Breaking up for the Kids' Sake: Evidence from a British Birth Cohort*

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Abstract

This paper considers the relationship between family break-up and young adults' cognitive and non-cognitive outcomes. We use British cohort data from the Avon Longitudinal Study of Parents and Children (ALSPAC), and consider separately parental separation and the quality of the relationship when the parents were together. We find that conflict within the household prior to parental separation entirely explains the negative correlation between divorce and child outcomes in terms of emotional health and behaviour, but not their test scores. Interactions between parental separation and prior conflict reveal that separations that end conflictual relationships can be beneficial for young adult non-cognitive outcomes.

Keywords: Inter-Parental Conflict, Divorce, Subjective well-being, education, ALSPAC.

JEL Classification Codes: I31, D60, D10, J12.

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I. Introduction

A large literature has shown that childhood conditions can have lasting effects on human-capital accumulation, feeding through to a range of important later outcomes such as adult income, employment and life satisfaction (e.g. Almond and Currie, 2011; Black and Devereux, 2011; Case *et al*., 2002; Cunha and Heckman, 2007; Frijters *et al*., 2014; Goodman et al., 2011; Heckman & Rubinstein, 2001; Layard *et al*., 2014). One of the potentially stressful disruptions to a child's environment while growing up is parental separation, an event that children in the US, UK and elsewhere are now more likely than ever to experience at some point during their childhood (CDC, 2012; ONS, 2014).

One of the main empirical challenges in estimating the effects of divorce on subsequent outcomes – whether of the couple themselves or of their children – is accounting for the stock of tension that has built up within the household prior to separation. Households that have, for example, experienced a great deal of marital conflict will likely have worse subsequent outcomes as well as being more likely to divorce. We here address this potential omitted-variable issue by making use of rich cohort data that allows us to investigate the roles of both parental relationship quality and family breakdown in the development of children's cognitive and non-cognitive skills through to early adulthood. Parents in the survey data we use are, for example, asked a repeated battery of questions on conflict within their relationship, such as how often they argue, shout or throw anything in anger, or slap or not speak to the other for prolonged periods.[1] We can therefore assess the extent to which the differences in outcomes at age 16 between intact and non-intact families can be explained by prior differences in parental relationship quality. In general, we find that inter-parental conflict and affection explain differences in the non-cognitive skills of children from separated and non-separated households, but do not account for the divergence in cognitive outcomes.

Prior work has suggested that parental relationships - and conflict in particular - can have an impact on children, especially for the development of non-cognitive skills (Buehler *et al*., 1997). One channel here is that exposure to parental conflict destabilises children's sense of emotional security, which can have effects on both children's emotional health as well as their behaviour (Cummings and Davies, 2010). Alternatively, children may model their own behaviour on that of their parents: if a child grows up being exposed to inter-parental conflict, she may learn that resolving issues through violent or aggressive behaviour is a normal or acceptable way to behave and deal with others (Grych and Fincham, 1990). Including parental relationship quality variables into the analysis is then particularly important, as the assumption that divorce is uncorrelated

[1] Of course, conflict represents only one element of the quality of a parental relationship. We thus also make use of repeated questions on inter-parental affection and communication, such as whether they often discuss their days and make plans together, talk about their feelings, laugh together, and kiss and hug each other.

with the error term will be violated if such omitted variables influence both child outcomes and the likelihood of separation.

In addition to conditioning on prior parental relationship quality, we also consider the interaction between separation and relationship quality. Although parental separation may be associated with worse child outcomes on average, the size of this correlation may differ according to the pre-separation extent of conflict. We ask whether separation may play a "stress-relieving" role in instances of the divorce bringing to an end a situation in which the child is exposed to acute conflict (Wheaton 1990). Our intuition here is that even though parental conflict and separation may both be bad for child wellbeing, the interaction between the two may attract a compensatory positive coefficient, since the child is removed from a stressful environment. We build on the existing research into such a dynamic (e.g. Amato *et al*., 1995; Hanson 1999; Jekielek 1999), which relies heavily on US data, focuses solely on married couples and not cohabiting couples, and rarely considers child outcomes comparably across different domains (both cognitive and non-cognitive) of child outcomes.

We contribute to a large body of work on parental separation and child outcomes (Amato, 2001; Amato and Keith, 1991). A typical finding in this diverse literature is that children growing up in families that separate during childhood perform systematically worse in terms of various young adult outcomes than those raised in families that remain intact. Given that separation is far from a random event, however, it is much less clear whether this widely-documented negative association is causal (McLanahan *et al*., 2013). A number of recent contributions have found that the effect of family breakdown becomes statistically insignificantly with the inclusion of other covariates, with household income and family fixed effects playing a particularly important role in this respect (e.g. Aughinbaugh *et al*., 2005; Björklund *et al*., 2007; Björklund and Sundström, 2006; Francesconi *et al*., 2010; Ginthner and Pollack, 2004). Nevertheless, other work has concluded that even though the size of the correlation falls with the inclusion of new variables, a significant association between parental separation and adverse child outcomes remains (e.g. Antecol and Bedard, 2007; Bratberg *et al*., 2014; Cooper *et al*., 2011; Ermisch *et al*., 2004; Ermisch and Francesconi, 2001; Fronstin *et al*., 2001; Kiernan, 1997; Prevoo and ter Weel, 2014).

Much of the existing evidence on the effects of family breakdown has focused on its consequences for child educational attainment (e.g. Björklund and Sundström, 2006; Francesconi *et al*., 2010). Although recent work has widened the net to other outcomes such as early childbearing and feelings of distress (Ermisch and Francesconi 2001), locus of control and self-esteem (Prevoo and ter Weel, 2014), and crime and substance abuse (Antecol and Bedard, 2007), less is known in general about how family breakdown relates to child emotional and behavioural development. One of the main contributions of this paper is to conduct parallel analyses on three broad types of child outcome - emotional health, behaviour, and cognitive achievement – so that

we can compare the life-course consequences across different important domains of child development.

We confirm the common finding that adolescents who experienced family breakdown generally have fewer cognitive and non-cognitive skills by age 16 than do children in intact two-parent families. Once we condition on background characteristics, household finances during childhood, and parental relationship quality, the strength of this correlation varies by the different outcomes, child gender, as well as varying levels of prior household conflict.

Consistent with selection, the inclusion of a rich vector of background characteristics measured before the child's birth - such as parental age, education, employment, finances and so on – reduces the strength of the correlation, particularly in terms of child test scores at age 16; this equally results from controlling for the pecuniary aspects of the family environment such as mean household income and parental employment between 0-16 years old. But, in line with many of the analyses noted above, these aspects of children's lives do not entirely account for the correlation between separation and adverse outcomes. We extend the analysis by also introducing controls for inter-parental conflict and affection, and do here find that the correlation between separation and children's subsequent non-cognitive skills is explained by the quality of the parents' relationship: the quality of family relations, rather than family structure *per se*, is what matters for child non-cognitive outcomes. We further show that family break-up may be beneficial for boy's emotional health and behaviour when the parents' relationship is conflictual (although we find no such significant positive interaction for girls). The situation regarding cognitive outcomes is different, and even in our most restrictive specifications, parental separation continues to be significantly negatively associated with administratively-linked test scores at age 16.

The remainder of the paper is structured as follows. Sections II and III describe the data and the empirical strategy used to investigate the effects of family breakdown on child outcomes. Section IV presents the results, and section V concludes with a discussion of the main findings, potential limitations, policy implications and directions for further research.

II. Data

i) The ALSPAC Cohort Study

ALSPAC is a near-census English cohort study designed to investigate the influence of environmental, genetic, and socio-economic influences on health and development over the life course. The study recruited over 14,000 pregnant women residing in the Avon area of the UK with expected delivery dates between April 1, 1991, and December 31, 1992. This amounted to around 70% of the eligible pregnancies in the study area, which comprises the city of Bristol and surrounding towns, villages and farming communities. The sample is broadly representative of

the national population of mothers with infants less than 12 months old, although there is an over-representation of higher socio-economic status groups as well as people of white ethnicity, compared to the national population as a whole (Boyd *et al*., 2013). The study contains multiple measures of the family environment as well as indicators of the development of child wellbeing and skills over time, along with rich information on the parents' characteristics and backgrounds. Our data is drawn from a mixture of postal questionnaires and tests collected in a clinical setting, as well as from linked administrative data on educational performance in national tests.[2]

ii) Measures of Child Outcomes

Whereas many analyses of the impact of family breakdown on child wellbeing look at only one child outcome, we here investigate three separate domains: emotional health, behaviour and cognition. To compare the size of the resulting associations with family breakdown across these domains, we standardise all continuous variables, both outcome and explanatory, to have a mean of zero and a standard deviation of one.

