

Childcare and behavioural outcomes

**Descriptive Title:**

## **The Influence of Different Forms of Early Childcare on Children's Emotional and Behavioural Development at School Entry**

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## **ABSTRACT**

**Background:** Over the past few decades there has been a dramatic increase in maternal employment and, as a result, an increase in the use of non-maternal childcare in the early years. The purpose of this longitudinal study was to examine, in a large representative English sample, the influence of different forms of childcare on children's behavioural and emotional development around the age of school entry.

**Methods:** A sample of 991 families, originally recruited when the children were 3 months old, was assessed around school entry age at 51 months. The main outcome variable was the children's emotional and behavioural functioning, measured by questionnaire completed by both mothers and teachers. A range of repeated assessments were carried out at different time points, including direct observation of the quality of maternal caregiving and observations of the quality of non-parental care, and amount of time spent in different forms of care.

**Results:** The strongest and most consistent influences on behaviour and emotional problems were derived from the home, including lower socio-demographic status, poorer maternal caregiving, parental stress/ maternal mental health problems, as well as child-gender (being a boy). Non-parental childcare had small effects on child outcome. One finding that did emerge was that children who spent more time in group care, mainly nursery care, were more likely to have behavioural problems, particularly hyperactivity.

**Conclusions:** These findings suggest that interventions to enhance children's emotional and behavioural development might best focus on supporting families and augmenting the quality of care in the home.

## 1. INTRODUCTION

Over the past few decades there has been a dramatic increase in maternal employment and, as a result, an increase in the use of non-maternal childcare in the early years. This social trend has given rise to a great deal of debate about the short and long term effects of early childcare on child development, family life and more widely, the impact on broader society. One of the areas that has been of particular interest is the potential impact on children's behavioural and emotional development and this has been recognised as a major public health issue. In particular, the recent Marmot report on health inequalities highlights the importance of children's early experiences in influencing their later emotional and behavioural development (Marmot, 2010).

The most consistent finding from longitudinal studies of the relative influences on children's emotional and behavioural development is that the most important are socio-demographic factors and parental behaviours, particularly the quality of maternal care in the home (NICHD ECCRN 2005; Melhuish *et al.* 2008). There is good evidence from follow-up studies from the USA (Belsky *et al.* 2007; NICHD ECCRN 2001) that young children who spend considerable periods of time in centre-based care are more at risk of developing externalising behaviour problems (Melhuish *et al.* 2008). However, the findings from some European studies have not found these negative effects of centre-based care (Borge *et al.* 2004; Mathers & Sylva 2007). Some possible reasons for the conflicting findings are: i) a higher percentage of children in the USA are in non-maternal care before four months due to national differences in employment arrangements such as maternity leave allowances; there is no maternal leave allowance in the USA with varying amounts in different European countries (NICHD ECCRN 2001). Furthermore in the UK there is legislation that allows working mothers with young children to work part-time if they wish (NICHD ECCRN 2001; Leach 2009); ii) there are national

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differences in licensing and funding of childcare facilities (Leach *et al.* 2008); and iii) there are cultural factors such as attitudes to maternal employment. One problem interpreting the different studies is that a number of them have not looked at the range and quality of different forms of non-parental care.

The purpose of this longitudinal study was to examine, in a large representative English sample, the influence of different forms of childcare on children's behavioural and emotional development around the age of school entry (51 months), a critical point in children's lives. The children had already been followed up to 36 months (Barnes *et al.* 2010). Critically, the key questions were

- i) to examine the relative influences of the home environment (the quality of maternal care, mental health and socioeconomic status) and the *quantity* of a range of different types of non-maternal care in the early years of life on children's behaviour and emotional development.
- ii) to examine whether the *quality* of the non-maternal care and changes in care type affected children's behaviour and emotional development.

