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Paternal postnatal and subsequent mental health symptoms and child socio-emotional and behavioural problems at school entry

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**Abstract**

Research on the effect of paternal mental health problems, particularly on young children, is based predominantly on clinical levels of depression. Furthermore, potential mediators such as marital discord have often been overlooked. This longitudinal community study assessed the association between paternal mental health symptoms in a community sample (N=705) assessed at 3 months postnatally (Edinburgh Postnatal Depression Scale) and 36 months (General Health Questionnaire) and children's socio-emotional and behavioural problems at 51 months (Strengths and Difficulties Questionnaire) as reported by mother, father and teacher. Controlling for SES and maternal mental health symptoms at 3 and 36 months, paternal postnatal depressive symptoms predicted more father-reported child problems at 51 months but, in contrast to previous findings, not mother-reported problems. Paternal mental health symptoms at 36 months predicted both maternal and paternal reports of child problems at 51 months controlling for both paternal and maternal postnatal symptoms. Paternal mental health symptoms at 3 and 36 months were not significant predictors of teacher reported child problems. Postnatal marital discord and paternal mental health problems at 36 months both mediated the relationship between paternal postnatal symptoms and later child emotional and behavioural problems. Child gender did not moderate the relationship. Implications for interventions are discussed.

**Keywords:** Paternal depression, child socio-emotional problems, marital discord

Maternal postnatal depression can have a detrimental effect on children's emotional and behavioural development (Beck, 1998; Bureau, Easterbrooks, & Lyons-Ruth, 2009; Murray & Cooper, 1997). Fathers are also at risk for postnatal depression (estimates between 2.1% and 25.5%; Goodman, 2004). While evidence has emerged on the importance of fathers to child development (Lamb, 2010) the relationship between paternal postnatal mental health and child development prior to school age has received little attention, with more focus on children between school age and young adulthood (Beardslee, Versage & Gladstone, 1998; Kane & Garber, 2004; Phares & Compas, 1992). With increased maternal employment there has been an increase in fathers' caregiving of young children (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Therefore it is important to explore the likelihood that paternal mental health problems early in children's lives may have an impact on subsequent child well-being. In particular, the postnatal period provides an opportunity for intervention, when health professionals routinely contact families (Shribman & Billingham, 2009).

A small study (N=18) found that paternal postnatal depression (above the EPDS cut-off) was associated with infant fussiness at six months as reported by mother, father or both parents (Davé, Nazareth, Sherr & Senior, 2005). The relevance of child gender is not clear-cut. Some researchers have found that maternal depression is more influential on boys (Murray, 1992; Weinberg, Olson, Beeghly & Tronick, 2006) while others have shown girls to be more vulnerable (Davies & Windle, 1997; Hops, 1992). A large study of fathers in the UK (N=6,170) found that, controlling for maternal depression (but not education or social class), marked paternal depression at six months (a relatively small group, 3%) was related to difficult temperament of boys but not girls at 24 months, as reported by mothers (Hanington, Ramchandani & Stein, 2010). However, in the same sample (ALSPAC), postnatal paternal depression (above the EPDS cut-off at 8 weeks) was predictive of both girls' and boys'

marked emotional and conduct problems (top 10%) and marked total behaviour problems (top 10%) at 42 months as described by mothers, controlling for education and social class (Ramchandani, Stein, Evans, & O'Connor, 2005).  Controlling for subsequent paternal depression at 21 months, paternal postnatal depression was only predictive of hyperactivity and conduct problems; the impact on conduct problems was greater for boys than girls (Ramchandani et al., 2005).

Different findings can be identified depending on whether depression is defined according to total symptoms or a cut-off and whether child difficulties are defined using a temperament scale or a behaviour problem measure with a cut-off or total problems. For example, Davé, Sherr, Senior and Nazareth (2008) found a relationship between paternal depression and child problems in a sample of parents of 4-6 year olds recruited though General Practitioners.  However this result was based on only 8 men with major depression and 10 children with marked total problems out of a sample of 248 families. There was no effect for men with minor depression. To understand what public health interventions might be appropriate, in addition to clinical treatment for severely ill parents, it is important to look at representative samples to understand whether less severe levels of paternal mental health problems pose any risk for their children's development.

