The relationship between maternal care experience and early child development: Evidence from the UK

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Abstract

We examine the relationship between maternal out-of-home care (OHC) experience and her child's early behavioural, emotional and cognitive development, drawing on data collected for the UK Millennium Cohort Study. We observe stark raw differences between the early development of children with OHC and non-OHC mothers, with children of OHC mothers performing worse across all domains – cognitive, behavioural and emotional. While the differences in cognitive (language) and emotional development are explained by differences in family demographic characteristics and socio-economic status, the associations between OHC and both behavioural problems and school readiness remain. Behavioural differences are explained by differences in parenting behaviours and the quality of the parent-child relationship across OHC and non-OHC mothers; school readiness differences are fully attenuated once maternal health and wellbeing measures are accounted for. Our paper highlights the importance of support for care leavers who become parents and for nurturing parent-child relationships in helping to break the intergenerational transmission of disadvantage.

Keywords

Out-of-home care; Mothers; Disadvantage; Parenting; Intergeneration Transmission.

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Introduction

There is evidence that care leavers, i.e., adults who have spent time in out-of-home care (OHC) as a child, have a heightened risk of exposure to adverse psychosocial circumstances across the life course, including higher risks both in their family of origin and later on through their own experiences. This can manifest in a variety of ways including: low levels of educational attainment (Forsman, 2020; O'Higgins et al., 2017; Sebba et al., 2015), unemployment and socio-economic disadvantage (Boddy et al., 2020; Cameron et al., 2018; Osterberg et al., 2016; Naccarato et al., 2010; Buehler et al., 2000), unstable relationships and early family formation (Roberts et al., 2017; Botchway et al., 2014; Svoboda et al., 2012), and poorer mental and physical health (Murray et al., 2020; Rees & Stein, 2016; Martin et al., 2014; Stein & Dumaret, 2011; Cheung & Buchanan, 1997). Recent research by Parsons and Schoon (2021), using data from the UK Millennium Cohort Study (MCS), corroborates this evidence, showing that these risk factors are indeed experienced by higher proportions of mothers with out-of-home care (OHC) experience than mothers without OHC experience.

There is far less evidence on the life chances and experiences of the children of care leavers however, which is where our study contributes new evidence. For example, recent work showed that children of care leavers are at an increased risk of low educational attainment at the end of compulsory schooling (Parsons et al., 2022) and of experiencing poor mental health into mid-life (Parsons & Schoon, 2022). Care leavers experience, on average, higher adversity in terms of socio-economic disadvantage both during childhood and in their adult years. Their own experiences in childhood, in turn, including their interactions with parents and carers, are likely to shape their later interactions with their own children in profound and long-lasting ways. Given the centrality of parental behaviours and relationships for early child development (see Cattan et al., 2022), alongside the importance of economic and material resources (Cooper & Stewart, 2013) and parental physical and mental health and wellbeing (Goodman & Gotlib, 1999), our study compares the early cognitive and behavioural development of children with OHC and non-OHC mothers, and examines separately the role of resources, demographics, parenting behaviours and parental mental and physical health in shaping it.

Our focus is on the early years, specifically the inter-related domains of early cognitive, language and socio-emotional/behavioural development. There is extensive evidence that socio-inequalities emerge from the moment of birth and indeed before – including variations in birthweight (e.g. Weightman et al., 2012) and breastfeeding (Fitzsimons & Vera-Hernandez 2022; Kelly & Watt, 2005). These inequalities persist throughout childhood and adolescence and are manifest in subsequent levels of socio-emotional and behavioural adjustment (Deighton et al., 2019; Reiss, 2013; Hansen & Joshi, 2007; 2008; Dex & Joshi, 2004), cognitive and language development (Cattan et al., 2022; Sullivan et al., 2013; Parsons et al., 2011; Feinstein, 2003) – with major repercussions for a wide range of longer term educational and life outcomes (Cattan et al., 2022; Schoon et al., 2021). Several early childhood interventions targeted towards children at high socio-economic risk show sustained effects, enabling at-risk children to achieve socially important outcomes years, even decades later (García et al., 2021). In particular, there is strong evidence regarding early parenting programmes (see Jeong et al., 2021 for a review), a key policy lever with much potential and a key area of focus

for care leavers whose own formative experiences as children may have been especially challenging.

The remainder of the paper proceeds as follows. In section 2 we discuss our aims and research questions, followed by a description of data and methods in section 3. Section 4 presents the main research findings, and section 5 provides a discussion.

Aims and Research Questions

In order to gain a deeper understanding of how the intergenerational transmission of risk and disadvantage varies for children of OHC and non-OHC mothers, this study examines whether children of mothers with OHC experience perform less well in cognitive assessments and exhibit more behavioural problems in the pre-school years than their peers whose mothers did not experience OHC. It further asks whether it is the maternal experience of OHC *per se* or correlated risk factors that are detrimental to their child's development; whether the OHC 'penalty' remains after demographics and socio-economic circumstances are accounted for, and the extent to which parenting styles and the parent-child relationship mediate any residual association.

Adopting a multi-dimensional conceptualization of risks and unpacking their differential influences, we assess the relative and independent contributions of OHC experience versus other psychosocial risk factors that are associated with both OHC experience and with early cognitive skills and/or behavioural problems. In our analysis we differentiate between the OHC experience itself and correlated risk factors. The first set of factors we consider are more structural in nature, including family demographics and socio-economic status, and we assess whether the OHC 'penalty' remains after demographics and socio-economic circumstances are accounted for. The family demographics we consider include those which have consistently been shown to correlate with early development: maternal age at birth (Duncan et al., 2019), single parenthood (Hansen et al., 2010; Kiernan & Huerta, 2008; Osborn et al., 1984); ethnicity and English as an additional language (Whiteside et al., 2017; Farkas & Beron, 2004). In terms of socio-economic status, we consider home ownership as an important indicator of wealth (Tunstall et al., 2013; Furley, 1989), and poor housing and overcrowding in the home as potential predictors of behavioural problems (Mind, 2017; Coley et al., 2015; Evans, 2006; Harker, 2006; Office of the Deputy Prime Minister, 2004). We also account for worklessness in the household, and for highest maternal educational qualification given strong links with early development (e.g. Parsons et al., 2014). Regarding the processes linking these factors to children's development one has to keep in mind that socio-economic risk factors tend to show stronger associations with cognitive development, while indicators of family structure or family disruption tend to be more strongly associated with socio-emotional adjustment (Schoon et al., 2010; Kiernan & Mensah, 2009; Kiernan & Huerta, 2008).

We further examine the extent to which behavioural and lifestyle factors including parenting behaviours and the parent-child relationship, as well as maternal mental and physical health, mediate any association that remains between our child outcomes and maternal OHC experience after accounting for family demographics and socio-economic status measures detailed above. Taking a developmental perspective, all of the factors included are assessed during early childhood (at age 9 months or 3 years) to tap into the challenges faced by care leavers who become mothers and to gauge the extent to which these very early risk exposures cast a shadow on later outcomes.