Emotional Health and Behaviour. We mainly rely on the Strengths and Difficulties Questionnaire (SDQ) to measure emotional health and good conduct/behaviour. The SDQ is a brief behavioural screening questionnaire that has been widely-used in the child-development literature (Goodman, 1997). The questionnaire consists of 25 questions that are answered by the parent on the child's concentration span, temper tantrums, happiness, worries and fears, whether the child is obedient, often lies or cheats, and so on (see the Appendix for a full list of the SDQ questions). The answers to these questions can be used to produce five wellbeing sub-scales referring to emotional problems, peer problems, behavioural problems, hyperactivity and pro-social behaviour. Following Goodman *et al*. (2010), our main analyses appeal to two broader subscales that refer to "internalising behaviour" and "externalising behaviour", as in low-risk samples such as the ALSPAC respondents the five finer subscales may not be able to pick up distinct aspects of child wellbeing.[3] The internalising-behaviour scale is a composite of the emotional and peer subscales, and the externalising-behaviour scale is made up of the conduct and hyperactivity subscales. We reverse the SDQ scales so that higher values represent better outcomes (i.e. strengths rather than difficulties).

In additional analyses we also employ an alternative measure of emotional health, the Short Moods and Feelings Questionnaire (SMFQ), which is a well-established measure of mood and depression (Angold *et al*., 1995). One notable advantage of the SMFQ as a measure of child emotional health is that it is administered to both the young respondent and their carer (most often the mother). This helps to reduce any measurement error from parents not fully observing their children's inner state. In the context of the current paper, a correlation between mother-

[2] The ALSPAC study website contains details of all the data, and is available through a searchable data dictionary (http://www.bris.ac.uk/alspac/researchers/data-access/data-dictionary/).
[3] Appendix Table A2 shows the results when we consider the five finer sub-scales separately.

reported parental separation and mother-reported child emotional health may reflect the mother's own emotional health rather than any effect on the child. Although we can of course use either the self-report or the parent-report separately, we here analyse the combined score from both reports, which has been shown to be the most reliable predictor of young adults' depressive symptoms identified from detailed separate diagnostic interviews (Rhew *et al*., 2010).

Educational Attainment. Child cognitive development is measured via school-test results from the National Pupil Database (NPD) that have been linked to ALSPAC respondents from administrative data. Our main outcome here at age 16 is the standard measure of the total average points score from the GCSE exams, which were at the time of the study the final set of standard exams prior to the end of the compulsory schooling period.

iii) Measures of the Family Environment

Parental Separation. When the child is between zero and 12 years old, the mother is asked (typically every year) whether she has either divorced or separated within the past 12 months. At age 16, the child is also asked about parental divorce or separation over the past four years. We use this information to create a dummy variable for whether a divorce or a separation occurred between birth and age 16. We focus on separation between the child's two original parents, and do not here investigate any re-coupling or subsequent separations.

Parental Conflict and Affection. Throughout the child's early life, the mother is asked about the quality of her relationship with her partner. We construct a conflict index using the responses to these questions, which include whether the parents argue frequently, and whether either one has been irritable with the other, shouted in anger, thrown anything in anger, slapped the partner, or not spoken to the other for a prolonged period. We in addition construct an affection index from the responses to questions such as how often the two parents discuss their days, kiss and hug each other, talk about their feelings, make plans, and laugh with each other. The Appendix provides more details on the original questions and the way in which these two indices are constructed.

To measure the child's average exposure to parental conflict and affection, we standardise the indices at each wave, and then take the mean of the non-missing scores over the whole of childhood. When the child's original parents are still together, this is the mean of all of the (non-missing) periods, and for parents who separate, it is the mean of the (non-missing) periods prior to separation, with any subsequent reports of conflict/affection with a new partner set to missing. The two indices are correlated with each other, but are not the same thing ($r = -.44$).

Questionnaires are sent to the child's main carer - usually the mother - in which she is asked about her relationship with her *current* partner, if she has one. Unfortunately, one important limitation of our study is that we are unable to investigate the impact of the parents' relationship following their initial separation, and the smoothness of the transition is very likely to affect the extent to which divorce affects children.

Household Economic Resources. While the conflict and affection indices pick up the non-pecuniary aspects of the family environment, we also consider the household's economic resources. The two variables that we concentrate on here are household income and maternal employment during the childhood years.[4] Household income appears in ASLPAC 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 replied to on an ordinal scale of five income bands at ages 3, 4, 7 and 8, and ten income bands at age 11. For each ALSPAC income band and wave we calculate the corresponding expected income taken from the Family Resource Survey (FRS) net household income distribution in the South West region, deflated to 2008 prices. We calculate the mean value over the whole of childhood, and then take the log of this figure.

Maternal employment is measured from repeated questions asked to the mother during the child's first 12 years of life. The reports her employment situation in each wave; we calculate whole-childhood maternal employment as the number of waves in which the mother reports to be working.

iv) Background Control Variables

The ALSPAC dataset allows us to control for a wide range of potentially confounding variables that may bias our estimates of the effect of family breakdown on child outcomes. We control for parents' age at the time of the child's birth, as well as their employment status, education, financial situation and home ownership status; we also include child characteristics at birth, such as gender, ethnicity, birth weight, and premature-birth status.

All of these background covariates are taken from surveys in the pre-natal period (or at birth), in order to ensure they do not represent the mechanisms via which the effect of family breakdown on child outcomes occurs. Summary statistics of the main input and outcome variables, as well as background characteristics, can be found in Tables 1 and 2.

v) Sample Attrition

As is the case with many large cohort and panel datasets, there are issues of attrition and non-response. The ALSPAC wave when the child is aged 16, which is used to measure child non-cognitive skills, is answered by just over 5,000 survey participants – less than half of the original sample. It is likely that attrition is non-random, and depends on respondent characteristics. Following other research in the human-capital literature (e.g. Campbell *et al*., 2014), we attempt to deal with sample attrition using non-probability weighting in regressions where the outcome is based on survey responses. Note that attrition is less of an issue when we consider cognitive outcomes, as these are picked up by test scores matched in from administrative data.

[4] Other information in this respect comes from the pre-natal background characteristics, which are included as controls, such as home ownership status and the family's experience of major financial problems (see Barazetta *et al*., 2015).

To address selective attrition by maternal pre-natal characteristics, we estimate logit regressions for the probability of dropping out of the sample by age 16. The explanatory variables in this attrition equation are a vector of pre-birth characteristics, z_{i0}. These include mother's education, mothers' age at the child's birth, child gender and ethnicity, whether the mother was married, and whether she worked at any point during her pregnancy. This methodology therefore relies on "selection on observables", and considers attrition to be ignorable non-response, conditional on the pre-natal characteristics z_{i0} (Fitzgerald *et al*., 1998; Wooldridge, 2002). We use the outcomes from the logit attrition regression to calculate inverse-probability weights: these give more weight to observed individuals who have similar characteristics to those who are more likely to attrit from the study.

In general, response in the early waves of the study is high. However, where categorical background control variables (i.e. those measured before or at birth) are missing, we include an additional "missing" category. For inputs measured during childhood, such as income, separation, conflict, and so on, which are measured at multiple time points between 0 and 16, our strategy is to retain as much information and as much of the sample as possible by taking the average of all of the non-missing informational available for each respondent.

III. Identification Issues and Empirical Strategy

Parents do not of course separate at random, so the use of observational data to identify the effect of family breakdown is problematic (McLanahan *et al*., 2013). The empirical difficulties include the usual ones of omitted variables and reverse causality, as well the fact that the treatment (divorce) may well occur over time as a process rather than a single shock, and that any effects may vary over time and across different subgroups.

