

Paternal Depression and Infant Outcomes: the Role of Expressed Emotion



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Thesis submitted for the degree of
Master of Science (by Research) in Psychiatry

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ABSTRACT

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Introduction: The aim of this study was to examine expressed emotion (EE) in depressed fathers one year postpartum. Paternal depression in the postnatal period has been shown to place children at risk for emotional and behavioural problems. However, the mechanism through which the risk is transmitted remains unidentified. EE, a measure of family environment, has been investigated in children and adolescents and has been associated to child psychopathology. EE has also been found to mediate the relationship between maternal depression and child externalizing behaviours. There exists no research however examining EE in the context of paternal depression. The primary aims of the study were:

- a) To examine differences in EE in depressed and non-depressed fathers and
- b) To investigate whether EE mediates the relationship between paternal depression and child externalizing behaviours.

Methods: EE was examined in families of one year old infants, whose fathers (n=24) had experienced an episode of major depression within the first postnatal year and were compared to families whose fathers (n=79) had no history of depression. EE was measured using the preschool version of the Five-Minute Speech Sample (pFMSS). Both parents completed the EE assessment and the externalizing scale of the Child Behavior Checklist.

Results: Depressed fathers expressed fewer positive comments towards their infants than non-depressed fathers but did not differ in other aspects of EE. Depression predicted externalizing behaviours, but the relationship was not mediated by EE. Maternal EE revealed no differences in families with a depressed and non-depressed father.

Discussion: This is the first study to examine EE in the context of paternal depression and to report depressed fathers to be less positive towards their infants. The low rates of high EE in both mothers and fathers indicates that further adaptations are necessary to the pFMSS for use with one year old infants. Even though EE did not mediate the relationship between paternal depression and child externalizing behaviours; the low rates of positivity in families of depressed fathers may negatively impact on child development and therefore warrant further exploration.

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1 INTRODUCTION

1.1 Paternal depression in the postnatal period. Is it a significant problem?

Depression presents a significant worldwide health problem. Currently, it is the leading global cause of years lost in disability (YLD) for both males and females (WHO, 2004). Research indicates that approximately 13% of the male population will be affected by depression over a lifetime (Kessler et al., 1994), a large portion of which are fathers. Major depression, according to the Diagnostic and Statistical Manual of mental disorders (DSM), is evident when an individual experiences a minimum of two weeks of depressed mood or loss of interest, concurrent with other symptoms such as psychomotor agitation, disruption of appetite and sleeping habits, feelings of worthlessness or suicidality (American Psychiatric Association, 1994). Symptoms which have more specifically been associated with male depression include irritability, anger, sadness, difficulty making decisions and loss of interest in the outside world (Bronte-Tinkew, Moore, Matthews, & Carrano, 2007).

1.1.1 *Prevalence rates of paternal depression in the postnatal period*

Goodman (2004) reported rates of paternal depression in the postnatal period, to vary in community samples as much as 1.2% to 25.5%, and period prevalence ranges from 10.1% to 28.6% (Areias, Kumar, Barros, & Figueiredo, 1996; Matthey, Barnett, Ungerer, & Waters, 2000). Rates are likely to vary this much due to the different measures and cut-offs used for assessment of depression. Timing of assessment is also likely to have affected results as unlike maternal postnatal depression, which presents within the first weeks postpartum, paternal depression has been shown to

develop more gradually throughout the first postnatal year (Areias et al., 1996; Matthey et al., 2000). Most of the studies however have relied on self-report questionnaires rather than clinical diagnosis, and this may have resulted in elevated estimates of prevalence. Using a clinical diagnosis, a prevalence of 10% for the first postnatal year was found in a large sample of fathers from the Fragile Families and Child Wellbeing Study (Huang & Warner, 2005). Particularly high levels of depression were found in fathers whose partners were themselves suffering from depression. Rates in this group range between 24-50% (Goodman, 2004).

1.1.2 *Why is the postnatal period particularly important?*

The early weeks and months of a child's life appear to be a period of critical importance for development; the quality and sensitivity of parenting during this time may be crucial (Murray & Cooper, 1997). Research on maternal depression in the postnatal period, indicates profound effects on the individual, the child and the general well-being of the family. In terms of mother-child relations, it has been shown to affect their interaction and to place children at increased risk of behavioural, emotional, cognitive and physical problems (Murray & Cooper, 1997). More specifically, maternal postnatal depression has been associated to poorer infant mental and motor development as assessed by the Bayley scales (Lyons-Ruth, Zoll, Connell, & Grunebaum, 1986). Furthermore, children of depressed mothers have been shown to have more negative responses and lower rates of overall interactive behaviours (Stein et al., 1991). They are also more likely to be rated as behaviourally disturbed by their teachers at five years of age (Sharp et al., 1995).

Children experiencing the effects of parental depression from a very early age are more likely to suffer the negative effects not only because of the significance of the postnatal period to development, but also because of subsequent episodes of depression. Parents who have suffered from depression in the postnatal period are more likely to suffer from additional episodes and so children of depressed parents are more likely to endure longer periods of parental depression (Goodman & Gotlib, 2002).

The effects however, of paternal depression in the postnatal period, remain largely unknown. This may be in part because of the mothers' role in child development, as the primary care-giver. Alternatively, higher prevalence rates of maternal postnatal depression might have raised concerns over the effects of depression on child development sooner than have possible effects of paternal depression. A more practical reason perhaps is the assumption that women are more willing to participate in research (Goodman, 2004). There is thus a dearth of research on the effects of paternal depression, especially during the early postnatal period.

1.2 How does paternal depression in the postnatal period affect the individual?

1.2.1 *Symptoms of depression in men in the postnatal period*

There appear to be gender-specific factors, which shape the manifestation of depressive symptoms in men. According to Buist, Morse and Durkin (2002) men have more sparse support networks and are more reluctant to seek help for emotional problems and so will more often resort to maladaptive strategies such as substance

abuse. The responsibility for providing material support may also add to work stress and marital conflict. Furthermore, young men may have a more idealized view of pregnancy, childbirth and parenthood than young women, and may experience more difficulties adapting to life with a newborn (Buist et al., 2002). Participants in the study conducted by Condon et al. (2004) reported pregnancy to be the most stressful period with some improvement in the early postnatal period. Expectant fathers drank more alcohol, were more depressed and irritable, suffered more somatic symptoms and had higher scores on negative affect. Results further suggested increasing deterioration in the couple relationship over the first postpartum year.

1.2.2 *Risk factors for development of depression in the postnatal period*

Certain factors may be especially important predictors of depression in fathers such as personal history of depression and substance or drug abuse (Areias et al., 1996; Huang & Warner, 2005; Matthey et al., 2000; Pilyoung & Swain, 2007; Pinheiro et al., 2006). Couples relationship and functioning also seems to be an important factor with married men reporting better mental health than non-married, and prenatal distress predicting postnatal distress in both men and women (Condon, 2006; Huang & Warner, 2005). More specifically, disagreement about the pregnancy or perceived lack of supportiveness have been shown to predict depression (Matthey et al., 2000; Zaslow, Pedersen, Cain, Suwalsky, & Kramer, 1985).

Depression in the female partner during or after pregnancy has been identified as possibly the strongest predictor of depression in the male partner (Ballard & Davies, 1996; Condon et al., 2004; Dudley, 2001; Zelkowitz & Milet, 2001). Matthey et al. (2000) found that 36% of mothers scoring high on depression had high scoring

partners at six weeks postpartum and this rose to 53% by the twelve month assessment. First-time fathers exhibited higher levels of anxiety than experienced fathers during the early postnatal period (Goodman, 2004).

1.3 How does paternal depression affect child development?

Paternal depression seems to have long lasting effects on the child's life, with the child having a 26% greater likelihood of suffering from any psychiatric disorder including alcohol dependence and a 45% increase in depression in the offspring (Spector, 2006). A review by Kane and Garber (2004) indicates that there is a significant association between paternal depression and child internalizing and externalizing symptoms. Effect sizes reported were comparable to those reported by Beck (1999) for maternal depression. Data from the Avon Longitudinal study of Parents and Children (ALSPAC), a population-based study in the UK, has demonstrated that paternal depression in the early postnatal period is significantly associated with increased emotional and behavioural problems at three years of age with an increased risk of conduct problems for boys. The effects remained even when controlling for maternal depression (Ramchandani, Stein, Evans, & O'Connor, 2005). Longitudinal data from the same sample indicated that paternal depression was significantly associated to psychiatric diagnosis at age seven especially with oppositional and conduct disorders, and social difficulties. This was true even after adjusting for maternal depression and paternal educational level (Ramchandani et al., 2008b).

Kane and Garber (2009) examined the contribution of paternal depression to child internalizing and externalizing problems, in a high risk sample of children with mothers, with prior or current symptoms of depression. Paternal depression was associated with both child internalizing and externalizing symptoms. Father-child conflict mediated the relationship above and beyond the effect of maternal depression. Results here mirror findings from two older studies where conflict again mediated the relationship between fathers' depressive symptoms and adolescents' externalizing symptoms in a normative and high-risk sample respectively (Conger, Patterson, & Ge, 1995; Kane, Garber, & Kaminski, 2002). It has been hypothesized, that parental depression may have a more adverse impact on children of the same sex, as the child is more likely identify with the same-sex parent and model maladaptive cognitions and behaviours (Connell & Goodman, 2002). Thomas and Forehand (1991) report an association between paternal depression and adolescent functioning, which was equally strong to that of maternal depression and adolescent functioning. Paternal depression predicted internalizing symptoms for sons and accounted for 7% of unique variance in female conduct problems after controlling for maternal depression, socioeconomic status and adolescent age.

In terms of early father-infant interactions a study by Field, Hossain and Malphurs (1999) reported depressed fathers to interact with their infants in a similar way to non-depressed fathers. When compared to depressed mothers' interactions, depressed fathers' interactions were rated more positively. They demonstrated higher rates of physical activity, facial expressions and vocalizations than depressed mothers. Infants of depressed fathers also received more positive ratings in facial expressions,

gaze and vocalizations. An interesting finding was that partners of depressed fathers, who were not themselves depressed, during interaction with their infants, received lower ratings and so did their infants. In situations where both parents were depressed, father-infant interactions seemed not to be affected. Field et al. (1999) suggest fathers may be coping with depression in a more active way than mothers. However, as the authors note, fathers in the study were not the primary caregivers and thus, were not spending an equivalent amount of time with their infants to mothers. Using depressed fathers who were the primary caregivers may have yielded different results. Similar results were reported by Lundy (2002) in a small sample of fathers and their six month old infants. Paternal depressive symptoms were not associated to the quality of father-infant interactions. Other studies examining father-child interaction in the context of paternal depression have found contradictory results. In a low risk sample, McElwain and Volling (1999) reported fathers to be more withdrawn during interactions and less involved. Forbes, Cohn, Allen and Lewinsohn (2004) did not find current symptoms of depression to relate to paternal engagement in physical play, however, fathers with a history of depression displayed greater negative affect in the still face condition. In addition, paternal depression led to more conflictual and irritable interaction with children (Patterson & Dishion, 1988). Finally, Leinonen, Solantaus and Punamaki (2003) studied the effect of depressive symptoms on parenting and found paternal depression to be associated with being more punitive towards their children. Punitive parenting was also related to boys internalizing and externalizing symptoms and to girls internalizing symptoms.

1.3.1 *Combined effects of maternal and paternal depression on child development*

As aforementioned, a risk factor for depression in the male partner is depression in the female partner. This increases the possibility that children will endure the negative effects of two parents battling with depression and face problems greater than anticipated. It still remains unclear, whether depression in both parents affects the offspring in an additive or interactive way. In an *interactive* model paternal depression would exacerbate the risk of children developing emotional and behavioural problems only when the children were already at risk because of an impaired mother. In an *additive* model, each parent's symptoms contribute differentially to the children's risk. Studies looking at the combined effect of parental depression in the postnatal period report mixed evidence on this.

A study by Mezulis, Hyde and Clark (2004), found that in families of depressed mothers, paternal depression exacerbated the effect of maternal depression only when the father had spent a significant amount of time caring for the child during infancy. Living with a non-depressed father, however, did not buffer the effects of maternal depression. Data from a large community sample illustrate that depression in both parents is associated to a lower likelihood of fathers playing outside regularly with the child and a lower likelihood of mothers telling stories daily to the child when only the father was depressed (Paulson, Dauber, & Leiferman, 2006). Interestingly, depression in the father was shown to impact on the mother-infant interaction as well, even when the mother was not herself affected by depression. In the same sample, maternal depression alone was negatively associated to enrichment; when however, paternal depression was pronounced, mothers interacted at baseline

level, which indicates a compensatory model. Paulson, Keefe and Leiferman (2009) report depressive symptoms in both parents postpartum to have a negative impact on parent-to-child reading frequency. Paternal depression in particular, predicted decrease in reading frequency and limited child expressive vocabulary up to 15 months postpartum. Finally, a study by Weinfield, Ingerski and Moreau (2009), supports an additive model for prediction of externalizing behaviours. A community sample was assessed for symptoms of parental depression and symptoms of internalizing and externalizing behaviours in thirty month old children. Paternal and maternal depression each accounted for unique variance in the prediction of externalizing behaviours, however, paternal depression did not predict internalizing behaviours. Finally, Carro, Grant, Gotlib and Compas (1993) examined the combined effect of maternal and paternal depression on child internalizing and externalizing behaviours at two to three years of age. Paternal depression served as an additional risk factor for increased behavioural problems and interacted with maternal depression to predict internalizing problems.

1.4 Paternal depression impacts on the general functioning of the family.

So far paternal depression has been shown to negatively impact on the individual, the child and their interaction. Studies have also shown how, in the context of paternal depression, the quality of the mother-child interaction may also deteriorate, even when the mother is not suffering herself from symptoms of depression. The study by Field et al. (1999) demonstrated how in families with a depressed father mothers and infants received lower interaction ratings. Furthermore, the study by Paulson et al. (2006) reported mothers with a depressed partner being less likely to sing songs to

their children and to play peek-a-boo with them than mothers with non-depressed partners. This suggests that in families with a depressed father the general functioning of the family deteriorates, with the interaction between mothers and children showing impairments even when the fathers is not present. Further evidence to support this comes from the influential studies by Jacob and Johnson on the effects of paternal depression on family communication (Jacob, 1997; 2001; Johnson & Jacob, 2000). They compared families with either a depressed mother or depressed father to controls in a video-taped problem solving task. Overall, families with a depressed parent displayed less positivity and congeniality during interaction compared to families with no depressed parent. A comparison of communication patterns between depressed fathers and mothers revealed mothers were less positive and more negative. Paternal depression predicted child depression, and internalizing and externalizing problems. This association was moderated by father-child interaction. Analysis of sequential patterns of father-child interactions exhibited what the authors term, *positivity suppression*, whereby decreased rates of positivity were evident following a positive communication. *Positivity suppression* was not always initiated by the depressed individual as would be expected; rather it was mostly initiated from another family member. Effects of *positivity suppression* were evident across intra-familial relationships; the interaction between mothers and children was marked by a lack of affective expression and a deterioration in marital interactions was also evident.