In addition, we control for sex, given important disparities in early development. For example, research has shown that males tend to have higher behavioural difficulties than females in the early years, but lower socio-emotional difficulties (Davis et al., 2010). These trends by sex continue as children age (Cullis & Hansen, 2008). Females tend to outscore males in cognitive development, and the gender gap in achievement remains throughout the school years (Machin & McNally, 2005).

We pose the following research questions:

- Do children whose mothers experienced out-of-home care fare worse in terms of early development, specifically regarding cognitive skills, emotional and behavioural adjustment?
- To what extent is any association between maternal OHC and child development mediated by child and family demographics, and family socio-economic status?
- What is the role of parenting behaviours and of maternal health and wellbeing, in mediating the association between maternal OHC experience and children's cognitive and behavioural development (once family demographics and SES accounted for)?

Data and Methods

Millennium Cohort Study

The Millennium Cohort Study (MCS) is a multi-purpose on-going longitudinal study of approximately 19,000 babies born to families living in the UK between September 2000 and January 2002 (Joshi & Fitzsimons, 2016; Connelly & Platt, 2014; Plewis, 2007). Data has been collected when the children were aged around 9 months, 3, 5, 7, 11, 14 and 17 when approximately 10,700 study members participated. Here we draw on information collected from personal interviews and self-completion questionnaires administered to parents of the cohort children at child age 9 months and 3 years and the child's performance in cognitive assessments at age 3 (University of London, 2022a; 2022b). Information collected includes a wide range of robust socio-economic, employment and qualification details, together with information on family transitions, health, health-behaviour, wellbeing and parenting behaviour.

Analytic Sample

Of the 18,552 families who first took part in sweep 1 or the 692 new families introduced at sweep 2, our analytic sample comprises of 19,082 families. The sample was restricted to families where the natural mother was the main respondent, had provided information on her experience of out-of-home care and their child's sex and ethnicity. Of the 19,082 natural mothers in the analytic sample, 308 (1.6%) had experienced out-of-home care before they were 17.

The 308 (1.6%) mothers with care-experience in our sample had an age range at baseline of 15-45 years, being born between 1955 and 1985 and experiencing (mainly) UK care systems and policies covering the 1950s-2000.

Multiple Imputation

We used Multiple Imputation (MI) to deal with attrition and item non-response to restore sample representativeness, adopting a chained equations approach (White, Royston & Wood, 2011) under the assumption of 'missing at random' (MAR), which assumes that the most important predictors of missing data are included in our models. To maximise the plausibility of the MAR assumption the most important predictors of missing data (e.g. Disadvantaged socio-economic background in childhood, worse mental health and lower cognitive ability in early life,) are included in our models to further reduce bias and retain power (see Silverwood et al., 2021; Mostafa et al., 2021; Mostafa & Wiggins, 2015). All reported analyses are averaged across 25 replicated data sets based upon Rubin's Rule for the efficiency of estimation under a reported degree of missingness across the whole data of around 0.25 (Little & Rubin, 2014). Missingness in the variables ranged from less than 1% in many of the sweep 1 measures to 33% for a scale assessing parent-child closeness (PIANTA) at Sweep 2. (See Appendix Table A1 for the level of missingness in all variables included in the imputation process.)

The analyses were additionally weighted to adjust for the survey's stratified clustered sampling design (Plewis, 2007).

Key Measures

Out of Home Care Experience

Experience of out of home care was identified with two questions included in the parent interview at child age nine months and child age three years (for new respondents): 'Before the age of 17, did you spend any time living away from both of your parents?' If 'yes', a follow-on question asked, 'Where did you mainly live during this time?'[1] Parents who had spent time in a children's home or with foster parents, run by either a local authority or voluntary society, were coded as having been in out-of-home care.

Bracken School Readiness

At age three MCS cohort members completed the Bracken School Readiness Assessment-Revised (BSRA-R), which is one component of the Bracken Basic Concept Scale-Revised (Bracken, 1998). The BSRA-R is used as a screening instrument to assess the 'readiness' of a child for formal education by testing their knowledge and understanding of basic concepts (Bracken & Crawford, 2010; Bracken, 1998). Basic concepts are defined as aspects of children's knowledge that are taught by parents and/or pre-school teachers to prepare a child for formal education. The assessment consists of 85 items across five basic concept sub-tests: Colours (10); Letters (15); Numbers/Counting (18); Size/Comparisons (22); and Shapes (20). All items are summed to produce a total score which is age standardised. The age standardised score is also used to place cohort members into a five-category 'Normative Classification' variable which ranges across 'very advanced' 'advanced' 'average' 'delayed' and 'very delayed'. Differentiating between children who are 'delayed' (combining delayed or very delayed) against those who are 'school ready' (combining average, advanced or very advanced) we find that in our sample 16% of children are classified as 'delayed', which is slightly higher than the percentage as the overall UK MCS age three sample who completed the assessment (for further details see Connelly, 2013).

BAS Naming Vocabulary

The British Ability Scales Second Edition (BAS II) is a battery of individually administered tests of cognitive abilities and educational achievement, published by the NFER-NELSON Publishing Company Ltd (Elliott, 1996)[2]. The Naming Vocabulary assessment is part of The Early Years Battery that is generally administered to pre-school children under 6 years of age. It assesses expressive language and knowledge of names. The child was shown a series of

[1] Response options to the question 'Where did you mainly live during this time?': Local authority children's home; Voluntary society children's home; Children's home - not sure which type; Local authority foster parents; Voluntary society foster parents; Foster parents - not sure which type; Boarding school; Living with relatives; Prison/Young Offenders Institute/Borstal; Some other place.

[2] The BAS II has since been updated to BAS3. For further details see Elliott & Smith, 2011; 2013.

pictures presented in the stimulus booklet and asked to say what it was, e.g., a picture of a shoe, chair or pair of scissors. The BAS includes 36 pictures of increasing difficulty level. The number of items a child answers is dependent on his / her progress and performance. Children complete different items as they progress through the assessment based on their performance, thus their raw scores cannot be compared directly and are therefore converted to an ability score, which reflects both the raw score and the difficulty of the items administered.

Early behaviours problems (age 3)

Behaviour and emotions were assessed from parent reports on the Strengths and Difficulties Questionnaire [SDQ] at child age 3. The SDQ is widely validated cross-nationally and cross-culturally for use in non-clinical settings (see Goodman 1997, 2001). The SDQ includes 25 measures comprising five scales of five items each. For each negative attribute, the parent is asked to say whether it is 'not true' (0), 'somewhat true' (1) or 'certainly true' (2) about their child's behaviour, with scores reversed for positive attributes. For this analysis we use the four sub-scales – emotional symptoms, peer relationship problems, conduct problems, hyperactivity/inattention. We combine emotional with peer problems to represent 'internalising' symptoms (social and emotional adjustment) and conduct with hyperactivity problems to represent 'externalising' symptoms (behaviour) (Goodman et al., 2010).

All four of the outcome measures are standardised[3].