It is important to consider other factors which may play a part in the relationship between parental depression and child difficulties. Lower socioeconomic status (SES) is positively associated with depression (Birtchnell, Masters, & Deahl, 1988) and child difficulties (Meltzer, Gatward, Goodman, & Ford, 2000), and is therefore likely to be involved in this relationship.  Some studies, but not all, have controlled for parental education and social class, but other family factors may also be involved.  Marital discord has been found to be positively associated with depression in both partners (Beach & O'Leary, 1993)

and with child difficulties (Reid & Crisafulli, 1990) and to mediate the relationship between parental depression and child outcomes (Cummings, Keller, & Davies, 2005; Hanington, Heron, Stein, & Ramchandani, 2012). Marital discord may influence child well-being through a number of pathways.  Marital discord may disrupt the child-parent relationship (Erel & Burman, 1995; Krishnakumer & Beuhler, 2000) or the child's emotional stability and sense of security (Cummings & Davies, 1994; 1999). Furthermore, the child's attribution of the conflict witnessed between parents may shape their own interactions with their parents and others (Harold & Conger, 1997). Despite these findings, few studies of the impact of paternal depression have accounted for both marital discord and SES.

In summary, there is a wealth of evidence on the relationship between maternal depression in the postnatal period and early years and young children's development. Research examining the effect of paternal mental health is not as yet so conclusive, with several studies looking at the most severe paternal depression and the most marked child behaviour difficulties. In addition, most previous studies have not explored mediating factors and the majority rely on reports of child behaviour from a single-informant, usually the mother.

The current study examines the relationship between paternal mental health and children's socio-emotional difficulties at the start of school, using a large sample and multiple informants. The following hypotheses were addressed:

(1) Paternal postnatal depressive symptoms will have an adverse effect on child socio-emotional outcomes at 51 months, independently of SES and maternal mental health symptoms.

(2) Paternal mental health symptoms at 36 months will have an adverse effect on children's socio-emotional outcomes at 51 months, independently of SES, paternal postnatal depressive symptoms, and maternal mental health symptoms.

(3) The effect of paternal postnatal depressive symptoms on child difficulties at 51 months will be mediated by marital discord at 3 months and by later mental health symptoms at 36 months.

**Method**

*Sample*

The sample was taken from the Families, Children and Child Care study (FCCC) which recruited 1201 mothers and their babies from antenatal clinics in North London and Oxfordshire. Eligibility included mother at least 16 years, infant full term singleton with no congenital abnormalities, and no plans to put the child into care or adoption (Malmberg, et al., 2005). The majority of parents were living together (99.0%), had a white ethnic background (80.0%) and more than half the families had at least one parent with a managerial/professional occupation (60.6%). Seven hundred and five partners agreed to participate and were the sample of the present study. Of these, 97.6% were the child's biological father. Ethical approval for the study was given by the Royal Free and University College Medical School and Oxford University and all participants gave written informed consent.

*Procedure*

Data were collected at 3 months after the child's birth, with follow-up at 10, 18, 30, 36 and 51 months. Data for this study involve contacts at 3, 36 and 51 months. Maternal interviews and questionnaires were administered during home visits and paternal

questionnaires were left at visits and returned by post. Teachers' questionnaires (51 months) were sent and returned by post.

### Measures

*Demographic characteristics*

Information was collected on child gender, partnership/marital status and parents' occupational status. Computer Assisted Standard Occupational Coding (CASOC) assigned each participant to the 3-step CASOC (Working, Intermediate, Managerial/Professional). Mothers' and partners' scores were averaged to create family SES.