In the absence of changes in divorce laws, the difficulty of finding a convincing instrument for parental separation rules out the use of instrumental variables to deal with endogeneity.[5] Given the nature of the birth cohort data we use here, we also cannot use a family/sibling difference model, in which family fixed effects condition on time-invariant family characteristics that are common to siblings (e.g. Ermisch *et al*., 2004; Björklund and Sundström, 2006).[6] Our strategy here is to use rich cohort data to estimate OLS regressions of child outcomes at age 16 on parental separation, controlling for a wide range of background characteristics as well as the stock of tension in the household prior to separation.

We begin by estimating the baseline equation

[5] Gruber (2004) appeals to divorce-law changes across U.S. states in order to assess the long-term effects of divorce on children. Another strategy used in the literature is to compare parental divorce with parental death as a natural experiment (e.g. Corak 2001; Lan and Zagorsky, 2001) although this approach does require that parental death occur at random.

[6] The intuition here is that we can compare the test scores of a sibling who experiences separation whilst still living at home with those of an older sibling who already took the same test before the parents decide to split.

$$W_{it} = \alpha + \beta_{it} SEP_{it} + \varepsilon_{it}, \quad (1)$$

where W_{it} is one of the three outcomes for child *i* (emotional, behavioural and cognitive) measured at time *t* (here age 16), SEP_{it} is a dummy variable for the child living in a non-intact family at the age of 16 (i.e. her parents separated between birth and age 16), and ε_{it} is the error term. We also include in all regressions the age of the child in months at the point of testing, *t*. This first equation provides us with the basic correlational difference in terms of outcomes between children who grew up in intact and non-intact families. As family breakdown is not random, we the estimate the equation

$$W_{it} = \alpha + \beta_1 SEP_{it} + \gamma X_i + \varepsilon_{it}. \quad (2)$$

This second equation includes X_i, a vector of family characteristics that are measured prior to the child's birth in the ALSPAC dataset. These control for a number of elements of family background that may confound the relationship observed in equation (1).

We then begin to include variables that pick up various aspects of the home environment when the child was growing up. These new variables are divided up into two types: pecuniary and non-pecuniary. First, given the central role of income in the work cited above on the difference in outcomes between intact and non-intact families, we include information on the material aspects of the home environment,

$$W_{it} = \alpha + \beta_1 SEP_{it} + \beta_2 INC_{it} + \beta_3 EMP_{it} + \gamma X_i + \varepsilon_{it}. \quad (3)$$

Here INC_{it} and EMP_{it} respectively refer to average exposure variables to household income and maternal employment over the whole childhood period (from birth to age 16).

Where we differ from previous work is that we are also able to look at the impact of non-material aspects of the home environment that could affect the family-breakdown estimates in equations (1) to (3) above. We in particular look at the quality of the parents' relationship, as this likely determines both whether parents stay together and child outcomes. We have measures of parental conflict and affection/communication (CON_{it} and AFF_{it}) in this respect. Both conflict and affection are measured at six separate child ages (see Appendices A5 and A6). For children whose parents had not separated by age 16, conflict and affection are given by the average reports over all six of these observations; for children whose parents did separate before the child was age 16, conflict and affection are given by the average reports in the pre-separation waves. We add these two parental-relationship variables into our well-being equation:

$$W_{it} = \alpha + \beta_1 SEP_{it} + \beta_2 INC_{it} + \beta_3 EMP_{it} + \beta_4 CON_{it} + \beta_5 AFF_{it} + \gamma X_i + \varepsilon_{it}. \quad (4)$$

As separation and conflict are correlated, adverse outcomes following separation may just reflect the presence of parental conflict in the child's environment.

To explore gender differences in the way children react to separation, we split the sample by child sex. Finally, we investigate interaction effects between separation and prior parental conflict. Although we may well expect a negative effect of both separation and conflict on child outcomes, it is of interest to ask whether the presence of conflict mitigates the negative effect of separation by removing the child from a stressful environment. We hence estimate the equation

$$W_{it} = \alpha + \beta_1 SEP_{it} + \beta_2 INC_{it} + \beta_3 EMP_{it} + \beta_4 CON_{it} + \beta_5 AFF_{it} + \beta_6 (SEP_{it} * CON_{it}) + \gamma X_i + \varepsilon_{it}. \quad (5)$$

In equation (5), the standardised conflict index is interacted with the separation dummy. The effect of separation on child outcomes in an average conflict household is then β_1, while the effect on a child in a "high-conflict" household (one that is one conflict standard deviation above the mean) is $\beta_1+\beta_6$. We also estimate a similar equation in which we interact the incidence of separation with the prior level of affection, the results of which are reported in Appendix Table A3.

Table 2 compares the pre-natal characteristics of parents who end up separating to those of parents who stay together. These are often different. For example, parents who remain together have higher levels of education and income, are older at the child's birth, and are more likely to be white. Some of these differences may themselves be related to child outcomes through channels other than separation, which is why we control for as many of these background characteristics as possible in our empirical analysis.

Our key contribution here is then to see whether the correlation between separation and child outcomes is robust to the inclusion of relationship variables, and how separation and parental relationship interact. The inclusion of relationship variables is key, since the assumption that separation is not correlated with the error term will be violated if there are variables that influence both child outcomes and the likelihood of separation. If we split the distribution of the standardised conflict and affection indices between intact and non-intact families (by 16) in Figures 1 and 2, we can see quite clearly there are systematic differences, with those families that ultimately separate reporting higher levels of marital conflict and lower levels of affection.

While some of the work in the existing literature has used family fixed effects, it is not clear that this approach would be useful in the current context. In the first instance, the fixed effect may well pick up underlying parental relationship quality, which is exactly what we want to measure explicitly here. Equally, if parental conflict varies over time, one sibling may be exposed to both conflict and divorce and the other to neither, in which case the correlation between separation and child outcomes in a fixed-effect framework may still reflect the omitted variable of relationship quality. Whether it is family background variables, the household's economic resources, or relationship quality that explain the correlation between separation and adverse child outcomes is not neutral, as these imply different policy responses.

An alternative to fixed effects is the use of lagged dependent variables (LDVs). However, separation can be seen as a process rather than a single event, with the antecedents potentially stretching back a number of years. If the adverse elements associated with family breakdown occur well before actual separation or divorce, they may already appear in the LDV, biasing the separation coefficient downwards. The use of LDVs here would also limit us to separations taking place after the first measurement of child outcomes at around child age 5. Our examination of separation over the whole of childhood in relation to young-adulthood outcomes - rather than analysing the data period-by-period using LDVs - allows us to pick up any delayed effects of marital separation.[7]

A last point relates to reverse causality: it may be child emotional and behavioural problems or cognitive outcomes that place strain on the parental relationship, which then feeds through to separation.[8] We test this by breaking childhood up into three broad periods (0-5 years old, 5-10 and 10-16: corresponding roughly to pre-school, junior school and secondary school), and regress parental divorce during each of these periods on the child's outcomes at the beginning of the period. The results of these reverse causality regressions appear in Appendix Table A1. Prior child wellbeing is not a significant predictor of subsequent parental separation.

IV. Results

Table 3 presents our baseline OLS estimates of the relationship between family breakdown and child outcomes. Column 1 in each panel shows regressions with no other control variables, so the estimated coefficients represent the raw difference in outcomes (as a percentage of the outcomes' standard deviations) between children in intact and non-intact families. All of the estimates suggest that children growing up in families that separated during childhood do systematically worse in all three domains, with the strongest negative relationship being for educational attainment and behavioural problems at age 16. Children from separated households have scores on national tests at age 16 that are around one-third of a standard deviation lower, on average, than children in intact homes. The analogous figures for emotional health and behaviour are around 13% and 22% of a standard deviation respectively.

Column 2 then introduces a wide set of background controls into the equation, all of which are measured before the child is born (or at birth). The separation coefficient falls for all four outcomes, suggesting that separation and child well-being are commonly affected by these new variables. This is in particular the case for child educational attainment, which is known to be

[7] This could actually work either way, with children either i) reacting strongly to divorce immediately after the event and then becoming less affected over time, or ii) not reacting at the time but feeling the adverse effects later on in childhood as they grow up in a separated family.

[8] Alternatively, parents of emotionally fragile children may well not separate, or perhaps delay separation until the child reaches adulthood, to protect the child from any supposed negative consequences.

intergenerationally transmitted. The separation coefficient here falls to about one third of its original size, although it does remain significant.