Covariates

We control for a wide range of family background, socio-economic, parenting style and health and wellbeing characteristics that have been associated with early childhood cognitive and behavioural outcomes in the literature. These measures are taken from the first MCS survey when cohort members were age 9 months or three years. The majority of measures were dichotomised for ease of interpretation in the regression modelling. For child characteristics we include child sex (male = 0; female = 1); ethnicity (white = 0; British Minority Ethnic [BME] = 1); and age (continuous). For family demographics we differentiate between two parent (0) or single parent (1) families, whether the mother was an older (0) or teenage mother (1), and if only English is spoken in the home (0) or English and/or only another language is spoken (1).

The socio-economic status measures included are parent highest qualification level (National Vocational Qualification [NVQ] levels) grouped at NVQ2-5 (0) or None/NVQ1 (1); whether someone in the household is working (0) or it is a workless household (1); In terms of housing, we include if the housing is owner occupied (0) or rented (1); whether the home is overcrowded, comparing homes with <1 person per room (0) against those with 1+ person per room (1); and whether there is no dampness (0) or the home suffers from dampness (1).

Under parenting styles we include how long the child was breastfed for, 0-3 months (0) or more than 3 months (1); from the age 3 survey we include the quality of the home learning

[3] We additionally looked at the health of the child, specifically whether the mother reported they had a longstanding illness at age 3. We found no association with maternal OHC experience (.15 OHC, .16 No OHC). Although a finding of interest, the lack of association did not fit with the analytic purpose of this research.

environment comparing the majority (0) to the poorest, which are those with a score of 1 standard deviation (sd) below the mean (1); assessment of the parent-child relationship, using the Pianta Child-Parent Relationship Scale: Short Form[4] (Pianta, 1992), separately in terms of closeness and conflict again comparing the majority (0) to those with low closeness (1) or high conflict (1), based on scores being 1 sd below/above the mean; and finally how the mother rates her own parenting skills, comparing separately those with below average or above average against the majority who rate their parenting skills as average.

For health, we include a measure of maternal general health, comparing those who self-report good, very good or excellent health (0) against those who report having poor or fair health (1) in the first survey. We also include the mother's smoking practices from the first survey comparing not being a smoker (0) to current smokers (1). In addition, we assessed whether the mother exhibits a high number of depressive symptoms at child age 3, as measured by the widely used Kessler scale K6 (Kessler et al., 2003), a screening instrument for non-specific distress. The K6 has a score range of 0-24, with higher scores indicating that the mother is experiencing higher levels of distress. For K6, cut-off points differentiate between moderate (5+) and severe (13+) levels of distress. In our analysis we use the 13+ cut-off, 0-12 (0) 13+ (1).

Analytic strategy

We first describe the association between maternal out-of-home care experience and our four child outcomes at age 3 (Table 1) and a range of child and family background characteristics and parenting style measures (Table 2). For each outcome measure we then run a series of five ordinary least squares (OLS) regression models given our outcomes are continuous measures. We first regress each outcome measure on mother OHC experience (model 1), and then adjust for additional sets of characteristics to show how the direct relationship between mother OHC experience and behaviour problems or cognitive scores changes once the inter-related family socioeconomic and individual characteristics are taken into account. In summary:

- Model 1: Mother OHC experience
- Model 2: Model 1 + Child and family demographics
- Model 3: Model 2 + SES characteristics
- Model 4: Model 3 + Parenting styles
- Model 5: Model 4 + Mother health and wellbeing

The complete regression results are included in the appendix (Tables A2-A5) and we additionally present the coefficient for mother OHC experience from each of the five models for each outcome graphically to optimise readability.

[4] The Child-Parent Relationship Scale (CPRS) was adapted from the Student-Teacher Relationship Scale (STRS, Pianta, 1992). The CPRS (Short Form) is a 15-item self-administered rating scale, with responses on a 5-point Likert scale. Eight items assess conflict and seven items closeness in the child-parent relationship. (For details of the scales including their alpha reliability see Johnson et al., 2015.)

Results

Descriptives

Table 1 shows that compared to children whose mother has no OHC experience, children of mothers with OHC experience have higher internalising and externalising scores and lower cognitive scores at age 3. Differences are most notable for externalising symptoms and school readiness.

Table 1: Child standardised outcome scores [95% CIs] by maternal OHC experience

	Mother	
Mean Child Outcomes (age 3)	No OHC	OHC
SDQ: Internalising symptoms	-.07 [-.10,-.05]	.24 [.09,.40]
SDQ: Externalising symptoms	-.05 [-.08,-.02]	.42 [.27,.57]
BAS: Naming Vocabulary	.12 [.09,.16]	-.06 [-.19,.06]
Bracken School Readiness	.16 [.11,.20]	-.35 [-.49,-.22]
Bracken School Readiness (delayed): proportion	.16 [.15,.17]	.31 [.24,.38]
N(100%)	*18774*	*308*

Table 2 highlights how the families differ by maternal OHC experience across all the covariates included in the modelling. There are no differences in terms of child sex, ethnicity or age, but the mothers with OHC experience are, on average, younger, more likely to be a single parent (.32, .15) with only English spoken in the home. They are also far more likely to have no or low-level educational qualifications (.53, .24), to be part of a workless household (.49, .18) and to be living in rented, overcrowded and/or damp housing.

In terms of parenting, fewer mothers with OHC experience rated their parenting skills as 'above average', although they provided a similar home learning environment for their child than non-OHC mothers (.17, .14). Fewer mothers with OHC experience had breastfed for more than three months (.33, .17), were more likely to experience conflict and less likely to experience closeness in their relationship with their child. In terms of health and wellbeing, more mothers with OHC experience smoked (.68, .28) and more mothers with OHC experience reported to only be in 'fair' or 'poor' general health (.36, .17). They also experienced more symptoms associated with depression: compared to no OHC mothers, more OHC mothers exhibited both moderate (.51, .28) and severe levels of distress (.09, .03).

Table 2: Family characteristics, parenting styles and health and wellbeing by maternal OHC experience: proportions [95% CIs]

	Mother	
Child & Family Demographics (9 months)	No OHC	OHC
CM ethnicity: BAME	.13 [.11,.16]	.13 [.08,.19]
CM sex: female	.49 [.48,.50	.48 [.41,.54]
CM age at interview: years (mean)	3.1 [3.1,3.1]	3.2 [3.1,3.4]
Single parent	.15 [.14,.16]	.32 [.25,.38]
Age Mother at CM birth: years (mean)	28.8 [28.6,29.0]	25.4 [24.6,26.3]
English and/or only other language spoken at home	.11 [.09,.13]	.04 [.01,.07]
SES Characteristics (9 months)		
Parent no or NVQ1 level qualifications	.24 [.22,.25]	.53 [.46,.60]
Workless household	.18 [.17,.19]	.49 [.42,.56]
Rented housing	.38 [.36,.40]	.81 [.75,.87]
Overcrowded home	.25 [.24,.26]	.40 [.33,.47]
Damp home	.13 [.12,.14]	.28 [.22,.34]
Parenting Styles (9 months or 3 years)		
CM breastfed > 3 months (9 months)	.33 [.31,.35]	.17 [.12,.23]
Pianta: parent-child high conflict score (3 years)	.12 [.12,.14]	.23 [.17,.29]
Pianta: parent-child low closeness score (3 years)	.10 [.09,.11]	.23 [.17,.30]
Poor home learning environment (3 years)	.14 [.13,.15]	.17 [.12,.23]
Mother feels she is a below average parent (3 years)	.06 [.06,.07]	.09 [.05,.13]
Mother feels she is an above average parent (3 years)	.60 [.59,.61]	.44 [.36,.51]
Mother Health & Wellbeing (9 months or 3 years)		
Mother poor/fair general health (9 months)	.17 [.16,.18]	.36 [.29,.42]
Mother psychological distress (Kessler): mean [0-24] (3 years)	3.4 [3.3,3.4]	5.6 [4.9,6.2]