*Paternal and maternal mental health*

At 3 months mothers and fathers completed the self-report 10-item Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden & Sagovsky, 1987) with possible scores ranging from 0 to 30 and a cut-off of 12/13 indicating the likelihood of depression. While initially developed for female respondents it has subsequently been validated for use with males (Edmondson, Psychogiou, Vlachos, Netsi, & Ramchandani, 2010). Total EPDS scores were used in all analyses (Cronbach alphas: mothers .84; fathers .80).

At 36 months mothers and fathers completed the self-report 12-item General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988), a measure of non-psychotic mental health symptoms. Scores can range from 0 to 36 with a cut-off of 11/12 indicating likely mental health problems. Total GHQ scores were used in all analyses (Cronbach alphas: mothers .87; fathers .86).

*Marital Discord*

At 3 months mothers and fathers completed the self-report 32-item Dyadic Adjustment Scale (DAS; Spanier, 1976) which measures dyadic consensus, dyadic satisfaction, affectional expression, and dyadic cohesion. The majority of items are scored

from 0 to 5 with two binary items. The four scales give a total satisfaction score (maximum 143). The scoring was reversed so that a higher total score represented more marital discord (Cronbach alphas: mothers .88; fathers .89).

*Child Behaviour*

The 25-item Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), with items scored from 0 to 2, has good internal consistency (mean Cronbach alpha .73), and retest stability (mean .62) (Goodman, Lamping, & Ploubidis, 2010). It was completed by mothers, fathers, and teachers at 51 months. There are five subscales each with five items (conduct problems, hyperactivity, emotional symptoms, peer problems, and prosocial behaviour). The first four combine to give a total difficulties score (range 0 to 40) which was used in this study (Cronbach alphas: mother .74, father .74, teacher .81).

**Statistical Analysis**

Missing data for predictors were imputed using the Full Information Maximum Likelihood (FIML) technique (Wothke, 1998). FIML calculates the maximum likelihood estimates of the model's parameters which are then used to make the optimal regression equations and predict missing values. As regression methods can underestimate standard error, some error is added to the variances of these estimates. Bivariate correlations were calculated between family characteristics, parents' mental health and total child difficulties to determine which variables to include in regression analyses. A series of hierarchical regression analyses were then fitted in order to test the current hypotheses. In order to test for mediation, bias-corrected (95 %) confidence intervals was examined using bootstrapping in AMOS (MacKinnon, Lockwood, and Williams (2004). Finally, to test the moderation of child gender on mediations, multi-group analysis in AMOS was run for boys and girls. AMOS allows to compare models across samples (i.e., girls and boys) evaluating the

differences in goodness of fit statistics between unconstrained models and models where paths were constrained to be equal across samples.

**Results**

*Sample characteristics*

Attrition was low between 3 and 36 months. Of the 705 men who completed the EPDS at 3 months, 626 (88.8%) completed the GHQ at 36 months. Of the 705 fathers completing the EPDS, 543 (77.0%) completed the SDQ at 51 months. The reasons for attrition are not known, but some contact with mothers at 51 months was by telephone rather than home visit, which may have reduced the likelihood of paternal response. Characteristics of participants and non-participants at 51 months were compared (see Table 1). The groups did not differ in terms of fathers' ethnicity, marital discord, paternal age, paternal postnatal and 36 month mental health symptoms or child difficulties. Fathers participating at 51 months were more likely to live with the mother at 3 months ($\chi^2$ (1) =4.66, $p < .05$) and be in a managerial/professional SES family ($\chi^2$ (1) =14.21, $p < .001$). Participating fathers' partners (child's mother) were younger ($t$ (243) =3.15, $p < .01$) and had fewer mental health symptoms at 3 months ($t$ (217) = -3.30, $p < .001$) and at 36 months ($t$ (122) = -2.83, $p < .01$). There were 502 teacher SDQ scores for these 543 families (92%).