Another way in which parental depression impacts on family functioning is by the decrease in successful marital adjustment that accompanies depressive symptoms,

which adds to an already stressful environment. A study by O’Leary, Christian and Mendell (1994) reports a tenfold increase in the risk of depression in distressed couples and 25-fold increase in the development of depression in unhappy marriages (Weissman, 1997). It is suggested that the relationship between depression and marital distress is bi-directional with each influencing the other (Whisman, 2001), possibly in a cyclical manner. Fincham, Beach, Harold and Osborne (1997) report husbands’ depression to predict marital distress both at the time of assessment and at an 18-month follow up. Marital conflict has been also found to predict internalizing and externalizing problems of children and impairments in social and academic functioning (Cummings & Davies, 2002). A recent study by Kouros, Merrilees and Cummings (2008) supports the contention that marital conflict and paternal psychopathology interact to impact on children’s regulatory processes to family stress. The study reports marital conflict to be a strong predictor of emotional security for children whose fathers had clinical levels of depression compared to children whose fathers had low levels of depressive symptomatology.

1.5 How do these increased risks translate into later development?

A lot of emphasis has been placed on the predictive role of parental depression on emotional and behavioural outcomes (Cicchetti & Toth, 1991; Connell & Goodman, 2002; Kane & Garber, 2004). What does this mean however, for later child development? Prevalence rates of behaviour problems in both preschoolers and older children range from 7-20% with the majority of studies reporting 10-15% (Campbell, 1995). Stability over a one to two year follow up period has been shown to be high and longitudinal studies have indicated a relatively high stability for behavioural

problems from the preschool age spanning a three to seven year follow up period. Emotional and behavioural problems are most commonly divided and measured as two broadband syndromes of internalizing and externalizing behaviours. Externalizing problems include symptoms of hyperactivity and aggression, while internalizing include anxiety, depression and somatic concerns. Externalizing problems have yielded a larger body of literature, and this may be in part because of the controversy over the reliable identification and long term significance of internalizing behaviour in childhood (Cicchetti & Toth, 1991). In terms of externalizing symptoms, research indicates stability over time which is especially true in children over 6 years old. Huesmann, Lefkowitz, Eron and Walder (1984) measured aggression longitudinally at eight and twenty years of age and found positive correlations to adult aggression. Similar stability has been shown for conduct problems, future emotional instability, delinquency and continuity of dysfunction in children as young as three years old (Cicchetti & Toth, 1991; Olweus, 1979). Externalizing behaviours in childhood have been strongly associated to early parenting. Lorber and Egeland (2009) have shown poor-quality parenting during infancy to be associated with externalizing behaviours at kindergarten and first grade as well as at twenty-three and twenty-six years old. As infancy is a particularly sensitive period for development of emotion regulation, internal representations of others and patterns of relating to others, which in turn are important to the development of externalizing behaviours, infants may be more vulnerable to environmental influences. Thus impaired parenting, during this stage is suggested to be a risk factor for the development of externalizing behaviours (Lorber & Egeland, 2009).

1.6 How are these risks transmitted?

We have so far discussed paternal depression in the postnatal period and have presented evidence of how it affects the individual, the child and the general functioning of the family. Paternal depression has been shown to place children at risk of developing externalizing behaviours. These in turn have shown stability over time with externalizing behaviours measured in preschool years showing continuity even in early adulthood. Here we now consider a model proposed to explain the mechanisms through which the risk is transmitted.

Goodman and Gotlib (1999a) have proposed an integrative model for the transmission of risk to children of depressed mothers. Although it was originally developed to describe maternal depression, the broad parameters can be applied to explain transmission of risk from fathers to children. The model describes four *mechanisms*¹, a) genetic contribution and heritability of depression, b) innate dysfunctional neuroregulatory mechanisms, c) parenting and d) exposure to stressful environments.

In terms of genetic contribution, Phares and Compas (1992) pointed out that fathers contribute 50% of the genetic material. In terms, of adult depression 26-42% of the variance can be explained due to genetic effects (Sullivan, Neale, & Kendler, 2000). Similar estimates for younger ages have been reported but seem to be more varied, but this is also probably related to methodological limitations. There is now a large body of research that suggests vulnerability to depression is genetically transmitted

¹ It is important to note that the term *mechanism* is used by Goodman and Gotlib “consistently with the statistical concept of *mediation*” (Goodman, 2007; Goodman & Gotlib, 1999b).

in terms of cognitive, interpersonal and psychobiological characteristics of the individual (Goodman, 2007).

The prenatal environment has also been shown to play a major role in child development. Maternal depression and anxiety during the prenatal period has been associated to emotional and behavioural problems and to children's intellectual development, with lower scores on cognitive assessments in the first two years of life (O'Connor, Heron, Golding, & Glover, 2003; Pawlby, Hay, Sharp, Waters, & O'Keane, 2009; Sarkar P, Bergman K, O'Connor TG, & Glover V., 2008; Van den Bergh & Marcoen, 2004). It has been suggested that anxiety and depression will impact on the development of the Hypothalamic Pituitary Adrenal axis (Bergman, Sarkar, O'Connor, Modi, & Glover, 2007). Maternal mental health is therefore, a crucial determinant; however, the paternal role should not be overlooked. Fathers may play a key role in mothers' well being. Prenatal partner relationship strain and stress events during pregnancy have been found to be significant risk factors for behaviour problems at age two and infant cognitive and fearfulness scores (Bergman et al., 2007; Robinson et al., 2008). Paternal mental health during that period, or increased marital conflict, will adversely affect the mother's mental state and therefore, the infant as well. Furthermore, paternal depression in the prenatal period has been associated to increased infant crying (van den Berg et al., 2009) and to behavioural and emotional outcomes (Ramchandani et al., 2008a).

The third proposed mechanism of transmission of risk is *parenting*. Parenting may impact in two ways; firstly, through exposure to and modelling of maladaptive affect, behaviour and cognitions or secondly, through inadequate or impaired parenting. The extensive exposure to these maladaptive coping strategies, which children may adopt

through observational learning or reinforcement, may place them at increased risk of developing depression themselves. Maternal critical perceptions of their children have been associated to children's self blaming attributions for negative life events and to lower perceived self worth (Goodman, Adamson, Riniti, & Cole, 1994; Radke-Yarrow, Belmont, Nottelman, & Bottomly, 1990). Greater criticism and hostility expressed by the parent might contribute to the emergence of coercive strategies similar to those implicated in the development of externalizing behaviours (Goodman, 2007). Furthermore, the depressed parent has been described as an inadequate social partner for the child. Unable to always meet the social and emotional needs, depressed parents have been shown to be less responsive during interaction, to provide less structure, monitoring and discipline (Cicchetti & Toth, 1998; Goodman, 2007). Parental symptoms of depression have been associated to more negative parenting practices such as disengagement and low warmth (Downey & Coyne, 1990). In particular for fathers, symptoms of depression have been associated to more psychological control, less warmth and in being more punitive towards their children (Cummings, Keller, & Davies, 2005; Leinonen et al., 2003).

The final proposed mechanism of transmission of risk is through exposure to stressful environments. Examples of stressful environments for the child might include inadequate parenting, the symptoms and course of parental depression or a decrease in the marital quality. These proposed *mechanisms* will often co-exist within a family environment, and will often interact in complex ways to create pathways to disorders. Several theoretical models have tried to take into account how these mechanisms interact to predict outcome, but an analysis of those is beyond the scope of this thesis.

It is important to acknowledge that the proposed model by Goodman and Gotlib (1999), describes a unidirectional impact of parental depression on the developing child. Research however, has shown that child factors may impact on parental mental health and even exacerbate symptoms of depression. Such factors include difficult temperament, gender and social and cognitive skills (Beardslee, 1987; Compas, Langrock, Keller, Merchant, & Copeland, 2002; Cutrona & Troutman, 1986).

The present study attempts to examine how paternal depression impacts on development of behavioural problems in infants by focusing on one of the proposed mechanisms, *parenting*. More specifically, this is attempted by determining the role of expressed emotion (EE), a measure of family environment, as a mediating factor between paternal depression and child behavioural outcomes.

1.7 Expressed Emotion (EE)

EE aims to tap into the emotional atmosphere of the family by measuring the intensity of attitudes from one member to another and aims to capture routine emotional features such as criticism, hostility and over-involvement, rather than unusual patterns of interaction (Leff & Vaughn, 1985; Vaughn & Leff, 1976). The construct of expressed emotion emerged from research in schizophrenia in the 1950's. Brown and colleagues investigated 229 discharged chronic male patients who had been hospitalized for two years or more (Brown, 1985). Two findings seemed noteworthy; firstly, patients suffering from schizophrenia, who returned to live with parents or a wife, were more likely to relapse and secondly, clinical outcome was also related to whether one or both worked at home or outside. This led

to the hypothesis that specific elements in the family environment might be distinctively important for relapse in schizophrenia. Since then, EE has been found to be a reliable predictor of relapse in schizophrenia (Butzlaff & Hooley, 1998). Research in EE has now gone beyond the area of schizophrenia to measuring the importance of expressed emotion in depression, agoraphobia and obsessive compulsive disorder. More recently, research has extended to child and adolescent health in a variety of situations ranging from asthma and diabetes to depression in adolescents and conduct disorders.

The following sections aim to illustrate first, the strong link between EE and child psychopathology, secondly, the role of EE as a mediator between maternal depression and child behavioural outcomes and finally, to examine studies which have assessed EE in children of preschool age. The sections provide evidence for the rationale of this study to examine EE as mediator between paternal depression and child behavioural outcomes one year postpartum. Before proceeding it is important to consider the concept of EE as it applies specifically to children and the advantages of using this measure over others.

The measurement of EE in children is characterized by four key features (Caspi et al., 2004). Firstly, expressed emotions are specific to the individuals experiencing (the parent) and receiving (the child) the emotions. Secondly, EE refers to the way in which the individual perceives and experiences the child. The parent is given the opportunity to refer to any aspect of the child's personality and behaviour and is not limited by closed-ended questions. Thirdly, rating of EE utilizes both verbal and vocal elements (*tone of voice*) for coding. This allows the coders to take into account a satirical or critical tone evident for example in a positive comment. Finally, it

focuses on emotions about the child as an individual rather than emotions on the child's symptoms, which may for example, relate to physical illness.

Evidence presented in the following sections demonstrates how high EE is associated with an increased risk of emotional and behavioural problems for the child. The literature suggests that even from a very early age children may be subjected to high EE. Further understanding and investigation is necessary as through interventions, EE is modifiable, thus improving the parent-child interaction and the general communication patterns within the family.

A variety of measures have been used for the assessment of EE in children (Daley, Sonuga-Barke, & Thompson, 2003; Leff & Vaughn, 1980; Magana et al., 1986; Scott & Campbell, 2000), all of which measure slightly different aspects. The most common aspects are: *Critical comments*, a scale which is common to all EE measures, and refers to disapproval or resentment towards the child. It involves blaming or rejecting the individual and not merely expressing dissatisfaction. *Hostility* is evident when the child is rejected for who he or she is rather than his/her actions. *Emotional over-involvement* (EOI) refers to marked concern. A high EOI is given when a parent exhibits behaviours of self-sacrificing or exaggerated emotional responses. *Warmth* is assessed throughout the EE assessment based on tone of voice, spontaneity and concern about the child. *Positive comments* refer to praise, approval or appreciation of the child. EE is usually examined as a dichotomy with relatives scoring high or low in EE. High EE, also sometimes referred to as negative EE is a combination of the dimensions of hostility, criticism and EOI. Measures for assessment of EE are discussed in more detail in the methods section.

1.7.1 *Association of EE with child psychopathology*

High parental EE has been identified as a risk factor for child internalizing and externalizing problems. Studies supporting this range from clinically referred to normative children, from the preschool age to adolescence. In this section we consider evidence which demonstrates the link between high parental EE and child psychopathology.

Stubbe, Zahner, Goldstein and Leckman (1993) studied the relationship between parental EE and child psychiatric diagnosis in a community sample of 108 children. The dimension of criticism in EE was associated to disruptive behaviour problems, while EOI was related to symptoms of anxiety. Asarnow, Goldstein, Tompson, and Guthrie, (1993) demonstrated a strong association between EE, depressive disorder and 1 year post-discharge clinical outcome in adolescents. Recovery rates were associated to EE levels at home, with adolescents returning to low EE homes showing better recovery rates. This finding is in line with the original findings by Brown and colleagues in discharged patients suffering from schizophrenia (Brown, 1985). EE predicted clinical outcome and depressive disorder at 1 year. A comparison between groups of children with depressive disorders, schizophrenia spectrum disorders and controls, identified that rates of EE were higher in the group of depressive disorders compared to the other two (Asarnow, Tompson, Hamilton, Goldstein, & Guthrie, 1994). The highest rates were found in a subgroup of children diagnosed with co morbid disruptive behaviour problems. The results were replicated in a sample of adolescents with depressive disorders, attention deficit hyperactivity disorder (ADHD) and controls. Results in the group of depressive disorders,

indicated that combined EE ratings from both parents yielded higher overall EE rates and higher critical EE rates.

Vostanis, Nicholls and Harrington (1994) compared levels of EE in three groups of children with conduct disorder, emotional disorder and controls. Maternal criticism was higher in the conduct disorder group and was significantly associated to externalizing behaviours. The component of warmth was higher in the control group and lowest in the conduct disorder group. This study is the first to underscore the importance and potential protective role of warmth when examining EE in children. In a follow up study, after nine months of psychiatric treatment, Vostanis and Nicholls (1995) examined again EE in the groups of children with emotional disturbance and conduct disorder. They found higher levels of warmth and lower levels of criticism.

More recently, EE and child psychopathology were examined in a large group of monozygotic twins and their mothers (Caspi et al., 2004). Assessment of EE and child internalizing and externalizing problems took place at two time points at ages five and seven. Results indicated that maternal EE was significantly associated to antisocial behaviours, as measured by the externalizing scale on the CBCL, at both time points. The twin receiving less warmth and more negativity exhibited more antisocial behaviour. One of the seminal papers on the topic by Schwartz, Dorer, Beardslee, Lavor and Keller (1990) investigated EE using the Camberwell Family Interview in 273 participants aged 6-19 years old and their parents. The study suggests higher maternal EE to be predictive of increased risk for development of disorder for the child, such as depression, substance abuse or conduct disorder.

In a sample of 100 school aged children EE was examined in relation to ADHD, conduct problems and emotional problems in children (Psychogiou, Daley, Thompson, & Sonuga-Barke, 2007). The study also assessed symptoms of maternal psychopathology including ADHD, low mood and aggression. Higher EE was present in mothers of children with conduct and emotional problems. The association between maternal criticism and child emotional and conduct problems remained even after controlling for maternal psychopathology. Conduct problems were also associated to decreased emotional-over involvement. Mothers' elevated ADHD symptoms were associated to increased criticism; however, the association was no longer significant when controlling for child symptoms, which the authors suggest, indicates that EE is driven more by child rather than maternal characteristics.

It is suggested that the sub-components of EE contribute differentially to child psychopathology. Criticism has been identified as a particularly important factor contributing to the risk for later development of psychopathology (Hirshfeld, Biederman, Brody, Faraone, & Rosenbaum, 1997; Kershner, Cohen, & Coyne, 1996; McCarty, 2004; Nelson et al., 2003; Peris & Baker, 2000; Vostanis & Nicholls, 1995). Emotional over involvement on the other hand, has been linked to child separation anxiety and reduced metabolic activity in children with diabetes mellitus (Hirshfeld, 1997; Liakopoulou et al., 2001), but has received less support in the predictive role it has to the development of psychopathology. The above evidence demonstrates the strong link that exists between EE and child psychopathology, especially for criticism and externalizing behaviours.