Column 3 then adds in variables related to the pecuniary aspects of the child's home environment. These also reduce the size of the estimated coefficient for all four outcomes, but again do not fully account for the association between separation and adverse child outcomes. Column 4 then turns to the non-pecuniary aspects of the home environment, and in particular the quality of the parents' relationship. This latter turns out to matter differently across outcomes. The inclusion of parental-relationship quality renders the association between separation and the two SDQ measures insignificant, and cuts the separation coefficient in half for the SMFQ well-being outcome (which is now significant at the ten percent level only). However, it makes almost no difference to our cognitive outcome, GCSE test scores.

The last column of Table 3 includes both the pecuniary and parental relationship variables. Household income is associated with better outcomes in all four panels. On the contrary, maternal employment has no effect on children's emotional health (the internalising scale of the SDQ or the SMFQ). It is, however, negatively correlated with children's good behaviour at 16 but positively associated with their test scores. Parental conflict and affection are robust predictors of child non-cognitive outcomes at age 16, but have much less of an impact on test scores at the same age. Conflict has a larger effect than affection on all non-cognitive outcomes (although affection is separately significant in all three regressions here). In line with the discussion above, conflict is particularly strongly associated with child bad behaviour at age 16, with children perhaps learning from their parents how to deal with problems and disagreements with others.

One thing to note from this Table is the R^2 values across the models. There is a divergence here between cognitive and non-cognitive outcomes. In general, the background family characteristics (like parental education, home ownership, mother's age, and so on) are able to explain much more of the variance in a child's test scores at age 16 than they can her emotional health and behavioural outcomes.

Table 4 introduces an interaction term between parental separation and prior conflict within the household. The regressions here seek to shed light on the "stress-relief" hypothesis discussed above, whereby children may do better when high-conflict parental relationships end in separation. We continue to control for the main effect of parental separation and conflict in these regressions. The last row in Table 4 shows the estimated coefficient on the interaction between separation and pre-separation conflict. This turns out to be positive and statistically significant for all three non-cognitive outcomes, but insignificantly different from zero for child test scores.[9]

[9] Table A3 replicates these findings, interacting separation with the affection index. In this case, we find that the interaction term works in the opposite direction, as would expect given the conflict results. Once

The conflict index is standardised, with a mean of 0 and a standard deviation of 1. The effect of separation in high-conflict households (i.e. those household with a degree of conflict one SD above the mean) is then given by the sum of the figures in the first and final rows. The positive interaction terms suggest that children in high-conflict situations are at least no worse off in terms of their emotional health and behaviour when their parents separate. In all three non-cognitive outcomes, the sum of the separation and conflict*separation coefficients (plotted in Figure 4, along with 90% confidence intervals) is positive, although as can be seen, given the separation coefficient's statistical insignificance the linear combination of the two is not well defined statistically across all of the outcomes.

Another way to read the significant interaction effect is to calculate how separation diminishes the adverse effects of parental conflict. Here, we can sum the coefficients on conflict and conflict*separation, in order to obtain separate conflict estimates for children in families that stay together (the main effect of conflict in the regression) versus those who separate (the main conflict effect plus the interaction). Figure 1 plots these two values (with 90% confidence intervals), revealing that conflict is less negatively correlated with young adult non-cognitive skills for those whose parents ultimately split up before the end of childhood than it is for those who stay within high-conflict households and continue to be exposed to the stress of parental conflict.

Tables 5 and 6 split the sample by child sex, and uncover a number of gender differences. Table 5 repeats the final column of Table 3 for male and female children. As for the full sample, parental separation is not significantly correlated with child non-cognitive outcomes at age 16, but is negatively related with the test scores of both boys and girls. There are equally few discernible gender differences in terms of how the pecuniary aspects of the home relate to child outcomes. However, parental relationship quality does seem to affect the non-cognitive skills of boys and girls differently. Internalising behaviour (e.g. depression and anxiety), as measured by both the SDQ and SMFQ, affection between parents has a positive effect on boys but not on girls. Girls, on the other hand, respond more adversely to parental conflict, both in terms of their emotional health and behaviour, with the conflict coefficients across the first 6 columns being around 50% more negative for girls than boys.

One reason why boys are less parental conflict is found in Table 6, which splits the regressions in Table 4 by child sex. The positive interaction term between separation and prior conflict for the three non-cognitive outcomes is found only for boys, so that separation compensates at least partially for the adverse effects of conflict for them. There is no such compensation for girls.

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both interaction terms are included together in a regression (not reported), however, but lose statistical significance.

V. Concluding Remarks

This paper has asked whether disruptions to the family environment affect young adults' cognitive and non-cognitive outcomes. We use rich cohort data of children born in the 1990s in the UK, and find evidence that adolescents whose parents separated during the first 16 years of life have systematically worse outcomes at age 16 than do children in intact two-parent families. The size of the separation coefficient is reduced, although remaining significant, when we control for a wide range of confounding factors such as parents' socioeconomic status, employment, financial situation, age and mental health, suggesting that separation partly picks up the effect of these confounders.

We then appeal to detailed repeated reports of the quality of the parental relationship prior to separation. Controlling for relationship quality renders the relationship between parental separation and children's subsequent non-cognitive outcomes - measured in terms of both internalising (such as depression and anxiety) and externalising (such as conduct and hyperactivity) behaviour – insignificant: it is the relationship between parents, rather than family structure itself, that matters for child emotional and behavioural outcomes. We also produce find some evidence that separations preceded by conflictual relationships may be beneficial for teenage boys, although not for teenage girls.

There is a distinct difference between cognitive and non-cognitive outcomes. Children's GCSE test scores are lower when the parents separate. The size of this correlation is reduced by the addition of other controls, but it is not driven to zero (as was the case for the non-cognitive outcomes). There is only a small main effect of parental conflict and affection on test scores, and no evidence of the kind of interaction terms that we identified for our non-cognitive outcomes. Whether parental separation is good or bad for the children concerned then depends critically on the weight that we give to their cognitive and non-cognitive outcomes. Within the wider context of a model of human wellbeing over the life course - such as that presented in Layard et al (2014) - the overall impact of parental separation is minimal: among child outcomes the most powerful predictors of later adult life satisfaction are children's emotional health and behaviour, much more so than their educational attainment.

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Table 1 - Summary Statistics of Main Variables

		Total		Parents Still Together at 16Y		Parents Separated by 16Y		
	N	Mean	SD	Mean	SD	Mean	SD	Difference
Parental Divorce/Separation								
Separated by age 16	14,109	0.26	0.44	0.00	0.00	1.00	0.00	
Parental Conflict Index (#8)								
Month 21	9,583	2.47	2.08	2.23	1.96	3.22	2.28	-0.99***
Month 33	8,823	2.52	2.07	2.30	1.95	3.24	2.28	-0.93***
Month 73	7,305	2.30	2.02	2.15	1.93	2.98	2.26	-0.83***
Month 110	6,448	2.14	1.96	2.00	1.87	3.04	2.28	-1.03***
Month 145	5,306	2.05	1.93	2.00	1.90	2.75	2.26	-0.75***
Parental Affection Index (#/8)								
Month 21	9,589	20.85	3.27	21.16	2.97	19.86	3.93	1.30***
Month 33	8,799	20.97	3.21	21.25	2.90	20.04	3.93	1.22***
Month 73	7,305	20.89	3.36	21.10	3.14	19.92	4.12	1.17***
Month 110	6,415	20.70	3.44	20.94	3.15	19.17	4.68	1.77***
Month 145	5,325	20.72	3.49	20.82	3.35	19.22	4.88	1.60***
Household Income (£2008)								
Month 33	8,842	334.01	194.82	365.17	188.43	260.93	189.98	104.24***
Month 47	8,645	358.29	207.08	393.19	198.42	278.11	204.30	115.08***
Month 85	7,548	445.41	221.89	489.07	205.36	338.73	224.65	150.34***
Month 97	7,094	480.41	217.74	522.13	198.64	377.49	228.40	144.64***
Month 134	6,553	557.40	349.19	619.70	349.39	410.55	301.58	209.14***
Maternal Employment								
Survey waves employed (#/10)	12,733	5.74	3.63	5.85	3.66	5.43	3.54	0.42***
Outcomes at Age 16								
SDQ Internalising	5,635	2.60	2.78	2.50	2.75	2.87	2.87	-0.37***
SDQ Externalising	5,653	3.57	3.00	3.40	2.88	4.04	3.27	-0.64***
GCSE Test Scores	11,426	317.99	94.66	325.79	91.06	296.63	100.85	29.16***
SMFQ	6,602	50.05	9.23	50.44	8.99	48.97	9.80	1.47***

The Difference in the last column refers to t-tests of the separated versus non-separated means, * p<0.1 ** p<0.05*** p<0.01.