Of the 543 fathers completing the SDQ, 43 (7.9 %) had scores above the male EPDS cut-off score of 10 at 3 months, indicating that they were at risk of a depressive disorder (Edmonson et al., 2010). A similar proportion (33, 6.1%) of their partners was at risk of a depressive disorder at 3 months using a cut-off of 12 (Murray & Carothers, 1990). Of the 543 families with paternal SDQ scores, 30.0% of fathers and 32.9% of mothers had GHQ scores at 36 months scored at or above the threshold of 12, indicating that they were at risk of a psychological disorder.

[Insert Table 1]

*Bivariate correlations*

There were significant associations among mothers', fathers' and teachers' reports of child socio-emotional problems based on the SDQ, though these were lower for parent-teacher than parent-parent correlations (mother-father r=.57, mother-teacher r=.28, father-teacher r=.21). The associations among family characteristics, parents' mental health and child difficulties were also examined (see Table 2). Child gender was only significantly associated with teacher-reports of child difficulties (boys having more difficulties) and not that of parents. Lower SES was significantly associated with child difficulties according to all respondents. Postnatal depression symptoms of mothers and fathers were positively associated with subsequent child difficulties as reported by each parent. However, fathers' mental health symptoms at 36 months was only associated with father-reported child difficulties at 51 months; and mother's mental health symptoms at 36 months was only associated with mother-reported child difficulties. Fathers' and mothers' postnatal depressive symptoms were positively related to each other (r = .22), as were fathers' and mothers' 36 months mental health symptoms (r = .22). The extent of depressive symptoms at 3 months was also positively associated with mental health symptoms at 36 months for both parents (see Table 2).

Marital discord at 3 months was positively associated with child behaviour problems at 51 months according to both maternal and paternal reports. Father and mother reports of marital discord were closely associated to each other (r = .65).To avoid collinearity, only fathers' reports of marital discord were entered into the analyses. Teachers' SDQ scores were not significantly associated with parents' postnatal depression, later mental health symptoms, or marital discord, therefore no further analyses were based on teacher-reports.

[Insert Table 2]

*Direct effect of paternal postnatal depression and later mental health symptoms*

It was predicted (hypothesis 1) that paternal postnatal depressive symptoms would have an adverse effect on child socio-emotional outcomes at 51 months, independently of SES and maternal mental health symptoms. The step-wise regression analysis first examined the influence of paternal depression at 3 months on child behaviour at 51 months, then controlled for family SES, maternal depression at both time points and marital discord. Then the influence of paternal depression at 36 months was examined, and finally the influence of paternal depression at 36 months taking all other factors into account. These analyses were conducted first for father-reported behaviour problems then for mother-reported problems. All the steps in both regression models were able to account for a substantial amount of the variance in maternal and paternal reports of child socio-emotional problems at 51 months (see Tables 3a and 3b).

Paternal postnatal depressive symptoms significantly predicted father-reported and mother-reported child socio-emotional problems (see Tables 3a and 3b, step 1) and remained so controlling for SES (Step 2). Controlling for maternal symptoms (step 3) paternal postnatal depression was only a predictor for father-reports of child behaviour and controlling for marital discord (step 4) it was not significant for mother or father reports. Nor was postnatal paternal depression significant after controlling for paternal 36 month mental health ( step 6). It was also predicted that paternal mental health symptoms at 36 months would have an adverse effect on children's socio-emotional outcomes at 51 months, independently of SES, paternal postnatal depressive symptoms, and maternal mental health symptoms (hypothesis 2) and this was confirmed. Paternal mental health problems at 36 months significantly predicted both mother and father reported child

behaviour problems (Tables 3a and 3b, step5) and remained significant when all other factors were controlled (step 6).