1.7.2 *Parental Depression, Child outcome and EE*

A substantial part of research in EE has also examined how parental psychopathology relates to EE. A number of studies now have demonstrated the link between maternal psychopathology and high EE, with depression being a frequently noted diagnosis (Bolton et al., 2003; Brennan, Hammen, Katz, & Le Brocque, 2002; Brennan, Le Brocque, & Hammen, 2003; Frye & Garber, 2005; Goodman et al., 1994; Hilsman, 2001; Nelson et al., 2003; Rogosch et al., 2004; Stern, 2002). This section discusses research on parental depression and EE and the evidence that suggests that EE acts as a mediator between parental depression and child outcome. To date, there are five studies supporting the role of EE as mediator between maternal depression and child outcome, three of which have incorporated information on both parents' psychopathology.

The most pertinent study to this thesis, due to its design, is the study by Rogosch, Cicchetti and Toth (2004), investigating EE in multiple subsystems of the family of toddlers of depressed mothers. The study by Rogosch et al. (2004) and this study have both collected EE from both mothers and fathers towards their very young children (20 month old for Rogosch and 12 month old for this study). EE was collected from both parents for themselves, their spouses and their child. Families with a depressed mother had higher scores on maternal EE regarding the child, themselves and their spouse. The same families also exhibited lower marital satisfaction, higher trait negative affect and more negative childhood relationship representations compared to non-depressed mothers. Criticism was found to be prevalent at multiple levels of the family system. Both parents were more likely to express self-criticism and criticism towards their partners, and their children were also more likely to be

the recipients of more criticism from their depressed mothers. Fathers of toddlers with depressed mothers were not found to be more critical. Findings support the role of EE as a mediator between maternal depression and child behaviour problems. This study has several strengths. It is one of the few studies to include fathers in assessment of EE and the first to examine EE in multiple subsystems in the family. Furthermore, it has assessed a large number of depressed mothers (n=101/155) using clinical diagnosis and has included paternal mental health. Assessment of EE between the couple as well as assessment of marital adjustment has further strengthened the study as it was possible to investigate levels of criticism between the couple, to which the child will be also be subjected.

Another study to include fathers in assessment of EE, investigated maternal depression, paternal psychopathology and adolescent diagnostic outcomes (Brennan et al., 2002). Maternal and paternal depression had an additive effect on youth externalizing outcomes. Chronic family stress, paternal EE and marital satisfaction were also assessed to examine whether they mediated parental psychopathology and adolescent outcomes. Maternal depression interacted with paternal depression and substance abuse in predicting youth depression. Chronic family stress and paternal EE appeared to mediate the relationship between paternal psychopathology and youth depression.

A study by Hilsman (2001) looking at prospective development of depressive disorder in a high risk sample indicated that depressed mothers were higher in critical EE rates compared to mothers with no psychiatric history. Criticism was associated to the development of both externalizing and internalizing problems. Rates of criticism predicted development of depressive disorder at one year. The results

remained even when controlling for current maternal depressive symptoms, mothers' history of depression and children's initial symptoms. Initial externalizing symptoms and behaviour disorders predicted maternal expressed emotion over 2 years. Child self-esteem mediated the relationship between maternal critical EE and internalizing symptoms.

Bolton et al (2003) examined the relationship between EE, spontaneous causal attributions and depression in mothers of children referred for problem behaviour. Using the Camberwell Family Interview (CFI), mothers were interviewed and the speech sample was coded for EE and spontaneous causal attributions in relation to the child's behaviour. Further assessments of child problem behaviour and maternal depressive symptoms were collected through questionnaires. Results indicated that mothers high in EE, were more likely to attribute and to judge the cause of problem behaviour to be personal to and controllable by the child. Mother's depressive symptoms were associated to 'child-blaming' attributions and higher levels of EE. Attributions were not identified as a mediator in the relationship between depression and EE but EE was identified as a mediator between maternal depressive mood and child problem behaviour.

Nelson, Hammen, Brennan and Ullman (2003) looked at EE in a large community study of adolescents with mothers with varying degrees of depression. Using structural equation modelling (SEM) the study examined the role of maternal EE and depression in adolescent outcomes. Results indicate that maternal criticism on EE and maternal depression separately predicted child externalizing problems and functional impairment. EE criticism accounted for 20% of the indirect effect between child outcomes and maternal depression and for 15% of the association between

maternal depression and youth functional outcomes. EOI on the other hand, was not predictive of any child outcomes nor did it associate with maternal depression. This study provides further support for the notion that maternal depression has a direct link to children's outcomes as well as an indirect link, affecting child outcomes through the quality of parenting which is impaired. Consistent with previous literature, the study illustrates how the subcomponents of EE contribute differentially, with criticism being associated to child functional impairment beyond the effect of maternal depression, and EOI not predicting child outcomes.

Finally, parental EE from both parents was examined in a group of children with obsessive compulsive disorder, disruptive behaviour disorder and normal controls (Hibbs et al., 1991). This is the earliest study to look at parental psychiatric disorders and expressed emotion in children while including both parents. Parental psychiatric diagnosis was significantly related to EE status for both mothers and fathers. Absence of parental psychiatric diagnosis was associated to low EE status. Parental psychopathology and frequency of high EE status was similar for children with obsessive compulsive disorder and disruptive behaviour problems. This was not the case for normal controls. The strongest predictor for paternal EE status was psychiatric diagnosis, while for mothers' EE status it was child diagnosis.

The studies above highlight three important findings. Maternal depression was associated to high EE, the crucial factor identified in EE was criticism rather than emotional over involvement and finally EE was found to mediate the relationship between maternal depression and child outcome.

1.7.3 *Assessment of EE in preschool-aged children*

The focus of this section has been to describe the construct of EE. Increasingly, evidence from research in EE and child and adolescent populations indicates that certain adaptations to the original measures of EE are necessary to take into account developmental issues especially for use with caregivers of children of preschool age. As this study measures parental EE towards their one year old infant, it is important, to consider other studies which investigate EE in young children and discuss the findings and adaptations to the EE measures presented. This section will focus on studies collecting EE for children up to four years old.

To our knowledge, the youngest sample of infants towards which EE was collected was three months old. The study by Barnes et al. (2007) investigated factors associated with negative EE. The sample consisted of 179 mother-infant dyads from the Families, Children and Child Care study (FCCC), a longitudinal community sample. A modified version of the Five Minute Speech Sample (FMSS; Magana et al., 1986) was used. Mothers were asked to talk for two minutes about adapting to life with a baby and about their well being. Unlike the original FMSS which only measures EE towards the child, this version has incorporated comments on pregnancy, birth and coping with a newborn. This study only measured negative remarks. Factors which predicted negative EE included maternal depression symptoms, child illness and fussy temperament. The authors report that almost half of the speech samples did not exceed duration of one minute. They suggest this may be because the mothers did not feel comfortable expressing themselves freely which could present as a limitation to the study.

In a slightly older sample, 83 mothers completed a revised version of the FMSS (R-FMSS) towards their low birth weight infants at six months of age (St Jonn-Seed & Weiss, 2002). In relation to the FMSS this measure was different in four ways, it included verbal as well as non verbal elements (*i.e. physical contact and facial expressions*) in coding, it included ratings of positive remarks and warmth and finally, for a mother to be classified as negative in EE hostility or criticism must have been expressed for more than 50% of the speech sample. EE was categorized into negative, positive or over-involved. The study reports maternal EE to predict internalizing problems measured at two years of age, with negative EE having the most debilitating effect for children who were less adaptable and persistent (St Jonn-Seed & Weiss, 2002). For persistent children positive EE did act as a protective factor by decreasing rates of internalizing problems. Child temperament was found to moderate the effect of maternal EE. Especially vulnerable were infants with short attention spans and more difficulty pursuing tasks.

Kaugars and colleagues (2007) investigated EE in a sample of English and Spanish speaking mothers from low income, minority backgrounds. EE was collected for 169 infants, six to twenty-four months old. The purpose of the study was twofold; to demonstrate the use and coding of EE in Spanish and to examine associations between EE and a measure of the home environment, the Home observation for Measurement of the Environment (HOME). The sample was part of a larger cohort investigating wheezing during infancy. A slightly adapted version of the FMSS was also used here. EE consisted of two scales, criticism and positive affect. Parents were classified as critical even when borderline criticism was present. The positive affect scale consisted of the frequency of positive remarks, relationship and the initial

statement. Analysis was divided based on whether the assessment was conducted in English or Spanish. There was a trend for English speaking participants to have more positive comments than Spanish speaking participants. Positive comments were positively correlated to cognitive functioning. The authors suggest as language is confounded with cognitive functioning it may be possible that this difference in positive comments reflects the low educational level of some of the Spanish speaking participants. The study finally reports positive comments to be associated to scores on the HOME for the English but not for the Spanish speaking participants.

A seminal paper examining toddlers of depressed mothers and EE by Rogosch et al. (2004) was discussed in the previous section of this thesis and therefore, findings will not be replicated here. It is important however to note here that the study used the FMSS for assessment of EE and adopted a three category system of *low*, *borderline* and *high* for classification of criticism and emotional over-involvement.

In a sample of 100 mother-child dyads Daley et al. (2003) examined the psychometric properties of a revised version of the FMSS, targeted specifically for use with children of preschool age (pFMSS). The sample consisted of 80 children with AD/HD and 20 without. The adaptations to the measure as well as its psychometric properties are discussed in detail in the methods section (section 2.3.2.2, p.43-44). The authors report that dimensions of the pFMSS such as lower warmth and less positive relationship correlate with more negative and less positive feelings on parenting as measured by the Family Impact Questionnaire. The pFMSS also correlated with mother-child interactions. Mothers who demonstrated more affection during play had a more positive relationship, exhibited higher warmth and fewer critical comments on the pFMSS.

Finally, two sets of analyses from another study report on the stability of preschool EE and its association to internalizing and externalizing symptoms (Baker, Heller, & Henker, 2000; Peris & Baker, 2000). The sample was drawn from a longitudinal study investigating cognitive, emotional and social development from preschool to 3rd grade. A modest stability was found in EE from preschool to 1st grade using the FMSS. Preschool EE was only related to meeting diagnostic criteria for ADHD at 3rd grade. Within this subgroup, symptom scores were higher for children of mothers classified as high EE at preschool age than children of mothers low in EE (Peris & Baker, 2000). When criticism and over-involvement were examined separately for a sub-sample, critical remarks were associated to externalizing but not internalizing scores (Baker et al., 2000). Emotional over-involvement was not related to either externalizing or internalizing behaviours.

1.8 How EE relates to other measures of family functioning.

The construct of EE emerged as researchers realized that some factors in the family environment contributed to relapse in schizophrenia and depression. It remains unclear why some parents will express more hostility and criticism towards their children (Bolton et al., 2003; Hibbs et al., 1991; Hirshfeld et al., 1997; Nelson et al., 2003; Schwartz et al., 1990). Research in this respect has been divided into exploring primarily “what sort of factors make a particular relative high or low in EE” (Hooley, 1985) as these pertain to personality characteristics and to a lesser extent family factors that contribute to high EE status.

There is increasing evidence to indicate that there are differences in the beliefs that relatives high and low in EE may hold about the individual and the source of the problem. Relatives high in EE tend to perceive the problem or illness as being internal to the patient and controllable by the patient, whereas relatives low in EE tend to see the problem as external and do not hold the patient responsible for the situation (Barrowclough & Hooley, 2003). High EE relatives are also less flexible and less tolerant, are rated lower on empathy and achievement and appear more conventional in their behaviour. Heikkilä and colleagues (2006) found an association between good cognitive functioning in patients and higher EE ratings in relatives. The authors suggest that the better cognitive functioning the patient exhibits the more relatives are primed to higher expectations from the patient and the subsequent disappointments experienced are expressed through high EE (Heikkilä et al., 2006).

In relation to children and EE particularly, there is very little work examining factors within the family environment which contribute to a high EE status and only one study which has included fathers. In a sample of children with disruptive behaviour disorder, obsessive compulsive disorder and controls, Hibbs, Hamburger, Kruesi and Lenane (1993) examined the association between EE status, a measure of family environment, the Family Environment Scale (FES), and a measure of marital adjustment, the Dyadic Adjustment Scale (DAS). Fathers high and low in EE did not differ in their description of family environment or marital adjustment. Mothers however, seemed to differ in the dimensions of personal growth and systems maintenance on the FES and on the cohesion, consensus and satisfaction dimensions of the DAS. Mothers of controls scored significantly higher on all the aforementioned dimensions. A similar investigation was carried out by Vostanis and

Nicholls (1992) using the Camberwell Family Interview and the Family Environment Scale, where scales which measured similar concepts were compared (critical comments-conflict, warmth-cohesion, positive comments-expressiveness, emotional over involvement- control). This study however, did not replicate findings from Hibbs et al. (1993). In a sample of 112 preschool-aged children, Baker, Heller and Henker (2000) showed maternal stress and quality of parental relationships to be significantly correlated to criticism towards the child. A similar association was shown by Calam, Bolton, Barrowclough and Roberts (2002) in a sample of children referred for behaviour problems. Parenting stress positively correlated to criticism and negatively to warmth. St Jonn-Seed and Weiss (2005) extracted expressed emotion from video-taped mother-infant interactions and demonstrated an association between family interactions and EE. Mothers, who felt better about their family interactions, expressed less criticism and more positive comments towards their six month old infants. Furthermore, maternal stress predicted hostility and over-involvement.

A more recent study by Boger, Tompson, Briggs-Gowan, Pavlis, and Carter (2008) investigated levels of EE in a socioeconomically and ethnically diverse sample of parents and the relationship between socio-demographic factors and EE. EE was collected from 276 participants who were part of a larger longitudinal investigation of emotional and behavioural problems in children. The sample here represents children at elevated risk for emotional and behavioural problems. EE was assessed using the FMSS when the children were on average six years old. Family expressiveness was the only consistent predictor of high EE over time, with lower

family expressiveness associated to high EE. This study indicates that communication between family members is the factor most related to maternal EE.

The above evidence suggests that EE may represent an important dimension of the family environment but also it may reflect other dimensions such as stress, marital adjustment, hostility and conflict. The family environment will play an important role in providing support for the parent and difficulties found within that are likely to affect EE towards the child as well.

1.9 Summary

In conclusion, major depression is a life-long disabling psychiatric disorder and the impact of parental depression on infant development and family well being has been widely established. The postnatal period specifically has received a lot of attention as it is an important developmental stage where the quality of care and sensitivity are crucial. Elevated symptoms of depression for both mothers and fathers at this time place the infant at risk of emotional, behavioural and cognitive problems. While the effects of maternal postnatal depression have been extensively researched, the effects of paternal postnatal depression remain to date less known. Research so far points to an increased risk of emotional and behavioural problems at age three and seven. Boys seem to be more affected, with an increased risk of conduct problems at age three. The above average likelihood of fathers developing postnatal depression when their partners are suffering raises concern over the combined effects of maternal and paternal depression on child development. The child's life seems to be further affected by the deterioration of marital interactions in families with a depressed

individual and a decrease in the quality of interaction with their mother even when the father is not present. How this increased risk for adverse outcome may be transmitted is discussed in a model proposed by Goodman and Gotlib (1999). One of the key modifiable mechanisms explored is parenting, more specifically negative and hostile parenting behaviours such as criticism. To explore the role of negative parenting in the context of paternal depression, a measure of family environment is used here, EE. EE has been strongly linked to child psychopathology and more specifically, increased criticism in the family has been linked to the presence of externalizing behaviours. Research examining the role of parental psychopathology on EE status has identified that depressed parents are more likely to be high in EE than low. Furthermore, EE has been shown to mediate the relationship between maternal depression and child outcome. Few studies have investigated EE in fathers but none have done so in a sample of fathers with depression in the postnatal period and one year old infants. This study aims to increase our understanding of how paternal depression in the postnatal period impacts on child development by examining the role of EE. It further aims to expand on current research by examining maternal EE towards infants in families with a depressed partner. Finally, although paternal depression has been shown to impact on other areas of family functioning such as marital quality there is little research examining the association between EE towards children and other measures of family functioning including marital quality. This study will consider some of these issues.