## 2. METHOD

### 2.1. Participants

Recruitment to the Families, Children and Childcare study (FCCC; [www.familieschildrenchildcare.org](http://www.familieschildrenchildcare.org)) took place from 1998 to early 2001 primarily in two large hospital antenatal clinics (in London and Oxford), each catering for a demographically diverse population, and in child health clinics in the same areas. Eligibility criteria were: mother 16 or over; sufficient English; no plan to move in the next two years; no plan to have their child adopted; singletons; birth weight > 2500 grams; gestation  $\geq$  37 weeks; no major congenital abnormalities; and  $\leq$  48 hours in a Special Care Baby Unit. Of the 1862 mothers approached 217 (11.6%) were ineligible; of the remaining 1645, 444 (27.0%) chose not to participate, making the final sample 1201. Their demographic characteristics are representative of the areas where the study took place (Malmberg *et al.* 2005a). The study was approved by the relevant Oxfordshire and North London NHS research ethics committees in Oxford and London and informed consent was obtained prior to participation.

### 2.2. Procedure

All mothers (1201) were initially interviewed at three months postpartum. Their mean age at the birth of their child was 30.0 years ( $SD = 5.3$ ; *Range* 15.6 to 46.5). Subsequent waves of assessments, including parents and children, took place at 10 months (1077 families), 18 months (1049 families), 36 months (1016 families) and 51 months (996 families). After initial attrition (8.1%) between 3 and 10 months, 94.8% were followed up at least three out of the four remaining time-points. The pattern of attrition in the FCCC is similar to that of large-scale UK studies (e.g. Schoon *et al.* 2002).

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The data collection points were designed to cover particular developmental stages: at 3 months, the immediate post-birth experiences; at 10 months, children became more mobile and attachment began to emerge; at 18 months, the emergence of language; at 36 months, the age at which free nursery school places are taken up by many families (Leach 2009; Malmberg *et al.* 2005b); and at 51 months, around school entry. At 10, 18 and 36 months these assessments included direct observations of the quality of maternal caregiving in the home. It was not logistically possible to also observe all fathers. Thus a sub-sample was observed (reported on elsewhere; Lewis *et al.* 2009; Malmberg *et al.* 2007; West *et al.* 2009). For those children who spent 12 or more hours in non-parental care per week, and where parents gave consent, observations in the childcare settings were also conducted. For children who received more than one type of childcare within the week, the type of care in which the child spent the most hours was observed.

The number of children observed at each assessment point was: 10 months ( $n = 320$ ), 18 months ( $n = 345$ ; Leach *et al.* 2008) and 36 months ( $n = 361$ ). At 36 months, this represented 56/94 (60%) of grandparents (or other relative); 54/78 (69%) of childminders; 33/36 (92%) of nannies; and 218/236 (92%) of day care centres. Some families were reluctant to agree to the grandparent or childminder being approached for quality observations. At 51 months, questionnaires were sent prior to a home interview and collected during the home visit. This included a questionnaire measure of children's emotional and behavioural development ( $n = 911$ ). In addition, with parental consent, a questionnaire concerning children's emotional and behavioural development was sent to the child's current teacher ( $n = 966$ ), usually at a nursery school and sometimes a reception class.

### 2.3. Measures

#### 2.3.1. Demographic characteristics.

The 3 month interview covered child-gender, birth order, ethnic background and language(s) spoken at home. Three-month and subsequent interviews covered: parental partnership; parental education; family income; mother's and partner's occupational status. A composite family socio-economic status (SES)/education score was based on z-scored mother's and father's occupational status, mother's and father's education and family income (Barnes *et al.* 2010).

#### 2.3.2. Maternal mental health problems.

At 3 and 10 months, maternal depression was measured using the 10-item Edinburgh Postnatal Depression Scale (EPDS; Cox *et al.* 1987), an efficient and validated tool for identifying mothers at risk for postnatal depression. At 18 months, mothers completed the 28-item General Health Questionnaire (GHQ-28; Goldberg, 1978), and at 36 and 51 months the 12-item General Health Questionnaire (GHQ-12; Goldberg 1982). The internal consistencies of the measures were  $\alpha = .84, .86, .91, .87$  and  $.87$  from 3 to 51 months respectively. The GHQ is a widely used validated screening questionnaire for psychological problems.