[Insert Tables 3a and 3b]

*Mediation models*

The third hypothesis was that the effect of paternal postnatal depressive symptoms on child difficulties at 51 months would be mediated by marital discord at 3 months and by later mental health symptoms at 36 months.  The coefficients in Table 3 suggested two indirect paths to be examined for mediation: the indirect link between paternal postnatal depressive symptoms and both father- and mother-reported child difficulties through marital discord; and the indirect link between marital discord and both father- and mother-reported child difficulties through later paternal mental health.  The bias-corrected confidence intervals for the mediation of marital discord between paternal postnatal depression and child difficulties showed a significant indirect path for father-reported child difficulties (*Standard indirect effect*=.071, *p*<.01; 95% CI= .042; .107 ) and for mother-reported child difficulties  (*Standard indirect effect*=.047, *p*<.01; 95% CI= .019; .080).

Paternal later mental health symptoms were found to be a significant mediator of the association between marital discord and later child difficulties as reported by fathers (*Standard indirect effect*=.032, *p*<.01; 95% CI= .010; .062) and mothers (*Standard indirect effect*=.030, *p*<.01; 95% CI= .009; .064).  To summarise, marital discord at 3 months mediated the relationship between early paternal mental health at 3 months and child difficulties at 51 months. Later paternal mental health at 36 months was a mediator of the link between marital discord at 3 months and child outcomes at 51 months.

 *Child gender moderation*

Child gender did not moderate the associations among paternal mental health and marital discord, controlling for maternal mental health and SES. The associations were similar across boys and girls except for the link from paternal mental health at 36 months to father-reported child difficulties ($\beta = .19$, s.e.= .06, p<.001 for females, $\beta = .32$, s.e.= .05, p<.001 for males). This path was constrained to be equal in order to test whether the difference was significant. However, the delta chi square test (comparing the models when the path was and was not constrained) showed this path to be statistically equal across boys and girls ($\Delta\chi2= 1.631$ $\Delta df = 1$, ns).  To summarise, the direct and indirect links from paternal mental health and child problems were not moderated by child gender.

**Discussion**

This study aimed to investigate the relationship between paternal mental health symptoms and child socio-emotional problems.  The parents in this relatively large study were comparable in terms of the prevalence of depression in mothers and fathers to other research (Gaynes et al., 2005; Goodman, 2004). The first and second hypotheses were that paternal postnatal depressive symptoms and later paternal mental health symptoms would both have an adverse effect on child socio-emotional outcomes, controlling for the expected effects of SES and maternal mental health.  Hypotheses 1 was confirmed for father-reported child difficulties but not mother-reported child difficulties. Previous research has used the small percentage of fathers with major depression to indicate a link between paternal postnatal depression and child behaviour difficulties or difficult temperament (Hanington et al., 2010; Ramchandani et al., 2005), but it appears that taking an approach based on a continuous score of depression fails to find such a relationship unless the father is also the informant of the child. This could indicate a tendency for fathers prone to depression to be negative about their children. Depressed parents can over-report child difficulties as a result

of their own negative mood (Briggs-Gowan, Carter, & Schwab-Stone, 1996), although the time between measures here was four years.

However, hypothesis 2 was confirmed in that paternal mental health symptoms at 36 months was a significant predictor of child socio-emotional problems at 51 months as reported by fathers and mothers. Thus any response bias related to fathers with mental health problems being more likely to perceive their child as a problem is less likely. The greater influence of later paternal mental health symptoms may be related to fathers' increased involvement with caregiving from 0 to 5 years (Bailey, 1994), i.e. later paternal mental health symptoms may affect children more than symptoms in the postnatal year as there is increased exposure to fathers' symptoms at this later stage.  These findings may also be related to the fact that the GHQ includes questions covering additional symptoms to depression (e.g. anxiety). This broader range of symptoms may be more relevant to parenting and influential on children developing socio-emotional problems.