1.10 Aims & Hypotheses

Aim 1: To investigate father's EE towards their one year old child, and examine differences between depressed and non-depressed fathers.

It is hypothesized that depressed fathers will express more negativity (High EE) toward their children than non-depressed fathers.

Aims 2 & 3: To examine whether EE mediates the relationship between paternal depression and child behavioural outcomes at one year.

It is hypothesized that paternal depression will predict externalizing problems.

It is hypothesized that EE will mediate any relationship between paternal depression and child behavioural outcomes at 1 year.

Aim 4: To investigate maternal EE towards their one year old child and examine differences between mothers with a depressed partner and mothers with a non-depressed partner.

It is hypothesized that mothers' EE will be affected by paternal depression such that, mothers with a depressed partner will express more negativity (High EE) toward their children.

Aim 5: To examine whether paternal EE relates significantly to a measure of marital adjustment, the Dyadic Adjustment Scale (DAS) and a measure of Perceived Criticism (PC) completed by the father.

It is hypothesized that EE will be significantly associated to both the Dyadic Adjustment Scale (DAS) and Perceived Criticism.

2 METHODS

2.1 Design

This was a cross sectional cohort study nested within an ongoing longitudinal study examining the influence of paternal depression on child development.

2.2 Sample

The sample of the study originally consisted of 192 families (father-mother-infant triads) recruited by the Oxford Fathers Project, which completed the first home assessment. The process of recruitment is described in more detail in section 2.4 (p.49). Due to attrition and time constraints 160 families completed the second phase of the study. Participants were then allocated into three groups according to paternal diagnosis of depression. Seventy nine participants with no current episode of depression or history of depression formed the index group. Twenty four fathers were found to have suffered an episode of depression in the first postnatal year and formed the depressed group. Fifty seven fathers had a history of depression and were excluded from the present study. Demographic characteristics of the sample are presented in Table 1. The sample consisted of all biological parents residing with their children, with the exception of one father who did not live with his child but had regular contact. In terms of co morbid diagnosis three fathers in the depressed group were diagnosed with current Generalized Anxiety Disorder (GAD) and one father was diagnosed with borderline GAD. In the control group one father was diagnosed with current GAD and one with borderline GAD. Mothers were also interviewed for symptoms of depression. Thirteen partners of depressed fathers either

suffered from major depression (n=5, 21%) or had a history of depression (n=8, 33%). Partners of controls were also found to either suffer from depression (n=7, 9%) or had a history of depression (n=16, 20%).

2.2.1 *Differences between families with a depressed vs. non depressed father*

Differences in demographic characteristics were examined for the two groups. In terms of parental characteristics, statistical analysis revealed no differences between the depressed and control groups in terms of paternal and maternal educational qualification, $\chi^2(3)=5.97$, $p=.113$, $\chi^2(3)=0.28$, $p=.965$, paternal age, $U=847$, $p=.430$ or length of relationship, $U=640.5$, $p=.167$. In terms of educational qualification over 2/3 of the sample had a degree or postgraduate degree, which indicates the sample may not be representative of the general population in this respect. No differences were evident in paternal or maternal ethnicity, $\chi^2(3)=1.05$, $p=.789$; $\chi^2(3)=1.5$, $p=.683$, marital status, $\chi^2(2)=0.41$, $p=.816$, paternal employment status $\chi^2(1)=0.21$, $p=.650$, or paternal socioeconomic status $\chi^2(2)=3.38$, $p=.184$. Significant differences however, were evident in maternal age, $U=574.5$, $p=.003$; with mothers with a depressed partner ($m=35.58\pm4.06$) being significantly older than mothers with a non-depressed partner ($m=32.35\pm4.94$). In terms of infant characteristics no significant differences were evident in infant gender, $\chi^2(1)=0.01$, $p=.982$, gestational age, $U=878.5$, $p=.582$, or birth weight $t(101)=-0.26$, $p=.795$. Significant differences however, were evident in birth order where controls were 2.6 times more likely to have a first born, $\chi^2(1)=3.99$, $p=.046$, (OR 2.55, 95%CI 1-6.48) and in infant age. At the time of

assessment, infants of depressed fathers ($m_{\text{months}}=12.67 \pm 1.01$) were younger than controls ($m=13.29 \pm 1.41$), $U=688$, $p=.041$.

All participants were fluent in English. 93% of them indicated English as the main language they were using with their infants, 5% indicated French and German (3% and 2% respectively) and the remaining 3% indicated Swedish, Turkish and Yoruba as the main languages.

Table 1: Demographics characteristics of the sample

	Controls (n=79)	Depressed (n=24)	Total (n=103)
<u>Fathers</u>			
Age	34.86±5.82	36.17±5.39	35.17±5.72
<i>(range)</i>	(19-50)	(28-48)	(19-50)
Ethnicity	N (column %)	N (column %)	N (column %)
<i>White</i>	62(95.4)	22(100)	84(96.6)
<i>Mixed race</i>	1(1.5)	-	1(1.1)
<i>Black African</i>	1(1.5)	-	1(1.1)
<i>Other</i>	1(1.5)	-	1(1.1)
Educational Qualification			
<i>No qualification</i>	2(2.6)	-	2(2)
<i>GCSE</i>	8(10.3)	-	8(7.8)
<i>A Level</i>	8(10.3)	1(4.2)	9(8.8)
<i>Diploma or equivalent</i>	13(16.7)	6(25)	19(18.6)
<i>Degree</i>	20(25.6)	10(41.7)	30(29.4)
<i>Postgraduate Degree</i>	27(34.6)	7(29.2)	34(33.3)
Employment status			
<i>Full Time</i>	77(97.5)	22(95.7)	99(97.1)
<i>Part Time</i>	2(2.5)	1(4.3)	3(2.9)
Socioeconomic status			
<i>Routine and Manual</i>	11(14.9)	4(17.4)	15(15.5)
<i>Intermediate occupations</i>	20(27)	2(8.7)	22(22.7)
<i>Managerial and Profession</i>	43(58.1)	17(73.9)	70(61.9)
<u>Mothers</u>			
Age	32.35±4.94	35.58±4.06	33.11±4.92
<i>(range)</i>	(18-42)	(27-43)	(18-43)

(Table continued- p.39)

	Controls (n=79)	Depressed (n=24)	Total (n=103)
<u>Mothers</u>	N (column %)	N (column %)	N (column %)
Ethnicity	63(94)	24(100)	87(95.6)
<i>White</i>	2(3)	-	2(2.2)
<i>Mixed race</i>	1(1.5)	-	1(1.1)
<i>Other Asian</i>	1(1.5)	-	1(1.1)
<i>Chinese</i>			
Educational Qualification	6(8)	-	6(6)
<i>GCSE</i>	5(6.7)	3(12.5)	8(9.9)
<i>A Level</i>	14(18.7)	4(16.7)	18(17)
<i>Diploma or equivalent</i>	26(34.7)	8(33.3)	34(36.8)
<i>Degree</i>	24(32)	9(37.5)	33(30.2)
<i>Postgraduate Degree</i>			
Marital Status			
<i>Single</i>	1(1.3)	-	1(1)
<i>Married</i>	62(79.5)	20(83.3)	82(80.4)
<i>Living Together</i>	15(19.2)	4(16.7)	19(18.6)
Years in Relationship	8.6±3.97	10.11±4.24	8.98±4.08
<i>(range)</i>	(2-17)	(3-20)	(2-20)
<u>Infants</u>			
Gender	N (column %)	N (column %)	N (column %)
<i>Boy</i>	36(45.6)	11(54.4)	47(45.6)
<i>Girl</i>	43(45.8)	13(54.2)	56(54.4)
Birth Order			
<i>First Born</i>	51(64.6)	10(41.7)	61(59.2)
<i>Not First Born</i>	28(35.4)	14(58.3)	42(41.8)
Infant Age (in months)	13.29±1.41	12.69±1.01	13.15±1.35
<i>(range)</i>	(10-18)	(11-15)	(10-18)
Gestational Age (in weeks)	39.5±1.74	39.29±1.78	39.46±1.74
Birth Weight (in kg)	3.45±.59	3.49±.52	3.46±.57

2.3 Measures

2.3.1 *Measure for Depressive Symptoms*

2.3.1.1 *The Edinburgh Postnatal Depression Scale (EPDS).*

This is a ten-item self-report scale developed by Cox, Holden and Sagovsky (1987b) to measure mood disturbances in women during the perinatal period. The scale consists of eight questions addressing depressive symptoms and two addressing anxiety symptoms. Scores on each question range from 0-3, the highest possible score being 30. A higher score on the scale indicates greater severity of depression. The scale has been validated for English speaking women in the antenatal and postnatal periods (Boyce, Stubbs, & Todd, 1993; Cox, Holden, & Sagovsky, 1987a; Cox, Chapman, Murray, & Jones, 1995; Harris, Huckle, Thomas, & Johns, 1989; Murray & Cox, 1990; Murray & Carothers, 1990). Using a cut-off score of 12/13 has yielded a specificity of 80-100% (Cox, Chapman, Murray, & Jones, 1996). Matthey, Barnett, Kavanagh and Howie (2001) validated the scale for men and suggested the optimum cut-off is 9/10 with specificity being 93.8% and sensitivity 71.4%. Fathers completed the questionnaire seven to ten weeks postpartum. The EPDS was used for initial screening of paternal depressive symptoms at 7 weeks postpartum.

2.3.1.2 *SCID*

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) is a semi-structured psychiatric interview for making the major DSM-IV Axis I diagnoses (First, Spitzer, Gibbon, & Williams, 2001). Administration of the SCID may take from 15 minutes up to a few hours depending on the psychiatric co-morbidity of a

participant. The interview focuses on diagnosis rather than symptomatology. It is designed hierarchically with decision trees that guide the researcher when to terminate administration of each module (see *Appendix 3*). Symptoms are rated as absent (1), sub threshold (2) or threshold (3, i.e.: criterion is met). To meet criteria for diagnosis of depression the participant must meet threshold criteria in 5 out of 9 symptoms as well other diagnostic factors such as impairment in social or family functioning. Trained researchers administered the SCID to both mothers and fathers at two time points at 3 months and 1 year. Parents were allocated in the depressed or control groups based on whether they had suffered an episode of depression throughout the first postnatal year.

2.3.2 *Expressed Emotion*

For the assessment of EE this study used the preschool version (pFMSS) of the Five Minute Speech Sample (FMSS). The measure has been specifically adapted for use with children of preschool age, however it is important to first consider the measure from which it was adapted.

2.3.2.1 *Five Minute Speech Sample (FMSS)*

The Five Minute Speech Sample (FMSS) is a brief method developed by Magana and colleagues (1986) to assess expressed emotion (EE). The EE rating based on the FMSS is derived in a similar way to the EE rating from the original measure for assessment of EE, the Camberwell Family Interview (CFI). The CFI is a long and detailed tape-recorded semi- structured interview. It is a highly valid and

reliable predictor of poor clinical outcomes among patients with major psychopathology. Parents or carers are classified as high if they make more than a specified number of critical comments or show signs of hostility or marked emotional over-involvement (Tienari & Wahlberg, 2008). The FMSS sub-categories are similar to those of the CFI and include criticism, emotional over-involvement, quality of initial statement and quality of relationship. Unlike the CFI, the FMSS only requires five minutes for administration and about 20 minutes for coding (Magana et al., 1986). The instructions invite the family member to talk about their thoughts and feelings about the individual for 5 uninterrupted minutes.

Concurrent validity has been examined in a series of studies yielding comparable results to the CFI. Magana and colleagues (1986) identified rates of 65.2% for sensitivity and 88.2% for specificity in the original study. Comparable results were found in a Spanish speaking population (sensitivity 50%, specificity 90.9%) and a German speaking population (sensitivity 80%, specificity 71%) (Leeb et al., 1991). Overall agreement between the CFI and the FMSS has been identified within the range of 73-75% (Leeb et al., 1991; Magana et al., 1986). A limitation of the FMSS is that relatives high in EE tend to be under identified, that is to say that relatives identified as high EE on the CFI were not identified as high on the FMSS. This was true for about 20% of participants who has been misclassified as low in EE, when using the FMSS. Sensitivity rises significantly when borderline low EE relatives are added to the high EE group. In terms of predictive validity of the FMSS, evidence seems to be unclear. The measure has failed to predict outcome over 1 or 2 years in cases of patients with schizophrenia and patients with bipolar disorder. However, clinical outcome has been predicted in cases of depressive symptoms in youth

(Asarnow et al., 1993). Reviews on the assessment measures of expressed emotion emphasize both the advantages and limitations in using the FMSS (Hooley & Parker, 2006; Van Humbeeck, Van Audenhove, De Hert, Pieters, & Storms, 2002). The FMSS is an easy and short instrument to administer. Information can be provided by relatives that may not be as informed and aware as the CFI would require in order for them to be able to answer all questions. On the other hand, the FMSS still requires well trained raters for the coding, it under-identifies relatives high in EE and its predictive validity remains unclear.

2.3.2.2 *Preschool Five Minute Speech Sample (pFMSS)*

An adapted version of the FMSS has been developed especially for use with preschool children, the pFMSS (Daley et al., 2003). The authors identified problematic areas in the FMSS when this was applied to children of younger age. Firstly, a high level of involvement is quite normal for young children and therefore, emotional over involvement (EOI) in terms of self-sacrificing behaviour and over-involvement were difficult to identify and rate. Secondly, parents with children of young age are less likely to criticize them in a way that would qualify as a critical comment in the FMSS. Finally, warmth has been identified as a category missing from the FMSS which presents however, as an important and potentially protective factor for children of young age (Tully, Arseneault, Caspi, Moffitt, & Morgan, 2004; Vostanis et al., 1994). The pFMSS takes into account these shortcomings of the FMSS. It consists of 6 subscales (Daley, 2001). Four global scales; Initial Statement (IS), warmth (W), Relationship (R) and Emotional Over involvement (EOI) and two frequency counts Critical Comments (CC) and Positive Comments (PC) (*for more*

details on coding see Appendix 4b). EOI, as aforementioned, is difficult to identify and rate in young children and this was confirmed in results by Daley et al. (2003), where the EOI component exhibited very low reliability and did not successfully discriminate between parents of children with AD/HD and without. For this reason coding of EOI was excluded in the present study. Furthermore, two subscales were added Intermediate Critical Comments (ICC) and Intermediate Positive Comments (IPC). These were added with the intention of capturing more subtle forms of criticism and positivity addressed towards the infants, which would not qualify as critical and positive comments. For example phrases such as “she is fairly easy-going” or “he is pretty bright”, which would not qualify as positive comments, were added to the intermediate categories.