Table 2 - Summary Statistics of Background Characteristics

		Total		Parents Still Together at 16Y		Parents Separated by 16Y		
		Mean	SD	Mean	SD	Mean	SD	Difference
Mother's Age at Birth	13,607	28.08	4.93	28.59	4.77	26.66	5.09	1.94***
Mother Married at Birth	14,109	0.75	0.43	0.82	0.39	0.55	0.50	0.27***
Child Low Birth Weight	14,109	0.06	0.23	0.06	0.23	0.06	0.23	-0.00
Child Premature	14,109	0.07	0.25	0.07	0.26	0.06	0.23	0.01**
Child Male	14,109	0.52	0.50	0.52	0.50	0.50	0.50	0.02
Child White	14,109	0.95	0.22	0.96	0.20	0.93	0.26	0.03***
Child Firstborn	14,109	0.43	0.50	0.42	0.49	0.48	0.50	-0.06***
Mother Worked during Preg'	14,109	0.70	0.46	0.71	0.46	0.69	0.46	0.01
Father Unemployed during Preg'	14,109	0.07	0.26	0.06	0.23	0.12	0.32	-0.06***
Mother's education: No qualifications	12,371	0.20	0.40	0.19	0.39	0.23	0.42	-0.04***
CSE	12,371	0.10	0.30	0.09	0.29	0.11	0.32	-0.02***
O-Level	12,371	0.35	0.48	0.34	0.47	0.37	0.48	-0.04***
A-Level	12,371	0.23	0.42	0.23	0.42	0.20	0.40	0.03***
University Degree	12,371	0.13	0.34	0.15	0.35	0.08	0.28	0.06***
Father's education: No qualifications	11,897	0.26	0.44	0.23	0.42	0.34	0.47	-0.11***
CSE	11,897	0.08	0.28	0.08	0.28	0.09	0.28	-0.01
O-Level	11,897	0.21	0.41	0.21	0.41	0.23	0.42	-0.02**
A-Level	11,897	0.26	0.44	0.27	0.44	0.23	0.42	0.04***
University Degree	11,897	0.18	0.39	0.21	0.41	0.11	0.31	0.10***
Housing: Private rental	12,910	0.12	0.33	0.10	0.30	0.19	0.39	-0.09***
Owns house	12,910	0.74	0.44	0.79	0.41	0.60	0.49	0.19***
Council housing	12,910	0.14	0.35	0.11	0.31	0.21	0.41	-0.10***

The Difference in the last column refers to t-tests of the separated versus non-separated means, * p<0.1 ** p<0.05*** p<0.01

Table 3 - Parental Separation and Child Outcomes at Age 16

	(1)	(2)	(3)	(4)	(5)
Panel A	SDQ Externalising 16Y				
Parental Separation					
Separated by age 16	-0.216***	-0.144***	-0.109***	-0.036	-0.012
	(0.039)	(0.040)	(0.041)	(0.040)	(0.041)
Household Economics					
HH Income			0.084***		0.063**
			(0.025)		(0.025)
Maternal Employment			-0.070***		-0.058***
			(0.020)		(0.020)
Parents' Relationship					
Parental Conflict				-0.208***	-0.205***
				(0.022)	(0.022)
Parental Affection				0.085***	0.082***
				(0.022)	(0.022)
Background Controls	No	Yes	Yes	Yes	Yes
Observations	5013	5013	5013	5013	5013
Adjusted R-squared	0.009	0.030	0.035	0.073	0.075

	(1)	(2)	(3)	(4)	(5)
Panel B	SDQ Internalising 16Y				
Parental Separation					
Separated by age 16	-0.130***	-0.122***	-0.074**	-0.049	-0.011
	(0.035)	(0.036)	(0.037)	(0.037)	(0.037)
Household Economics					
HH Income			0.139***		0.125***
			(0.023)		(0.023)
Maternal Employment			0.010		0.017
			(0.019)		(0.019)
Parents' Relationship					
Parental Conflict				-0.120***	-0.122***
				(0.022)	(0.021)
Parental Affection				0.070***	0.060***
				(0.019)	(0.019)
Background Controls	No	Yes	Yes	Yes	Yes
Observations	5001	5001	5001	5001	5001
Adjusted R-squared	0.003	0.022	0.030	0.040	0.046

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised (mean=0 and SD=1). Household economics and parents' relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls include the age of the child in months at testing, family financial situation at birth, parental education, employment, home ownership and age at child's birth, child ethnicity, gender and birth order, and dummy vairables for premature birth and low birth weight. * p<0.1 ** p<0.05*** p<0.01.

Table 3 (cont') - Parental Separation and Child Outcomes at 16

	(1)	(2)	(3)	(4)	(5)
Panel C			Moods and Feelings 16Y (SMFQ)		
Parental Separation					
Separated by age 16	-0.126***	-0.123***	-0.090***	-0.059*	-0.034
	(0.033)	(0.033)	(0.034)	(0.034)	(0.035)
Household Economics					
HH Income			0.096***		0.082***
			(0.021)		(0.021)
Maternal Employment			-0.030*		-0.024
			(0.017)		(0.017)
Parents' Relationship					
Parental Affection				-0.121***	-0.121***
				(0.019)	(0.019)
Parental Conflict				0.047***	0.039**
				(0.018)	(0.018)
Background Controls	No	Yes	Yes	Yes	Yes
Observations	5730	5730	5730	5730	5730
Adjusted R-squared	0.003	0.068	0.072	0.083	0.085

	(1)	(2)	(3)	(4)	(5)
Panel D			GCSE Test Scores 16Y		
Parental Separation					
Separated by age 16	-0.327***	-0.130***	-0.084***	-0.109***	-0.071***
	(0.023)	(0.021)	(0.021)	(0.022)	(0.022)
Household Economics					
HH Income			0.130***		0.126***
			(0.013)		(0.013)
Maternal Employment			0.028***		0.029***
			(0.011)		(0.011)
Parents' Relationship					
Parental Affection				-0.019	-0.020*
				(0.012)	(0.012)
Parental Conflict				0.028***	0.016
				(0.011)	(0.011)
Background Controls	No	Yes	Yes	Yes	Yes
Observations	8569	8569	8569	8569	8569
Adjusted R-squared	0.025	0.278	0.287	0.279	0.287

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised (mean=0 and SD=1). Household economics and parents' relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls include the age of the child in months at testing, family financial situation at birth, parental education, employment, home ownership and age at child's birth, child ethnicity, gender and birth order, and dummy vairables for premature birth and low birth weight. * p<0.1 ** p<0.05*** p<0.01.

Table 4 - The Interaction between Separation and Prior Conflict

	(1)	(2)	(3)	(4)
	SDQ Externalising 16Y	SDQ Internalising 16Y	SMFQ 16Y	GCSE Test Scores 16Y
Parental Separation				
Separated by age 16	-0.028	-0.023	-0.047	-0.070***
	(0.041)	(0.037)	(0.035)	(0.022)
Household Economics				
HH Income	0.063**	0.125***	0.083***	0.126***
	(0.024)	(0.023)	(0.021)	(0.013)
Maternal Employment	-0.057***	0.018	-0.022	0.029***
	(0.020)	(0.019)	(0.017)	(0.011)
Parents' Relationship				
Parental Affection	0.085***	0.062***	0.041**	0.016
	(0.022)	(0.019)	(0.018)	(0.011)
Parental Conflict	-0.247***	-0.153***	-0.155***	-0.019
	(0.024)	(0.024)	(0.022)	(0.013)
Interaction Term				
Separation x Prior Conflic	0.116**	0.086**	0.090**	-0.003
	(0.046)	(0.043)	(0.038)	(0.023)
Observations	5013	5001	5730	8569
Adjusted R-squared	0.077	0.047	0.086	0.287

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised (mean=0 and SD=1). Controls are included in all models for the age of the child in months at testing. Household economics and parents' relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls (measured before child's birth) include family financial situation, parental education, employment, home ownership and age at child's birth, child ethnicity, gender and birth order, and dummy vairables for premature birth and low birth weight. * p<0.1 ** p<0.05*** p<0.01.

