***	0.097***	-0.006
SDQ behaviour at age 11	-0.127***	0.421***	-0.056***	-0.007
SDQ emotional at age 11	-0.154***	0.296***	-0.074***	0.044**
Table A5.2 (Teacher-reported)				
Antisocial behaviours at age 11	0.011	-0.070***	0.031**	0.023*
SDQ behaviour at age 11	-0.033**	0.149***	-0.025*	-0.018
SDQ emotional at age 11	-0.060***	0.105***	-0.022	0.027
Table A6				
Normal BMI at age 11	-0.069***	0.022	-0.039*	0.032
Normal BMI at age 13	-0.044*	-0.005	-0.007	0.003
Normal BMI at age 16	-0.051**	-0.011	0.006	0.011
Table A6 (alternative child health measures)				
Poor health - age 11 (carer)	0.072***	0.300***	0.049***	-0.027
Poor health - age 13 (carer)	0.078***	0.271***	0.049***	-0.028
No. of health problems at age 11	0.109***	0.296***	0.087***	-0.018
Cognitive outcomes				
Table A7				
Achieved Level 2	-0.020**	0.506***	-0.012	0.013
Average GCSE points	-0.025***	0.427***	-0.025***	0.001

Notes: The estimates in columns 2-4 show the results from the estimation of equation (2). The child outcome variables at age 4/5 indicated in column 2 are: internalising SDQ at age 4 in rows 1-3 and for emotional SDQ at age 11; externalising SDQ at age 4 for the four behavioural variables; carer-reported poor health at age 5 for the three BMI variables and child poor health at ages 11 and 13; child number of health problems at age 5 for number of health problems at age 11; and Key-Stage 1 cognitive outcomes (at age 6) for the two cognitive variables at the foot of the table. Significance levels: ***p<0.01; **p<0.05; *p<0.10. These are weighted estimates using IPW. All the models include the controls and missing values flags as set out in Table 1.

Appendix A

Table A1 – Children's outcomes – Summary statistics

	N	Mean	Std. Dev.	Min.	Max.
Non-cognitive outcomes					
SWB at age 16 (SMFQ)	4784	20.11	5.62	0	26
SWB at age 18 (SMFQ)	3193	19.21	5.90	0	26
SWB at age 16 (SMFQ, carer-reported)	5238	23.88	3.40	0	26
Antisocial behaviour at age 16 (DAWBA, carer-reported)	4516	0.71	1.57	0	16
Emotional health at age 11 (SDQ, carer-reported)	7019	17.43	2.73	3	20
Behaviour at age 11 (SDQ, carer-reported)	7013	16.04	3.16	0	20
Antisocial behaviour at age 11(DAWBA, teacher-reported)	7202	0.58	1.79	0	22
Emotional health at age 11 (SDQ, teacher-reported)	7206	16.43	3.25	0	19
Behaviour at age 11 (SDQ, teacher-reported)	7202	16.75	3.95	0	20
Normal BMI at age 11 (%)	6751	80.18	0.40	0	1
Normal BMI at age 13 (%)	5821	80.43	0.40	0	1
Normal BMI at age 16 (%)	5159	80.36	0.40	0	1
Cognitive outcomes					
Achieved Level 2 (%)	11543	53.05	0.50	0	1
Average GCSE points	11393	38.40	9.98	0	64

Table A2 – Net Household Income per week

Ages 3, 4, 7, 8 (mean)			Age 11		
ALSPAC Band	Observed value from FRS	% of households in the band	ALSPAC Band	Observed value from FRS	% of households in the band
< £100	£62.77	5.7	< £120	£72.94	2.3
£100 - £199	£153.38	13.5	£120-189	£156.51	5.1
£200 - £299	£248.03	22.4	£190 -239	£215.69	5.5
£300 - £399	£347.74	21.7	£240 -289	£265.64	7.0
£400+	£679.48	36.8	£290 -359	£324.25	11.7
			£360 -429	£394.95	11.1
			£430 -479	£453.94	7.1
			£480 -559	£520.91	15.2
			£560 -799	£667.22	20.8
			£800+	£1130.13	14.4

Table A3 – Control variables –Summary statistics

	Mean	Std. Dev.	Min.	Max.
No. years mother had a MFP	1.17	2.02	0	10
Net family income	424.37	149.63	60	896
Net family income (ln)	5.92	0.41	4	7
Male	0.52	0.50	0	1
Child ethnicity (White)	0.95	0.20	0	1
Mother not born in Europe	0.03	0.16	0	1
First born	0.33	0.46	0	1
Mother's age at birth	28.00	4.96	15	44
Mother's education	2.97	1.22	1	5
Father's education	3.02	1.34	1	5
Ever in single-adult household	0.10	0.22	0	1
No. children	2.14	0.81	0	12
No. location moves	1.95	2.58	0	63
Parents divorced/separated	0.24	0.40	0	1
Early time investments	12.86	1.65	1	18
Pre-school time investments	15.64	2.81	4	26
In-school time investments	22.93	3.38	2	37
No. years mother worked	6.34	3.71	0	11
Private school KS1	0.39	0.30	0	1
Private school KS2	0.37	0.28	0	1
Private school KS3	0.21	0.36	0	1
Home owner	0.77	0.36	0	1
Mother's mental health	23.0	4.09	0	30

Table A4 - SWB at age 16 and 18

	SWB at age 16			SWB at age 18			SWB at age 16 (carer-reported)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No. years mother had a MFP		-0.160***	-0.158***		-0.133***	-0.127***		-0.170***	-0.164***
		(0.0340)	(0.0347)		(0.0335)	(0.0342)		(0.0430)	(0.0435)
Net household income (ln)	0.032		0.008	0.042*		0.023	0.050*		0.025
	(0.0239)		(0.0241)	(0.0246)		(0.0251)	(0.0258)		(0.0256)
Male	0.204***	0.202***	0.202***	0.165***	0.163***	0.164***	0.101***	0.098***	0.099***
	(0.0192)	(0.0191)	(0.0191)	(0.0199)	(0.0198)	(0.0198)	(0.0202)	(0.0201)	(0.0201)
Child ethnicity (White)	0.031	0.033	0.033	0.021	0.023	0.022	-0.021	-0.018	-0.018
	(0.0208)	(0.0208)	(0.0208)	(0.0267)	(0.0264)	(0.0264)	(0.0208)	(0.0206)	(0.0205)
Mother not born in Europe	0.028	0.027	0.028	0.025	0.023	0.024	0.010	0.007	0.008
	(0.0173)	(0.0176)	(0.0177)	(0.0162)	(0.0159)	(0.0159)	(0.0162)	(0.0164)	(0.0164)
First born	0.039*	0.036*	0.035*	-0.010	-0.013	-0.013	0.012	0.007	0.007
	(0.0214)	(0.0213)	(0.0213)	(0.0228)	(0.0226)	(0.0226)	(0.0220)	(0.0219)	(0.0220)
Mother's age at birth	-0.030	-0.021	-0.022	-0.049*	-0.041	-0.043	-0.042	-0.030	-0.032
	(0.0253)	(0.0251)	(0.0252)	(0.0270)	(0.0269)	(0.0270)	(0.0261)	(0.0256)	(0.0258)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	0.106	0.134	0.132	0.033	0.059	0.054	-0.056	-0.021	-0.027
	(0.1181)	(0.1188)	(0.1189)	(0.1192)	(0.1195)	(0.1196)	(0.1194)	(0.1164)	(0.1167)
O-level	0.121	0.144	0.142	0.061	0.084	0.078	-0.017	0.011	0.006

	(0.0936)	(0.0918)	(0.0921)	(0.0931)	(0.0921)	(0.0923)	(0.0866)	(0.0851)	(0.0854)
A-level	0.148	0.177*	0.172*	0.152	0.184**	0.172*	0.010	0.046	0.034
	(0.0962)	(0.0941)	(0.0952)	(0.0951)	(0.0937)	(0.0942)	(0.0907)	(0.0891)	(0.0904)
Degree	0.164	0.179*	0.173*	0.174*	0.195*	0.181*	-0.003	0.022	0.007
	(0.1038)	(0.1006)	(0.1022)	(0.1017)	(0.0998)	(0.1007)	(0.0976)	(0.0952)	(0.0962)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	0.091	0.099	0.099	-0.059	-0.052	-0.051	-0.106	-0.103	-0.102
	(0.0958)	(0.0959)	(0.0960)	(0.1126)	(0.1128)	(0.1127)	(0.1203)	(0.1210)	(0.1212)
O-level	-0.008	-0.003	-0.005	-0.068	-0.062	-0.067	-0.049	-0.041	-0.046
	(0.0808)	(0.0798)	(0.0799)	(0.0867)	(0.0856)	(0.0859)	(0.0772)	(0.0760)	(0.0761)
A-level	0.014	0.028	0.026	-0.055	-0.040	-0.046	-0.049	-0.029	-0.035
	(0.0783)	(0.0774)	(0.0778)	(0.0820)	(0.0812)	(0.0815)	(0.0744)	(0.0732)	(0.0734)
Degree	-0.008	-0.003	-0.007	0.009	0.021	0.008	-0.048	-0.032	-0.046
	(0.0850)	(0.0833)	(0.0841)	(0.0882)	(0.0860)	(0.0876)	(0.0848)	(0.0838)	(0.0845)
Ever in single-adult household†	-0.034	-0.041	-0.038	-0.013	-0.025	-0.015	-0.118**	-0.132***	-0.121**
	(0.0383)	(0.0358)	(0.0373)	(0.0358)	(0.0342)	(0.0355)	(0.0489)	(0.0486)	(0.0478)
No. children†	0.007	0.008	0.008	-0.003	-0.001	-0.002	0.030	0.030	0.029
	(0.0273)	(0.0271)	(0.0271)	(0.0276)	(0.0273)	(0.0274)	(0.0302)	(0.0303)	(0.0302)
No. location moves	0.011	0.024	0.023	0.009	0.023	0.019	-0.037	-0.024	-0.027
	(0.0305)	(0.0299)	(0.0301)	(0.0311)	(0.0311)	(0.0312)	(0.0408)	(0.0412)	(0.0415)
Parents divorced/separated†	-0.020	-0.002	-0.003	-0.058**	-0.043	-0.043	0.028	0.045	0.045
	(0.0266)	(0.0263)	(0.0264)	(0.0285)	(0.0285)	(0.0286)	(0.0288)	(0.0287)	(0.0287)
No. years mother worked	-0.005	0.006	0.005	-0.026	-0.016	-0.018	-0.010	0.001	-0.001
	(0.0235)	(0.0231)	(0.0232)	(0.0240)	(0.0235)	(0.0239)	(0.0229)	(0.0227)	(0.0228)
Private school KS1	0.042**	0.043**	0.043**	-0.001	0.001	0.001	-0.000	0.001	0.001
	(0.0212)	(0.0210)	(0.0210)	(0.0212)	(0.0211)	(0.0211)	(0.0201)	(0.0202)	(0.0202)
Private school KS2	-0.040*	-0.036*	-0.036*	-0.014	-0.010	-0.012	-0.020	-0.015	-0.017
	(0.0204)	(0.0202)	(0.0203)	(0.0203)	(0.0200)	(0.0202)	(0.0213)	(0.0212)	(0.0213)
Private school KS3	-0.007	-0.006	-0.006	-0.009	-0.007	-0.008	0.021	0.021	0.021
	(0.0191)	(0.0191)	(0.0191)	(0.0207)	(0.0208)	(0.0208)	(0.0188)	(0.0187)	(0.0187)
Home owner	0.015	0.021	0.018	0.075*	0.086**	0.077**	-0.003	0.008	-0.002
	(0.0359)	(0.0348)	(0.0357)	(0.0389)	(0.0381)	(0.0389)	(0.0396)	(0.0373)	(0.0395)
Early time investments	-0.016	-0.016	-0.016	0.001	0.001	0.001	0.045	0.046	0.046
	(0.0288)	(0.0290)	(0.0290)	(0.0299)	(0.0299)	(0.0299)	(0.0325)	(0.0329)	(0.0329)
Pre-school time investments	0.039*	0.038	0.039	0.020	0.019	0.020	0.008	0.008	0.008
	(0.0235)	(0.0235)	(0.0235)	(0.0256)	(0.0256)	(0.0256)	(0.0242)	(0.0243)	(0.0242)
In-school time investments	0.012	0.010	0.010	0.050**	0.048*	0.048*	0.038	0.034	0.034
	(0.0243)	(0.0244)	(0.0244)	(0.0251)	(0.0251)	(0.0251)	(0.0262)	(0.0265)	(0.0265)
Missing flag income	0.004		-0.002	0.014		0.013	0.033		0.022
	(0.0385)		(0.0383)	(0.0396)		(0.0397)	(0.0401)		(0.0399)
Missing flag MFP		-0.036	-0.036		-0.049	-0.049		0.029	0.028
		(0.0327)	(0.0329)		(0.0322)	(0.0325)		(0.0369)	(0.0369)
Constant	-0.195	-0.253**	-0.247**	0.050	-0.011	0.008	0.025	-0.043	-0.021
	(0.1218)	(0.1196)	(0.1208)	(0.1106)	(0.1097)	(0.1108)	(0.1256)	(0.1222)	(0.1263)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2220	2220	2220	2220	2220	2220	2220	2220	2220
R²	0.07	0.08	0.08	0.06	0.07	0.07	0.04	0.06	0.06

Notes: These are linear models with standardised coefficients. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses. †indicates that the variable is averaged over the entire childhood (0-11).