Psychometrics of the pFMSS were examined by Daley et al. (2003). Code –recode reliability on the scales presented with good and acceptable values with the exception of EOI which was found to be low (Daley et al., 2003). Test –retest reliability was lower compared to the previous forms of reliability, but results here mirror results examining the stability of EE over a period of time even on the CFI (Vostanis & Nicholls, 1995). Correlations between the pFMSS and observations of mother-child interaction revealed that more maternal affection was related to positive initial statements and relationship ratings, higher warmth and fewer critical comments. The psychometric properties of the pFMSS were also demonstrated in a study examining EE in child-to-child sibling relationship where the measure exhibited good code re-code reliability. The measure further displayed good concurrent and discriminant validity with siblings high in EE scoring higher on conflict and rivalry and lower and

the dimensions of warmth and closeness on the Sibling Relationship Questionnaire (Yelland & Daley, 2009).

The pFMSS was collected from both parents twelve months postpartum and was tape-recorded for coding. Parents were asked to talk about their child for five uninterrupted minutes. They were asked to describe what sort of child they were and how the two of them had been getting along over the last six months. The full instructions and coding sheet can be found in Appendix 4.

2.3.2.3 Inter-rater reliability

Coding of the PFMSS was done by a trained coder (EN) who was blind to the depression status of the participants. The coder had received training by an experienced coder and joint coding was conducted on 10% of the sample before proceeding alone. 25% of the sample was then randomly selected and rated by both coders to establish inter-rater reliability levels. Inter-rater reliability was examined using Cohen's κ for IS, W and R and Spearman's rho for CC, ICC, PC and IPC. Results are presented in Table 2.

Table 2: Inter-rater reliability of EE components as measured using the pFMSS

	Inter-rater reliability
	κ
Initial Statement	0.90**
Warmth	0.76 **
Relationship	0.81**
	ρ
Critical Comments	1**
Intermediate Critical Comments	0.87**
Positive Comments	0.94**
Intermediate Positive Comments	0.96**
Overall (average)	0.89

Notes: (n=40), (**) $p < .001$

2.3.2.4 pFMSS categorization into High and Low EE

Conventionally EE is coded using a dichotomous variable, which distinguishes between High and Low. The literature has used different ways of assigning a high classification. This is the first time the pFMSS has been used with infants only 12 months old and so the levels of High and Low EE have not been documented elsewhere. For this reason, three different groupings were examined. *Grouping 1* follows the guidelines by Daley, Sonuga-Barke and Thompson (2003) whereby a negative score on one of the global measures and a higher number of Critical Comments (CC) than Positive Comments (PC) is indicative of high EE. *Grouping 2* adopts a broader approach whereby high EE is assigned based on a negative score on

one of the global measures and at least one CC, rather than a ratio of more CC than PC. Finally, *Grouping 3* follows guidelines by Magana-Amato (1993) whereby, a High EE is assigned when there is either a negative score on a global measure or at least one CC.

2.3.3 *Child Behaviour Checklist (CBCL)*

The Child Behaviour Checklist for ages 1 ½ to 5 (Achenbach & Rescorla, 2000) was used to assess externalizing behaviours at 12 months. This is a parent report questionnaire and is widely used in clinical and research setting to assess child functioning. The questionnaire measures two broadband syndromes of internalizing and externalizing symptoms. The CBCL was completed by both mothers and fathers. Only the externalizing scale of the questionnaire was used as its use has been validated for infants younger than 18 months (van Zeijl et al., 2006). The scale consists of 31 items and parents were asked to rate their infants behaviour on a 3 point scale (0 *not true*, 1 *somewhat or sometime true*, 2 *very true or often true*). Higher scores indicate greater problems. The externalizing syndrome can be subdivided into Overactive (5 items), Oppositional (17 items) and Aggressive (9 items), (Koot, van Den Oord, Verhulst, & Boomsma, 1997) (see *Appendix 5*). Internal consistencies (Cronbach's alpha) for mothers and fathers were high for the externalizing symptoms (.89/.87) and oppositional symptoms (.86/.83), and acceptable for the overactive (.70/.66) and aggressive symptoms (.72/.56).

2.3.4 *Marital Quality*

2.3.4.1 *Dyadic Adjustment Scale*

Parental perceptions of marital quality were assessed using the Dyadic Adjustment Scale (DAS), (Spanier, 1976), (see *Appendix 6*). This is a widely used self report measure consisting of 32 items assessing marital satisfaction, cohesion, consensus and affectional expression. The scale yields scores for each of these subscales and a total score of marital quality with a theoretical range of 0-151. Overall scores below 100 typically indicate marital distress. Numerous studies have demonstrated the psychometric validity and reliability of the DAS. It has also been shown to correlate well with other measure of marital quality, and to distinguish between married and divorced couples and distressed and normal couples (Spanier & Thompson, 1982). The questionnaire was completed by fathers at 12 months postpartum. Internal consistency ranged from .73 to .88 in the subscales (affectional expression ($\alpha=.73$), cohesion ($\alpha=.75$), consensus ($\alpha=.87$), satisfaction ($\alpha=.88$). Overall internal consistency for the DAS was high (.91).

2.3.4.2 *Success of relationship*

An additional item was measured along with the DAS and perceived criticism. The likert-type question asked participants: “How confident are you that your relationship will succeed”. The scale ranged from 0 (not at all confident) to 10 (completely confident it will succeed).

2.3.4.3 *Perceived Criticism Scale*

A measure of perceived criticism was added for the 1 year assessment. It was collected concurrently with marital quality and the CBCL. Hooley and Teasdale (1986) first assessed perceived criticism in relation to risk of relapse in a sample of depressed patients and their partners. The scale consists of the two likert-type questions: a) “How critical do you think you are of your partner” and b) “How critical do you think your partner is of you”, (see *Appendix 5*). Answers range from 1 (not at all critical) to 10 (very critical indeed). In the original study, scores on perceived criticism correlated $r=.51$ to scores on expressed emotion as measured by the Camberwell family Interview (CFI). Patients’ perception of criticism was highly predictive of relapse in a 9 month follow up. Patients who assigned their partners a score on perceived criticism below 2 did not relapse; however, all patients who assigned their partners a score above 6 had a relapse over the following 9 months. The scale has shown a good test-retest reliability from initial assessment to 3 month follow up ($r=.75$ for patients, $r=.60$ for partners) (Hooley & Parker, 2006).

2.4 Procedure

This study is part of a larger ongoing longitudinal project, the Oxford Fathers Project (OFP), which aims to examine the effects of paternal depression on child development. The OFP contacted participants at four time points; 7 weeks, 3 months, 1 year and 2 years postpartum. This study utilizes data collected from the second and third time points.

2.4.1 *Process of recruitment*

Participants (fathers and mothers) were recruited from the maternity wards of the John Radcliffe Hospital in Oxford and Milton Keynes Hospital from July 2006 to August 2008. The inclusion criteria for recruiting parents were: being 18 years of age or older and speaking English fluently. Inclusion criteria for the infant included: gestation of 36 weeks and over and no serious long-term medical condition. When fathers were absent at the point of recruitment mothers provided the information necessary to contact the fathers. A flow diagram of the stages of a) recruitment and b) screening for symptoms of depression is presented in Figure 1 (p.54).

Fathers, the primary participants of the study, were initially contacted via a postal questionnaire 7-10 weeks postpartum, which contained an information leaflet, an invitation letter to participate in the study and a questionnaire. They completed information on symptoms of depression (EPDS) and infant temperament (ICQ) as well as information on marital status and occupation. Originally, 4,107 fathers were contacted at 7 weeks of which 3,192 received a reminder pack at 10 weeks (*see Figure 1*). In total, 1,562 fathers returned the questionnaire indicating a response rate of 38%.

On average, fathers who returned the questionnaire ($M=34.45$, $SE=.18$), were older than those who did not respond ($M=31.76$, $SE=.22$). The difference was found to be significant, $t(1957)=-9.621$, $p<.001$. Furthermore, there was a significant association between fathers responding to the questionnaire and whether they were present or absent at the maternity ward during recruitment $\chi^2(1)=38.72$, $p<.001$, (OR 1.5, 95%CI 1.32-1.7). If fathers were present at the maternity ward at the time of recruitment they were 1.5 times more likely to respond to the questionnaire. A

significant association was also found between fathers responding to the questionnaire and whether this was their first child or not $\chi^2 (1) = 21.59, p < .001$, (OR 1.35, 95%CI 1.19-1.54). Fathers were 1.4 times more likely to respond to the questionnaire if this was their first child.

2.4.2 *Allocation to Home Visit at 3 months*

The sample was then divided into a High and Low depression group based on fathers' scores on the EPDS. Fathers scoring 10 or above on the screening questionnaire formed the High Depression group (n=199) and the rest formed the Low depression group (n=1,334). Questionnaires from 28 fathers were excluded due to missing information. Fathers scoring high on depression and a random selection of those scoring low were invited to take part in the study. The EPDS was used as a screening tool to maximize recruitment of fathers with depression. Final allocation to the study groups (depressed vs. non depressed) was done using a clinical diagnosis and not scores obtained from the screening questionnaire. No analysis is conducted using scores from the EPDS.

From the High Depression Group 74 families received a visit at 3 months. Differences were examined for those assessed and not assessed in terms of fathers' age and socio-economic status. Fathers who received a home visit (35.36 ± 5.87) were significantly older than those who refused to take part in the study (33.01 ± 6.87), $t (178) = -2.36, p = .02$. No significant differences were found in terms of Socioeconomic status $\chi^2 (2) = 3.64, p = .162$. In total, 126 fathers did not take part in the study; and we examined whether this could be accounted for by elevated EPDS scores, however, there were no significant differences between the scores of those

who participated (12.87 ± 2.85) and those who didn't participate (12.44 ± 2.73), $t(196) = -1.068$, $p = .287$

From the Low Depression Group ($n=1335$), 266 families were randomly selected and contacted for a home visit and 118 were completed successfully. When examining for differences in age between those who did receive a visit ($Mdn=35$) and those who did not take part in the study ($Mdn=35$) no significant differences were found, $U = 63767$, $p = .954$. No significant differences were found in terms of Socioeconomic status $\chi^2(2) = 1.78$, $p = .412$.

In total, 274 fathers were contacted and did not take part in the study, of which 79 could not be contacted, 41 infants were too old to take part, 6 families moved home and 118 refused with no further reason.

The final sample consisted of 192 families. During the 3 month home visit both parents were administered the SCID and information on demographics was collected (see *Appendix 2*). Other data collected from this home visit is not used in this study. Families were again contacted when their baby was 12 months old for a second home visit.

2.4.3 *Home Visit at 12 months*

For the second home visit 58 visits were completed successfully from the High Depression group ($n=72$) and from the Low Depression Group ($n=118$) 102 visits were completed successfully, resulting to a total of 160 families. Data collected during the clinical interview indicated that from these 160 families 79 fathers had never experienced an episode of depression, 24 had experienced an episode of

depression within the first postnatal year and 57 had a history of depression. Those with a history of depression were excluded from further analysis.

Reasons for uncompleted visits include; contact could not be established (n=2), refused with no further reason (n=21), one baby died or the infants were too young (n=8) at the time of assessment.

During the second home visit both parents completed the pFMSS and completed questionnaires on, marital conflict (DAS), perceived criticism and the externalizing scale of the Child Behaviour Checklist (CBCL). Parents were again administered the SCID. Collection of the pFMSS was always conducted prior to the SCID to ensure that issues discussed during the clinical interview did not interfere with their comments about their children.

Participants were reimbursed with a 15 pounds voucher at each home visit for their time. During both home visits participants signed consent forms. In circumstances where the researchers found elevated symptoms of depression or other psychiatric diagnosis, they requested permission from the participants' to contact their GP. All information was entered on SPSS16.0 and analysis was conducted using the same statistical package.

2.5 Ethical Approval

Ethical approval was obtained from the Oxfordshire Research Ethics Committee A (06/Q1604/63) and the Milton Keynes Research Ethics Committee.

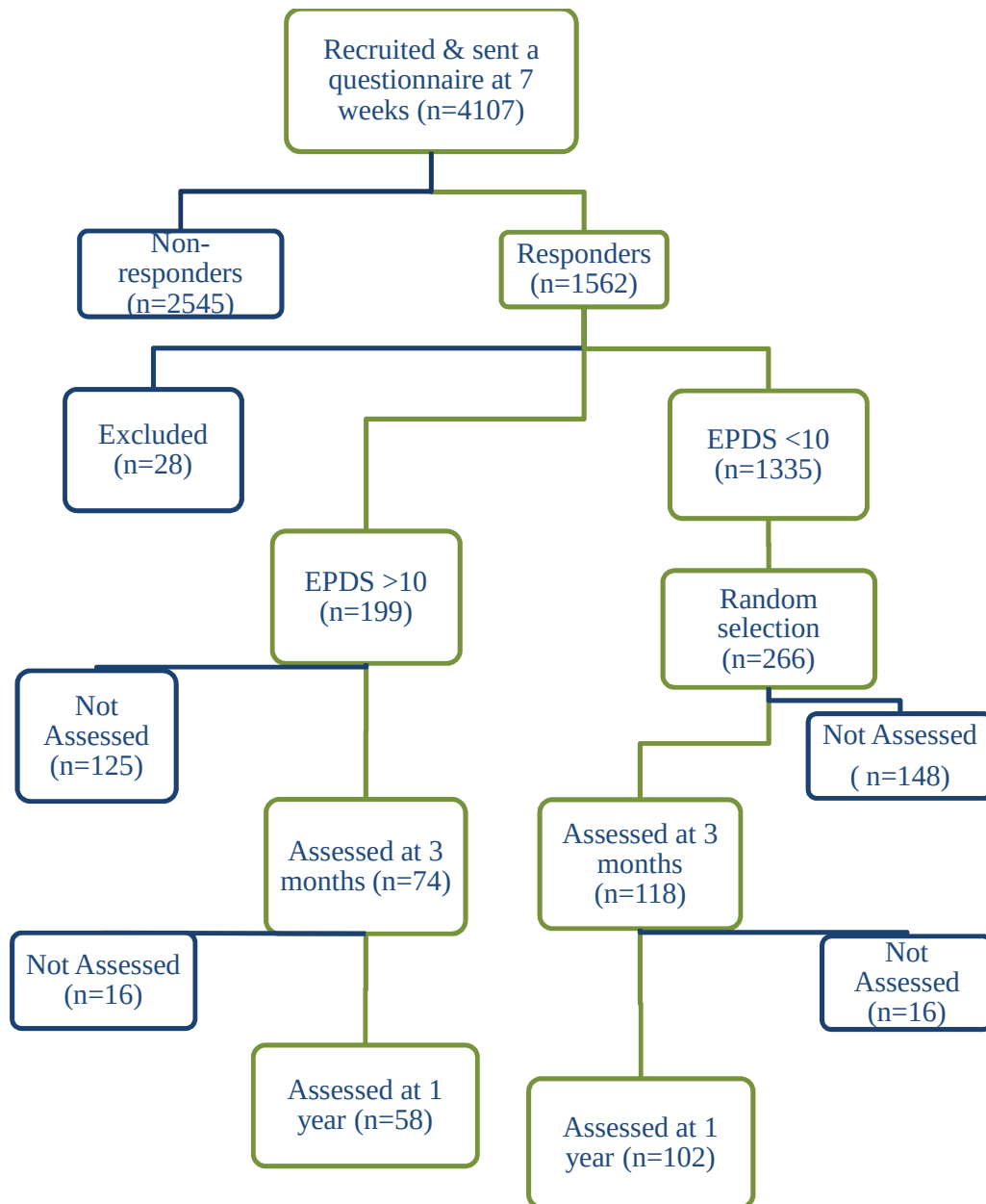


Figure 1: Flow diagram to illustrate the stages of: a) recruitment at the John Radcliffe Hospital in Oxford and the Milton Keynes General Hospital and b) screening for depression using the EPDS.