#### 2.3.3. Parental Stress.

At 10 and 36 months, maternal stress was measured using the Parental Stress Index Short Form (PSI/SF; Abidin 1995), a 36-item parent self-report questionnaire with three 12-item subscales. For the purpose of these analyses, only the Parental Stress subscale was used, as the other two subscales overlapped with the content of the outcome measures with items about child behaviour. Internal consistency at 10 months was  $\alpha = .84$  and  $\alpha = .85$  at 36 months. Parental stress was stable from 10 to 36 months ( $r = .60$ ;  $p < .001$ ).

#### 2.3.4. **Childcare.**

At each time point the amount and type of current and inter-interview non-maternal childcare was determined. Average hours per week for all children were calculated from 0 to 51 months, in total and for six types: father; grandparent/relative; childminder/friend; nanny; day care centre; and from 19 to 51 months, preschool playgroup. The average childcare hours from 0 to 18 months and 19 to 51 months were also calculated. The age of onset of any type of childcare was determined as well as the number of changes of childcare, including: changes in carer of the same type; changes in type of childcare; and changes back to no maternal childcare only.

#### 2.3.5. **Quality of maternal care and simulation.**

Maternal care and simulation was assessed at 10, 18 and 36 months using a combination of the Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell 1988), the Caregiver Interaction Scale (CIS; Arnett 1989) and the Observation Record of the Caregiving Environment (ORCE; NICHD ECCRN 1991). The ratings were made following at least 90 minutes in the home. At 10 months three subscales were used, the HOME Emotional and Verbal Responsiveness of Mother, and the CIS: Positive Relationship and (lack of) Detachment subscales. At 18 months the HOME Emotional and Verbal Responsiveness were used. At 36 months the toddler version of the HOME Pride, Affection and Warmth, HOME Language Stimulation, and the ORCE (see Barnes *et al.* 2010) were used. Each subscale was standardised ( $M = 0$ ,  $SD = 1$ ) and averaged into one indicator for 10, 18 and 36 months respectively. Weighted mean Kappa coefficients of inter-rater agreement for the CIS instrument were  $\kappa = .68-.74$ , the HOME  $\kappa = .70-.85$  and the ORCE  $\kappa = .70$  to  $.74$ . The CIS is usually used to describe non-maternal childcare providers but it was observed for mothers so that some quality measures were used consistently in all childcare settings and the home.



A Confirmatory Factor Analysis (CFA) was specified in which one higher order maternal caregiving construct explained the variance of three first-order constructs, one per time point, which fitted the data well ( $\chi^2_{[9]} = 31.21$ ;  $p < .001$ ; RMSEA = .050; CFI = .985; NNFI = .965; see Figure 1).

[INSERT FIGURE 1 HERE]

### 2.3.6. **Quality of non-parental childcare.**

For children receiving non-parental care, the quality of care was observed in the childcare setting for a minimum of 90 minutes. At 10 and 18 months the ORCE rating scales (NICHD ECCRN 1991), the CIS (Arnett 1989) and the HOME ‘emotional responsiveness’ subscale (Bradley & Caldwell 1988) were completed. Use of the HOME subscale in childcare settings was designed to allow direct comparisons with maternal behaviour and to provide comparability across all childcare settings. A composite score comprised HOME ‘emotional responsiveness’, CIS ‘positive relationships’ and (reverse coded) CIS ‘detachment’ and the ORCE mean score. At 36 months a similar child caregiving quality score was created by averaging three subscales: the ORCE, the HOME ‘personal warmth’ and ‘language stimulation’ subscales. All children who had been observed on at least one occasion were included (n=471). A Confirmatory Factor Analysis (CFA) was specified in which one higher order quality of caregiving construct explained the variance of three first-order constructs, one per time-point, which fitted the data well ( $\chi^2_{[24]} = 32.27$ ;  $p = .12$ ; RMSEA = .028; CFI = .991; NNFI = .987; see Figure 2).