Mother severe psychological distress (Kessler): 13+ (3 years)	.03 [.02,.03]	.09 [.05,.13]
Mother a current smoker (9 months)	.28 [.27,.30]	.68 [.62,.75]
N(100%)	*18774*	*308*

Regression results

Cognitive skills: BAS Naming Vocabulary and School Readiness

Maternal OHC experience has a significant association with both naming vocabulary (Appendix Table A2) and school readiness (Appendix Table A3) scores, which remained when family demographic measures were included in the modelling. Figure 1 shows that the association with naming vocabulary scores was attenuated when socio-economic conditions were taken into account (model 3), while the association with school readiness scores was not (Figure 2). The association between OHC and school readiness remains significant (but now only at the 5% level) after including SES characteristics (model 3) only being completely attenuated when parenting characteristics were also included in the modelling (model 4).

Figure 1: association between maternal OHC experience and BAS Naming Vocabulary scores: OLS coefficients [95% CIs] from model 1 to model 5

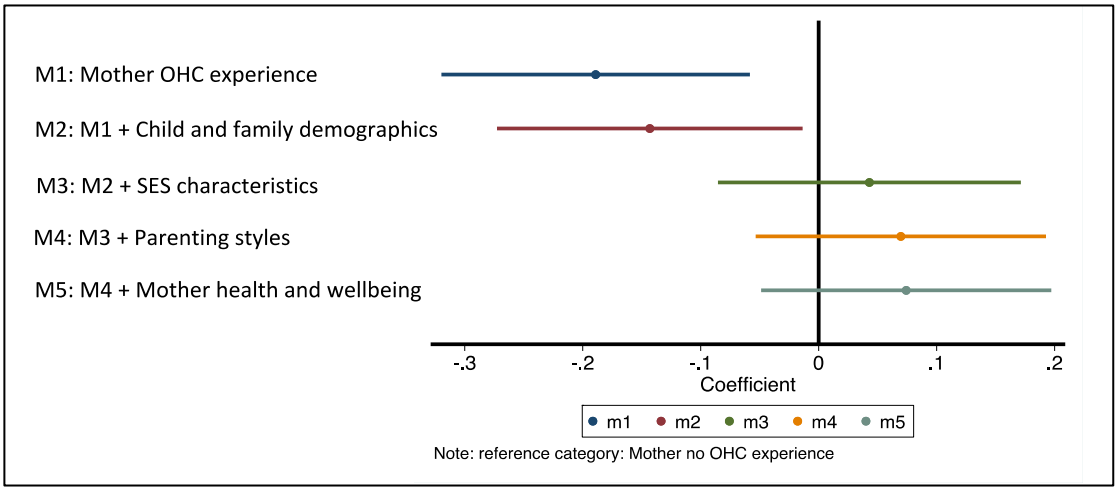
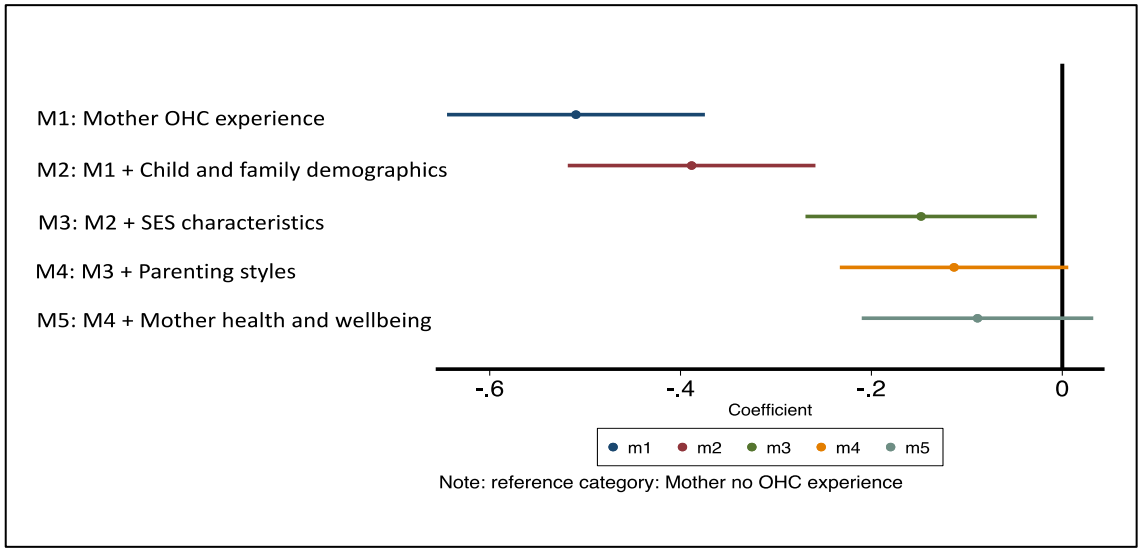


Figure 2: association between maternal OHC experience and Bracken School Readiness scores: OLS coefficients [95% CIs] from model 1 to model 5



Notably, regarding the assessment of school readiness this analysis uses the overall age standardised school readiness score. Comparing those who are delayed versus those who are 'school ready' in a smaller sample of cohort members living in England (see Parsons et al., 2022) the findings suggest that the association between maternal OHC experience and school readiness is completely explained by family socio-economic resources (lower levels of parent qualification, being part of a workless household and a household where an additional language to English is spoken; or by housing conditions (living in poor quality rented housing in a deprived area). Family status, parental health, and child's sex do not fully attenuate the negative association between maternal OHC experience and their child being 'school ready' at age 3. Thus, while child and family socio-demographic characteristics do not explain the association between maternal OHC experience and school readiness measured as a continuous score, they can fully explain whether the child is delayed or school ready by age 3.

Internalising and Externalising symptoms

Mother OHC experience has a significant association with both internalising (Appendix Table A4) and externalising (Appendix Table A5) symptoms, which remained when family demographic measures were included in the modelling. As shown in Figure 3, the association with internalising symptoms was attenuated when family socio-economic conditions were accounted for (model 3), but the association with externalising symptoms (Figure 4) was only attenuated when aspects of parenting, including the parent-child relationship, were included (model 4).