The participants (n=160) were then allocated to groups based on a clinical interview into a control group (n=79), depressed group (n=24) and a history group (n=57).

2.6 Analysis Plan

Analysis presented in the results section follows the order of the aims and hypotheses presented earlier.

Aim 1

The study's first aim was to examine differences between depressed and non-depressed fathers in EE. χ^2 tests were computed to study differences between the two groups when using groupings 1, 2 and 3. Differences between groups were also examined for the pFMSS subscales separately. χ^2 tests were used to study differences in the three global measures (Initial Statement, Warmth and Relationship) and Mann-Whitney tests for the four continuous scales measuring critical (**CC**), positive (**PC**) and intermediate critical (**ICC**) and positive comments (**IPC**). Finally, a linear regression was then computed to control for paternal education and infant age.

Aims 2 & 3

The second and third aims of the study were to examine whether paternal depression predicted externalizing behaviours and whether EE mediated this relationship. For the second aim, differences in externalizing behaviours were examined between depressed and non depressed fathers and inter-parental agreement was examined using correlations. To address the third aim and in accordance to guidelines by Baron and Kenny (1986) for testing mediational models; multiple regressions were computed to test the mediating role of EE between paternal depression and child outcome at 1 year. First, paternal depression and child outcome were entered to establish there was a relation to be mediated. Paternal depression was already established as a predictor of EE in the first aim. Finally both paternal depression and

positive comments were entered as predictors of child outcome. If EE did mediate the relationship between paternal depression and child outcome when added to the model it is expected that the initial predictor will no longer be significant and a decrease in the β value from step 1 to step 2 will be noted. Finally, correlations of EE and externalizing behaviours were examined to further investigate how the two relate.

Aim 4

The fourth aim of the study was to examine EE in mothers with a depressed and non-depressed partner. As in Aim 1, EE was classified into High and Low using all three groupings that were used for fathers. Differences were examined using χ^2 tests. EE subscales were also examined separately. For the three global measures χ^2 tests were used and for the continuous scales Mann-Whitney tests. Correlations of maternal and paternal EE were then examined.

Aim 5

Associations between EE and measures of marital functioning were examined in two ways. Firstly, differences were investigated by comparing fathers high and low in EE against the measures of marital functioning. This was done using only grouping 1, as this is the classification which has been validated with the pFMSS. Associations between the EE subscales and the measures of marital functioning were further explored through correlations.

3 RESULTS

3.1 Differences between depressed and non depressed fathers in EE

3.1.1 *High vs. Low EE*

Participants were categorized in High vs. Low EE status based on the criteria described previously in the methods section (p. 46) and differences were examined between depressed and non depressed fathers². Descriptives for *Groupings* 1, 2 and 3 are presented in *Table 3*.

Table 3: High vs. Low EE in depressed and non-depressed fathers

	Controls (n=79)		Depressed(n=24)		Total (n=103)	
	High	Low	High	Low	High	Low
Groupings						
N (%row)						
Grouping 1	5(6.3)	74(93.7)	2(8.3)	22(91.7)	7(6.8)	96(93.2)
Grouping 2	6(7.6)	73(92.4)	1(4.2)	23(95.8)	7(6.8)	96(93.2)
Grouping 3	25(68.4)	54(31.6)	16(66.7)	8(33.3)	43(32)	60(68)

Grouping 1

There were no significant associations between paternal depression (controls vs. depressed) and EE (High vs. Low) $\chi^2 (1) = 0.12$, (OR 1.35, 95%CI 0.24-7.42).

Grouping 2

² In line with APA guidelines, all statistics are reported to 2 decimal points, with the exception of *p* where the exact value is reported.

There were no significant associations between paternal depression (controls vs. depressed) and EE (High vs. Low) $\chi^2(1) = 0.34$, (OR 0.53, 95%CI 0.06-4.63).

Grouping 3

There were no significant associations between paternal depression (controls vs. depressed) and EE (High vs. Low) $\chi^2(1) = .02$, (OR 1.08, 95%CI 0.41-2.86).

With *Grouping 1* only 7 fathers scored high in EE. This probably indicates that *Grouping 1* does not distinguish well between fathers High and Low EE when this refers to 1 year old infants. *Groupings 2* and *3* only require one critical comment to be classified as High EE, failing thus, to distinguish between parents who only make one critical comment and those with multiple critical comments.

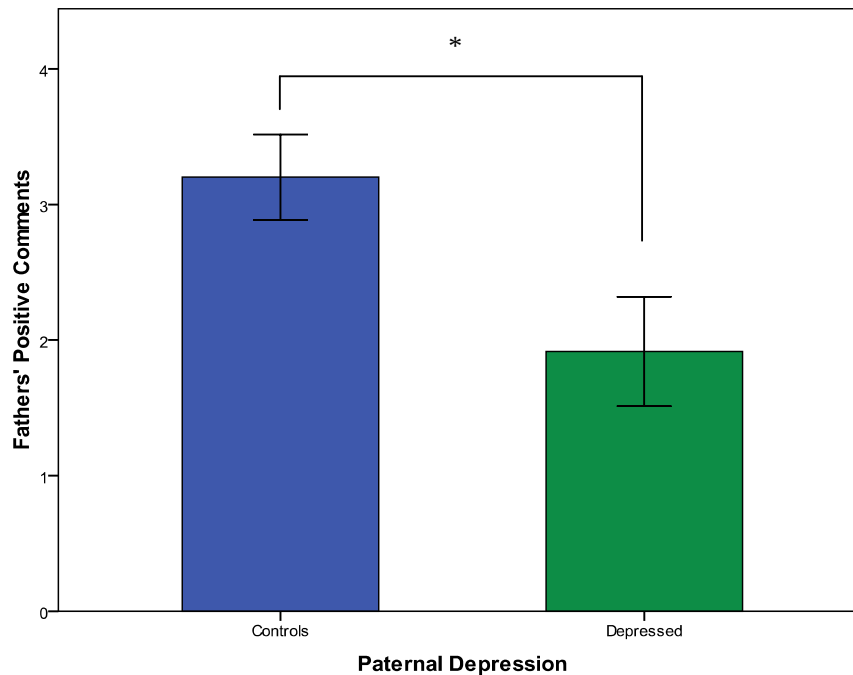
3.1.2 ***pFMSS subscales***

The pFMSS was examined in more detail by looking for differences between depressed and non-depressed fathers in the subscales separately. This was done for two reasons. Firstly, no differences were found using a dichotomous classification of High vs. Low EE. As the pFMSS has not been used previously with depressed fathers or with infants this young, the above groupings may not represent the most appropriate way to classify this group. Secondly, critical comments have been used in the past as a separate continuous variable to assess overall criticism or the absence of it. In this case, in addition to the critical and positive comments, intermediate critical and positive comments were coded. Differences between the latter groups might have detected a more subtle form of criticism that was directed towards the infants. Descriptives of the subscales are presented in *Table 4*.

Depressed fathers were not significantly different to non-depressed fathers in any of the global measures of EE, **IS** $\chi^2(2) = 3.94$, $p = .139$, **W** $\chi^2(2) = 0.84$, $p = .656$, or **R** $\chi^2(2) = 4.11$, $p = .128$.

A Kolmogorov-Smirnov test was performed on the four continuous variables to examine whether data were normally distributed. All scales were found to be non-normally distributed: critical comments, $D(156) = .48$, $p < .001$, intermediate critical comments, $D(156) = .43$, $p < .001$, positive comments, $D(156) = .15$, $p < .001$ and intermediate positive comments, $D(156) = .27$, $p < .001$. Mann-Whitney tests were used to examine differences between depressed and non-depressed fathers in the remaining subscales. Controls did not differ from depressed fathers in critical comments, $U = 872.5$, $p = .336$, or intermediate critical comments, $U = 899$, $p = .614$. However, depressed fathers ($Mdn = 2$) on average had fewer positive comments than controls ($Mdn = 3$), $U = 697$, $p = .048$ (*Figure 2*). The two groups did not seem to differ in intermediate positive comments $U = 943.5$, $p = .971$.

Figure 2: Comparison of mean positive comments for depressed vs. non- depressed fathers.



Notes: * $p < .05$

A linear regression was computed for the only subscale where significant differences were found between depressed and non-depressed fathers, to examine whether this relationship could be explained by a difference in paternal education and infant age. Paternal depression was entered as a predictor and positive comments as the dependent variable. The relationship was significant, $F_{(1,100)} = 4.41$, $p = .038$. Paternal education and infant's age were entered in the second step. The model was no longer significant, $F_{(4, 97)} = 1.72$, $p = .168$. There was no longer strong evidence of an association between paternal depression and positive comments, $t(97) = -1.95$, $p = .054$ (Table 5); although a p value of 0.054 is perhaps suggestive of an association despite controlling for these confounding variables, particularly as the beta value is not substantially reduced.

Table 4: Descriptives of pFMSS subscales in depressed and non-depressed fathers

		Controls (n=79)			Depressed (n=24)			Total (n=103)		
		N(%column)								
Initial Statement (IS)	Positive	36 (45.6)			6 (26.1)			42 (41.2)		
	Neutral	41 (51.9)			15 (65.2)			56 (54.9)		
	Negative	2 (2.5)			2 (8.7)			4 (3.9)		
Warmth (W)	High	22 (27.8)			6 (25)			28 (27.2)		
	Moderate	41 (51.9)			11 (45.8)			52 (50.5)		
	Low	16 (20.3)			7 (29.2)			23 (22.3)		
Relationship (R)	Positive	59 (74.7)			15 (62.5)			74 (71.8)		
	Neutral	20 (25.3)			8 (33.3)			28 (27.2)		
	Negative	0 (-)			1 (4.2)			1 (1)		
		Median			Median			Median		
		M	SD	Range	M	SD	Range	M	SD	Range
Critical Comments (CC)		0.29	0.9	0(0-6)	0.13	0.48	0(0-2)	0.25	0.81	0(0-6)
Intermediate CC (ICC)		0.32	0.63	0(0-3)	0.38	0.65	0(0-2)	0.33	0.63	0(0-3)
Positive Comments (PC)		3.2	2.8	3(0-10)	1.92	2	2(0-8)	2.9	2.68	2(0-10)
Intermediate PC (IPC)		1.19	1.34	1(0-6)	1.08	1.06	1(0-4)	1.17	1.28	1(0-6)

Table 5: Hierarchical Multiple Regression Analyses showing the association between Positive Comments and Paternal Depression and controlling for paternal education and infant age.

Positive Comments			
	B	SE B	β
Step 1			
Constant	4.53	.819	
Paternal Depression (controls=1, depressed=2)	-1.30	.621	-.206*, $p=.038$
Step 2			
Constant	2.25	2.97	
Paternal Depression	-1.25	.65	-.197, $p=.054$
Paternal Education	.08	.20	.04, $p=.615$
Infant Age	-.15	.20	.07, $p=.479$
Note: $R^2_{adj}=.033$ for Step 1; $\Delta R^2_{adj}=-.02$ for Step 2, * $p<.05$			

3.1.3 pFMSS Inter-correlations

Inter-correlations between components of the pFMSS revealed several significant correlations (Table 6). Correlation coefficients did not exceed the moderate range suggesting that while tapping into the same construct each of the pFMSS components provides with useful and separate information. All correlations were in the predicted direction.

Table 6: Intercorrelations of paternal pFMSS components

	1.IS	2.W	3.R	4.CC	5.ICC	6.PC	7.IPC
1. IS (<i>p</i>)	-	.11 (.258)	.31** (.001)	.14 (.159)	.06 (.564)	.21* (.039)	-.14 (.168)
2. W (<i>p</i>)		-	.44** (.000)	.20* (.046)	.12 (.218)	.41** (.000)	-.08 (.404)
3. R (<i>p</i>)			-	.139 (.184)	.09 (.345)	-.18 (.062)	-.12 (.218)
4. CC (<i>p</i>)				-	.09 (.353)	-.05 (.646)	-.01 (.906)
5. ICC (<i>p</i>)					-	-.20* (.040)	-.04 (.668)
6. PC (<i>p</i>)						-	.16 (.105)
7. IPC (<i>p</i>)							-

Notes: * $p < .05$, ** $p < .01$ (two- tailed tests). IS=Initial Statement, W=Warmth, R=Relationship, CC=Critical Comments, ICC=Intermediate Critical Comments, PC=Positive Comments, IPC=Intermediate Positive Comments.

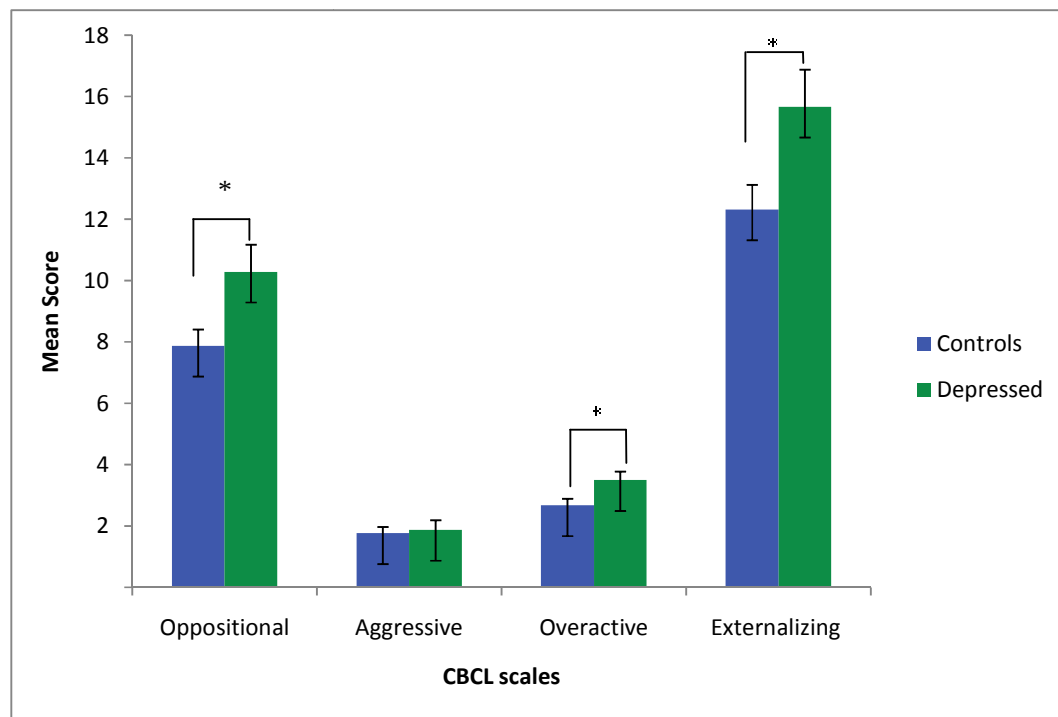
3.2 Paternal depression and Child Outcome

Children's externalizing symptoms were assessed using the CBCL, which consists of 3 subscales; oppositional, aggressive and overactive. All four scales (the total score and the three subscales) were examined separately. Descriptive analysis was carried out for the CBCL (Table 7) and differences between the two groups (depressed vs. non-depressed) were examined. Scores on the CBCL were found to be non-normally distributed when reported by fathers $D(100) = .1$, $p < .05$ and by mothers $D(101) = .09$, $p < .05$. Tests for non-parametric data were used.