One important difference in this study was that marital discord was assessed in the postnatal period and hypothesis 3 was confirmed in that paternal postnatal depression was no longer a significant predictor of child difficulties once marital discord was taken into account. The impact of paternal postnatal depressive symptoms on child difficulties at school entry was fully mediated by early marital discord and paternal mental health beyond the postnatal period.  The importance of marital discord in the months following the birth of a child, when couples are likely to be making many adjustments, should be of importance to health professionals working with families. Many parents experience a range of depression symptoms in the months following a birth and where the depression is extreme need strong clinical intervention is likely to be needed so that children are not adversely affected.

However, for other families, a more holistic approach may be more useful, focusing on the marital relationship and family difficulties related to social disadvantage.

In addition, the exploratory examination to determine if the impact of marital discord at 3 months would be mediated by paternal mental health symptoms at 36 months was supported. Thus the relevance of early marital discord is most likely when there are ongoing paternal problems. Ideally we would have asked about marital discord again at 36 months, but this was not collected. However, as marital discord is more likely when one, or both, parents has mental health problems (Beach & O'Leary, 1993), any intervention to reduce depression postnatally for fathers or mothers is likely to minimise any ongoing impact of paternal postnatal depression.

Contrary to some previous research, the possibility that child gender moderates the relationship between paternal mental health and child difficulties was not confirmed. Other studies have noted gender differences particularly for temperament (Hanington et al, 2010) or for specific sub-types of problems such as conduct problems (Ramchandani et al., 2005). Using the total difficulties score and a continuous measure of paternal mental health problems rather than focussing on individuals with marked problems, may have masked gender effects which previous research has identified using clinical cut-off points. However it was decided that, given the low Cronbach alphas for the subscales in this sample, any conclusions about subscales would not be warranted. A sample with more variability in child behaviour problems may lead to additional results, linking parental mental health problems to particular aspects of child behaviour.

*Strengths and Limitations*

A strength of this study was the availability of information about marital discord in the postnatal period, and that it was a population study recruited to look at a range of factors

affecting child development with no mention of a specific focus on parental mental health.
The use of multiple informants of child difficulties was also important. The lack of any
relationship between paternal mental health and teacher reported problems highlights the
possibility that child problems may be situation specific (Achenbach, McConaughy &
Howell, 1987), with home behaviours exacerbated by marital discord. It was noteworthy that
mother and father reports of child behaviour were closely related but that neither was closely
related to teacher reports. There are limitations, nevertheless. The sample was over-
representative of high SES families which could be both a strength and a weakness. It
lessens the generalisability of the findings to more disadvantaged families, but the fact that in
this relatively advantaged group there was an important effect of both paternal and maternal
depression indicates that the topic is suitable for a public health approach rather than one
focussing on the most vulnerable parents. A similar study with families from a diverse SES
background, again taking marital discord into account and measuring discord at more than
one time point, would extend these findings. Another weakness was the attrition at the 51
month time point. It was shown that attrition was more likely if mothers reported more
mental health problems at 3 and 36 months. The absence of information from these families,
who are likely to have had children with more difficulties at 51 months, may have reduced
the likelihood of identifying significant influences. The response rate for teachers was high,
thus the reason for the lack of relationship between family characteristics and teacher
assessments of children's behaviour is unlikely to be due to lack of information.

The present study had a measure of postnatal depression but a more general measure
of later mental health. The GHQ does not measure depression alone; therefore it could be
that other psychological symptoms (e.g. anxiety or somatic symptoms) are the most relevant
in predicting child difficulties. Additionally, most contact with fathers was via the mothers or

by post. A more direct route to fathers might have enabled some who were reluctant (possibly those with more depression) to provide information.

**Conclusions**

The results suggest that fathers' mental health symptoms in the pre-school years are likely to adversely affect both boys' and girls' socio-emotional behaviours at school entry. The relevance of paternal postnatal depression on subsequent child difficulties was mediated by postnatal marital discord. The relevance of postnatal marital discord was further mediated by subsequent paternal mental health symptoms at 36 months. These findings have important implications for clinical interventions in terms of who to target and how best to help.