Table A5.1 - Carer-reported antisocial behaviours at age 16 and SDQ at age 11

	Antisocial behaviours at age 16 (DAWBA)			Behaviour at age 11 (SDQ Externalising)			Emotional health at age 11 (SDQ Internalising)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No. years mother had a MFP		0.132***	0.130***		-0.130***	-0.127***		-0.168***	-0.154***
		(0.0312)	(0.0309)		(0.0226)	(0.0229)		(0.0268)	(0.0276)
Net household income (ln)	-0.028		-0.008	0.037*		0.016	0.091***		0.066***
	(0.0198)		(0.0188)	(0.0191)		(0.0193)	(0.0200)		(0.0204)
Male	0.023	0.023	0.023	-0.136***	-0.135***	-0.135***	0.002	0.002	0.003
	(0.0145)	(0.0144)	(0.0144)	(0.0150)	(0.0149)	(0.0149)	(0.0162)	(0.0162)	(0.0161)
Child ethnicity (White)	-0.032	-0.032	-0.031	0.003	0.003	0.002	-0.005	-0.004	-0.006
	(0.0258)	(0.0252)	(0.0251)	(0.0172)	(0.0172)	(0.0171)	(0.0176)	(0.0178)	(0.0177)
Mother not born in Europe	-0.002	0.001	0.000	0.015	0.012	0.013	0.004	-0.000	0.001
	(0.0149)	(0.0144)	(0.0145)	(0.0137)	(0.0137)	(0.0138)	(0.0148)	(0.0146)	(0.0147)
First born	-0.018	-0.015	-0.015	-0.004	-0.008	-0.007	-0.022	-0.025	-0.026
	(0.0146)	(0.0145)	(0.0146)	(0.0159)	(0.0159)	(0.0159)	(0.0187)	(0.0185)	(0.0186)
Mother's age at birth	-0.013	-0.019	-0.019	0.012	0.020	0.019	-0.013	-0.002	-0.006
	(0.0191)	(0.0190)	(0.0191)	(0.0196)	(0.0195)	(0.0195)	(0.0212)	(0.0212)	(0.0213)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	0.074	0.061	0.062	0.059	0.074	0.071	0.090	0.114	0.103
	(0.0843)	(0.0844)	(0.0845)	(0.0779)	(0.0774)	(0.0775)	(0.0819)	(0.0816)	(0.0818)
O-level	0.067	0.051	0.054	0.075	0.094	0.088	0.165***	0.197***	0.180***
	(0.0640)	(0.0640)	(0.0642)	(0.0615)	(0.0610)	(0.0610)	(0.0634)	(0.0625)	(0.0628)
A-level	0.059	0.033	0.038	0.068	0.099	0.089	0.146**	0.206***	0.170**
	(0.0667)	(0.0652)	(0.0665)	(0.0664)	(0.0654)	(0.0660)	(0.0681)	(0.0665)	(0.0678)
Degree	0.053	0.031	0.037	0.112	0.141**	0.128*	0.032	0.094	0.050
	(0.0745)	(0.0722)	(0.0736)	(0.0719)	(0.0710)	(0.0717)	(0.0795)	(0.0782)	(0.0791)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	-0.077	-0.076	-0.076	0.160**	0.157**	0.156**	-0.003	-0.002	-0.007
	(0.0794)	(0.0794)	(0.0793)	(0.0749)	(0.0748)	(0.0746)	(0.0705)	(0.0701)	(0.0699)
O-level	-0.137**	-0.136**	-0.134**	0.181***	0.181***	0.178***	-0.006	0.004	-0.010
	(0.0601)	(0.0605)	(0.0602)	(0.0574)	(0.0565)	(0.0569)	(0.0558)	(0.0548)	(0.0550)
A-level	-0.113*	-0.117*	-0.115*	0.130**	0.138**	0.132**	-0.068	-0.045	-0.066
	(0.0592)	(0.0598)	(0.0591)	(0.0561)	(0.0552)	(0.0558)	(0.0537)	(0.0526)	(0.0530)
Degree	-0.167**	-0.164**	-0.158**	0.175***	0.179***	0.168***	-0.057	-0.024	-0.067
	(0.0656)	(0.0657)	(0.0657)	(0.0649)	(0.0633)	(0.0648)	(0.0634)	(0.0615)	(0.0630)
Ever in single-adult household[†]	0.036	0.043	0.041	-0.010	-0.021	-0.015	0.017	-0.011	0.011
	(0.0297)	(0.0292)	(0.0292)	(0.0272)	(0.0260)	(0.0270)	(0.0279)	(0.0260)	(0.0272)
No. children[†]	0.022	0.020	0.020	0.043**	0.044**	0.044**	0.078***	0.083***	0.080***
	(0.0184)	(0.0186)	(0.0186)	(0.0178)	(0.0175)	(0.0175)	(0.0239)	(0.0231)	(0.0232)
No. location moves	0.043	0.030	0.032	-0.029	-0.017	-0.020	-0.019	0.002	-0.007
	(0.0284)	(0.0276)	(0.0283)	(0.0234)	(0.0231)	(0.0233)	(0.0234)	(0.0231)	(0.0234)
Parents divorced/separated[†]	0.072***	0.059***	0.059***	-0.009	0.004	0.003	-0.018	-0.005	-0.003
	(0.0221)	(0.0215)	(0.0216)	(0.0201)	(0.0201)	(0.0201)	(0.0191)	(0.0188)	(0.0189)
No. years mother worked	0.002	-0.006	-0.004	-0.022	-0.013	-0.018	0.050**	0.067***	0.057***
	(0.0184)	(0.0186)	(0.0185)	(0.0180)	(0.0176)	(0.0180)	(0.0209)	(0.0207)	(0.0210)
Private school KS1	0.026	0.027*	0.027*	-0.003	-0.004	-0.003	-0.016	-0.017	-0.017
	(0.0166)	(0.0165)	(0.0165)	(0.0157)	(0.0156)	(0.0156)	(0.0169)	(0.0168)	(0.0168)
Private school KS2	-0.009	-0.013	-0.013	0.003	0.007	0.007	-0.018	-0.010	-0.013

	(0.0164)	(0.0165)	(0.0164)	(0.0146)	(0.0146)	(0.0146)	(0.0168)	(0.0166)	(0.0167)
Private school KS3	-0.022*	-0.023*	-0.023*	-0.005	-0.006	-0.005	0.005	0.005	0.006
	(0.0134)	(0.0133)	(0.0133)	(0.0144)	(0.0143)	(0.0143)	(0.0161)	(0.0161)	(0.0160)
Home owner	-0.054*	-0.052*	-0.049	-0.005	-0.005	-0.010	-0.007	0.011	-0.013
	(0.0305)	(0.0292)	(0.0304)	(0.0269)	(0.0258)	(0.0268)	(0.0269)	(0.0256)	(0.0265)
Early time investments	-0.023	-0.025	-0.025	0.079***	0.082***	0.081***	0.016	0.016	0.018
	(0.0231)	(0.0228)	(0.0229)	(0.0226)	(0.0224)	(0.0224)	(0.0238)	(0.0237)	(0.0237)
Pre-school time investments	-0.045***	-0.042**	-0.042**	0.075***	0.072***	0.073***	0.074***	0.071***	0.071***
	(0.0166)	(0.0165)	(0.0165)	(0.0177)	(0.0177)	(0.0177)	(0.0188)	(0.0189)	(0.0189)
In-school time investments	-0.004	-0.003	-0.003	0.001	0.001	-0.000	0.039**	0.040**	0.038*
	(0.0174)	(0.0173)	(0.0173)	(0.0176)	(0.0175)	(0.0176)	(0.0198)	(0.0197)	(0.0198)
Missing flag income	0.010		0.015	-0.044		-0.051*	-0.010		-0.018
	(0.0286)		(0.0282)	(0.0307)		(0.0302)	(0.0323)		(0.0320)
Missing flag MFP		-0.011	-0.011		0.050**	0.051**		0.035	0.033
		(0.0207)	(0.0207)		(0.0227)	(0.0227)		(0.0231)	(0.0231)
Constant	0.076	0.101	0.098	-0.094	-0.116*	-0.114	-0.106	-0.171***	-0.132*
	(0.0694)	(0.0680)	(0.0688)	(0.0735)	(0.0706)	(0.0725)	(0.0685)	(0.0657)	(0.0677)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3829	3829	3829	3829	3829	3829	3829	3829	3829
R²	0.05	0.06	0.06	0.07	0.08	0.08	0.04	0.05	0.05

*Notes: These are linear models with standardised coefficients. Higher DAWBA scores in the first panel refer to worse behaviour; higher externalising SDQ scores in the second panel refer to better behaviour. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses. †indicates that the variable is averaged over the entire childhood (0-11).*

Table A5.2 - Teacher-reported antisocial behaviours and SDQ at age 11

	Antisocial behaviours at age 11 (DAWBA)			Behaviour at age 11 (SDQ Externalising)			Emotional health at age 11 (SDQ Internalising)		
	(1)	(2)	(3)	(5)	(6)	(7)	(9)	(10)	(11)
No. years mother had a MFP		0.010	0.011		-0.032**	-0.033**		-0.063***	-0.060***
		(0.0140)	(0.0141)		(0.0131)	(0.0131)		(0.0150)	(0.0152)
Net household income (ln)	0.019		0.020	-0.009		-0.012	0.048***		0.042***
	(0.0144)		(0.0145)	(0.0136)		(0.0137)	(0.0152)		(0.0153)
Male	0.147***	0.147***	0.147***	-0.313***	-0.313***	-0.312***	-0.064***	-0.064***	-0.064***
	(0.0104)	(0.0104)	(0.0104)	(0.0108)	(0.0108)	(0.0108)	(0.0121)	(0.0121)	(0.0121)
Child ethnicity (White)	0.004	0.004	0.004	-0.017	-0.018	-0.018	-0.037***	-0.039***	-0.039***
	(0.0121)	(0.0121)	(0.0121)	(0.0123)	(0.0123)	(0.0123)	(0.0128)	(0.0128)	(0.0128)
Mother not born in Europe	-0.015*	-0.016*	-0.015*	0.017*	0.018*	0.017*	-0.010	-0.012	-0.010
	(0.0084)	(0.0084)	(0.0084)	(0.0091)	(0.0091)	(0.0091)	(0.0128)	(0.0128)	(0.0128)
First born	-0.023**	-0.023**	-0.022**	0.033***	0.032***	0.032***	-0.035**	-0.038***	-0.037***
	(0.0113)	(0.0113)	(0.0112)	(0.0121)	(0.0121)	(0.0121)	(0.0138)	(0.0137)	(0.0137)
Mother's age at birth	-0.048***	-0.049***	-0.048***	0.018	0.019	0.019	-0.060***	-0.057***	-0.057***
	(0.0132)	(0.0132)	(0.0132)	(0.0139)	(0.0139)	(0.0139)	(0.0167)	(0.0167)	(0.0167)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	-0.071	-0.071	-0.072	0.114**	0.114**	0.115**	0.126**	0.128***	0.129***
	(0.0495)	(0.0496)	(0.0495)	(0.0468)	(0.0468)	(0.0468)	(0.0497)	(0.0497)	(0.0496)
O-level	-0.072*	-0.071*	-0.073*	0.133***	0.134***	0.135***	0.113***	0.121***	0.118***
	(0.0375)	(0.0377)	(0.0376)	(0.0357)	(0.0357)	(0.0357)	(0.0393)	(0.0392)	(0.0392)
A-level	-0.076**	-0.070*	-0.078**	0.155***	0.155***	0.160***	0.095**	0.118***	0.104**
	(0.0385)	(0.0379)	(0.0387)	(0.0399)	(0.0394)	(0.0399)	(0.0444)	(0.0438)	(0.0445)
Degree	-0.020	-0.010	-0.022	0.150***	0.148***	0.155***	0.047	0.077	0.055