Father's report on CBCL

Mann Whitney tests comparing father-reported CBCL scores between depressed and non-depressed fathers showed significant differences between the two groups. Depressed fathers rated their infants as having more externalizing problems in three CBCL scales. Differences were significant for the externalizing, $U=648.5$, $p=.033$, $r=.210$ oppositional, $U=651.5$, $p=.035$, $r=.208$ and overactive scales, $U=647.5$, $p=.03$, $r=.214$ (Figure 3). There was no evidence for a difference on the aggressive scale, $U=838.5$, $p=.544$ $r=.06$.

Figure 3: Mean scores on the CBCL scales of depressed and non-depressed father



Notes: $*p<.05$

Mother's report on CBCL

Mothers with a depressed partner rated their infants as having more externalizing symptoms on all the scales (Table 7) however, Mann-Whitney tests indicated that these differences were not significant for any of the scales: externalizing $U=782.5$, $p=.258$, $r=-.113$, oppositional $U=801.5$, $p=.327$, $r=-.098$ overactive $U=819.5$, $p=.397$, $r=-.084$ and aggressive $U=850.5$, $p=.544$, $r=-.06$.

3.2.1 *Occurrence of externalizing symptoms*

The occurrence of externalizing symptoms in 12 month old infants, using the CBCL, has only previously been documented in a study by van Zeijl et al. (2006). Presence of externalizing symptoms was examined in this sample to investigate whether rates were similar to the aforementioned study. The CBCL scores as reported by the mother will be used for this analysis for two reasons. Firstly, to avoid elevated scores due to rater bias, especially in the case of depressed fathers and secondly, as the mother is considered to be the primary care-giver it is likely that she may be a better informant of the infant's behaviour. Percentages of all CBCL items are reported in Appendix 5. Over two-thirds of the items occurred in more than 25% of the sample. The most prevalent items were "Gets into everything" (88%), "Quickly shifts from one activity to another (78%), "Can't stand waiting, wants everything now (76%), "Wants a lot of attention (73%), "Easily frustrated" (69%). Only five items occurred in less than 10% of the sample. Analysis of mean scores and frequencies illustrates, that rates of externalizing symptoms found in this study are similar to those reported in the study by van Zeijl et. al. (2006).

Table 7: Parent-reported mean scores for externalizing CBCL symptoms at 12 months

	Controls			Depressed			Overall		
	M	SD	Median Range	M	SD	Median Range	M	SD	Median Range
Father reported									
Externalizing	12.32	7.01	11(0-27)	15.67	5.93	15(6-31)	13.13	6.9	13(0-31)
Oppositional	7.88	4.66	8(0-18)	10.29	4.34	10(4-22)	8.46	4.69	8(0-22)
Aggressive	1.77	1.8	1(0-7)	1.86	1.57	2(0-6)	1.8	1.74	1(0-7)
Overactive	2.68	1.84	3(0-7)	3.5	1.35	3(1-6)	2.89	1.77	3(0-7)
Mother Reported									
Externalizing	12.07	7.5	0-34	14.2	7.7	4-33	12.58	7.57	12(0-34)
Oppositional	7.9	5.23	0-27	9.08	5.01	3-21	8.17	5.18	8(0-27)
Aggressive	1.57	1.88	0-9	1.95	2.21	0-7	1.66	1.96	1(0-9)
Overactive	2.61	1.86	0-8	3.2	2.21	0-8	2.74	1.96	2(0-8)

3.2.1 *Inter-parent agreement*

Agreement between mothers' and fathers' report on the CBCL is summarized in Table 7. Results indicate significant correlations ranging from .21 to .29. Correlations between parents were significant in all but the aggression scale. They were in the predicted direction but did not exceed the small range.

Table 8: *Inter-parent agreement on the CBCL*

	Mother CBCL	OPP	AGG	OVE	EXT
Father CBCL					
OPP (p)		.26* (.010)	.1 (.345)	.25* (.014)	.28** (.006)
AGG (p)		.13 (.184)	.18 (.080)	.14 (.155)	.2 (.052)
OVE (p)		-.03 (.784)	-.03 (.751)	.25* (.014)	.05 (.605)
EXT (p)		.21* (.039)	.11 (.280)	.29** (.004)	.26** (.009)

Notes: OPP=Oppositional, OVE=Overactive, AGG= Aggressive, EXT=Externalizing, (Spearman's Correlations), two- tailed tests, * $p < .05$, ** $p < .01$.

3.3 **Mediational models of the relations between paternal depression and child behaviour symptoms.**

3.3.1 *Externalizing scale*

As was shown earlier, there was no evidence for a difference in externalizing behaviours when maternal reports were used. To proceed with the mediational analysis paternal reports of externalizing behaviours were used. A multiple regression was computed where in the first step paternal depression was entered as a predictor and child externalizing symptoms as the dependent variable. The model was found to be significant $F_{(1,98)}=4.44$, $p=.038$. In the second step positive comments was added in the regression and the relationship was no longer significant

$F_{(2,97)}=2.4$, $p=.097$. In step 2 paternal depression no longer predicted externalizing symptoms $t(97)=1.95$, $p=.054$. A slight decrease was noted in the β values from step 1 ($\beta=.208$) to step 2 ($\beta=.196$). In accordance with the guidelines by Baron and Kenny (1986) the values have changed in a direction which would be indicative of a partial mediation, however the change in the beta and p values is so small that a claim of partial mediation can not be made. Therefore, results suggest that positive comments did not mediate the relationship between paternal depression and externalizing symptoms (Table 9).

Table 9: Hierarchical Multiple Regression Analyses predicting Externalizing symptoms from Paternal Depression and Positive Comments

Externalizing Symptoms			
	B	SE B	β
Step 1			
Constant	8.98	2.08	
Paternal Depression (controls=1, depressed=2)	3.34	1.59	.208*, $p=.038$
Step 2			
Constant	9.67	2.37	
Paternal Depression	3.16	1.62	.196, $p=.054$
Positive Comments	-.16	.27	-.06, $p=.54$
Note: $R^2_{adj}=.034$ for Step 1; $\Delta R^2_{adj}=-.007$ for Step 2, * $p<.05$			

Similar analysis was computed for the two subscales of the CBCL (overactive and oppositional) which were significantly associated to paternal depression.

3.3.2 *CBCL subscales – Overactive and Oppositional Symptoms*

A multiple regression was computed to examine the mediating role of positive comments between paternal depression and overactive symptoms. In the first step paternal depression was entered as the predictor and overactive symptoms as the dependent variable. The model was found to be significant, $F_{(1,98)}=4.05$, $p=.047$. In the second step positive comments were added as a predictor. The model was no longer significant, $F_{(2,97)}=2.02$, $p=.138$. In the second step depression no longer predicted overactive symptoms $t(97)=1.94$, $p=.056$. A marginal drop in the β values was noted from step 1 ($\beta=.199$) to step 2 ($\beta=.196$). The results indicate that positive comments did not mediate the relationship between paternal depression and overactive symptoms (*Table 10*). Results here are very similar to the statistics reported in the previous mediational model. Changes here in the statistics are again so small that partial mediation can not be supported.

Finally, a multiple linear regression was computed to examine whether positive comments mediated the relationship between paternal depression and oppositional symptoms. First, as in the previous analysis, paternal depression was entered as a predictor of oppositional symptoms and the model was significant, $F_{(1,98)}=5.05$, $p=.027$, depression did predict oppositional symptoms $t(97)=2.25$, $p=.037$. Positive comments were then added in the second step and the model was no longer significant, $F_{(2,97)}=2.6$, $p=.079$. However, depression continued to significantly predict oppositional symptoms, $t(97)=2.12$, $p=.037$. A small decrease was noted in the β values from step 1 ($\beta=.221$) to step 2 ($\beta=.213$). Results suggest that positive

comments did not mediate the relationship between paternal depression and oppositional symptoms (*Table 10*).

Table 10: Hierarchical Multiple Regression Analyses predicting a) Overactive symptoms and b) Oppositional symptoms from Paternal Depression and Positive Comments

A. Overactive Symptoms

			B	SE B	β
Step 1					
Constant			1.86	.54	
Paternal Depression (controls=1, depressed=2)			.82	.41	.199*, $p=.047$
Step 2					
Constant			1.9	.61	
Paternal Depression			.81	.42	.196, $p=.056$
Positive Comments			-.01	.07	-.02, $p=.87$
Note: $R^2_{adj}=.030$ for Step 1; $\Delta R^2_{adj}=-.01$ for Step 2, * $p<.05$					

B. Oppositional Symptoms

			B	SE B	β
Step 1					
Constant			5.46	1.41	
Paternal Depression (controls=1, depressed=2)			2.42	1.08	.221*, $p=.027$
Step 2					
Constant			5.8	1.61	
Paternal Depression			2.33	1.1	.213*, $p=.037$
Positive Comments			-.08	.18	-.04, $p=.663$
Note: $R^2_{adj}=.039$ for Step 1; $\Delta R^2_{adj}=-.008$ for Step 2, * $p<.05$					

3.4 Child Outcome and EE

In order to examine in more detail the relationship between child outcome and EE, Spearman's correlations were computed between the CBCL scales and the pFMSS

subscales. Table 11 summarizes the results. As is evident, there are no significant correlations between paternal EE and CBCL scores.

Table 11: Spearman's Correlations between pFMSS subscales and father reported CBCL.

	IS	W	R	CC	ICC	PC	IPC
OPP (<i>p</i>)	.14 (.171)	.05 (.626)	.02 (.870)	-.02 (.846)	.15 (.146)	-.07 (.520)	.01 (.926)
AGG (<i>p</i>)	.07 (.503)	.13 (.198)	-.10 (.307)	.11 (.259)	.07 (.473)	-.16 (.103)	.08 (.406)
OVE (<i>p</i>)	-.01 (.964)	.10 (.314)	.00 (.996)	.00 (.983)	.10 (.332)	-.08 (.425)	-.01 (.936)
EXT (<i>p</i>)	.12 (.236)	.08 (.429)	-.03 (.789)	.01 (.993)	.13 (.183)	-.10 (.320)	.02 (.858)

Notes: OPP=Oppositional, OVE=Overactive, AGG= Aggressive, EXT=externalizing, IS=Initial Statement, W=Warmth, R=Relationship, CC=Critical Comments, ICC=Intermediate Critical Comments, PC=Positive Comments, IPC=Intermediate Positive Comments

3.5 Maternal EE in families with a depressed father

3.5.1 *High vs. Low EE*

Mothers were categorized in high vs. low EE status using the criteria previously used, outlined in the methods section (p.46). Comparison was made between mothers with a depressed and non-depressed partner. (*Table 12*).

Table 12: High vs. Low maternal EE in families with a depressed father

	Controls (n=79)		Depressed (n=24)		Total (n=103)	
	High	Low	High	Low	High	Low
Groupings						
N (% Row)						
Grouping 1	3(3.9)	74(96.1)	2(1.2)	22(91.7)	5(5)	96(95)
Grouping 2	4(5.2)	73(94.8)	1(4.2)	23(95.8)	5(5)	96(95)
Grouping 3	16(20.8)	61(79.2)	7(29.2)	17(70.8)	23(22.8)	78(77.2)

Grouping 1

There were no significant associations between maternal group status (living with a depressed vs. non depressed father) and EE (High vs. Low), $\chi^2(1)=0.38$, $p=.59$, (OR 2.24, 95%CI 0.35-14.28).

Grouping 2

There were no significant associations between maternal group status and EE, $\chi^2(1)=0.84$, $p=1$, (OR 0.8, 95%CI 0.08-7.46).

Grouping 3

There were no significant associations between maternal group status and EE, $\chi^2(1)=0.39$, $p=.412$, (OR 1.57, 95%CI 0.56-4.43).

3.5.2 Maternal EE subscales

Maternal EE was examined in more detail by exploring differences between the two groups in the pFMSS subscales (Table 13).

Statistical analysis revealed no differences between mothers with a depressed partner vs. a non depressed partner in the subscales of the pFMSS, for IS $\chi^2(2)=2.16$, $p=.341$, W $\chi^2(2)=3.65$, $p=.162$, R $\chi^2(2)=3.34$, $p=.188$, CC U=918.5, $p=.929$, ICC U=889.5, $p=.742$, PC U=756, $p=.176$, IPC U=846.5, $p=.52$.

Table 13: Descriptives of pFMSS subscales in mothers of depressed and non depressed partners.

		Controls (n=79)			Depressed (n=24)			Total (n=103)		
N (%column)										
Initial Statement (IS)	Positive	36(45.6)			6(26.1)			42(51.5)		
	Neutral	41(51.9)			15(65.2)			56(46.5)		
	Negative	2(2.5)			2(8.7)			4(2)		
Warmth (W)	High	22(27.8)			6(25)			28(27.7)		
	Moderate	41(51.9)			11(45.8)			52(55.4)		
	Low	16(20.3)			7(29.2)			23(16.8)		
Relationship (R)	Positive	59(74.7)			15(62.5)			74(71.3)		
	Neutral	20(25.3)			8(33.3)			28(25.7)		
	Negative	0(-)			1(4.2)			1(3)		
		M	SD	Range	M	SD	Range	M	SD	Range
Critical Comments (CC)		0.14	0.56	(0-4)	0.17	0.64	(0-3)	0.15	0.57	(0-4)
Intermediate CC (ICC)		0.55	0.88	(0-3)	0.58	0.88	(0-3)	0.55	0.88	(0-3)
Positive Comments (PC)		3.68	2.26	(0-10)	4.38	2.7	(0-10)	3.84	2.37	(0-10)
Intermediate PC (IPC)		1.29	1.39	(0-5)	1.67	1.83	(0-6)	1.38	1.5	(0-6)

3.5.3 *Maternal EE Intercorrelations*

Several significant correlations were evident; all in the predicted direction. Correlation coefficients ranged from .21 to .49. It is interesting perhaps to note that the added subscale of ICC correlated to four measures of the pFMSS: IS, R, W and CC. This perhaps can be interpreted as evidence that ICC taps into the same construct with the other categories.

Table 14: Intercorrelations of maternal pFMSS subscales.

	1.IS	2.W	3.R	4.CC	5.ICC	6.PC	7.IPC
1. IS (<i>p</i>)	-	-					
2. W (<i>p</i>)	.17(.098)						
3. R (<i>p</i>)	.21*(.036)	.49**(.000)	-				
4. CC (<i>p</i>)	.08 (.421)	.21*(.033)	.37**(.000)	-			
5. ICC (<i>p</i>)	.32**(.001)	.35**(.000)	.40**(.000)	.25*(.013)	-		
6. PC (<i>p</i>)	-.08(.427)	-.33**(.001)	-.16 (.112)	.1(.328)	-.07(.482)		
7. IPC (<i>p</i>)	-.18(.070)	-.18 (.078)	-.12 (.244)	-.05(.610)	-.11(.287)	-.01(.899)	-

*Notes: two tailed tests, * $p < .05$, ** $p < .01$, m=maternal report, f=paternal report, IS=Initial Statement, W=Warmth, R=Relationship, CC=Critical Comments, ICC=Intermediate Critical Comments, PC=Positive Comments, IPC=Intermediate Positive Comments*

3.5.4 *Correlations of maternal and paternal EE scales*

Correlations of maternal and paternal EE were examined to investigate levels of positivity and negativity within the family irrespective of the depression status. Evidence from this table is mixed. A number of correlations point towards an additive model of interaction with levels of negativity in the mother correlating positively to levels of negativity in the father (mICC x fIS, mICC x fICC, mICC x

fPC, mR x fICC). From the same table though, two correlations (mIPC x fICC, mPC x fCC) point towards a compensatory model with maternal positivity rising as paternal negativity is rising as well.