Although there is growing evidence to suggest the inclusion of fathers in intervention programmes, the present findings suggest that in the postnatal period particular attention should be paid to marital discord, especially when it is associated with depression in either parent. Subsequently, at child health checks in the preschool period, it would be sensible to enquire about paternal mental health. Ideally this would be directly with fathers, but if they are not available then there should be a way to provide them with questionnaires so that they can describe any symptoms. This will enable a better system for the prevention of young children's socio-emotional problems.

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**Key points**

- Increasing attention is being paid to the potential implications for young children of paternal mental health problems.

- In this study paternal postnatal depressive symptoms were unrelated to child symptoms four years later once postnatal marital discord had been taken into account.

- Paternal mental health problems when children were three years old was a strong predictor of children's subsequent behavioural and emotional symptoms at 51 months, as reported by both mothers and fathers.

- The strong relationship between postnatal marital discord and child behaviour and emotional problems four years later, if paternal postnatal depression is also present, indicates that it may be important for health visitors and other health professionals to work closely with both parents when either has depression in the postnatal period and to talk about the marital relationship.

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Table 1. Characteristics of families with fathers who did and did not complete the Strengths and Difficulties Questionnaire (SDQ) at 51 months. Percentages in brackets for categorical indicators, standard deviations for continuous variables.

| | Completed (N=543) | Not completed (N=162) |
|---|---|---|
| Mother lives with partner (3 months) (%) | 540 (99.4) | 158 (97.5)* |
| Paternal Ethnicity - White (%) | 482 (88.8) | 137 (84.6) |
| Black (%) | 22 (4.1) | 10 (6.2) |
| Asian (%) | 16 (2.9) | 9 (5.6) |
| Mixed/other (%) | 23 (4.2) | 6 (3.7) |
| Family SES - Managerial/professional (%) | 402 (74.0) | 95 (58.6)** |
| Intermediate (%) | 76 (14.0) | 33 (20.4)* |
| Working (%) | 65 (12.0) | 34 (21.0)** |
| Mean maternal age at birth | 32.1 (4.6) | 34.5 (5.6)** |
| Mean paternal age at birth | 34.5 (5.6) | 33.5 (6.5) |
| Mean mother DAS[a] total (3 months) | 33.6 (12.4) | 35.6 (13.9) |
| Mean father DAS total (3 months) | 33.1 (12.4) | 35.9 (15.5) |
| Mean mother EPDS[b] total (3 months) | 5.9 (3.9) | 7.3 (5.0)*** |
| Mean father EPDS total (3 months) | 5.2 (3.8) | 5.8 (3.8) |
| Father EPDS above cut-off (3 months) (%) | 43 (7.9) | 14 (8.6) |
| Mother EPDS above cut-off (3 months) (%) | 33 (6.1) | 23 (14.2) |
| Mean mother GHQ[c] total (36 months) | 10.3 (5.3) | 11.9 (5.7)** |
| Mean father GHQ total (36 months) | 10.6 (5.1) | 10.2 (4.1) |
| Father GHQ above cut-off (36 months) (%) | 135 (30.0) | 16 (30.7) |
| Mother GHQ above cut-off (36 months) (%) | 159 (32.9) | 45 (44.1) |
| Mean SDQ total problems (mothers' report, 51 months) | 7.1 (4.1) | 6.8 (4.3) |

[a] Dyadic Adjustment Scale, [b] Edinburgh Postnatal Depression Scale, [c] General Health Questionnaire