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	(0.0461)	(0.0453)	(0.0461)	(0.0499)	(0.0493)	(0.0499)	(0.0589)	(0.0582)	(0.0589)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	-0.019	-0.021	-0.020	0.055	0.059	0.058	-0.010	-0.004	-0.003
	(0.0444)	(0.0445)	(0.0446)	(0.0458)	(0.0459)	(0.0459)	(0.0508)	(0.0509)	(0.0508)
O-level	-0.068*	-0.065*	-0.069*	0.106***	0.105***	0.107***	0.007	0.016	0.008
	(0.0351)	(0.0352)	(0.0352)	(0.0364)	(0.0363)	(0.0363)	(0.0390)	(0.0389)	(0.0390)
A-level	-0.060*	-0.055	-0.060*	0.128***	0.126***	0.129***	0.002	0.015	0.004
	(0.0349)	(0.0351)	(0.0349)	(0.0354)	(0.0353)	(0.0355)	(0.0390)	(0.0388)	(0.0390)
Degree	-0.130***	-0.115***	-0.128***	0.220***	0.209***	0.216***	0.049	0.069	0.042
	(0.0368)	(0.0368)	(0.0367)	(0.0429)	(0.0425)	(0.0429)	(0.0493)	(0.0484)	(0.0491)
Ever in single-adult household†	0.047**	0.042**	0.047**	-0.041**	-0.037**	-0.040**	0.023	0.012	0.023
	(0.0188)	(0.0178)	(0.0188)	(0.0161)	(0.0156)	(0.0161)	(0.0176)	(0.0170)	(0.0175)
No. children†	0.040**	0.040**	0.039**	-0.030**	-0.029**	-0.029**	0.017	0.020	0.018
	(0.0157)	(0.0157)	(0.0158)	(0.0134)	(0.0134)	(0.0134)	(0.0157)	(0.0155)	(0.0156)
No. location moves	-0.005	-0.004	-0.006	-0.007	-0.006	-0.005	-0.007	-0.001	-0.004
	(0.0190)	(0.0187)	(0.0192)	(0.0141)	(0.0141)	(0.0142)	(0.0144)	(0.0142)	(0.0143)
Parents divorced/separated†	0.028**	0.025*	0.026**	-0.060***	-0.055***	-0.056***	-0.078***	-0.073***	-0.070***
	(0.0127)	(0.0130)	(0.0128)	(0.0131)	(0.0132)	(0.0131)	(0.0153)	(0.0153)	(0.0153)
No. years mother worked	-0.012	-0.011	-0.013	-0.002	-0.001	0.000	0.054***	0.060***	0.056***
	(0.0117)	(0.0117)	(0.0118)	(0.0121)	(0.0121)	(0.0121)	(0.0139)	(0.0139)	(0.0140)
Private school KS1	0.009	0.009	0.009	-0.008	-0.008	-0.008	-0.002	-0.002	-0.002
	(0.0102)	(0.0102)	(0.0102)	(0.0109)	(0.0109)	(0.0109)	(0.0127)	(0.0127)	(0.0127)
Private school KS2	-0.000	0.000	-0.000	-0.011	-0.011	-0.010	-0.006	-0.004	-0.006
	(0.0092)	(0.0093)	(0.0092)	(0.0093)	(0.0093)	(0.0093)	(0.0109)	(0.0109)	(0.0109)
Private school KS3	0.014	0.014	0.014	-0.029***	-0.029***	-0.029***	-0.027**	-0.027**	-0.027**
	(0.0103)	(0.0103)	(0.0103)	(0.0108)	(0.0108)	(0.0108)	(0.0124)	(0.0124)	(0.0124)
Home owner	-0.091***	-0.086***	-0.090***	0.081***	0.076***	0.079***	0.108***	0.114***	0.104***
	(0.0183)	(0.0176)	(0.0184)	(0.0160)	(0.0156)	(0.0161)	(0.0180)	(0.0177)	(0.0180)
Early time investments	0.002	0.001	0.001	0.013	0.014	0.014	-0.035**	-0.032**	-0.032**
	(0.0151)	(0.0152)	(0.0152)	(0.0141)	(0.0141)	(0.0142)	(0.0155)	(0.0155)	(0.0155)
Pre-school time investments	-0.024*	-0.023*	-0.023*	0.037***	0.035***	0.035***	0.046***	0.043***	0.042***
	(0.0124)	(0.0126)	(0.0125)	(0.0129)	(0.0129)	(0.0129)	(0.0148)	(0.0148)	(0.0148)
In-school time investments	0.016	0.016	0.015	-0.029**	-0.028**	-0.028**	0.003	0.004	0.004
	(0.0128)	(0.0127)	(0.0127)	(0.0119)	(0.0118)	(0.0119)	(0.0140)	(0.0140)	(0.0140)
Missing flag income	-0.010		-0.013	0.004		0.007	-0.011		-0.008
	(0.0161)		(0.0163)	(0.0164)		(0.0165)	(0.0182)		(0.0183)
Missing flag MFP		0.012	0.014		-0.013	-0.013		-0.003	-0.002
		(0.0136)	(0.0138)		(0.0161)	(0.0162)		(0.0183)	(0.0183)
Constant	0.122***	0.116***	0.123***	-0.224***	-0.222***	-0.227***	-0.091**	-0.111***	-0.096***
	(0.0347)	(0.0339)	(0.0349)	(0.0327)	(0.0323)	(0.0327)	(0.0363)	(0.0356)	(0.0363)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6290	6290	6290	6290	6290	6290	6290	6290	6290
R^2	0.10	0.10	0.10	0.20	0.20	0.20	0.05	0.05	0.06

Notes: These are linear models with standardised coefficients. Higher DAWBA scores in the first panel refer to worse behaviour; higher externalising SDQ scores in the second panel refer to better behaviour. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses. †indicates that the variable is averaged over the entire childhood (0-11).

Table A6 – Normal BMI (> 5th and < 85th percentile) at ages 11, 13 and 16

	Normal BMI age 11			Normal BMI age 13			Normal BMI age 16		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
No. years mother had a MFP		-0.076***	-0.069***		-0.046**	-0.044*		-0.057**	-0.051**
		(0.0233)	(0.0238)		(0.0226)	(0.0231)		(0.0228)	(0.0233)
Net household income (ln)	0.044**		0.034*	0.018		0.012	0.034*		0.026
	(0.0188)		(0.0193)	(0.0184)		(0.0189)	(0.0186)		(0.0191)
Male	-0.011	-0.011	-0.011	-0.004	-0.004	-0.004	-0.011	-0.011	-0.011
	(0.0151)	(0.0151)	(0.0151)	(0.0152)	(0.0151)	(0.0151)	(0.0152)	(0.0152)	(0.0152)
Child ethnicity (White)	-0.001	-0.002	-0.001	0.004	0.003	0.003	-0.003	-0.004	-0.003
	(0.0170)	(0.0171)	(0.0171)	(0.0177)	(0.0177)	(0.0177)	(0.0175)	(0.0174)	(0.0174)
Mother not born in Europe	0.009	0.007	0.008	-0.006	-0.007	-0.006	-0.010	-0.011	-0.011
	(0.0137)	(0.0138)	(0.0138)	(0.0148)	(0.0148)	(0.0148)	(0.0149)	(0.0149)	(0.0149)
First born	0.023	0.022	0.021	0.019	0.019	0.018	0.020	0.019	0.018
	(0.0183)	(0.0183)	(0.0183)	(0.0178)	(0.0178)	(0.0178)	(0.0169)	(0.0169)	(0.0169)
Mother's age at birth	-0.043**	-0.038*	-0.041*	-0.008	-0.006	-0.007	-0.014	-0.009	-0.011
	(0.0219)	(0.0220)	(0.0220)	(0.0208)	(0.0208)	(0.0209)	(0.0211)	(0.0211)	(0.0211)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	0.063	0.067	0.066	0.109	0.111	0.110	0.041	0.044	0.043
	(0.0787)	(0.0788)	(0.0788)	(0.0794)	(0.0794)	(0.0795)	(0.0805)	(0.0805)	(0.0805)
O-level	0.040	0.053	0.048	0.111*	0.117*	0.116*	0.035	0.043	0.040
	(0.0621)	(0.0620)	(0.0620)	(0.0631)	(0.0631)	(0.0632)	(0.0629)	(0.0630)	(0.0630)
A-level	0.035	0.060	0.047	0.106	0.118*	0.113*	0.078	0.096	0.086
	(0.0662)	(0.0657)	(0.0663)	(0.0666)	(0.0662)	(0.0667)	(0.0664)	(0.0660)	(0.0664)
Degree	0.106	0.131*	0.114	0.124	0.136*	0.129*	0.086	0.105	0.092
	(0.0745)	(0.0735)	(0.0745)	(0.0763)	(0.0754)	(0.0763)	(0.0750)	(0.0741)	(0.0750)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-
Vocational	-0.003	-0.002	-0.005	-0.092	-0.093	-0.093	-0.029	-0.028	-0.030
	(0.0743)	(0.0742)	(0.0742)	(0.0746)	(0.0745)	(0.0745)	(0.0756)	(0.0754)	(0.0754)
O-level	0.035	0.041	0.033	-0.021	-0.020	-0.023	0.065	0.070	0.063
	(0.0575)	(0.0573)	(0.0575)	(0.0568)	(0.0564)	(0.0567)	(0.0580)	(0.0576)	(0.0579)
A-level	0.104*	0.116**	0.104*	0.061	0.065	0.061	0.087	0.097*	0.088
	(0.0545)	(0.0542)	(0.0544)	(0.0529)	(0.0527)	(0.0528)	(0.0557)	(0.0552)	(0.0556)
Degree	0.111*	0.126**	0.105*	0.066	0.069	0.062	0.103	0.115*	0.099
	(0.0633)	(0.0626)	(0.0632)	(0.0626)	(0.0617)	(0.0625)	(0.0641)	(0.0627)	(0.0639)
Ever in single-adult household†	0.049**	0.035	0.048**	0.037	0.033	0.037	0.019	0.008	0.018
	(0.0243)	(0.0233)	(0.0243)	(0.0248)	(0.0239)	(0.0248)	(0.0251)	(0.0244)	(0.0251)
No. children†	0.022	0.024	0.022	0.012	0.013	0.013	0.035*	0.036*	0.035*
	(0.0273)	(0.0270)	(0.0271)	(0.0253)	(0.0252)	(0.0252)	(0.0194)	(0.0194)	(0.0194)
No. location moves	-0.005	0.004	0.000	0.008	0.012	0.011	0.006	0.013	0.010
	(0.0211)	(0.0209)	(0.0211)	(0.0220)	(0.0221)	(0.0221)	(0.0213)	(0.0212)	(0.0213)
Parents divorced/separated†	-0.033*	-0.027	-0.026	-0.017	-0.013	-0.012	-0.001	0.002	0.003
	(0.0194)	(0.0196)	(0.0196)	(0.0198)	(0.0200)	(0.0200)	(0.0198)	(0.0199)	(0.0199)
No. years mother worked	-0.004	0.003	-0.000	0.009	0.013	0.011	0.022	0.026	0.023
	(0.0196)	(0.0193)	(0.0196)	(0.0189)	(0.0187)	(0.0190)	(0.0193)	(0.0190)	(0.0193)
Private school KS1	0.005	0.005	0.004	0.022	0.022	0.022	0.024	0.024	0.024
	(0.0151)	(0.0151)	(0.0151)	(0.0153)	(0.0154)	(0.0154)	(0.0154)	(0.0154)	(0.0154)
Private school KS2	-0.013	-0.009	-0.010	-0.009	-0.008	-0.008	0.005	0.008	0.006
	(0.0157)	(0.0157)	(0.0157)	(0.0156)	(0.0156)	(0.0156)	(0.0156)	(0.0156)	(0.0156)
Private school KS3	-0.011	-0.011	-0.011	-0.005	-0.005	-0.005	0.008	0.008	0.008
	(0.0148)	(0.0148)	(0.0148)	(0.0144)	(0.0143)	(0.0144)	(0.0143)	(0.0143)	(0.0143)
Home owner	0.026	0.034	0.023	0.055**	0.057**	0.053**	0.021	0.027	0.018
	(0.0269)	(0.0261)	(0.0270)	(0.0266)	(0.0260)	(0.0267)	(0.0264)	(0.0259)	(0.0265)
Early time investments	0.020	0.018	0.020	0.023	0.023	0.023	0.002	0.002	0.003