[INSERT FIGURE 2 HERE]

### **2.3.7. Emotional and Behavioural Development.**

The children's emotional and behavioural adjustment was assessed using the Strength and Difficulties Questionnaire (SDQ; Goodman 2001; Goodman *et al.* 2003) and completed by both mothers and teachers. This well validated and widely used questionnaire comprises 25 items with 5 subscales – emotional symptoms, peer problems, hyperactivity, conduct disorder and prosocial behaviour (Goodman 2001; Goodman *et al.* 2003). A total problem score is generated by summing the scores of 4 subscales (excluding the prosocial behaviour subscale). Abnormal and borderline score thresholds are: abnormal scores, 17+ for parent reports and 16+ for teacher reports; borderline scores, 14-16 for parent reports and 12-15 for teacher reports. A total of 991 mother reports and 966 teacher reports were completed.

### **2.4. Data analytic strategy**

The purpose of the analysis was to examine the relative contributions of a range of home variables (including socio-demographic, quality of maternal caregiving, maternal mental health problems and maternal stress) and non-maternal childcare variables, both the extent and quality, in predicting children's psychological functioning. Thus a series of latent variable regression analyses was conducted as Structural Equation Models (SEM) in MPLUS (Muthén & Muthén 1998-2007). Where possible, the manifest indicators were parcelled into three indicators per construct (Little *et al.* 2002) specified to load on their respective constructs. Childcare hours were specified as one item indicators calculated as an average of the number of hours spent in different types of childcare per month over the period 0-51 months. Model fit was assessed by inspecting cut-offs for good fit : < .05 for the Root Mean Square Error of Approximation (RMSEA) and >.95 for the Tucker Lewis Index (TLI) and the Comparative Fit Index (CFI; Browne & Cudeck 1993).

#### 2.4.1. Analytic strategy

We carried out structural equation model (SEM) for two reasons. First, it enabled us to estimate effects of family and maternal characteristics and childcare, net of measurement error (i.e., disattenuated parameter estimates). Second, it allowed us to specify the number of manifest indicators of each construct in an optimal way. As our developmental outcomes were measured at 51 months, many of the predictors could be modelled as indicators of stability of a certain predictor during the preceding months (e.g., parental stress was modelled as the stability of parental stress at 10 and 36 months).

We specified a latent regression model, carried out in two steps. In the first step we included family socio-demographic background ( $z$ -scored mother's and father's occupational status, mother's and father's education and family income; Malmberg *et al.* 2007); maternal mental health problems (the average of the  $z$ -scored EDPS scores at 3 and , the  $z$ -scored 28-item GHQ score at 18 months, and the average  $z$ -scored 12-item GHQ at 36 and 51 months), parental stress (at 10 and 36 months), maternal caregiving quality (caregiving at 10 months:  $z$ -scored HOME Emotional and Verbal Responsiveness of Mother, and the CIS: Positive Relationship and Detachment subscales; at 18 months:  $z$ -scored HOME: Emotional and Verbal Responsiveness; and at 36 months: the  $z$ -scored HOME: Pride, Affection and Warmth, HOME: Language Stimulation, and the ORCE), and child gender (0 = boy, 1 = girl). We carried out one model for each mother and teacher reported developmental outcome, first using the total problem score (emotional, conduct, hyperactive and peer problems) and then the specific outcomes separately. These models fitted data well for mother reports (ranges for RMSEA = .023 - .034; CFI = .966 - .986; TLI = .954 - .978) and teacher reports (RMSEA = .017 - .032; CFI = .968 - .987; TLI = .956 - .978).

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In the second step we included average childcare hours from 0 to 51 months for each of the six forms of non-maternal childcare: father, grandparent, childminder, nanny, day care centre, and playgroup. Each latent construct was specified by a manifest indicator, so the factor loadings were fixed at 1 and the measurement error at 0. All models fitted data well for mother reports (RMSEA = .021 - .034; CFI = .961 - .986; TLI = .939 - .978) and for teacher reports (RMSEA = .020 - .032; CFI = .963 - .987; TLI = .943 - .978).