Figure 3: association between maternal OHC experience and SDQ internalising symptoms: OLS coefficients [95% CIs] from model 1 to model 5

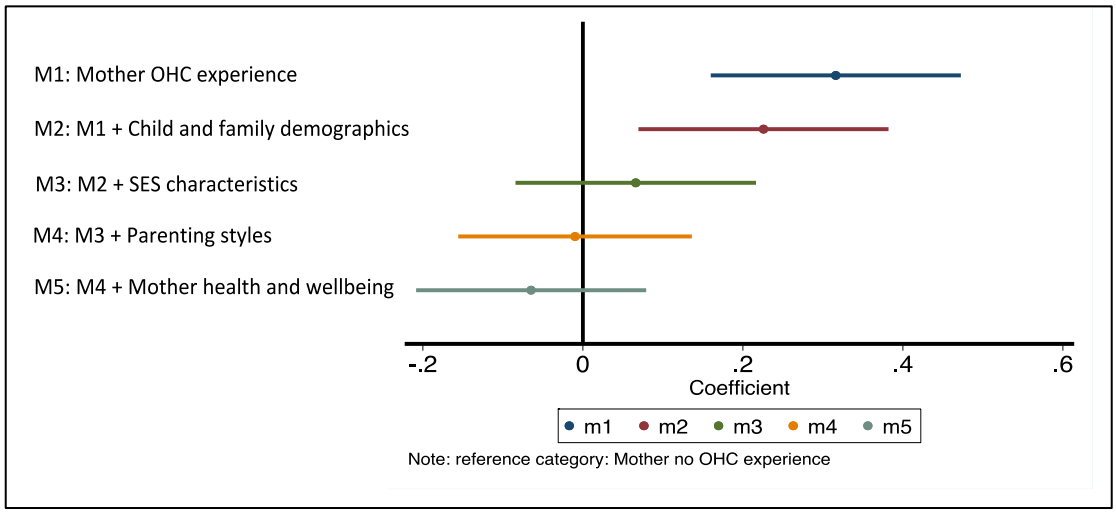
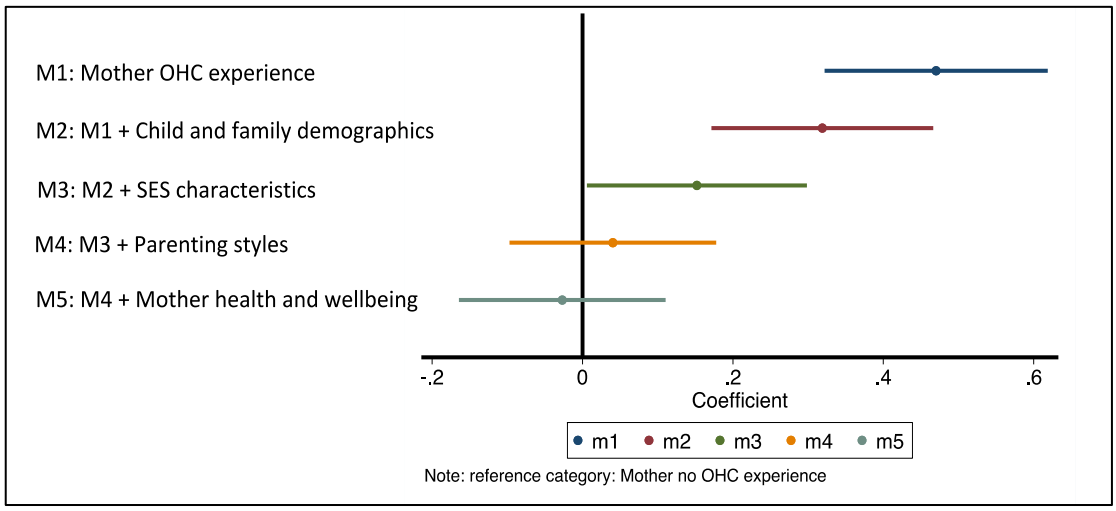


Figure 4: association between maternal OHC experience and SDQ externalising symptoms: OLS coefficients [95% CIs] from model 1 to model 5



What other factors are associated with cognitive skills and socio-emotional and behavioural development?

Although some caution is needed in interpreting the coefficients in the final models which include all the covariates (model 5) as some measures will be influenced by others along the causal pathway, we see that having British minority ethnic (BME) status or living in a house were an additional language to English is only or also spoken are associated with increased internalising symptoms and reduced performance scores in both cognitive assessments. Being a girl is associated with fewer behaviour problems and higher cognitive scores; being younger when the age 3 interviews took place is associated with higher externalising behaviour problems. Maternal age is also associated with all four outcomes, with children's behaviour and emotional problems higher for younger mothers, cognitive scores higher for older mothers.

Having parents with no or only low-level qualifications and living in rented housing are also associated lower cognitive scores, and higher externalising and internalising symptoms. Being part of a workless household is associated with all outcomes except for externalising symptoms, and overcrowded housing conditions are negatively correlated with cognitive performance. Damp housing is associated with higher internalising symptoms.

In terms of parenting, viewing yourself as an above average parent and breastfeeding for more than three months is protective against behaviour symptoms and is associated with higher cognitive scores, whereas having a poor home learning environment and not having a close parent-child relationship are all associated with lower cognition, and with higher internalising and externalising symptoms, at age 3. Having high levels of conflict in the parent-child relationship is also associated with increased internalising and externalising symptoms and lower school readiness.

A child's behaviour and school readiness are also negatively influenced if their mother has poor mental health; if she reported poor or fair general health or smoked a child has an increased risk of externalising behaviour problems and having a lower school readiness score. A mother's poor or fair general health is also associated with increased internalising symptoms.

Our focus is on the association between maternal OHC experience and the early cognitive performance or behavioural development of her child, and the extent to which parenting mediates this relationship. It is therefore interesting to note differences in the pseudo R^2 across the models. As suggested by previous research (Kiernan & Huerta, 2008; Kiernan & Mensah, 2009; Schoon et al., 2010; we would expect the structural measures included first in Model 2 and additively in Model 3 are more important for cognitive development (R^2 .22 and .19 for BAS Naming Vocabulary and Bracken School Readiness respectively) than for socio-emotional and behavioural development (R^2 .09 internalising, .12 externalising). In contrast, parenting styles and the parent-child relationship are more important for attenuating the association between maternal OHC and socio-emotional and behavioural development, most notably for externalising symptoms (R^2 .29). For further details see Appendix Tables A2-A5.