	(0.0216)	(0.0216)	(0.0217)	(0.0217)	(0.0217)	(0.0217)	(0.0217)	(0.0217)	(0.0217)
Pre-school time investments	-0.014	-0.014	-0.014	-0.005	-0.005	-0.005	0.022	0.022	0.022
	(0.0181)	(0.0182)	(0.0182)	(0.0182)	(0.0182)	(0.0182)	(0.0180)	(0.0180)	(0.0180)
In-school time investments	-0.028	-0.028	-0.028	-0.027	-0.027	-0.027	-0.029*	-0.029*	-0.029*
	(0.0171)	(0.0171)	(0.0171)	(0.0170)	(0.0170)	(0.0170)	(0.0171)	(0.0171)	(0.0171)
Missing flag income	0.026		0.025	0.003		0.003	0.020		0.017
	(0.0282)		(0.0281)	(0.0294)		(0.0294)	(0.0292)		(0.0293)
Missing flag MFP		-0.013	-0.014		-0.012	-0.012		0.016	0.015
		(0.0222)	(0.0223)		(0.0232)	(0.0233)		(0.0232)	(0.0233)
Constant	-0.115*	-0.149**	-0.126*	-0.204***	-0.217***	-0.211***	-0.155**	-0.179**	-0.162**
	(0.0687)	(0.0679)	(0.0688)	(0.0710)	(0.0705)	(0.0712)	(0.0705)	(0.0701)	(0.0707)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4233	4233	4233	4233	4233	4233	4233	4233	4233
R^2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Notes: These are linear models with standardised coefficients. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses. †indicates that the variable is averaged over the entire childhood (0-11).

Table A7 - Educational outcomes at age 16

	Achieved Level 2			Average GCSE points		
	(1)	(2)	(3)	(4)	(5)	(6)
No. years mother had a MFP		-0.022**	-0.020**		-0.028***	-0.025***
		(0.0102)	(0.0102)		(0.0089)	(0.0089)
Net household income (ln)	0.022**		0.020*	0.039***		0.037***
	(0.0109)		(0.0109)	(0.0096)		(0.0096)
Male	-0.102***	-0.102***	-0.102***	-0.131***	-0.130***	-0.130***
	(0.0090)	(0.0090)	(0.0090)	(0.0078)	(0.0078)	(0.0078)
Child ethnicity (White)	-0.010	-0.010	-0.011	-0.008	-0.009	-0.009
	(0.0099)	(0.0099)	(0.0099)	(0.0095)	(0.0094)	(0.0094)
Mother not born in Europe	0.007	0.006	0.007	0.022**	0.021**	0.021**
	(0.0101)	(0.0101)	(0.0101)	(0.0091)	(0.0091)	(0.0091)
First born	0.028***	0.027***	0.027***	0.028***	0.027***	0.027***
	(0.0102)	(0.0103)	(0.0103)	(0.0092)	(0.0092)	(0.0091)
Mother's age at birth	0.059***	0.060***	0.060***	0.056***	0.057***	0.057***
	(0.0116)	(0.0116)	(0.0116)	(0.0101)	(0.0102)	(0.0102)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-
Vocational	0.040	0.042	0.041	0.071**	0.075**	0.073**
	(0.0378)	(0.0379)	(0.0379)	(0.0334)	(0.0334)	(0.0334)
O-level	0.230***	0.234***	0.232***	0.237***	0.244***	0.240***
	(0.0293)	(0.0293)	(0.0293)	(0.0257)	(0.0257)	(0.0257)
A-level	0.387***	0.397***	0.391***	0.412***	0.428***	0.416***
	(0.0335)	(0.0333)	(0.0335)	(0.0288)	(0.0287)	(0.0288)
Degree	0.422***	0.435***	0.424***	0.602***	0.624***	0.604***
	(0.0398)	(0.0395)	(0.0398)	(0.0367)	(0.0362)	(0.0366)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-
Vocational	0.026	0.028	0.028	0.054	0.057*	0.057*
	(0.0403)	(0.0403)	(0.0403)	(0.0333)	(0.0333)	(0.0333)
O-level	0.247***	0.251***	0.248***	0.223***	0.230***	0.223***
	(0.0310)	(0.0309)	(0.0309)	(0.0258)	(0.0257)	(0.0257)
A-level	0.282***	0.287***	0.282***	0.271***	0.280***	0.271***
	(0.0305)	(0.0304)	(0.0305)	(0.0255)	(0.0254)	(0.0255)
Degree	0.426***	0.435***	0.424***	0.565***	0.583***	0.563***
	(0.0363)	(0.0359)	(0.0363)	(0.0316)	(0.0313)	(0.0316)
Ever in single-adult household†	-0.003	-0.008	-0.003	-0.013	-0.021**	-0.012
	(0.0123)	(0.0120)	(0.0123)	(0.0112)	(0.0109)	(0.0112)
No. children†	-0.043***	-0.042***	-0.043***	-0.072***	-0.069***	-0.071***
	(0.0109)	(0.0109)	(0.0109)	(0.0097)	(0.0097)	(0.0097)
No. location moves	-0.002	0.001	-0.001	0.013	0.018*	0.015

	(0.0112)	(0.0113)	(0.0113)	(0.0095)	(0.0095)	(0.0095)
Parents divorced/separated[†]	-0.038***	-0.036***	-0.035***	-0.050***	-0.048***	-0.047***
	(0.0109)	(0.0109)	(0.0110)	(0.0094)	(0.0094)	(0.0094)
No. years mother worked	-0.000	0.003	0.001	-0.017*	-0.010	-0.015
	(0.0103)	(0.0103)	(0.0104)	(0.0092)	(0.0092)	(0.0092)
Private school KS1	0.009	0.009	0.009	0.006	0.006	0.006
	(0.0099)	(0.0099)	(0.0099)	(0.0087)	(0.0087)	(0.0087)
Private school KS2	0.001	0.002	0.001	0.015*	0.016*	0.015*
	(0.0098)	(0.0098)	(0.0098)	(0.0085)	(0.0085)	(0.0085)
Private school KS3	0.018**	0.018**	0.018**	0.016**	0.016**	0.016**
	(0.0079)	(0.0079)	(0.0079)	(0.0074)	(0.0074)	(0.0074)
Home owner	0.111***	0.114***	0.110***	0.127***	0.133***	0.125***
	(0.0124)	(0.0122)	(0.0124)	(0.0114)	(0.0112)	(0.0114)
Early time investments	0.032***	0.032***	0.032***	0.040***	0.040***	0.040***
	(0.0110)	(0.0110)	(0.0110)	(0.0099)	(0.0099)	(0.0099)
Pre-school time investments	0.022**	0.022**	0.021**	0.007	0.006	0.006
	(0.0106)	(0.0106)	(0.0106)	(0.0093)	(0.0093)	(0.0093)
In-school time investments	-0.033***	-0.033***	-0.033***	-0.033***	-0.031***	-0.032***
	(0.0102)	(0.0102)	(0.0102)	(0.0091)	(0.0091)	(0.0091)
Missing flag income	-0.011		-0.010	-0.025**		-0.021*
	(0.0140)		(0.0141)	(0.0117)		(0.0117)
Missing flag MFP		-0.007	-0.006		-0.031**	-0.028**
		(0.0146)	(0.0147)		(0.0128)	(0.0128)
Constant	-0.400***	-0.410***	-0.403***	-0.375***	-0.391***	-0.378***
	(0.0255)	(0.0253)	(0.0256)	(0.0235)	(0.0234)	(0.0235)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	9902	9902	9902	9902	9902	9902
R²	0.19	0.19	0.19	0.37	0.37	0.37

Notes: These are linear models with standardised coefficients. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses. [†]indicates that the variable is averaged over the entire childhood (0-11).

Table A8 – Potential Mediators

Child's outcome	No. of MFP					
	Baseline specification	Mediator: Mother's Mental Health	Mediator: Mother's Illness	Mediator: Mother's Job Loss	Mediator: Partner's Job Loss	All Four Mediators
Non-cognitive outcomes						
SWB at age 16 (SMFQ)	-0.158***	-0.115***	-0.150***	-0.147***	-0.147***	-0.098***
SWB at age 18 (SMFQ)	-0.127***	-0.078**	-0.119***	-0.125***	-0.125***	-0.071*
Carer-reported:						
SWB at age 16 (SMFQ)	-0.164***	-0.072*	-0.156***	-0.155***	-0.159***	-0.070*
Antisocial behaviours at age 16	0.130***	0.102***	0.118***	0.117***	0.131***	0.096***
SDQ behaviour at age 11	-0.127***	-0.059**	-0.116***	-0.119***	-0.124***	-0.056**
SDQ emotional at age 11	-0.154***	-0.074***	-0.140***	-0.141***	-0.149***	-0.063**
Teacher-reported						
Antisocial behaviours at age 11	0.011	0.004	0.005	0.011	0.006	-0.004
SDQ behaviour at age 11	-0.033**	-0.023*	-0.027**	-0.030**	-0.028**	-0.015
SDQ emotional at age 11	-0.060***	-0.049***	-0.050***	-0.058***	-0.048***	-0.030*
Health outcomes						
Normal BMI at age 11	-0.069***	-0.067***	-0.071***	-0.067***	-0.074***	-0.072***
Normal BMI at age 13	-0.044*	-0.047**	-0.047**	-0.043*	-0.047**	-0.048*
Normal BMI at age 16	-0.051**	-0.058**	-0.055**	-0.051**	-0.050**	-0.056**

Cognitive outcomes

Achieved Level 2	-0.020**	-0.016	-0.017	-0.017*	-0.016	-0.008
Average GCSE points	-0.025***	-0.022**	-0.022**	-0.021**	-0.020**	-0.014

Notes: These are linear models with standardised coefficients. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors are not shown.