Table 5 - Main Results by Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SDQ Externalising 16Y		SDQ Internalising 16Y		SMFQ 16Y		GCSE Test Scores 16Y	
Parental Separation	F	M	F	M	F	M	F	M
Separated by age 16	-0.051	0.015	-0.089*	0.079	-0.037	-0.031	-0.062**	-0.082**
	(0.051)	(0.065)	(0.054)	(0.052)	(0.055)	(0.042)	(0.029)	(0.033)
Household Economics								
HH Income	0.053	0.075**	0.105***	0.146***	0.069**	0.088***	0.120***	0.133***
	(0.034)	(0.035)	(0.034)	(0.031)	(0.035)	(0.024)	(0.018)	(0.019)
Maternal Employment	-0.062**	-0.055*	0.021	0.016	-0.019	-0.022	0.026*	0.030*
	(0.026)	(0.029)	(0.028)	(0.026)	(0.028)	(0.019)	(0.015)	(0.016)
Parents' Relationship								
Parental Affection	0.074**	0.090***	0.044	0.072***	0.009	0.065***	0.010	0.023
	(0.030)	(0.031)	(0.029)	(0.025)	(0.028)	(0.022)	(0.015)	(0.016)
Parental Conflict	-0.237***	-0.173***	-0.155***	-0.094***	-0.157***	-0.083***	-0.026	-0.016
	(0.028)	(0.033)	(0.032)	(0.029)	(0.029)	(0.025)	(0.016)	(0.017)
Observations	2573	2440	2567	2434	3077	2653	4239	4330
Adjusted R-squared	0.091	0.053	0.036	0.035	0.034	0.134	0.272	0.280

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised (mean=0 and SD=1). Controls are included in all models for the age of the child in months at testing. Household economics and parents' relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls (measured before child's birth) include family financial situation, parental education, employment, home ownership and age at child's birth, child ethnicity and birth order, and dummy vairables for premature birth and low birth weight. * p<0.1 ** p<0.05*** p<0.01.

Table 6 - The Interaction between Separation and Prior Conflict: By Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SDQ Externalising 16Y		SDQ Internalising 16Y		SMFQ 16Y		GCSE Test Scores 16Y	
	F	M	F	M	F	M	F	M
Parental Separation								
Separated by age 16	-0.061	-0.007	-0.090*	0.052	-0.047	-0.048	-0.061**	-0.081**
	(0.051)	(0.066)	(0.053)	(0.051)	(0.055)	(0.042)	(0.029)	(0.033)
Household Economics								
HH Income	0.052	0.078**	0.105***	0.149***	0.068*	0.090***	0.120***	0.133***
	(0.034)	(0.035)	(0.034)	(0.031)	(0.035)	(0.024)	(0.018)	(0.019)
Maternal Employment	-0.062**	-0.052*	0.021	0.020	-0.018	-0.018	0.026*	0.029*
	(0.026)	(0.029)	(0.028)	(0.026)	(0.028)	(0.019)	(0.015)	(0.016)
Parents' Relationship								
Parental Affection	0.076**	0.094***	0.044	0.077***	0.011	0.068***	0.010	0.023
	(0.030)	(0.031)	(0.029)	(0.025)	(0.028)	(0.022)	(0.015)	(0.016)
Parental Conflict	-0.270***	-0.222***	-0.159***	-0.154***	-0.185***	-0.126***	-0.026	-0.016
	(0.032)	(0.035)	(0.034)	(0.034)	(0.034)	(0.028)	(0.019)	(0.019)
Interaction Term								
Separation x Prior Conflic	0.086	0.147**	0.010	0.177***	0.073	0.119**	-0.002	-0.002
	(0.058)	(0.073)	(0.062)	(0.057)	(0.055)	(0.050)	(0.031)	(0.035)
Observations	2573	2440	2567	2434	3077	2653	4239	4330
Adjusted R-squared	0.092	0.055	0.036	0.040	0.035	0.137	0.272	0.280

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised (mean=0 and SD=1). Controls are included in all models for the age of the child in months at testing. Household economics and parents' relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls (measured before child's birth) include family financial situation, parental education, employment, home ownership and age at child's birth, child ethnicity and birth order, and dummy vairables for premature birth and low birth weight. * p<0.1 ** p<0.05*** p<0.01.