Discussion

In this study we have estimated the relationship between maternal OHC experience and the intergenerational transmission of disadvantage, specifically socio-emotional, behavioural and cognitive development in early childhood. We find that children whose mothers experienced OHC fare worse in terms of their early cognitive, socio-emotional and behavioural development than children whose mother was not in care. In terms of cognitive development, we find that when differences in family characteristics and socio-economic status are taken into account, the association between maternal OHC experience and a child's vocabulary acquisition is completely attenuated. For school readiness, the association with OHC status persists for the continuous score, but not for the binary classification of being 'school ready' or 'delayed' which we carried out as a robustness check to confirm our earlier findings (Parsons et al., 2022). Regarding socio-emotional and behavioural development, the association between maternal OHC and internalising symptoms is attenuated when we account for family characteristics and socio-economic status, whereas the association between maternal OHC and externalising symptoms remains. When we take into account parenting behaviours and aspects of the parent-child relationship, the association between maternal OHC experience and her child's externalising symptoms is fully explained.

There is a long history of work across different fields showing that parenting plays a vital role in all aspects of children's formative development, and our findings underscore the fact that parenting styles and early parent-child relationships and behaviours including breastfeeding vary across OHC and non-OHC mothers, and these observed differences play an important role in their child's behavioural development. It should be noted that behavioural problems are relatively common among young children (Campbell et al., 2000), yet untreated externalizing behaviour problems are associated with a wide range of negative later outcomes for children and adolescents – e.g. cognitive and academic progress through the school years (Washbrook et al., 2013; Barbaresi et al., 2007), together with educational attainment, (un)employment, wages and income (Egan et al., 2015; Goodman et al., 2011; Palloni, 2006; Healey et al., 2004; Feinstein, 2000) – and notably, ineffective parenting practices increase the likelihood that some children will continue to show aggressive behaviours (McKee et al., 2009; McMahon, 2003). Given that effective parenting practices are a key way to reduce externalising behavioural symptoms among children of care leavers, the findings point to the need to support parents to develop effective tools and practices specifically in this sphere of early development (Jeong et al., 2021; McKee et al., 2009; O'Connor, 2002).

Regarding cognitive development, we find that the association between maternal OHC and their child's language development is fully attenuated by accounting for family characteristics and SES. For our other cognitive outcome, school readiness, measured as a continuous score, the association is only attenuated when, in addition to child and family characteristics, SES we include parenting behaviours. However, when we differentiate between children who are 'school ready' versus not, the association between maternal OHC experience and school readiness is explained by family characteristics and socio-economic resources (Parsons et al., 2022). This combination of findings suggests that whilst the performance of children of OHC mothers at the more extreme end of the spectrum is similar to non-OHC mothers, once SES background is accounted for, they are generally performing worse across the distribution, and this difference can be explained by differences in parenting behaviours. Moreover, the

findings highlight the importance of supporting care leavers who become parents by providing adequate housing to enable their children to thrive.

Strengths and limitations

In interpreting the findings of this study, a number of limitations have to be considered. The study included a retrospective question on experience of out-of-home care during childhood, which has provided a rare opportunity to examine the early cognitive and behavioural outcomes of the children of a (relatively) large sample of care-experienced individuals who became mothers. However, our sample of care-leaver mothers may be relatively well adjusted and functional compared to all those with care experience known to social services. After all, the mothers in our sample are looking after their children in a family setting – and they agreed to take part in the MCS study. In addition, the analysis is limited by the relatively small number of care leavers in the sample and the variables available in the data set, so we are unable to examine the role of factors such as the type, duration and specific period in childhood of the OHC placement, or the support and guidance the mother had and has access to. As with any observational longitudinal study, other factors might play an important role in explaining variations in early cognitive performance and behavioural problems, and so bias due to other unmeasured confounding in background and behavioural measures cannot be ruled out. Missing data due to attrition are unavoidable in a longitudinal study, although this is minimised in this research by using multiple imputation and including the most important predictors of missing data in our models to maximise the plausibility of the missing at random assumption and restore sample representativeness. However, bias due to a non-ignorable missing data generating mechanism cannot be ruled out. Moreover, the study is focused on families in the UK and children born between 2000/2002, limiting the generalisability to other socio-cultural and historical contexts.

Nonetheless, a key strength of this research lies in its use of the UK Millennium Cohort Study, a large population-based and representative prospective longitudinal study with exceptionally rich data and a design that ensured adequate representation of disadvantaged groups and families from British minority ethnic backgrounds.

Implications of the findings

The findings point to policy levers, specifically regarding the provision of adequate housing and early, focused parenting support, that can attenuate the intergenerational transmission of poorer early cognitive, socio-emotional and behavioural development among children of mothers with OHC experience and underline the need for governments to better address the experiences of children in state care (see the 2022 report by the House of Commons Education Committee). Our analysis has highlighted how crucial parental education levels, employment and housing conditions are for the development of children's early cognitive skills and for mitigating behaviour problems among the children of care leavers. Parenting behaviours are an additional key factor, and particularly for helping in the early reduction of externalising symptoms among children of care leavers. The findings underscore the importance of early interventions for care-experienced families with young children before problems start to escalate. These interventions should be multi-faceted and integrated, targeting the educational opportunities and attainment of children and teenagers whilst they

are in care, as well as their access to housing upon leaving the care system, and supporting their parenting when they start to have a family of their own. Parenting behaviours transmit strongly across generations (Van Ijzendoorn, 1992), and we know that all care-leavers have had a disrupted relationship with their own mother and/or father and that mothers with OHC experience are less likely than other mothers to be in contact with their own mother (Parsons & Schoon, 2021) or to receive any help from a parent, underscoring the importance of supporting them.

Although the mothers with OHC experience in this research had an age range of 15-45 at the birth of the cohort child and experienced care systems and policies covering the latter half of the 20th century, the findings are just as pertinent for stopping the intergenerational transmission of disadvantage among more recent care leavers and their (future) children (Brännström et al., 2020; Okpych & Courtney, 2020; Sebba & Luke, 2019; O'Higgins et al., 2017). In 2013 the UK Government published the Care Leaver Strategy (HM Government, 2013) identifying key areas where today's care-leavers needed better, more joined up and on-going support: education, employment, finance, health, housing, and access to the justice system. This, together with the 'Putting Children First' and 'Keep on Caring' initiatives form the foundation of current policy to address the disadvantages care leavers experience across domains (DfE, 2016, HM Government, 2016).

The past two decades have seen major public (re)investment in the early years, mainly focused on increased public spending on early childcare places and childcare subsidies. Most of the focus has been on children aged 2 and over, initially on disadvantaged families but more recently on families in work. In England we have seen the development of Family Hubs and Start for Life services, as flagged in the government's recent early years review (HM Government, 2021). There is a focus on the whole of childhood, ages 0–18, and is therefore a potentially useful framework for supporting families with children across the whole of childhood. We particularly welcome the recent Scottish Government policy of extending 1140 free hours of early learning and childcare eligibility to include two-year-olds with a care-experienced parent. Eligibility for all looked after/care experienced children aged two or older has always been a feature of the policy, but children of care-experienced parents were more recently made eligible (Scottish Government, 2021). Whilst these policies are a step in the right direction, our work highlights the importance of housing conditions, the home environment, parenting behaviours and parent-child relationships, right from the moment of birth. We urge increased family support, targeted at those most in need including care-experienced parents to help improve children's early outcomes and break the intergenerational cycle of disadvantage. Effective measures should not just focus on parenting competences, but crucially provide a secure and safe environment in which effective parenting can be delivered. Without appropriate or secure housing the competences of parents are challenged, affecting parental health and wellbeing as well as their children's healthy development.