Table A9a – Summary Table Distinguishing Between Early and Late Childhood

Child's outcome	No. of MFP		T-test (p-value)	Net household income (ln)		T-test (p-value)
	Age 0-5	Age 6-11		Age 0-5	Age 6-11	
Non-cognitive outcomes						
SWB at age 16 (SMFQ)	-0.104***	-0.041	*0.256*	-0.024	0.032	*0.325*
SWB at age 18 (SMFQ)	-0.089***	-0.029	*0.225*	0.045	-0.003	*0.492*
SWB at age 16 (SMFQ, carer)	-0.055*	-0.126***	*0.192*	0.030	-0.002	*0.557*
Antisoc. behav. age 16 (Carer)	0.058***	0.075**	*0.679*	-0.013	-0.004	*0.824*
SDQ behaviour age 11 (Carer)	-0.078***	-0.044**	*0.295*	0.022	0.005	*0.667*
SDQ emotional age 11 (Carer)	-0.082***	-0.062***	*0.578*	0.038	0.048**	*0.823*
Antisoc. behav. age 11 (Teacher)	-0.003	0.036**	***0.083***	0.003	0.018	*0.629*
SDQ behaviour age 11 (Teacher)	-0.018	-0.026**	*0.666*	0.003	-0.011	*0.578*
SDQ emotional age 11 (Teacher)	-0.036**	-0.022	*0.581*	0.040**	0.022	*0.552*
Normal BMI age 11	-0.038*	-0.026	*0.728*	0.035	0.019	*0.681*
Normal BMI age 13	-0.038*	0.002	*0.225*	0.009	0.005	*0.910*
Normal BMI age 16	-0.062***	0.021	***0.009***	0.043*	-0.007	*0.217*
Cognitive outcomes						
Achieved Level 2	-0.008	-0.024**	*0.322*	0.007	0.014	*0.755*
Average GCSE points	-0.013	-0.006	*0.653*	0.042***	0.035***	*0.732*

Notes: The dependent variable appears in the first column. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Weighted estimates using IPW. All of the models include controls and missing values flag. Controls: gender, child's ethnicity, mother born outside Europe, first born, mother's age at birth, parents' education, single-adult household, no. children in the household, no. years the mother worked, no. house moves, parents divorced or separated, parental time investments, private school, and home ownership. In columns 3 and 6, significant differences at the ten per cent level are indicated in bold.

Table A9b - Child outcomes distinguishing between early and late childhood – full results

	SWB			Behaviour (carer-reported)			Behaviour (teacher-reported)			Normal BMI			Education	
	Age 16	Age 18	Age 16 (carer)	Age 16 (DAWBA)	Age 11 (SDQ External.)	Age 11 (SDQ Internal.)	Age 11 (DAWBA)	Age 11 (SDQ External.)	Age 11 (SDQ Internal.)	Age 11	Age 13	Age 16	Achieved Level 2	Average GCSE pts
No. years mother had MFP (0-5)	-0.104***	-0.089***	-0.055*	0.058***	-0.078***	-0.082***	-0.003	-0.018	-0.036**	-0.038*	-0.038*	-0.062***	-0.008	-0.013
	(0.0302)	(0.0293)	(0.0300)	(0.0210)	(0.0188)	(0.0219)	(0.0118)	(0.0122)	(0.0149)	(0.0207)	(0.0201)	(0.0200)	(0.0100)	(0.0086)
No. years mother had MFP (6-11)	-0.041	-0.029	-0.126***	0.075**	-0.044**	-0.062***	0.036**	-0.026**	-0.022	-0.026	0.002	0.021	-0.024**	-0.006
	(0.0352)	(0.0309)	(0.0406)	(0.0311)	(0.0216)	(0.0237)	(0.0166)	(0.0133)	(0.0152)	(0.0215)	(0.0200)	(0.0197)	(0.0099)	(0.0092)
Net household income (ln) (0-5)	-0.024	0.045	0.030	-0.013	0.022	0.038	0.003	0.003	0.040**	0.035	0.009	0.043*	0.007	0.042***
	(0.0321)	(0.0337)	(0.0317)	(0.0236)	(0.0235)	(0.0251)	(0.0151)	(0.0156)	(0.0180)	(0.0238)	(0.0238)	(0.0238)	(0.0129)	(0.0113)
Net household income (ln) (6-11)	0.032	-0.003	-0.002	-0.004	0.005	0.048**	0.018	-0.011	0.022	0.019	0.005	-0.007	0.014	0.035***
	(0.0318)	(0.0317)	(0.0308)	(0.0222)	(0.0215)	(0.0232)	(0.0187)	(0.0154)	(0.0181)	(0.0228)	(0.0228)	(0.0231)	(0.0128)	(0.0108)
Male	0.204***	0.162***	0.101***	0.022	-0.133***	0.006	0.148***	-0.314***	-0.064***	-0.010	-0.006	-0.012	-0.103***	-0.130***
	(0.0192)	(0.0199)	(0.0201)	(0.0145)	(0.0149)	(0.0162)	(0.0105)	(0.0108)	(0.0121)	(0.0151)	(0.0152)	(0.0153)	(0.0091)	(0.0079)
Child ethnicity (White)	0.033	0.018	-0.020	-0.033	0.001	-0.008	0.004	-0.018	-0.040***	-0.001	0.002	-0.004	-0.009	-0.013
	(0.0214)	(0.0268)	(0.0200)	(0.0252)	(0.0173)	(0.0180)	(0.0121)	(0.0123)	(0.0127)	(0.0171)	(0.0181)	(0.0176)	(0.0101)	(0.0095)
Mother not born in Europe	0.027	0.027*	0.004	0.003	0.011	0.002	-0.015*	0.017*	-0.011	0.008	-0.006	-0.010	0.006	0.021**
	(0.0179)	(0.0159)	(0.0162)	(0.0144)	(0.0138)	(0.0150)	(0.0085)	(0.0091)	(0.0128)	(0.0137)	(0.0147)	(0.0149)	(0.0103)	(0.0094)
First born	0.040*	-0.023	0.004	-0.018	-0.001	-0.028	-0.024**	0.031**	-0.035**	0.011	0.011	0.015	0.018*	0.025***
	(0.0223)	(0.0233)	(0.0229)	(0.0144)	(0.0161)	(0.0180)	(0.0115)	(0.0123)	(0.0143)	(0.0169)	(0.0168)	(0.0171)	(0.0107)	(0.0095)
Mother's age at birth	-0.013	-0.031	-0.014	-0.017	0.014	0.011	-0.048***	0.020	-0.052***	-0.015	0.013	-0.002	0.070***	0.072***
	(0.0268)	(0.0287)	(0.0274)	(0.0199)	(0.0206)	(0.0223)	(0.0140)	(0.0146)	(0.0171)	(0.0227)	(0.0217)	(0.0220)	(0.0121)	(0.0107)
Mother's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vocational	0.132	0.057	-0.035	0.064	0.074	0.107	-0.079	0.121***	0.144***	0.071	0.125	0.058	0.042	0.071**
	(0.1206)	(0.1201)	(0.1163)	(0.0848)	(0.0778)	(0.0814)	(0.0496)	(0.0468)	(0.0496)	(0.0786)	(0.0796)	(0.0802)	(0.0376)	(0.0336)
O-level	0.144	0.077	-0.015	0.043	0.097	0.178***	-0.076**	0.135***	0.123***	0.047	0.112*	0.046	0.228***	0.239***
	(0.0924)	(0.0926)	(0.0856)	(0.0643)	(0.0611)	(0.0624)	(0.0380)	(0.0359)	(0.0394)	(0.0619)	(0.0632)	(0.0634)	(0.0293)	(0.0259)
A-level	0.176*	0.173*	0.011	0.027	0.097	0.168**	-0.071*	0.152***	0.103**	0.037	0.102	0.090	0.376***	0.420***
	(0.0953)	(0.0944)	(0.0902)	(0.0672)	(0.0659)	(0.0672)	(0.0391)	(0.0402)	(0.0448)	(0.0663)	(0.0668)	(0.0670)	(0.0337)	(0.0293)
Degree	0.194*	0.187*	-0.014	0.019	0.145**	0.048	-0.005	0.138***	0.051	0.098	0.111	0.089	0.400***	0.608***
	(0.1036)	(0.1010)	(0.0970)	(0.0726)	(0.0719)	(0.0782)	(0.0467)	(0.0502)	(0.0594)	(0.0745)	(0.0765)	(0.0752)	(0.0407)	(0.0369)
Father's education (Ref.: CSE/None)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vocational	0.094	-0.044	-0.121	-0.068	0.156**	-0.002	-0.029	0.066	-0.000	-0.008	-0.095	-0.035	0.033	0.058*
	(0.0969)	(0.1134)	(0.1223)	(0.0796)	(0.0749)	(0.0705)	(0.0452)	(0.0459)	(0.0508)	(0.0743)	(0.0744)	(0.0753)	(0.0402)	(0.0334)
O-level	-0.014	-0.063	-0.051	-0.127**	0.169***	-0.013	-0.075**	0.109***	0.006	0.029	-0.024	0.060	0.244***	0.216***
	(0.0803)	(0.0863)	(0.0762)	(0.0604)	(0.0570)	(0.0548)	(0.0351)	(0.0364)	(0.0391)	(0.0579)	(0.0569)	(0.0578)	(0.0310)	(0.0259)
A-level	0.021	-0.037	-0.045	-0.110*	0.123**	-0.062	-0.065*	0.126***	-0.000	0.102*	0.057	0.082	0.271***	0.267***
	(0.0779)	(0.0823)	(0.0735)	(0.0598)	(0.0562)	(0.0530)	(0.0352)	(0.0355)	(0.0392)	(0.0547)	(0.0528)	(0.0555)	(0.0306)	(0.0258)
Degree	-0.010	0.021	-0.064	-0.159**	0.160**	-0.055	-0.130***	0.208***	0.028	0.098	0.049	0.084	0.391***	0.563***
	(0.0839)	(0.0887)	(0.0848)	(0.0660)	(0.0654)	(0.0630)	(0.0371)	(0.0432)	(0.0497)	(0.0636)	(0.0626)	(0.0638)	(0.0370)	(0.0322)
Ever in single adult household (0-5)	-0.097**	-0.059	-0.077	0.032	-0.057**	-0.006	0.056***	-0.053***	0.013	0.038	0.025	-0.004	-0.016	-0.007
	(0.0378)	(0.0366)	(0.0466)	(0.0296)	(0.0275)	(0.0275)	(0.0188)	(0.0166)	(0.0169)	(0.0238)	(0.0235)	(0.0251)	(0.0122)	(0.0118)
Ever in single adult household (6-11)	0.035	0.019	-0.062	0.020	0.027	0.004	-0.004	0.015	0.012	0.016	0.016	0.020	0.010	0.001
	(0.0333)	(0.0324)	(0.0397)	(0.0265)	(0.0245)	(0.0244)	(0.0164)	(0.0149)	(0.0159)	(0.0210)	(0.0211)	(0.0217)	(0.0117)	(0.0105)
No. children (0-5)	0.005	-0.045	-0.025	0.006	0.044**	0.017	0.024	-0.028*	0.003	-0.053**	-0.044**	-0.005	-0.072***	-0.083***