### 2.4.2. Sub-sample with childcare quality observations

To determine the impact of the quality and quantity of childcare on child outcome, the first set of SEMs including blocks 1 and 2 (see above) was re-run adding childcare quality for all those for whom quality of childcare was observed on at least one occasion ( $n = 471$ ). Thus the first block included the same predictors and the second block included average childcare hours for grandparents, childminders, nannies and day care centres as well as the quality of childcare variable. All block 1 models fitted data well (RMSEA = .015 - .029; CFI = .980 - .984; TLI = .972 - .976) as did the full models (RMSEA = .020 - .029; CFI = .965 - .984; TLI = .948 - .976), for mother reports. The block 1 models for teacher reports fitted data equally well (RMSEA = .015 - .033; CFI = .955 - .988; TLI = .938 - .982) as did the full models (RMSEA = .018 - .033; CFI = .951 - .988; TLI = .930 - .982).

### 2.4.3. Full Sample

The first set of analyses included all children for whom the SDQ was completed at 51 months. Separate analyses were conducted for the SDQ completed by mothers and teachers. The data were entered in block sequences. Block 1 comprised: the composite socio-demographic variable; maternal mental health problems (the mean of scores across all five time points), parental stress (PSI), maternal caregiving quality, and child-gender. These models

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fitted data well for mother reports (ranges given for RMSEA = .023 - .034; CFI = .966 - .986; TLI = .954 - .978) and teacher reports (RMSEA = .017 - .032; CFI = .968 - .987; TLI = .956 - .978).

Block 2 comprised: average childcare hours from 0 to 51 months for each of the six forms of non-maternal childcare: father, grandparent, childminder, nanny, day care centre, and playgroup. All final models fitted data well for mother reports (RMSEA = .021 - .034; CFI = .961 - .986; TLI = .939 - .978) and for teacher reports (RMSEA = .020 - .032; CFI = .963 - .987; TLI = .943 - .978).

### **2.4.4. Sub-sample with childcare quality observations**

To determine the possible impact of the quality of childcare on child outcome, the first set of SEMs including blocks 1 and 2 (see above) was re-run adding childcare quality for all those for whom quality of childcare was observed on at least one occasion. Thus the first block included the same predictors as and the second block included average childcare hours for grandparents, childminders, nannies and day care centres as well as the quality of childcare variable. All block 1 models fitted data well (RMSEA = .015 - .029; CFI = .980 - .984; TLI = .972 - .976) as did the full models (RMSEA = .020 - .029; CFI = .965 - .984; TLI = .948 - .976), for mother reports. The block 1 models for teacher reports fitted data equally well (RMSEA = .015 - .033; CFI = .955 - .988; TLI = .938 - .982) as did the full models (RMSEA = .018 - .033; CFI = .951 - .988; TLI = .930 - .982).

A separate set of analysis was run, adding two variables to blocks 1 and 2: the age at which non-parental care began and the number of changes of care.

### 3. RESULTS

#### 3.1. Rates of behavioural and emotional problems

[INSERT TABLE 1]

The extent of behavioural and emotional problems reported by both mothers and teachers using the SDQ were similar to those of a large national survey (Meltzer *et al.* 2003; see Table 1). Based on maternal reports, 40 children (4.0%) scored in the abnormal range, 62 (6.3%) scored in the borderline range, and 889 (89.7%) scored within the normal range. Based on teacher reports, 44 (4.6%) scored in the abnormal range, 80 (8.3%) were borderline, and 842 (87.2%) scored within the normal range.

#### 3.2. Structural equation models

##### 3.2.1. Full sample

##### 3.2.1.1. Maternal SDQ reports (see Table 2).

[INSERT TABLE 2]

Block 1 (Home variables and gender). We report the results for Block 1 within the full model i.e. once block 2 has been included as well. Thus any influence that the variables in Block 1 have on the outcome takes account of non-parental care. Lower Socio-demographic status ( $b = 0.197$ ), higher maternal parenting stress ( $b = 0.335$ ), lower maternal caregiving quality ( $b = 0.225$ ), and gender (being a boy;  $b = 0.077$ ) were all predictors of more total behavioural and emotional problems according to maternal reports (on the SDQ). Maternal mental health problems was not a significant predictor of total problems although it was strongly associated with parental stress ( $r = 0.63$ ).