Figure 1: Distribution of Inter-Parental Conflict

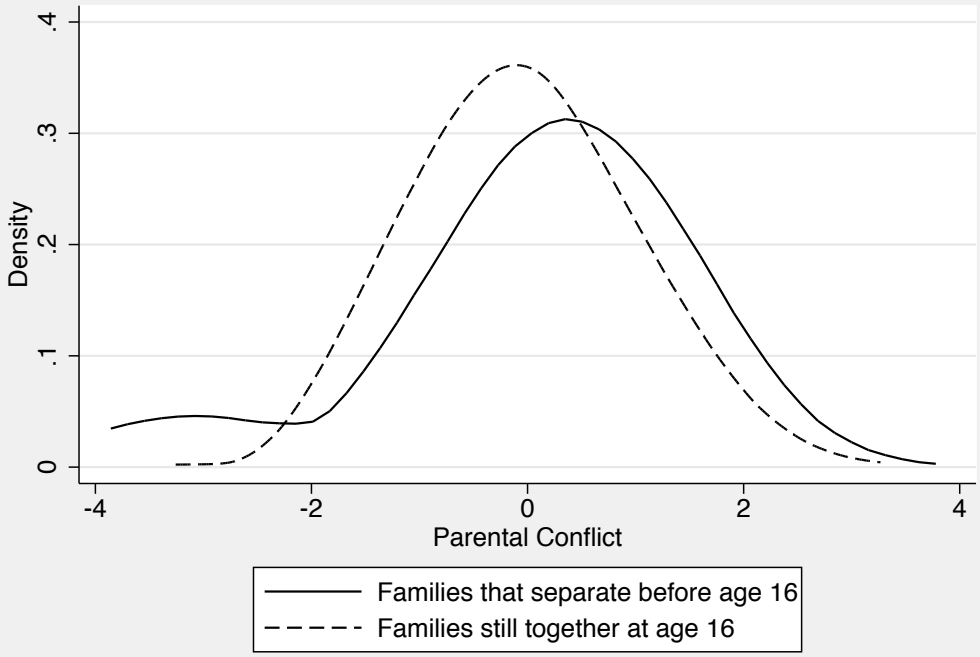


Figure 2: Distribution of Inter-Parental Affection

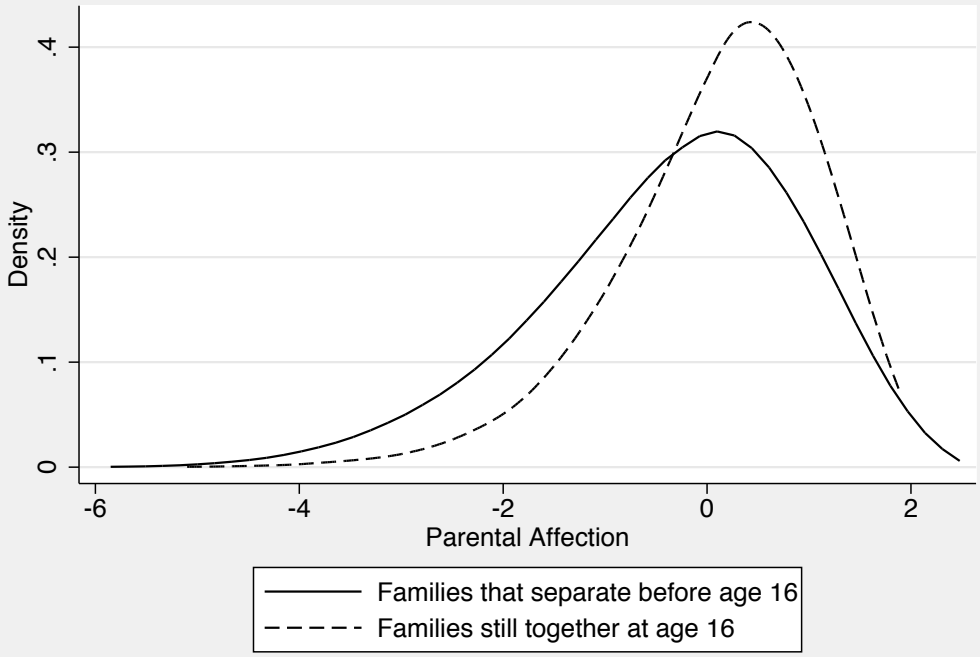
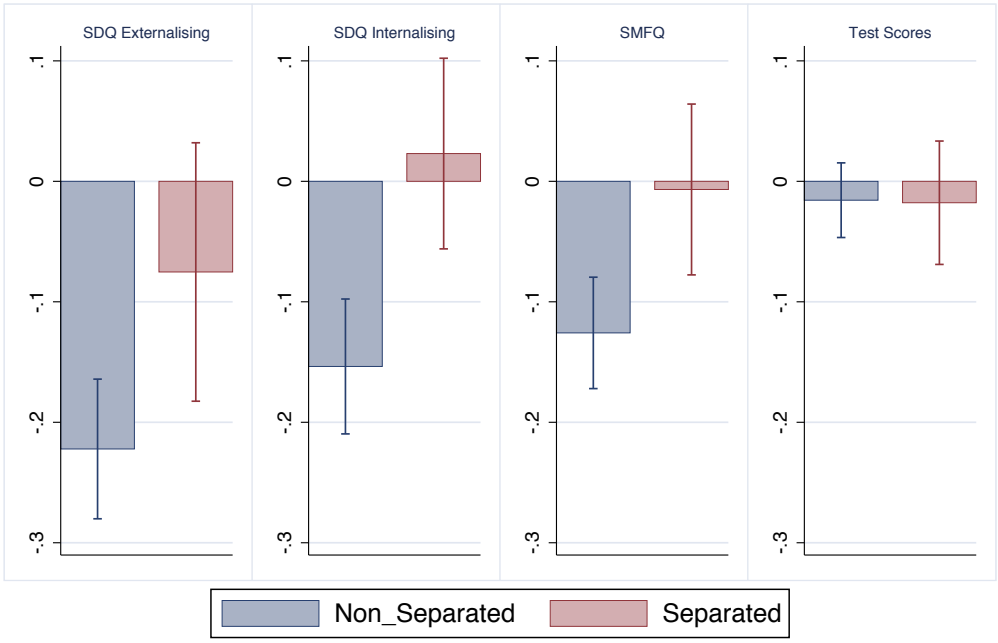
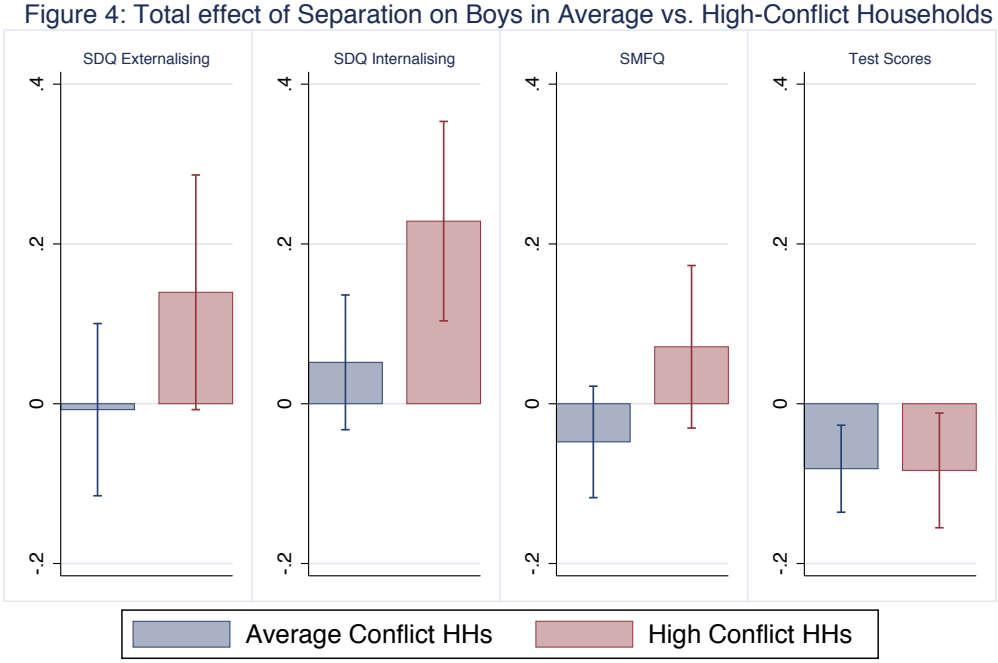


Figure 3: Total Effect of conflict on boys in Separated vs. Non-separated Households



Notes: Sample includes boys only. All regressions include a full set of background controls, measures of HH income, employment and parental aff
Separation =1 if parents separated by age 16. Conflict is a standardised index, mean=0, SD=1. All outcomes at age 16. 10% confidence intervals s

Figure 4: Total effect of Separation on Boys in Average vs. High-Conflict Households



Notes: Sample includes boys only. All regressions include a full set of background controls, measures of HH income, employment and parental aff
Separation =1 if parents separated by age 16. Conflict is a standardised index, mean=0, SD=1. All outcomes at age 16. 10% confidence intervals s

Table A1 - Reverse Causality Regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Parents Separated 5-10Y			Parents Separated 10-16Y		
Start of Each Period						
Internalising Behaviour	0.001			-0.001		
	(0.003)			(0.003)		
Externalising Behaviour		-0.003			-0.000	
		(0.003)			(0.002)	
Test Scores			-0.002			-0.000
			(0.004)			(0.003)
Observations	8591	8591	6528	6900	6897	6439
Adjusted R-squared	0.002	0.002	0.004	0.003	0.002	0.004

Notes: Logit models reported, robust standard errors in parentheses. Internalising and Externalising behaviours in columns (1) and (2) refer to SDQ reported at child age 47 months. Educational attainment in column (3) is school entry assessment at child age 54 months. The Internalising and Externalising behaviours in columns (4) and (5) refer to SDQ reported at child age 115 months. Educational attainment in column (6) is the Key Stage 1 exam result at child age 88 months.

Table A2 - Results by SDQ at 16 Years Old: Finer sub-scales

Panel A: Total	(1)	(2)	(3)	(4)	(5)
	Emotional	Peer Relations	Prosocial Behaviour	Conduct	Hyperactivity
Parents Separated	-0.036	0.006	0.016	-0.016	-0.031
	(0.038)	(0.038)	(0.041)	(0.043)	(0.040)
HH Income	0.095***	0.123***	0.009	0.060**	0.054**
	(0.023)	(0.023)	(0.024)	(0.025)	(0.025)
Maternal Employment	-0.004	0.035*	0.026	-0.038*	-0.058***
	(0.019)	(0.020)	(0.021)	(0.020)	(0.019)
Parental Affection	0.032*	0.076***	0.177***	0.052**	0.088***
	(0.019)	(0.019)	(0.022)	(0.022)	(0.021)
Parental Conflict	-0.194***	-0.046*	-0.122***	-0.242***	-0.192***
	(0.023)	(0.025)	(0.024)	(0.025)	(0.024)
Interaction Term					
Separation x Conflict	0.114***	0.024	0.123***	0.090*	0.102**
	(0.044)	(0.041)	(0.044)	(0.049)	(0.043)
Observations	5016	5016	5015	5023	5021
Adjusted R-squared	0.073	0.030	0.056	0.057	0.068

Panel B: Girls	(1)	(2)	(3)	(4)	(5)
	Emotional	Peer Relations	Prosocial Behaviour	Conduct	Hyperactivity
Parents Separated	-0.113**	-0.012	-0.063	-0.024	-0.078*
	(0.057)	(0.051)	(0.055)	(0.060)	(0.047)
HH Income	0.085**	0.103***	-0.021	0.046	0.048
	(0.037)	(0.032)	(0.034)	(0.035)	(0.034)
Maternal Employment	-0.008	0.054**	0.008	-0.037	-0.066***
	(0.030)	(0.027)	(0.028)	(0.028)	(0.025)
Parental Affection	0.010	0.070***	0.180***	0.058*	0.071***
	(0.030)	(0.027)	(0.030)	(0.031)	(0.027)
Parental Conflict	-0.198***	-0.051	-0.132***	-0.271***	-0.205***
	(0.036)	(0.033)	(0.032)	(0.034)	(0.031)
Interaction Term					
Separation x Conflict	0.037	-0.024	0.175***	0.049	0.084
	(0.065)	(0.056)	(0.061)	(0.062)	(0.055)
Observations	2573	2574	2576	2580	2574
Adjusted R-squared	0.027	0.040	0.053	0.069	0.072