	(0.0350)	(0.0348)	(0.0359)	(0.0168)	(0.0173)	(0.0183)	(0.0191)	(0.0167)	(0.0203)	(0.0209)	(0.0209)	(0.0201)	(0.0139)	(0.0127)
No. children (6-11)	0.002	0.027	0.052**	0.018	-0.002	0.060***	0.015	-0.002	0.028*	0.071***	0.055***	0.038**	0.028***	0.001
	(0.0265)	(0.0268)	(0.0257)	(0.0170)	(0.0171)	(0.0186)	(0.0145)	(0.0135)	(0.0162)	(0.0180)	(0.0183)	(0.0180)	(0.0113)	(0.0102)
No. location moves (0-5)	0.015	-0.008	-0.026	0.036	-0.012	-0.008	-0.005	0.002	0.001	-0.010	0.024	0.015	-0.007	0.019**
	(0.0263)	(0.0288)	(0.0351)	(0.0254)	(0.0216)	(0.0212)	(0.0133)	(0.0128)	(0.0144)	(0.0191)	(0.0189)	(0.0188)	(0.0110)	(0.0089)
No. location moves (6-11)	0.011	0.026	-0.002	-0.005	0.002	0.006	0.007	-0.013	-0.016	0.010	-0.004	0.007	0.003	0.007
	(0.0188)	(0.0178)	(0.0192)	(0.0138)	(0.0138)	(0.0155)	(0.0163)	(0.0125)	(0.0130)	(0.0131)	(0.0144)	(0.0130)	(0.0097)	(0.0083)
Parents divorced/separated (0-5)	-0.005	0.011	0.019	0.017	0.015	0.035*	0.011	-0.041***	-0.036**	0.001	-0.007	0.007	-0.009	-0.011
	(0.0296)	(0.0330)	(0.0331)	(0.0264)	(0.0217)	(0.0213)	(0.0142)	(0.0142)	(0.0164)	(0.0213)	(0.0216)	(0.0220)	(0.0116)	(0.0102)
Parents divorced/separated (6-11)	0.004	-0.053**	0.035	0.040*	-0.014	-0.016	0.025*	-0.034***	-0.038***	-0.020	0.004	-0.008	-0.027***	-0.044***
	(0.0246)	(0.0254)	(0.0255)	(0.0207)	(0.0174)	(0.0168)	(0.0128)	(0.0124)	(0.0143)	(0.0169)	(0.0171)	(0.0171)	(0.0100)	(0.0088)
No. years mother worked (0-5)	0.005	-0.024	-0.026	0.043***	-0.054***	0.010	-0.012	-0.022*	0.006	0.004	0.005	0.001	-0.018*	-0.040***
	(0.0245)	(0.0246)	(0.0243)	(0.0160)	(0.0177)	(0.0199)	(0.0119)	(0.0130)	(0.0144)	(0.0182)	(0.0187)	(0.0186)	(0.0108)	(0.0094)
No. years mother worked (6-11)	-0.011	-0.006	0.025	-0.049**	0.040**	0.053**	-0.001	0.020	0.056***	-0.001	0.012	0.027	0.022**	0.013
	(0.0249)	(0.0258)	(0.0247)	(0.0197)	(0.0186)	(0.0211)	(0.0132)	(0.0131)	(0.0155)	(0.0196)	(0.0195)	(0.0199)	(0.0110)	(0.0101)
Private school KS1	0.045**	-0.002	0.005	0.028*	-0.003	-0.015	0.010	-0.010	-0.004	0.008	0.023	0.026*	0.009	0.006
	(0.0212)	(0.0210)	(0.0206)	(0.0169)	(0.0156)	(0.0168)	(0.0102)	(0.0109)	(0.0127)	(0.0152)	(0.0153)	(0.0154)	(0.0100)	(0.0088)
Private school KS2	-0.038*	-0.004	-0.021	-0.014	0.010	-0.009	0.001	-0.012	-0.006	-0.011	-0.009	0.006	-0.006	0.021**
	(0.0200)	(0.0198)	(0.0209)	(0.0162)	(0.0145)	(0.0166)	(0.0091)	(0.0092)	(0.0109)	(0.0155)	(0.0153)	(0.0153)	(0.0098)	(0.0085)
Private school KS3	-0.009	-0.013	0.023	-0.022	-0.006	-0.000	0.013	-0.029***	-0.027**	-0.015	-0.005	0.008	0.021***	0.010
	(0.0191)	(0.0207)	(0.0187)	(0.0132)	(0.0142)	(0.0161)	(0.0103)	(0.0108)	(0.0123)	(0.0147)	(0.0143)	(0.0143)	(0.0079)	(0.0074)
Home owner (0-5)	-0.022	0.060	0.031	-0.036	-0.015	-0.007	-0.065***	0.067***	0.088***	0.025	0.062	0.019	0.080***	0.110***
	(0.0451)	(0.0452)	(0.0496)	(0.0452)	(0.0325)	(0.0367)	(0.0234)	(0.0205)	(0.0218)	(0.0361)	(0.0379)	(0.0357)	(0.0154)	(0.0141)
Home owner (6-11)	0.039	0.001	-0.039	-0.008	0.005	-0.009	-0.021	0.011	0.005	-0.011	-0.007	-0.006	0.026*	0.010
	(0.0388)	(0.0385)	(0.0412)	(0.0408)	(0.0299)	(0.0347)	(0.0209)	(0.0186)	(0.0210)	(0.0331)	(0.0340)	(0.0324)	(0.0144)	(0.0132)
Early time investments	-0.015	0.009	0.046	-0.027	0.085***	0.021	0.000	0.014	-0.030*	0.019	0.020	0.001	0.033***	0.039***
	(0.0291)	(0.0304)	(0.0332)	(0.0227)	(0.0226)	(0.0238)	(0.0152)	(0.0142)	(0.0155)	(0.0218)	(0.0218)	(0.0219)	(0.0111)	(0.0100)
Pre-school time investments	0.036	0.013	0.009	-0.040**	0.068***	0.070***	-0.020	0.033**	0.044***	-0.019	-0.006	0.023	0.021**	0.004
	(0.0238)	(0.0255)	(0.0237)	(0.0165)	(0.0178)	(0.0189)	(0.0123)	(0.0130)	(0.0149)	(0.0182)	(0.0183)	(0.0182)	(0.0108)	(0.0094)
In-school time investments	0.010	0.046*	0.033	-0.005	0.004	0.040**	0.012	-0.025**	0.003	-0.024	-0.023	-0.028	-0.033***	-0.029***
	(0.0247)	(0.0253)	(0.0265)	(0.0173)	(0.0176)	(0.0198)	(0.0126)	(0.0118)	(0.0142)	(0.0173)	(0.0170)	(0.0172)	(0.0103)	(0.0093)
Missing flag MFP (0-5)	-0.099	-0.168***	0.050	-0.042	0.044	0.092**	-0.008	0.040	0.012	-0.040	-0.040	0.050	0.035	0.007
	(0.0634)	(0.0636)	(0.0603)	(0.0345)	(0.0407)	(0.0390)	(0.0239)	(0.0254)	(0.0269)	(0.0398)	(0.0412)	(0.0391)	(0.0217)	(0.0194)
Missing flag MFP (6-11)	0.006	0.026	-0.003	0.033	0.046*	0.036	0.030**	-0.026	0.006	0.010	0.002	0.007	0.001	-0.020
	(0.0400)	(0.0370)	(0.0427)	(0.0238)	(0.0255)	(0.0259)	(0.0150)	(0.0172)	(0.0200)	(0.0253)	(0.0261)	(0.0259)	(0.0154)	(0.0134)
Missing flag income (0-5)	0.010	0.020	0.044	0.021	0.005	-0.018	-0.012	0.011	0.010	0.037	-0.027	-0.024	0.021	0.015
	(0.0422)	(0.0441)	(0.0425)	(0.0314)	(0.0329)	(0.0379)	(0.0163)	(0.0177)	(0.0195)	(0.0311)	(0.0343)	(0.0348)	(0.0145)	(0.0126)
Missing flag income (6-11)	-0.066	-0.022	-0.103*	-0.039	-0.094**	0.038	0.006	-0.004	-0.001	0.002	0.043	0.063*	-0.025	-0.019
	(0.0574)	(0.0584)	(0.0582)	(0.0366)	(0.0417)	(0.0420)	(0.0225)	(0.0212)	(0.0253)	(0.0375)	(0.0390)	(0.0376)	(0.0203)	(0.0169)
Constant	-0.197	-0.002	-0.025	0.205**	-0.226***	-0.204**	0.117***	-0.219***	-0.097***	-0.101	-0.161**	-0.094	-0.342***	-0.417***
	(0.1203)	(0.1140)	(0.1494)	(0.0855)	(0.0843)	(0.0882)	(0.0346)	(0.0320)	(0.0358)	(0.0682)	(0.0690)	(0.0677)	(0.0249)	(0.0234)
Missing flags other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

N	2220	2220	2220	3829	3829	3829	6290	6290	6290	4233	4233	4233	9902	9902
R^2	0.09	0.08	0.07	0.06	0.08	0.05	0.10	0.20	0.06	0.03	0.02	0.02	0.19	0.36

Notes: These are linear models with standardised coefficients. Significance levels: ***p<0.01; **p<0.05; *p<0.10. Standard errors appear in parentheses.

Appendix B – Questionnaires

B1. Major Financial Problems (MFP)

The question on major financial problem is part of a list of life events that could happen to the mother since a certain age of the child. The question is: *"Listed below are a number of events which may have brought changes in your life. Have any of these occurred since your study child's XXX birthday?"* There are 45 different types of events listed. That which appears in the 25th position is our variable of interest: *"You had a major financial problem"*. The question is asked at the following child ages: 8 months, 1y9m, 2y9m, 3y11m, 5y1m, 6y1m, 9y2m, 11y2m.

In the first six waves (from 8m to 6y1m) the question asks whether the mother had a MFP and how much she was affected by it. The possible answers are *"Yes, and affected me a lot"*, *"Yes, moderately affected"*, *"Yes, mildly affected"*, *"Yes, but didn't affect me"* and *"No"*. In the results reported in the main text, we created a dummy variable for each wave taking value 1 if the mother reported to have had a MFP (from *Yes, affected a lot* to *Yes, but didn't affect me*). When possible (in the first six waves of ALSPAC data), we have checked that the results are almost unchanged when recoding "*Yes, but didn't affect me*" to a value of 0 for the MFP dummy.

In the waves corresponding to child's age 9y2m and 11y2m, the question asks only whether a MFP occurred, but it refers not only to the previous year but also to the last two years. Specifically, the answers to the question at age 9y2m are: *"Yes, when the study child was 6 or 7"*, *"Yes, since the child's 8th birthday"*, *"Yes, both when the study child was 6/7 and 8+"*, *"No, didn't happen in the past 3 years"*. And similarly at age 11y2m: *"Yes, when the study child was 9 or 10"*, *"Yes, since the child's 11th birthday"*, *"Yes, both when the study child was 9/10 and 11+"*, *"No, didn't happen in this period"*. From the answer at age 9y2m and 11y2m we can derive information on whether the mother had a MFP when the child was 6/7 and 9.

For each child's age from 8 months to age 11 we have a dummy taking value 1 if the mother had a MFP in the previous year (from child's birth in the case of the questionnaire at 8 months). The final measure of financial insecurity is the number of year from child's birth to age 11 in which the mother reported a MFP.

B2. Short Moodls and Feeling Questionnaire (SMFQ)

These questions are about how you may have been feeling or acting recently. For each question, please say how much you have felt or acted this way in the past two weeks.

In the past two weeks:	NOT TRUE	SOMETIMES	TRUE
1. I felt miserable or unhappy.	2	1	0
2. I didn't enjoy anything at all.	2	1	0
3. I felt so tired I just sat around and did nothing.	2	1	0
4. I was very restless.	2	1	0
5. I felt I was no good anymore.	2	1	0
6. I cried a lot.	2	1	0
7. I found it hard to think properly or concentrate.	2	1	0
8. I hated myself.	2	1	0
9. I was a bad person.	2	1	0
10. I felt lonely.	2	1	0
11. I thought nobody really loved me.	2	1	0
12. I thought I could never be as good as other kids.	2	1	0
13. I felt I did everything wrong.	2	1	0
Total Subjective well-being score: 0-26			

B3. Antisocial behaviours at age 16 (DAWBA) – Carer-reported

We're now going to ask about behaviour that sometimes gets children into trouble, including dangerous, aggressive or antisocial behaviour. Please answer according to how s/he has been over the last year.