The predictors of specific types of behavioural or emotional problems, by examining SDQ subscales, (not shown in the tables) showed that lower socio-demographic status was

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associated with less prosocial behaviour ( $b = 0.218$ ,  $p < 0.05$ ) and more conduct problems ( $b = 0.204$ ,  $p < 0.05$ ). More maternal mental health problems was associated with more peer problems ( $b = 0.255$ ,  $p < 0.05$ ), while greater parental stress was associated with hyperactivity ( $b = 0.317$ ,  $p < 0.001$ ). Good quality maternal caregiving was associated with more prosocial behaviour ( $b = 0.233$ ,  $p < 0.01$ ), less hyperactivity ( $b = 0.217$ ,  $p < 0.01$ ), and fewer peer problems ( $b = 0.304$ ,  $p < 0.001$ ). Girls were more likely to be prosocial ( $b = 0.155$ ,  $p < 0.001$ ), and less hyperactive ( $b = 0.132$ ,  $p < 0.001$ ) than boys.

Block 2 (the length of time spent in different forms of childcare). Spending more time in day care centres, over the total period was a predictor of total problem scores ( $b = 0.114$ ). More time in day care centres was a predictor of more hyperactivity ( $b = 0.155$ ,  $p < 0.001$ ).

More time in pre-school playgroup was predictive of fewer peer problems ( $b = 0.120$ ,  $p < 0.05$ ). More time with a nanny was a significant predictor of more prosocial behaviour ( $b = 0.09$ ,  $p < 0.05$ ). More time in childminding predicted more hyperactivity ( $b = 0.086$ ,  $p < 0.05$ ). More time with grandparents predicted more peer problems ( $b = 0.100$ ,  $p < 0.05$ ).

When examining the amount of variance accounted for by the two blocks, the first block including home factors and child-gender, accounted for 45.3 % of the variance, while the second block, childcare variables, accounted for an additional 1.2 % of the variance ( $F = 3.66$ ,  $p < 0.003$ ) on total scores. When the specific behavioural problems and prosocial factors were examined, the childcare variables block similarly accounted for relatively small amounts of the variance. It was only significant for hyperactivity and peer problems: prosocial behaviour variance - block 1: 8.4 % with an additional 1.1 % for block 2, ( $F = 1.98$ ,  $p < 0.079$ ); conduct problems - block 1: 25.9 %, block 2, an additional 0.9 % (ns); hyperactivity block 1: 18.6 %,

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block 2 an additional 2.1 % ( $F = 4.3, p < 0.001$ ); peer problems block 1: 27.9 %, block 2 an additional 2.9 % ( $F = 6.8, p < 0.001$ ); emotional problems block 1: 14.1 %, block 2 an additional 1 % ( $F = 1.92, p < 0.088$ ).

### **3.2.1.2. Teacher reports (see Table 2)**

Block 1 (home variables and gender). Better maternal caregiving quality ( $b = -0.173$ ) and being a girl ( $b = -0.213$ ) were the only significant predictors of lower total problem scores based on teacher reports. As far as specific problems were concerned, better quality maternal caregiving was predictive of fewer peer problems ( $b = 0.212, p < 0.05$ ). Being a girl was associated with more prosocial behaviour ( $b = 0.119, p < 0.001$ ), less conduct problems ( $b = -0.118, p < 0.01$ ) and less hyperactivity ( $b = -0.221, p < 0.001$ ).

Block 2 (the length of time children spent in different forms of childcare). None of the childcare types predicted total problems. Children who spent more time in day care centres were more likely to be hyperactive ( $b = 0.109, p < 0.05$ ). Children receiving more care by childminders were more likely to have peer problems ( $b = 0.101, p < 0.05$ ).

Based on these teacher reports, block 1 accounted for 12.7 % of the variance and the childcare variables did not account for a significant additional proportion of the variance (1%,  $F = 1.84$  ns). Of the specific child problems, the only scale for which the childcare block added a significant amount of variance was peer problems: block 1: 5.6 %, block 2: an additional 2.4 % ( $F = 4.15, p < 0.0001$ ).

The total number of hours in non-maternal care, irrespective of type was not related to total problems whether rated by mothers or teachers.