*$p < .05$, **$p < .01$, ***$p < .001$ difference between groups

Table 2. Bivariate correlation coefficients between family characteristics, parents' mental health symptoms, and child socio-emotional and behavioural problems at 51 months based on the Strengths and Difficulties Questionnaire, completed by mother, father and teacher

| | 1. | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Child gender[a] | - | | | | | | | |
| 2. Family SES[b] | .04 | - | | | | | | |
| 3. DAS[c] 3m, Mother | -.06 | .01 | - | | | | | |
| 4. DAS 3m, Father | .05 | -.01 | .65** | - | | | | |
| 5. EPDS[d] 3m, Mother | .02 | .05 | .27** | .12** | - | | | |
| 6. EPDS 3m, Father | .04 | .06 | .24** | .32** | .22** | - | | |
| 7. GHQ[e] 36m, Mother | .07 | -.07 | .26** | .19** | .38** | .07 | - | |
| 8. GHQ 36m, Father | .04 | -.12* | .24** | .21** | .18** | .34** | .22** | - |
| 9. SDQ[f] total problems, Mother | -.03 | .13** | .22** | .15** | .23** | .08* | .17** | .08 |
| 10. SDQ total problems, Father | -.06 | .12** | .19** | .18** | .13** | .14** | .05 | .14** |
| 11. SDQ total problems, Teacher | -.14** | .12** | .04 | .02 | -.01 | -.04 | -.04 | -.02 |

[a] Coded 0=Male, 1=Female  [b] Socioeconomic status (3 months), coded 1=Managerial/Professional, 2=Intermediate, 3=Working, [c] Dyadic Adjustment Scale, [d] Edinburgh Postnatal Depression Scale, [e] General Health Questionnaire [f] Strengths and Difficulties Questionnaire

*$p<0.05$, **$p<0.01$

Table 3. Standardized coefficients from regression analyses to predict father- and mother-reported child total socio-emotional and behavioural problems (Strengths and Difficulties Questionnaire) with standard errors in brackets (n=705)

| *Table 3a. Father-Reported Child Problems* | | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 |
| 3 month Father EPDS[a] | .15** (.04) | .14*** (.04) | .11** (.04) | .04 (.04) | | -.03 (.04) |
| SES Intermediate [b] | | .11*** (.39) | .12** (.39) | .11** (.38) | | .12*** (.37) |
| SES Working [c] | | .13*** (.41) | .12*** (.41) | .13*** (.40) | | .15*** (.39) |
| 3 month Mother EPDS[a] | | | .13** (.04) | .13** (.04) | | .11** (.04) |
| 36 month Mother GHQ[d] | | | .06 (.04) | .02 (.04) | | -.03 (.04) |
| 3 month Marital Discord, DAS[e] | | | | .21*** (.01) | | .18*** (.01) |
| 36 month Father GHQ[d] | | . | | | .31*** (.31) | .26*** (.03) |
| Adjusted $R^2$ | .02 | .05 | .07 | .11 | .09 | .17 |

| *Table 3b. Mother-Reported Child Problems* | | | | | | |
|---|---|---|---|---|---|---|
| | Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 |
| 3 month Father EPDS[a] | .10** (.04) | .09* (.04) | .04 (.04) | -.01 (.04) | | -.08 (.04) |
| SES Intermediate [b] | | .12*** (.40) | .13*** (.39) | .13*** (.39) | | .13*** (.37) |
| SES Working [c] | | .14*** (.42) | .13*** (.41) | .13*** (.41) | | .15*** (.40) |
| 3 month Mother EPDS[a] | | | .20*** (.04) | .20*** (.04) | | .19*** (.04) |
| 36 month Mother GHQ[d] | | | .13*** (.04) | .11** (.04) | | .06 (.04) |
| 3 month Marital Discord, DAS[e] | | | | .14*** (.01) | | .11** (.01) |
| 36 month Father GHQ[d] | | | | | .29*** (.03) | .25*** (.04) |
| Adjusted $R^2$ | .01 | .09 | .12 | .13 | .09 | .18 |

[a] Edinburgh Postnatal Depression Scale total score, [b] vs. Managerial, [c] vs. Managerial, [d] General Health Questionnaire total score, [e] Dyadic Adjustment Scale total score.

*p < .05, **p < .01, *** p < .001.