As far as you know, over the last 12 months...	NO	PERHAPS	DEFINITELY
Has s/he often told lies in order to get things or favours from others, or to get out of having to do things s/he is supposed to do?	0	1	2
Has s/he often started fights? (Other than with brothers and sisters)	0	1	2
Has s/he often bullied or threatened people?	0	1	2
Has s/he often stayed out after dark much later than s/he was supposed to?	0	1	2
Has s/he stolen from the house, or from other people's houses, or from shops or school? (This doesn't include very minor thefts, e.g. stealing his/her brother's pencil or food from the fridge)	0	1	2
Has s/he run away from home more than once, or ever stayed away all night without your permission?	0	1	2
Has s/he often played truant (bunked off) from school?	0	1	2

We're now going to ask you about a list of less common but potentially more serious behaviours. We have to ask all people all questions even when they are not likely to apply.

As far as you know, over the last 12 months...	NO	YES
Has s/he used a weapon or anything that could seriously hurt someone? (e.g. a bat, brick, broken bottle, knife, gun)	0	1
Has s/he really hurt someone or been physically cruel to them? (e.g. has tied up, cut or burned someone)	0	1
Has s/he been really cruel on purpose to animals and birds?	0	1
Has s/he deliberately started a fire? (This is only if s/he intended to cause severe damage.)	0	1
Has s/he deliberately destroyed someone else's property?	0	1
Has s/he been involved in stealing on the streets, e.g. snatching a handbag or mugging?	0	1
Has s/he broken into a house, any other building or a car?	0	1
Has your teenager's ever been in trouble with the police?	0	1

Total Antisocial behaviours score: 0-22

B4. Antisocial behaviours at age 11 (DAWBA) – Teacher-reported

In the past school year how much to your knowledge has his/her behaviour been like the following:

As far as you know, he/she:	NOT TRUE	SOMEWHAT TRUE	CERTAINYLY TRUE
Lies or cheats	0	1	2
Starts fights	0	1	2
Bullies others	0	1	2
Plays truant	0	1	2
Uses weapons when fighting	0	1	2
Has been physically cruel, has really hurt someone	0	1	2
Has been deliberately cruel to animals	0	1	2
Sets fire deliberately	0	1	2
Steals things	0	1	2
Vandalises property or destroys things belonging to others	0	1	2
Shows unwanted sexual behaviour towards others	0	1	2
Has been in trouble with the law	0	1	2

Total Antisocial behaviours score: 0-22

B5. Strengths and Difficulties Questionnaire (SDQ)

Please think about this child's behaviour over the last 6 months if you can:

This child:	NOT TRUE	SOMEWHAT TRUE	CERTAINLY TRUE
Emotional health:			
Often complains of headaches, stomachaches or sickness	0	1	2
Has many worries, often seems worried	0	1	2
Is often unhappy, down-hearted or tearful	0	1	2
Is nervous or clingy in new situations, easily loses confidence	0	1	2
Has many fears, is easily scared	0	1	2
Total emotional health score: 0-10			
Behaviour problems:			
Has temper tantrums or hot tempers	0	1	2
Is generally obedient, usually does what adults request	2	1	0
Often fights with other children or bullies them	0	1	2
Often lies or cheats	0	1	2
Steals from home/school/elsewhere	0	1	2
Total behaviour problems score: 0-10			
Hyperactivity/Inattention:			
Is restless, overactive, cannot stay still for long	0	1	2
Constantly fidgets or squirms	0	1	2
Is easily distracted, concentration wandered	0	1	2
Thinks things out before acting	2	1	0
Sees tasks through to the end, good attention span	2	1	0
Total hyperactivity score: 0-10			
Peer relationship problems:			
Is rather solitary, tends to play alone	0	1	2
Has at least one good friend	2	1	0
Is generally liked by other children	2	1	0
Is picked on or bullied by other children	0	1	2
Gets on better with adults than with other children	0	1	2
Total peer relationship problems score: 0-10			
Pro-social behaviour:			
Is considerate of other people's feelings	2	1	0
Shares readily with other children	2	1	0
Is helpful if someone is hurt, upset or feeling ill	2	1	0
Is kind to younger children	2	1	0
Often volunteers to help others	2	1	0
Total peer relationship problems score: 0-10			
Total internalising behaviour = emotional + peer relationship (0-20)			
Total externalising behaviour = behaviour + hyperactivity (0-20)			

B6. Edinburgh Postnatal Depression Scale

Your feelings in the past week.

1. I have been able to laugh and see the funny side of things	As always (0)	Not as much (1)	Definitely not so much (2)	Not at all (3)
2. I have looked forward with enjoyment to things	As always (0)	Less than usual (1)	Definitely less than usual (2)	Hardly at all (3)
3. I have blamed myself unnecessarily when things went wrong	Yes, most of the time (3)	Yes, some of the time (2)	Not very often (1)	Never (0)
4. I have been anxious or worried for no good reason	Not at all (0)	Hardly ever (1)	Sometimes (2)	Often (3)
5. I have felt scared or panicky for no very good reason	Yes, quite a lot (3)	Sometimes (2)	Not much (1)	Not at all (0)
6. Things have been getting on top of me	Yes, most of the time (3)	Yes, some of the time (2)	Hardly ever (1)	Never (0)
7. I have been so unhappy that I have had difficulty sleeping	Yes, most of the time (3)	Yes, some of the time (2)	Not very often (1)	Not at all (0)
8. I have felt sad or miserable	Yes, most of the time (3)	Yes, quite often (2)	Not very often (1)	Never (0)
9. I have been so unhappy that I have been crying	Yes, most of the time (3)	Yes, quite often (2)	Only occasionally (1)	Never (0)
10. The thought of harming myself has occurred to me	Yes, quite often (3)	Sometimes (2)	Hardly ever (1)	Never (0)

Total EPDS score: 0-30

Appendix C – Review of the Literature and Additional Results

C1. Existing Literature

Research across a variety of disciplines has considered the relationship between the sufficiency of financial resources and family background on the one hand and later-life child outcomes on the other. Two broad channels have been examined. In the first resource or investment channel, income directly acts on the family's ability to obtain the resources and services required for child development; in the second family-process channel, the effect of economic resources works via family relationships and parents' behaviour towards their children by reducing parental stress. Haveman and Wolfe (1995) provide an excellent summary of the research across the disciplines in this context.

In the (direct) resource channel the family is an economic unit deciding how best to allocate its resources (Becker, 1981, Becker and Tomes, 1986 and 1994). The amount, type and timing of the resources allocated to children directly influence their future achievements. This is a choice-based view of children's attainments, depending on the choices made by society (policy instruments), parents (the resource channel), and the children themselves (for example in terms of their own behaviour and effort).

Other disciplines, in particular developmental psychology, have emphasised the relevance of the indirect effect via the family-process channel (Conger *et al.*, 2010, Voydanoff, 1990): economic problems may produce worse marital and parent-child relationships, increase household conflict, and reduce the time and quality of time spent in activities with the child. In addition, parents are role models for their children, and parental behaviour, attitudes and well-being affect the child's cognitive and behavioural development. As such, stressful events during childhood can create emotional distress that undermines child development (McLoyd, 1990 and 1998).

The empirical literature can also be split into that regarding the direct effect of income on children's achievements (see, for example, Blau, 1999, Shea, 2000, Maurin, 2002, Hardy, 2014, Akee *et al.*, 2018), and that on the indirect effect (Guo and Harris, 2000, Yeung *et al.*, 2002, Conger *et al.*, 2010, Washbrook *et al.*, 2014). The overall conclusion here is that income does matter for child outcomes. There is more evidence for cognitive outcomes than for non-cognitive outcomes, as the latter have rarely if at all been explored using large-scale cohort data (for reviews see Mayer, 1997, Duncan and Brooks-Gunn, 1997, Haveman and Wolfe, 1995, Conger *et al.*, 2010). We discuss some of this relevant literature below.

C1.1   Cognitive Outcomes

Blanden and Gregg (2004) analyse three British datasets, and conclude that a one-third reduction in family income leads to an average 3-4 percentage-point fall in the probability of achieving GSCE A-C grades or obtaining a degree. Ermisch and Francesconi (2001) consider various family characteristics in the first seven waves of the BHPS, and conclude that income is a strong predictor of educational attainment. Gregg and Machin (2000) estimate the effects of family background on children's educational attainment and labour-market outcomes at ages 16, 23 and 33 using British NCDS data. The strongest negative family-related predictor of school attendance and staying on at school at age 16 is financial hardship (defined as whether the family experienced financial difficulties in the year prior to the survey date). Children in families experiencing financial difficulties were also more likely to have contact with the police and experience unemployment at age 23, and earn lower wages at age 33. Maurin (2002) uses French INSEE data to show that ten percent higher family income is associated with a 6.5 percentage-point lower probability of being held back a year in elementary school. In Acemoglu and Pischke (2001), 10 percent higher family income leads to about 1.4 percentage point rise in the probability of child college attendance.

Other work, mainly on US data, has uncovered smaller income effects. Blau (1999), for example, finds a small, and in some cases insignificant, effect of current income on children's outcomes in National Longitudinal Survey of Youth (NLSY) data. The effect of permanent income is larger than that of transitory income, but still smaller than that of other family characteristics such as mother's ability or ethnicity. Hardy (2014) presents evidence from the Panel Study of Income Dynamics (PSID) that family-income volatility has a negative effect on post-secondary education but no effect on adult income.

Some work has used non-income measures of economic resources: wealth or financial assets reflect financial security that can reduce family stress and financial anxiety and promote child development. Yeung and Conley (2008) look at family wealth and Black-White test-score gaps in children aged 3 and 12 in PSID data. Wealth plays no role for the test-score gaps of pre-school children but does so for in-school children; wealth is also shown to be significantly correlated with mediating factors such as parental warmth, parental activities with the child, and the learning resources available at home. Kim and Sherraden (2011) analyse the effect of financial assets, non-financial assets and home ownership on high-school completion and college-degree attainment.

Assets significantly predict children's educational outcomes, reduce the size of the income effect and, in some cases, even render it insignificant.

The indirect effect of family income on child development includes parental behaviour toward the child, family relationships, the home environment, stimulating material at home, and activities. Washbrook *et al.* (2014) use the same ALSPAC data as we do here and find both direct and indirect effects of family income on the cognitive outcomes of children aged between 7 and 9, but not on their non-cognitive outcomes. Yeung *et al.* (2002) uncover both direct and indirect income effects on child cognitive outcomes at ages 3 through 5 in PSID data, with the direct effect being reduced by the introduction of the indirect effects. Yeung *et al.* also look at economic instability, measured by a year-on-year fall in income of at least 30 percent. This has a direct effect on some test scores, a small effect on behavioural problems, but a larger effect on mediating factors such as mother's mental well-being and parental behaviour, which in turn significantly affect child development. We address the question of income falls in Section 3.2.4.

C1.2   Non-cognitive Outcomes

Duncan and Brooks-Gunn (1997) suggest that non-cognitive outcomes are in general less sensitive to family income than are cognitive outcomes. Some work has found a positive correlation between income and children's physical health (see, among others, Case and Paxson, 2002, for the US, and Currie and Stabile, 2003, for Canada). However, there is no link between low-income and health in ALSPAC data in Propper *et al.* (2007) once mother's health, including mental health, has been controlled for.

Children from low-income families appear to have more psychological and behavioural problems (McLeod and Shanahan, 1993, and Bolger *et al.*, 1995), with the effect working only indirectly via family stress and parental attitudes towards the child (see, among others, Yeung *et al.*, 2002, for the US, and Washbrook *et al.*, 2014, for the UK), with no direct income effect. Analogously, child emotional well-being and mental health seem to be affected by family income only indirectly via its effect on family stress (see, for example, Mistry *et al.*, 2002). Income and child self-esteem do not seem to be correlated (Axinn *et al.*, 1997, and Washbrook *et al.*, 2014), although the importance of timing in children's non-cognitive outcomes, and in particular children's mental health in adulthood, remains to be established. Sobolewski and Amato (2005) report that economic hardship, such as family income, the value of equity in the family home and the value of other financial assets, has long-term consequences for adult psychological well-being,

such as self-esteem, distress symptoms, and satisfaction in various life domains. Their findings are based on a small US sample of 589 observations from the Marital Instability Over the Life Course Study. As above, the effect runs indirectly via parents' financial stress. Similarly, Wickrama *et al.* (2005) use data on 451 Iowa families to show that family income directly influences adolescent mental disorder and physical illness, and Evans and Cassells (2014) find that greater poverty exposure in the first nine years is associated with worse mental health outcomes in the later teens, using a sample of 196 families in upstate New York. However, there is no relationship between family income and child psychiatric disorder in the British Child and Adolescent Mental Health Survey (Ford *et al*., 2004).