### 3.3. Sub-sample with childcare quality observations (N = 471) (see Table 3)

[SEE TABLE 3]

In order to examine the potential contribution of the quality of care in influencing children's emotional and behavioural development, this variable was added to blocks 1 and 2 for the sample who had received significant amounts of non-maternal care.

#### 3.3.1. Maternal reports.

Block 1 (home variables and gender). Examining the quality of care sample, it was found that more maternal mental health problems ( $b=0.345$ ) and more disadvantaged socio-economic background ( $b= -0.277$ ) were significant predictors of higher total problems, while maternal stress and child-gender were not significant in predicting total problems. The quality of maternal caregiving tended to be associated with fewer problems ( $b= -0.199$ ) and was significant ( $b= -0.219$ ) in Block 1 prior to adding Block 2.

As far as specific problems were concerned (not shown in the table), lower socio-economic status was associated with fewer conduct ( $b= -0.293$ ,  $p < 0.05$ ) and emotional problems ( $b= -0.262$ ,  $p < 0.05$ ); more maternal mental health problems predicted more conduct problems ( $b=0.365$ ,  $p < 0.05$ ); and better maternal caregiving quality predicted less hyperactivity ( $b= -0.253$ ,  $p < 0.05$ ). Girls were more likely to be prosocial than boys ( $b= 0.174$ ,  $p < 0.001$ ).

While none of the observed types of childcare (Block 2) were associated with total problem scores, spending more time in day care centres was associated with more hyperactivity

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( $b = 0.138$ ,  $p < 0.05$ ) and more time in grandparental care was associated with increased peer problems ( $b = 0.235$ ,  $p < 0.01$ ), taking quality into account.

As can be seen from Table 3 the quality of non-parental childcare was not a significant predictor of emotional or behavioural problems.

The first block accounted for 45.2% of the variance, with the second block adding only another 1.3% of variance to the model ( $F = 2.236$ ,  $p < 0.05$ ).

### 3.3.2. Teacher reports.

Block 1 (home factors). With quality of childcare taken into account, better maternal caregiving quality was predictive of fewer total problems ( $b = -0.317$ ) and boys were more likely to have problems than girls ( $b = 0.205$ ). As far as specific problems were concerned, increased maternal caregiving quality predicted fewer peer problems ( $b = -0.356$ ,  $p < 0.01$ ), while being a girl was predictive of more prosocial behaviour ( $b = 0.145$ ,  $p < 0.01$ ), fewer conduct problems ( $b = -0.110$ ,  $p < 0.05$ ) and less hyperactivity ( $b = -0.222$ ,  $p < 0.001$ ). Block 2 (time spent in different forms of childcare) showed that children spending more time in day care centres had more total problems ( $b = 0.149$ ) and more conduct problems ( $b = 0.174$ ,  $p < 0.05$ ). Children spending more time with childminders also had higher levels of total problems ( $b = 0.146$ ). The quality of childcare was not significantly related to total scores.

Block 1(home block) accounted for 16.5% of the variance, while the childcare type block accounted for an extra 2.5% of variance ( $F = 2.77$ ,  $p < 0.05$ ). Neither the age at which a child began non-maternal childcare nor the number of childcare changes was related to the outcome.

### 3.4. Interactions

A number of interactions were examined to test for specific issues raised by the literature, but none were significant. In particular, there was no gender by childcare type interaction or maternal childcare quality by quality of non-maternal childcare interaction.

#### 4. DISCUSSION

The purpose of this study was to examine the influence of different forms of early childcare on children's emotional and behavioural development. Two views of the children's behaviour were obtained, from mothers and from their teachers, reflecting two different settings. The study found that the strongest and most consistent influences on child behaviour, according to both informant groups, were from the home environment with low quality of maternal caregiving, lower socio-demographic status and maternal stress and mental health all relevant influences. Consistent with previous studies, girls were more likely than boys to have fewer problems and were more prosocial with peers. Based on maternal reports, the home variables together accounted for almost half the variance in predicting children's emotional and behavioural scores.