In conclusion, the study highlights the multiple challenges facing care leavers starting a family and their children. The findings provide evidence of intergenerational transmission of disadvantage and pinpoint crucial risk factors, such as educational qualifications and housing conditions that show independent effects over and above the experience of OHC. It also highlights the importance of parenting and the parent-child relationship for children's early development, and the extent to which these aspects vary across OHC and non-OHC mothers.

Given the centrality of one's own childhood experiences of parenting to their own parenting behaviours, it is not surprising that OHC mothers, who in the majority are likely to have faced higher levels of parental instability in their formative years, may benefit from greater access to family and parenting support as well as access to safe and secure housing.

Interventions aiming to support the complex needs of care leavers are vital to break the vicious cycle. This extremely vulnerable group of parents and children should be – and have a right to be – better cared for, to improve their own and their children's future outcomes.

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APPENDIX

Table A1: missingness

Variable	N	N(missing)	%(missing)
Sex of child	19,082	0	0.00
Ethnicity of child	19,082	0	0.00
Mother OHC	19,082	0	0.00
Mother age at teenager birth	19,079	3	0.00
Mother highest qualification	19,054	28	0.00
Mother has problems reading	18,753	329	0.02
Mother has problems counting money	18,752	330	0.02
Mother has problems filling in a form	18,751	331	0.02
Single parent S1	18,462	620	0.03
Workless household S1	18,462	620	0.03
Older siblings S1	18,462	620	0.03
UK country live in S1	18,462	620	0.03
Mother smokes cigarettes	18,457	625	0.03
Mother treated for depression S1	18,456	626	0.03
Mother General Health S1	18,455	627	0.03
Frequency sees mother S1	18,454	628	0.03
Mother longstanding illness S1	18,454	628	0.03
Frequency sees father S1	18,451	631	0.03
Partner used force S1 & S2	18,448	634	0.03
Birthweight S1	18,445	637	0.03
Housing tenure S1	18,423	659	0.03
Poverty S1	18,404	678	0.04
Gestation (weeks) S1	18,260	822	0.04
Breastfeeding S1	18,157	925	0.05
Overcrowded home S1	18,134	948	0.05
Dislike home S1	18,124	958	0.05
Dislike area where live S1	18,122	960	0.05
Family receives State Benefits S1	18,121	961	0.05
Dampness in the home S1	18,119	963	0.05
Never get what want ouyt of life S1 & S2	18,025	1,057	0.06
Whatever I do has no effect on my life S1 & S2	18,023	1,059	0.06
Can run own life as I want S1 & S2	18,023	1,059	0.06
Place for children to play safely S1	17,892	1,190	0.06
Malaise score (depression) S1	17,737	1,345	0.07
Low satisfaction with life S1	17,536	1,546	0.08
Single parent S2	15,458	3,624	0.19
Workless household S2	15,376	3,706	0.19

Variable	N	N(missing)	%(missing)
Child has a regular bedtime S2	15,338	3,744	0.20
Child has a regular mealtime S2	15,338	3,744	0.20
Housing tenure S2	15,337	3,745	0.20
Child longstanding illness S2	15,337	3,745	0.20
Poverty S2	15,311	3,771	0.20
Disorganised home S2	15,158	3,924	0.21
Can't hear self think at home S2	15,158	3,924	0.21
Not a calm environment at home S2	15,158	3,924	0.21
Home learning environment scale S2	15,158	3,924	0.21
Child age S2	14,944	4,138	0.22
SDQ Conduct problems S2	14,676	4,406	0.23
SDQ Emotional Problems S2	14,650	4,432	0.23
SDQ Peer Problems S2	14,553	4,529	0.24
Highest qualification of partner S1	14,523	4,559	0.24
SDQ Hyperactivity problems S2	14,539	5,268	0.24
BAS Naming Vocabulary score S2	13,752	5,330	0.28
Bracken School Readiness S2	13,738	5,344	0.28
Bracken School Readiness: Normative Classification	13,738	5,344	0.28
Parenting competence S2	13,534	5,548	0.29
Kessler K6 S2	13,501	5,581	0.29
PIANTA Conflict scale S2	13,107	5,975	0.31
PIANTA Closeness scale S2	12,847	6,235	0.33
Average missing			0.12

Table A2: OLS regression results: BAS Naming Vocabulary score

	M1	M2	M3	M4	M5
Mother OHC	-0.19**	-0.14*	0.04	0.07	0.07
	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)
CM ethnicity: BME		-0.43***	-0.36***	-0.36***	-0.36***
		(0.04)	(0.03)	(0.03)	(0.03)
CM sex: female		0.23***	0.24***	0.21***	0.21***
		(0.02)	(0.02)	(0.02)	(0.02)
Single parent		-0.23***	0.06	0.06*	0.06
		(0.03)	(0.03)	(0.03)	(0.03)
Age Mother at CM birth		0.02***	0.01**	0.00*	0.00*
		(0.00)	(0.00)	(0.00)	(0.00)
English and/or other language spoken at home		-0.74***	-0.61***	-0.61***	-0.61***
		(0.04)	(0.04)	(0.04)	(0.04)
Parent no or NVQ1 level qualifications			-0.34***	-0.28***	-0.29***
			(0.02)	(0.02)	(0.02)
Workless household			-0.25***	-0.23***	-0.23***
			(0.03)	(0.03)	(0.03)
Rented housing			-0.12***	-0.10***	-0.11***
			(0.02)	(0.02)	(0.02)
Overcrowded home			-0.16***	-0.15***	-0.14***
			(0.02)	(0.02)	(0.02)
Damp home			0.00	0.00	0.00
			(0.02)	(0.02)	(0.02)
CM breastfed >3 months				0.09***	0.09***
				(0.02)	(0.02)
Pianta: parent-child high conflict score				-0.05*	-0.05
				(0.02)	(0.03)
Pianta: parent-child low closeness score				-0.29***	-0.29***
				(0.04)	(0.04)
Poor home learning environment				-0.24***	-0.24***
				(0.02)	(0.02)
Mother feels she is a below average parent				0.00	0.00
				(0.04)	(0.04)
Mother feels she is an above average parent				0.04**	0.04*
				(0.02)	(0.02)
Mother poor/fair general health					-0.03
					(0.02)
Mother poor mental wellbeing (Kessler)					-0.00
					(0.05)
Mother current smoker					0.02
					(0.02)
_cons	0.12***	-0.26***	0.16**	0.22***	0.21***
	(0.02)	(0.05)	(0.05)	(0.05)	(0.05)
R^2	.00	.17	.22	.24	.24
N	19082	19082	19082	19082	19082

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: OLS regression results: Bracken Composite School Readiness score