We will here add to this existing literature by providing systematic evidence from a large-scale long-run birth cohort survey. We consider not only cognitive, but also health, behaviour and subjective well-being outcomes. These latter are reported not only by the carer, but also by the children themselves and sometimes by the child's teacher (the cognitive outcomes are matched in from the national exam results database). We relate these outcomes to family income, as in most of the existing literature, and, more originally, to household financial problems as reported by the child's mother over an eleven-year period. Our broad conclusion is that income information on its own does not suffice as a measure of family economic resources and the demands that are made on them: conditional on income and home ownership, the incidence of financial problems is a significant predictor of almost all of our adolescent-outcome measures, and with an effect size that is typically much larger than that of income.

C2. Additional Results

C2.1 The other correlates of child outcomes

In Table A4, gender is the strongest correlate of children's SWB: boys have higher SWB by between 0.10 and 0.20 standard-deviation points, in line with existing work on adolescent mental health (e.g. Duncan *et al.*, 1985, and Nolen-Hoeksema and Girgus, 1994) where girls report more dissatisfaction and psychological problems than do boys (although adult women report both higher life satisfaction and higher stress scores than do men: Nolen-Hoeksema and Rusting, 1999). Only few other variables are significantly correlated with child SWB. While it is commonplace that parents' education affects child cognitive development, we here find only mostly insignificant SWB effects of mother's education and no effect of father's education. Being first-born attracts a positive coefficient for child-reported SWB, as does home ownership. Last, growing up in a single-parent household reduces carer-reported SWB at age 16, but not child-reported SWB.

Table A5.1 shows that there is no gender effect on antisocial behaviour at age 16, in contrast to some existing work suggesting that boys are worse offenders than girls (see Gregg and Machin, 2000, for contacts with the police), but we do have evidence that boys are worse-behaved at age 11. This is consistent with work showing that the behavioural gender gap falls with age (Cohen *et al.*, 1993). Parental separation is associated with more antisocial behaviour, while this latter falls with father's (but not mother's) education. Pre-school time investments and private school at KS3 (age 14) are associated with better child behaviour.

We find no gender effect on emotional health at age 11. Mother's education has a positive effect on child emotional health at age 11. The presence of other children in the household improves both emotional health and behaviour, as do time investments and mother's years of work.

More variables are significant in the teacher-reported version of the behaviour and emotional-health table (Table A5.2). Boys again behave worse and (to a lesser extent) have worse emotional health. White children also have lower emotional health. The first-born have better behaviour but worse emotional health. Home ownership and parental education are associated with better teacher-reported outcomes for almost all measures, while parental separation produces worse outcomes. As for the carer-reported outcomes, mother's employment is positively related to child emotional health but not behaviour.

Apart from MFP, only few variables are correlated with BMI in Table A6, and we in particular find no gender effect. We consider some alternative physical health measures in Appendix C2.5.

Last, in Table A7 home ownership is amongst the strongest predictors of cognitive outcomes, with an effect size of about 0.12 standard deviations. Girls, the first-born, and those with older mothers and better-educated parents record better educational performance; the number of siblings and parental separation are associated with lower test scores.

C2.2 Early versus late childhood

The existing literature on the importance of early vs. late childhood has produced ambiguous results: see, for example, Duncan and Brooks-Gunn (1997), Duncan *et al.* (1998), Guo (1998), Haveman *et al.* (1991), Heckman (2006) and Wagmiller *et al.* (2006). Early-childhood deprivation can be argued to affect the development of basic cognitive skills, feeding through to later achievements; alternatively, children may be more aware of economic disadvantage in later childhood, reducing their self-esteem and thus their outcomes (see, for example, Ogbu, 1978, and Mickelson, 1990).

We here separately estimate the effect of economic resources for early and late childhood (ages 0 to 5 and 6 to 11 respectively). Table A9a summarises the results, and lists the t-statistics from the tests of coefficient equality across childhood ages (the full table of results appears in Appendix Table A9b). The estimated MFP coefficients in early and late childhood in Table A9a are only different at the ten percent level in two cases. The first is child BMI, where early-childhood financial problems lead to worse BMI outcomes but those in later childhood do not (perhaps reflecting that children eat at home more often before the start of compulsory schooling). The second is teacher-reported antisocial behaviour at age 11, which is only significantly correlated with more-recent MFPs. This overall pattern is repeated in regressions that condition on mother's mental health (results available on request). The effect of income in the two childhood periods does not differ statistically for any outcome.[24]

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[24] We also experimented with decay functions, weighting MFPs at the different child ages by the ratio of child age at MFP report to child age at outcome, which gives more weight to more recent MFPs, or by the complement of this expression, giving more weight to earlier MFPs. The fit of the regressions (as measured by the R-squared) barely changed.

C2.3 Sub-group analyses

The pattern of our results is remarkably similar when we estimate boys' and girls' outcomes separately: the differences refer to income and cognitive outcomes, and MFPs and teacher-reported behaviour at age 11, both of which are only correlated for boys. This pattern of results chimes with the gender difference in cognitive outcomes and behaviour following family disadvantage in Autor *et al*. (2019) and the finding of no sex differences in the way in which negative cognitive style, depression and rumination are correlated with an index of negative or stressful life events that typically occur during adolescence in Hamilton *et al*. (2015). There are also no striking differences for children in above- and below-median income households (where income refers to the average household figure over the child's first eleven years).[25]

C2.4 Non-linearities

To see whether low values of MFP are unimportant, we cut the non-zero MFP distribution at its median and created two dummy variables. From Figure 1, this median is at a value of around 1.7. We would in general expect the estimated coefficient for below-median MFPs to be smaller than that on above-median MFPs. For a number of outcomes we find that the former is insignificant. This is in particular the case for child-reported well-being, and both cognitive outcomes. For these variables, a small number of MFPs does not matter: the overall negative MFP coefficient listed in Table 1 rather comes from those children whose mothers experienced repeated financial problems.

C2.5 Alternative child physical health measures

Physical health above was measured a dummy variable for child BMI being between the 5th and 85th percentiles by age and sex. We also ran all of our analyses considering only the upper tail of the BMI distribution, i.e. a dummy for being above the 85th percentile of the specific gender-age distribution. This made no difference to the results.

We also have information on a number of child physical-health symptoms at age 11 (such as stomach ache, arms/legs ache, cough at night, infection and asthma). We construct a dummy variable for the total number of symptoms being in the top 40% of the distribution (as in Propper

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[25] Four out of 28 estimated MFP and income coefficients are significantly different between above- and below-median households.

et al., 2007) and also look at the total number of symptoms. Last, we have information on the general health of the child at both ages 11 and 13, as assessed by the mother, and create a dummy for the child being anything other than very healthy. The results for both of the symptoms variables mirror those for BMI: the number of major financial problems attracts a positive estimated coefficient that is significant at the one per cent level while that on income is insignificant.[26] Regarding age-11 and age-13 child overall health, both MFP and income attract significant estimated coefficients of roughly equal size.

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[26] Janssen and Sandner (2016) exploit information on a German welfare reform and also find no effect of household income on young child health.

Appendix D – Tables of correlations

D1. Correlation coefficients between explanatory variables

	Mum had a MFP	Mum's age	Mum's educn.	Father's educn.	Mother born outside Europe	Household income	Mum income was reduced	Mum lost job	Partner lost job	Mum got very ill	Divorced/ separated	Single-adult hh	Mum work	No. of children	Home owner	Mum's mental health
Mum had a MFP	1															
Mum's age	-0.028*	1														
Mum's education	-0.030*	0.269*	1													
Father's education	-0.056*	0.265*	0.542*	1												
Mother not born in Europe	0.006	0.056*	0.088*	0.082*	1											
Household income	-0.167*	0.180*	0.287*	0.299*	0.021*	1										
Mum income was reduced	0.304*	-0.023*	-0.006*	-0.033*	-0.001	-0.202*	1									
Mum lost job	0.074*	0.001	0.006*	-0.003	0.006*	-0.043*	0.222*	1								
Partner lost job	0.190*	-0.018*	-0.019*	-0.025*	-0.003	-0.103*	0.330*	0.053*	1							
Mum got very ill	0.103*	-0.025*	-0.012*	-0.010*	0.007*	-0.073*	0.081*	0.035*	0.043*	1						
Divorced/separated	0.135*	-0.087*	-0.058*	-0.066*	0.001	-0.196*	0.207*	0.042*	0.032*	0.046*	1					
Single-adult household	0.061*	-0.070*	-0.073*	-0.093*	0.009*	-0.297*	0.056*	0.013*	-0.026*	0.032*	0.337*	1				
Mum work	-0.040*	0.071*	0.117*	0.054*	0.002	0.193*	-0.049*	-0.001	-0.029*	-0.039*	-0.038*	-0.049*	1			
No. of children	-0.010*	0.048*	-0.042*	-0.016*	0.004	0.038*	-0.067*	-0.026*	-0.000	-0.005*	-0.014*	-0.054*	-0.052*	1		
Home owner	-0.094*	0.195*	0.171*	0.172*	-0.001	0.262*	-0.060*	-0.013*	-0.057*	-0.042*	-0.172*	-0.219*	0.180*	-0.039*	1	
Mum's mental health	-0.054*	-0.009*	0.002	0.007*	-0.010*	0.106*	-0.020*	-0.027*	-0.018*	-0.054*	-0.084*	-0.070*	-0.066*	-0.063*	0.005	1

Notes: The figures here are unconditional correlations. * $p<0.05$.

D2. Correlation coefficients between dependent variables

	SWB 16	SWB 18	SWB 16 (carer)	Antisoc.16 (carer)	SDQ ext 11 (carer)	SDQ int 11 (carer)	Antisoc. 11 (teacher)	SDQ ext 11 (teacher)	SDQ int 11 (teacher)	Achieved Level 2	Average GCSE	Normal BMI 11	Normal BMI 13	Normal BMI 16
SWB at age 16	1													
SWB at age 18 (SMFQ)	0.462*	1												
SWB age 16 (carer)	0.323*	0.298*	1											
Antisoc.behav. age 16 (carer)	-0.098*	-0.132*	-0.236*	1										
SDQ conduct at age 11 (carer)	0.096*	0.099*	0.346*	-0.310*	1									
SDQ Emotional age 11 (carer)	0.119*	0.169*	0.316*	-0.211*	0.399*	1								
Antisoc. behav. age 11 (teacher)	-0.038	0.024	-0.020	0.101*	-0.245*	-0.201*	1							
SDQ conduct age 11 (teacher)	-0.029	-0.036	0.051	-0.210*	0.376*	0.240*	-0.564*	1						
SDQ emotional age 11 (teacher)	0.083	0.069	0.068	-0.065	0.166*	0.392*	-0.308*	0.384*	1					
Achieved Level 2	-0.006	-0.023	0.091	-0.219*	0.246*	0.119*	-0.112*	0.253*	0.093	1				
Average GCSE points	0.006	0.049	0.106*	-0.284*	0.304*	0.127*	-0.129*	0.326*	0.130*	0.559*	1			
Normal BMI age 11	0.008	0.006	-0.001	0.038	-0.032	0.019	-0.060	0.046	0.058	0.038	0.054	1		
Normal BMI age 13	0.032	-0.009	0.069	-0.018	0.058	0.040	0.031	0.046	0.035	0.077	0.054	0.591*	1	
Normal BMI age 16	-0.025	-0.016	0.022	0.008	0.039	0.041	0.019	0.025	0.027	0.110*	0.100*	0.544*	0.712*	1

Notes: The figures here are unconditional correlations. * $p<0.05$.