The findings in relation to the possible impact of childcare experiences present a complex picture. Overall the effects were small. However, there do appear to be influences of certain types of group care on behaviour and emotional problems. In particular, more time in day care centres was predictive of more total problems, and specifically more hyperactivity. However more time spent in a playgroup was predictive of fewer peer problems, while children who had received more childminding were rated by the teachers as having more peer problems. Consistent with previous research (Fergusson *et al.* 2008), children who had spent more time being looked after by a grandparent were more likely to have more peer problems; while one-to-one (home) nanny care was associated with more prosocial behaviour. Thus the one pattern that does appear to emerge is that children who receive more group care in day care centres, according to both teacher and maternal reports, subsequently show evidence of more behavioural difficulties. The findings in relation to childminding suggest that it might be out of

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home care rather than group care that raises the risk of behavioural difficulties. It should be emphasised that these childcare variables only account for a small proportion of the variance in predicting children's emotional and behavioural outcomes.

The findings that the principal and strongest influences derive from the home environment are consistent with earlier findings on children's socio-emotional development from this cohort at 36 months (Barnes *et al.* 2010). However, at 36 months there were no independent effects of different forms of childcare. There are a number of possible explanations for this. First, it takes longer for certain difficulties to manifest (Schoon *et al.* 2002). It is also important to note that our measures of behaviour at 36 months did not include hyperactivity, the domain in which some of the effects appear to be evident.

Although the pattern of findings across the analyses using mother and teacher reports was broadly similar, this was not always the case. One reason is the context, with mothers reporting principally within the home context, while teachers see the child outside the home. Another is that teachers perhaps provide a more independent view, although in a specific setting. However, there is increasing evidence from a number of studies, especially the Christchurch Health and Development study in New Zealand (Fergusson *et al.* 2009), that behaviour problems reported by both mothers and teachers are independently associated with significant later difficulties, thus providing support for the validity of situation specific (as well as generalised) conduct problems.

There were a number of strengths of the study: a representative sample of parents and young children was recruited, direct observations were made of the quality of care both in the home and in the childcare settings, and the amount of childcare received was carefully

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quantified across the different settings. The study had a number of limitations, in particular while there was relatively small attrition compared to many other studies (a reduction from 1200 to just under 1000 families over a period of more than 4 years), attrition occurred more commonly in disadvantaged families. A further limitation is the extent to which childcare quality was observed. While efforts were made to observe as many non-parental childcare settings as possible, a smaller proportion of grandparents and childminders were observed while a high proportion of day care centres were visited. While data on all fathers was collected, including the amount of childcare they undertook, it was not possible to observe the quality of all fathers' care and only a sub-study of the quality of their care was possible (Lewis *et al.* 2009; West *et al.* 2009).

In conclusion, in this large representative study of the influence of different forms of childcare on children's development, home influences including the quality of maternal care, maternal stress/mental health problems, and socio-economic factors were strong predictors of child behaviour around the age of school entry. There was also some evidence that children who spent more time in group care were likely to have more behavioural problems than other children. Overall these childcare effects were small. These findings have implications for families and policy makers. It suggests that interventions to improve child outcome should focus on potentially modifiable home factors such as supporting and improving the quality of caregiving in the home, reducing stress on families, and promoting interventions that deal specifically with maternal mental health. Interestingly, two possible ways of enhancing maternal mental health and decreasing stress are by either providing more substantial out of home care provision, and improving parental leave provision, which the UK government is considering at the moment. Childcare carried out by people other than parents is not unimportant in relation to children's emotional and behavioural development. In fact, it may be

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that the regulation of childcare introduced in the UK has helped to maintain quality across the board reducing differences between the different forms of childcare. Future research is also required to test whether enhancing the quality of non-parental care, particularly for vulnerable children, improves children's outcome

### Key Messages:

- The strongest and most consistent early influences on child behaviour problems around school entry were from the home environment. These included low quality maternal care giving, maternal stress and mental health problems.
- The overall effects of non-parental child care were small.
- There was some evidence that children who spent more time in group care were more likely to have behavioural problems.
- Lower SES was associated with more behavioural problems.
- Girls had fewer behaviour problems and were more pro-social with peers than boys.

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