	M1	M2	M3	M4	M5
Mother OHC	-0.51***	-0.39***	-0.15*	-0.12*	-0.09
	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)
CM ethnicity: BME		-0.26***	-0.17***	-0.19***	-0.19***
		(0.04)	(0.04)	(0.04)	(0.04)
CM sex: female		0.24***	0.24***	0.21***	0.21***
		(0.02)	(0.02)	(0.02)	(0.02)
Single parent		-0.36***	-0.01	0.00	0.01
		(0.03)	(0.03)	(0.03)	(0.03)
Age Mother at CM birth		0.02***	0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)	(0.00)
English and/or other language spoken at home		-0.38***	-0.23***	-0.24***	-0.25***
		(0.04)	(0.04)	(0.04)	(0.04)
Parent no or NVQ1 level qualifications			-0.40***	-0.31***	-0.31***
			(0.02)	(0.02)	(0.02)
Workless household			-0.29***	-0.25***	-0.25***
			(0.03)	(0.03)	(0.03)
Rented housing			-0.19***	-0.16***	-0.15***
			(0.02)	(0.02)	(0.02)
Overcrowded home			-0.25***	-0.22***	-0.22***
			(0.02)	(0.02)	(0.02)
Damp home			-0.02	-0.02	-0.02
			(0.03)	(0.03)	(0.03)
CM breastfed >3 months				0.20***	0.19***
				(0.02)	(0.02)
Pianta: parent-child high conflict score				-0.08**	-0.07*
				(0.03)	(0.03)
Pianta: parent-child low closeness score				-0.27***	-0.27***
				(0.03)	(0.03)
Poor home learning environment				-0.32***	-0.32***
				(0.02)	(0.02)
Mother feels she is a below average parent				-0.03	-0.02
				(0.04)	(0.04)
Mother feels she is an above average parent				0.07***	0.07***
				(0.02)	(0.02)
Mother poor/fair general health					-0.05*
					(0.03)
Mother poor mental wellbeing (Kessler)					-0.07
					(0.05)
Mother current smoker					-0.06**
					(0.02)
_cons	0.16***	-0.52***	0.04	0.18**	0.13***
	(0.02)	(0.05)	(0.05)	(0.06)	(0.06)
R^2	.00	.11	.19	.22	.23
N	19082	19082	19082	19082	19082

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: OLS regression results: Internalising behaviour problems

	M1	M2	M3	M4	M5
Mother OHC	0.32***	0.23**	0.07	-0.01	-0.04
	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)
CM ethnicity: BME		0.21***	0.16***	0.18***	0.18***
		(0.03)	(0.03)	(0.03)	(0.03)
CM sex: female		-0.09***	-0.09***	-0.06***	-0.06***
		(0.02)	(0.02)	(0.02)	(0.02)
CM age at interview		-0.01	-0.02	-0.01	-0.01
		(0.01)	(0.01)	(0.01)	(0.01)
Single parent		0.21***	-0.04	-0.05	-0.05
		(0.03)	(0.03)	(0.03)	(0.03)
Age Mother at CM birth		-0.02***	-0.01***	-0.01***	-0.01***
		(0.00)	(0.00)	(0.00)	(0.00)
English and/or other language spoken at home		0.32***	0.23***	0.24***	0.25***
		(0.04)	(0.04)	(0.04)	(0.04)
Parent no or NVQ1 level qualifications			0.27***	0.19***	0.19***
			(0.02)	(0.02)	(0.02)
Workless household			0.19***	0.16***	0.14***
			(0.03)	(0.03)	(0.03)
Rented housing			0.15***	0.10***	0.09**
			(0.03)	(0.03)	(0.03)
Overcrowded home			0.05*	0.04	0.03
			(0.02)	(0.02)	(0.02)
Damp home			0.11***	0.09**	0.08**
			(0.03)	(0.03)	(0.03)
CM breastfed >3 months				-0.11***	-0.11***
				(0.02)	(0.02)
Pianta: parent-child high conflict score				0.48***	0.45***
				(0.03)	(0.03)
Pianta: parent-child low closeness score				0.44***	0.43***
				(0.04)	(0.04)
Poor home learning environment				0.10***	0.09***
				(0.02)	(0.02)
Mother feels she is a below average parent				0.07	0.04
				(0.04)	(0.04)
Mother feels she is an above average parent				-0.13***	-0.12***
				(0.02)	(0.02)
Mother poor/fair general health					0.11***
					(0.03)
Mother poor mental wellbeing (Kessler)					0.37***
					(0.06)
Mother current smoker					0.02
					(0.02)
_cons	-0.07***	0.54***	0.19**	0.03	0.05
	(0.01)	(0.06)	(0.06)	(0.06)	(0.06)
R^2	.00	.06	.09	.16	.17
N	19082	19082	19082	19082	19082

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: OLS regression results: Externalising behaviour problems

	M1	M2	M3	M4	M5
Mother OHC	0.47***	0.32***	0.15*	0.04	-0.01
	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)
CM ethnicity: BME		0.03	-0.02	0.02	0.02
		(0.03)	(0.04)	(0.03)	(0.03)
CM sex: female		-0.21***	-0.22***	-0.18***	-0.18***
		(0.02)	(0.02)	(0.02)	(0.02)
CM age at interview		-0.03**	-0.04***	-0.03***	-0.03***
		(0.01)	(0.01)	(0.01)	(0.01)
Single parent		0.28***	0.04	0.01	0.01
		(0.03)	(0.04)	(0.03)	(0.03)
Age Mother at CM birth		-0.03***	-0.02***	-0.02***	-0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
English and/or other language spoken at home		0.10*	0.00	0.02	0.05
		(0.04)	(0.04)	(0.04)	(0.04)
Parent no or NVQ1 level qualifications			0.29***	0.19***	0.18***
			(0.02)	(0.02)	(0.02)
Workless household			0.14***	0.09**	0.07*
			(0.03)	(0.03)	(0.03)
Rented housing			0.20***	0.14***	0.12***
			(0.03)	(0.02)	(0.02)
Overcrowded home			0.05*	0.05*	0.04
			(0.02)	(0.02)	(0.02)
Damp home			0.08**	0.04	0.03
			(0.03)	(0.02)	(0.02)
CM breastfed >3 months				-0.13***	-0.15***
				(0.02)	(0.02)
Pianta: parent-child high conflict score				0.99***	0.96***
				(0.02)	(0.03)
Pianta: parent-child low closeness score				0.37***	0.35***
				(0.03)	(0.03)
Poor home learning environment				0.14***	0.13***
				(0.02)	(0.02)
Mother feels she is a below average parent				0.02	-0.00
				(0.04)	(0.04)
Mother feels she is an above average parent				-0.24***	-0.23***
				(0.02)	(0.02)
Mother poor/fair general health					0.13***
					(0.02)
Mother poor mental wellbeing (Kessler)					0.17***
					(0.05)
Mother current smoker					0.11***
					(0.02)
_cons	-0.05***	1.05***	0.65***	0.44***	0.42***
	(0.01)	(0.06)	(0.06)	(0.06)	(0.06)
R^2	.00	.08	.12	.29	.30
N	19082	19082	19082	19082	19082

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$