Panel B: Boys	(1)	(2)	(3)	(4)	(5)
	Emotional	Peer Relations	Prosocial Behaviour	Conduct	Hyperactivity
Parents Separated	0.041	0.038	0.107*	-0.028	0.012
	(0.049)	(0.056)	(0.060)	(0.063)	(0.064)
HH Income	0.111***	0.146***	0.035	0.084**	0.059*
	(0.028)	(0.034)	(0.034)	(0.036)	(0.035)
Maternal Employment	0.003	0.026	0.043	-0.040	-0.049*
	(0.024)	(0.028)	(0.031)	(0.029)	(0.029)
Parental Affection	0.053**	0.077***	0.181***	0.043	0.107***
	(0.023)	(0.028)	(0.031)	(0.030)	(0.031)
Parental Conflict	-0.194***	-0.049	-0.112***	-0.213***	-0.175***
	(0.030)	(0.037)	(0.036)	(0.035)	(0.035)
Interaction Term					
Separation x Conflict	0.208***	0.077	0.064	0.139*	0.115*
	(0.057)	(0.059)	(0.064)	(0.074)	(0.068)
Observations	2443	2442	2439	2443	2447
Adjusted R-squared	0.042	0.021	0.043	0.045	0.041

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised, mean=0 and SD=1, and control included in all models for age of child in months at testing. Household economics and parental relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls (measured before child's birth) include family financial situation, parental education, employment, home ownership status, mother's age at birth, child ethnicity, gender and birth order, and indicator vairables for whether the child was either premature or born with a low birth weight. * p<0.1 ** p<0.05*** p<0.01

Table A3 - Interaction between Separation and Affection

	(1)	(2)	(3)	(4)
	SDQ Externalising 16Y	SDQ Internalising 16Y	SMFQ 16Y	GCSE Test Scores 16Y
Parents Separated	-0.021	-0.019	-0.039	-0.073***
	(0.041)	(0.037)	(0.035)	(0.022)
HH Income	0.065***	0.126***	0.083***	0.127***
	(0.025)	(0.023)	(0.021)	(0.013)
Maternal Employment	-0.059***	0.016	-0.024	0.029***
	(0.020)	(0.019)	(0.017)	(0.011)
Parental Conflict	-0.206***	-0.123***	-0.121***	-0.020*
	(0.022)	(0.021)	(0.019)	(0.012)
Parental Affection	0.120***	0.093***	0.059***	0.022*
	(0.024)	(0.023)	(0.022)	(0.013)
Separation x Affection	-0.095**	-0.083**	-0.049	-0.015
	(0.045)	(0.037)	(0.034)	(0.020)
Observations	5013	5001	5730	8569
Adjusted R-squared	0.077	0.048	0.086	0.287

Notes: Robust standard errors in parentheses. All outcomes are measured at age 16 and are standardised, mean=0 and SD=1, and control included in all models for age of child in months at testing. Household economics and parental relationship variables refer to the average exposure over the whole 16 year period; all are standardised. Background controls (measured before child's birth) include family financial situation, parental education, employment, home ownership status, mother's age at birth, child ethnicity, gender and birth order, and indicator vairables for whether the child was either premature or born with a low birth weight. * p<0.1 ** p<0.05*** p<0.01

Table A4 - Correlation Matrix

	Separation	Conflict	Affection	Income	Maternal Employment	SDQ Internalising	SDQ Externalising	SMFQ	GCSEs
Separation	1.000								
Conflict	0.221	1.000							
Affection	-0.220	-0.406	1.000						
Income	-0.285	-0.122	0.166	1.000					
Maternal Employment	-0.008	0.018	0.012	0.232	1.000				
SDQ Internalising	-0.056	-0.127	0.119	0.111	0.052	1.000			
SDQ Externalising	-0.075	-0.216	0.157	0.112	-0.016	-0.369	1.000		
SMFQ	-0.075	-0.156	0.123	0.094	-0.002	-0.518	-0.380	1.000	
GCSEs	-0.147	-0.071	0.073	0.324	0.056	-0.180	-0.371	0.163	1.000

A5 – Conflict Index

	Conflict Questions (mother-reported at 21, 33, 73, 110, 145 months)
1)	*How often have you been irritable with your partner recently?*
2)	*How often has he been irritable with you?*
3)	*How many arguments have you had in the past 3M?*
	In the past 3 months, have any of these happened?
4)	*One of you not speaking to partner for more than half an hour*
5)	*One of you walking out of the house*
6)	*One of you shouting at partner and/or calling partner names*
7)	*One of you hitting or slapping the other*
8)	*One of you throwing or deliberately breaking things*

	Conflict Questions (mother-reported at 8 months)
1)	*Does your partner get angry with you?*
2)	*Do you get angry with your partner?*
3)	*Do you have arguments?*
	1. Never, 2. Rarely, 3. Sometimes, 4. Often, 5. Very Often

A6 – Affection Index

	Affection Questions (mother-reported at 21, 33, 73, 110, 145 months)
1)	*Frequency mum and partner discuss their day*
2)	*Frequency mum and partner laugh together*
3)	*Frequency mum and partner calmly talk things over*
4)	*Frequency mum and partner kiss and hug*
5)	*Frequency mum and partner make plans*
6)	*Frequency mum and partner talk about feelings*
	1. Never, 2. <once a week, 3. 1-3 times a week, 4. Most days

	Affection Questions (mother-reported at 8 months)
1)	*Mother receives affection from partner*
2)	*Partner listens to mother's feelings*
3)	*Partner discusses his feelings*
4)	*Mother enjoys partner's company*
5)	*Partner shows approval of mother*
6)	*Mother affectionate towards partner*
7)	*Mother and partner socialise together*
8)	*Partner kisses and hugs mother*
9)	*Parenthood made mother and partner stronger*
10)	*Partner holds mothers in arms*
	1. Never, 2. Rarely, 3. Sometimes, 4. Often, 5. Very Often

A7 – Strengths and Difficulties Questionnaire (SDQ)

Internalising Behaviour

Are the following statements about the child "Not True", "Somewhat True" or "Certainly True"?

(i) Often complains of headaches, stomach-aches or sickness
(ii) Many worries, often seems worried
(iii) Often unhappy, down-hearted or tearful
(iv) Nervous or clingy in new situations, easily loses confidence
(v) Many fears, easily scared
(vi) Rather solitary, tends to play alone
(vii) Has at least one good friend
(viii) Generally liked by other children
(ix) Picked on or bullied by other children
(x) Gets on better with adults than with other children

Externalising Behaviour

Are the following statements about the child "Not True", "Somewhat True" or "Certainly True"?

(i) Generally obedient, usually does what adults request
(ii) Often has temper tantrums or hot tempers
(iii) Often fights with other children or bullies them
(iv) Often lies or cheats
(v) Steals from home, school or elsewhere
(vi) Restless, overactive, cannot stay still for long
(vii) Constantly fidgeting or squirming
(viii) Easily distracted, concentration wanders
(ix) Thinks things out before acting
(x) Sees tasks through to the end, good attention span

A8 – Short Moods and Feelings Questionnaire (SMFQ)

Are the following statements about you / the child "True", "Sometimes True" or "Not at all"?

(i) I felt miserable or unhappy
(ii) I didn't enjoy anything at all
(iii) I felt so tired I just sat around and did nothing
(iv) I was very restless
(v) I felt I was no good anymore
(vi) I cried a lot
(vii) I found it hard to think properly or concentrate
(viii) I hate myself
(ix) I was a bad person
(x) I felt lonely
(xi) I thought nobody really loved me
(xii) I thought I could never be as good as other kids
(xiii) I did everything wrong

Figure A1: Percent of Parents Separated (by child age)