Table 15: Correlations of maternal and paternal EE scales

	fIS	fW	fR	fCC	fICC	fPC	fIPC
mIS (<i>p</i>)	.2(.052)	.11(.295)	-.04 (.661)	-.05 (.634)	.02 (.811)	-.02(.866)	-.12 (.247)
mW (<i>p</i>)	.08(.434)	.18(.067)	.13(.181)	.05(.604)	.16(.112)	-.13(.202)	.08(.431)
mR (<i>p</i>)	-.07(.469)	.12(.254)	.02(.846)	.09(.388)	.22* (.031)	.07(.517)	-.06(.552)
mCC (<i>p</i>)	-.14(.168)	.04(.695)	-.05(.599)	.00 (.977)	.08 (.421)	.1(.327)	.05(.625)
mICC (<i>p</i>)	.24* (.017)	.15(.137)	.10(.303)	.01(.936)	.25* (.011)	-.22* (.028)	-.18(.078)
mPC (<i>p</i>)	.04(.726)	.08(.428)	.17(.083)	.28** (.005)	-.05(.617)	-.07(.467)	-.05(.638)
mIPC (<i>p</i>)	.12(.255)	-.08(.428)	.11(.290)	-.05(.643)	.20* (.045)	-.11(.283)	.03(.760)

*Notes: two tailed tests, * $p < .05$, ** $p < .01$, m=maternal report, f=paternal report, IS=Initial Statement, W=Warmth, R=Relationship, CC=Critical Comments, ICC=Intermediate Critical Comments, PC=Positive Comments, IPC=Intermediate Positive Comments*

3.6 EE and other measures of family functioning

Associations between EE and other measures of family functioning were explored. As stated in the methods, three measures were used, the DAS, a question on the success of the marital relationship and a measure of perceived criticism. Descriptives for the measures are presented in *Table 16*.

Firstly, associations were examined in terms of High vs. Low EE and then associations between the EE subscales and measures of family functioning.

3.6.1 *High vs. Low EE*

While the previous sections in this chapter explore different ways of categorizing EE into high and low this section will only utilize the guidelines set out originally for the pFMSS by Daley et al. (2003).

As is evident from the following table fathers scoring high on EE were only significantly different to fathers scoring low on one item “How critical do you think you are of your partner”. The direction of this finding however, is contrary to what the literature indicates. Previous literature indicates parents high in EE to be high also towards their partners. In this sample however, fathers scoring high on EE perceived themselves as significantly less critical towards their partners compared to those scoring low (Table 16). This finding however should be interpreted with caution since the High EE category only contains 7 fathers.

3.6.1 *pFMSS subscales*

Correlations between the EE and measures of family functioning were computed. It is evident from the correlations (*Table 17*) that several significant associations emerged, all of which were in the predicted direction. CC emerged as an important factor with fathers reporting lower marital quality, affection and satisfaction, expressing more critical comments towards the infant. Interestingly, questions on perceived criticism did not correlate to any of the EE subscales. Success of relationship significantly correlated to positive comments, indicating that fathers less confident about their relationship succeeding also expressed fewer positive comments towards their infants.

Table 16: Descriptives of the DAS, PC and “success of relationship”, and test statistics based on EE status

	High EE		Low EE			Overall		
	(n=7)		(n=96)		Test Statistic	(n=103)		
	M	SD	M	SD				
DAS								
Consensus	45.29	8.32	49.34	5.88	U=231.5, p=.191	49.1	3.12	28-65
Satisfaction	39.43	7.37	40.86	4.71	U=307, p=.768	40.8	4.9	23-48
Affectional Expression	8.57	1.9	8.9	1.81	U=302, p=.713	8.88	1.8	4-12
Cohesion	14.14	4.22	14.89	3.15	U=287, p=.572	14.84	3.21	7-24
DAS Total	107.43	19.29	114.32	11.81	U=280.5, p=.571	113.83	12.47	67-144
Success of the relationship	8.57	1.9	8.89	1.14	U=323, p=.933	8.87	1.2	3-10
Perceived Criticism								
Critical of partner	2.57	1.72	4.76	2.59	U=162, p=.025*	4.6	2.59	1-10
Critical partner is of you	5.14	2.27	4.86	2.38	U=310, p=.798	4.88	2.37	1-10

Notes: *p<.05

Table 17: Summary of correlations for scores on EE, the DAS, Perceived Criticism and Success of relationship.

	IS	W	R	CC	ICC	PC	IPC
DAS							
Consensus (<i>p</i>)	-.23* (.023)	-.13 (.193)	-.17 (.088)	-.27* (.006)	.07 (.485)	-.03 (.734)	-.07 (.472)
Satisfaction (<i>p</i>)	-.04 (.727)	-.19 (.055)	-.05 (.618)	-.22* (.031)	.00 (.981)	.13 (.183)	-.08 (.455)
Affectional Expression (<i>p</i>)	-.02 (.830)	.06 (.581)	-.03 (.769)	-.07 (.487)	-.04 (.706)	.02 (.832)	-.05 (.633)
Cohesion (<i>p</i>)	-.15 (.145)	-.17 (.093)	-.09 (.384)	-.08 (.424)	.09 (.349)	.07 (.473)	.09 (.386)
DAS Total (<i>p</i>)	-.14 (.174)	-.11 (.261)	-.09 (.397)	-.20* (.045)	.05 (.639)	.04 (.7)	-.03 (.8)
Success of the relationship (<i>p</i>)	-.12 (.24)	-.09 (.374)	-.19 (.054)	.06 (.572)	.03 (.737)	.20* (.041)	-.01 (.917)
Perceived Criticism							
Critical of partner (<i>p</i>)	.07 (.506)	-.04 (.67)	-.07 (.472)	-.01 (.923)	-.09 (.352)	.05 (.619)	-.06 (.584)
Critical partner is of you (<i>p</i>)	.07 (.464)	.14 (.156)	.06 (.562)	.04 (.696)	-.15 (.141)	.1 (.332)	-.06 (.533)

Notes: two tailed tests, * $p < .05$

4 DISCUSSION

The overall aim of the study was to examine EE in the context of paternal depression. The main finding of the study is that although depressed fathers did not show higher levels of overall expressed emotion, they did express fewer positive comments towards their infants than non-depressed fathers. Furthermore, paternal depression was shown to predict externalizing symptoms at one year; however, this relationship was not substantially mediated by EE. Finally, increased paternal criticism was associated with a decrease in marital satisfaction and affection, while positive comments were associated with greater confidence that the marital relationship will succeed.

This study makes a unique contribution to existing research by investigating a novel set of questions. To our knowledge, this is the first study to look at EE and paternal depression in one year old infants and examine the mediating role of EE between paternal depression and infant outcome. Furthermore, this is the first study to examine maternal EE in the context of paternal depression, and associations of paternal EE to other measures of family functioning (such as marital quality).

This section proceeds with a more detailed presentation of the findings of this study, followed by a discussion of the strengths and limitations, clinical implications and suggestions for future research.

4.1 Differences between depressed and non depressed fathers in EE

Examination of EE in depressed and non-depressed fathers revealed a difference in only one dimension; depressed fathers were less positive than non-depressed fathers towards their children.

As the preschool Five Minute Speech Sample (pFMSS) has not been previously used with fathers or infants one year old, three different groupings were used to classify fathers into High vs. Low EE. Statistical analysis revealed no significant differences in depressed and non depressed fathers. It is important to note that the measure of EE used here did not include a scale of emotional over-involvement (EOI) and therefore, discussion of High/Low EE is limited to the scale of criticism. The lack of differences in the High/Low classification may reflect different communication patterns between mothers and fathers towards their children. The limited inclusion of fathers in EE research and the variety of measures used to collect EE data make it difficult to directly compare the rates found here to other studies. In addition, this study hypothesized that depressed fathers would score higher on EE than non depressed fathers, an assumption which stemmed primarily from research on depressed mothers. Research from depressed fathers however, suggests that they may cope differently than mothers with depression. Field et al. (1999) report interactions of depressed fathers with their infants to be similar to those of non-depressed fathers and significantly different to those of depressed mothers, with depressed fathers not displaying impaired interactions. That is to say, that a lack of differences in EE might be attributed to paternal depression not impacting or intruding in the interaction between father and child. As Field et al. (1999) have suggested the lack of differences can also be interpreted due to the sample of fathers recruited, the majority

of which were not the primary care-givers. In the present sample some fathers were the primary care-givers of their children, however, in the majority of families it was mothers who had more responsibility. It is possible therefore, that fathers may not have had the opportunity to interact and form a strong bond with their children compared to mothers and this might have affected their assessment of EE. Unfortunately, the study did not include a measure of father involvement or attachment which would have provided us with further understanding of how this could have affected EE. Interestingly, in this study no systematic differences were found in the assessment of EE between mothers and fathers.

Additional analysis was performed using the subscales of the pFMSS separately, for two reasons. Firstly, two additional scales were added to the coding of the pFMSS to detect more subtle forms of positivity and negativity, in part because of the younger age of the children in the study. Examination of the subscales could provide information on how well these two additional scales relate to the remaining subscales. Secondly, the subscales of critical and positive comments have previously been used, as measures of positivity and negativity (Phillips-Sisson, 2005; St John-Seed & Weiss, 2002). Examination of the subscales could provide insight into more specific differences between depressed and non depressed fathers not evident in the High/Low dichotomy.

Examination of the pFMSS subscales individually revealed one difference. Depressed fathers expressed significantly fewer positive comments compared to non depressed fathers. The hypothesis of this study, that depressed fathers would be more critical was not confirmed.

Existing research in EE overwhelmingly supports the presence of high criticism in the context of maternal depression (Bolton et al., 2003; Hirshfeld, 1997; Nelson et al., 2003; Rogosch et al., 2004), but there is little research on the role of positivity and more specifically decreased positivity. Decreased positivity should not be taken as an equivalent to increased negativity. There is some evidence to suggest that this decrease in positivity might be a characteristic associated to paternal depression specifically. The influential studies by Jacob and Johnson (1997; 2001) report the phenomenon of *positivity suppression* whereby family interactions were characterized by decreased rates of positivity following a positive communication from other family members. The authors also report that the degree of *positivity suppression* correlated to the severity of depression with families with more severely depressed fathers exhibiting greater positivity suppression.

If decreased positivity is a characteristic primarily of paternal depression then further research is necessary to establish its effects on child development. Studies in EE primarily focus on the negativity, hence levels of positive communication have received less attention. According to the guidelines by Daley (2003) and Magana (1993) in order to be classified as high in EE one must have a negative rating on one of the global scales and a ratio of more critical than positive comments for the pFMSS or at least one critical comment for the FMSS. This however, ignores parents who while not critical (*i.e.* no critical comments) also fail to express any positive comments. In this sample, one in four depressed fathers showed no evidence of criticism and no evidence of positivity. The importance of positive communication is reiterated by Hooley and Hahlweg (1986) who report that what differentiated High

vs. Low EE relatives of depressed patients was the absence of sustained positive communication rather than the presence of criticism.

Decreased positivity or positivity suppression may have implications in the maintenance of depression. When this decreased positivity is evident across intra-familial relationships as was evident in the studies by Jacob and Johnson (1997) the depressed individual might find it increasingly difficult to disengage from this pattern of communication. There are a few theories which focus on the absence of positive affect rather than negative affect (Clark, Watson, & Mineka, 1994). More specifically positivity has been defined as a stable heritable dimension, which includes traits such as positive emotionality, energy and dominance. It has been linked both theoretically and empirically with depression phenomena and has been shown to negatively correlate to depressive symptoms, cognitions, biology and behaviour. People scoring low on positive affect have also shown slower response rates to treatment (Clark et al., 1994).

As the pFMSS has not been previously used with fathers or with twelve-month old infants it is unclear why only a very low number of fathers scored high in EE. Earlier we discussed how this may be a finding specific to men. To further explore this it is important to look at other studies firstly, with fathers and secondly, with EE towards infants. As was discussed in the introduction, only a few studies have collected EE data from fathers. In the study by Rogosch et al. (2004) overall rates of paternal critical comments towards the infant using the FMSS were similar to rates found in this study. The study by Hibbs et al. (1993) though, reports 30% of fathers of non-referred children as high in EE. Using the classification of EE into High/Low according to Daley et al. (2003) this study only reports 7% of fathers high in EE.

Using the classification according to Magana (1994) the study did find a rate of 30% of fathers high in EE, however, this classification failed to differentiate between depressed and non depressed fathers. Vostanis and Nicholls (1992) attempted to establish rates of EE in mothers and fathers of non-referred children aged six to eleven years. Rates of critical comments reported there, are slightly elevated compared to the present study, however rates of positive comments are very similar. Maternal EE toward infants was examined by Barnes et al. (2007) at three months and by St Jonn-Seed and Weiss (2002) at six months postpartum. Both studies report slightly elevated levels of critical comments and negative EE compared to the present study.

One of the core symptoms of depression is increased negativity. While decreased positivity is not synonymous to negativity, it is one of the symptoms of depression. An important question is raised of whether the levels of positivity will rise when mood elevates and no longer pose any risk to the child and the family. However research in EE and maternal depression indicate parental EE to be relatively stable over time even after depression remits (Hilsman, 2001; Peris & Baker, 2000) and there is no reason to suggest this would not be true for the present sample. As EE is a measure of the emotional atmosphere and captures the intensity of attitudes from one individual to another it is possible that severity of depression specifically might impact the way in which an individual scores on EE. As this was not measured in this study it is not possible to assess how severity of depression might have impacted on EE assessment.

4.2 Paternal depression and Child outcome

Paternal depression was found to predict externalizing behaviours at one year. This finding is consistent with previous research which reports paternal depression in the postnatal period to be significantly associated with behaviour problems at three years of age and with oppositional and conduct problems at seven years of age (Carro et al., 1993; Middleton, Scott, & Renk, 2009; Ramchandani et al., 2005; 2008b). The same finding has been reported with children of older age in a range of studies (Kane & Garber, 2004, 2009; Kane et al., 2002; Middleton et al., 2009). This however, is the first study to report this association at such a young age. This finding however, should be interpreted with caution due to the use of paternal reports for infant behaviour.

The use of only the externalizing scale of the CBCL can be justified by three reasons. First, only the externalizing scale has been validated for use with infants as young as one year old before (van Zeijl et al., 2006). Secondly, taking into account the age of infants, externalizing behaviours are more likely to be observable and evident than internalizing behaviours at this age. Finally, research has consistently shown high EE, when using the criticism scale, to be strongly correlated to externalizing rather than internalizing behaviours (Hirshfeld et al., 1997; Kershner et al., 1996; McCarty, 2004; Nelson et al., 2003; Peris & Baker, 2000; Vostanis & Nicholls, 1995).

Reports of externalizing behaviours were collected from both parents, and inter-parental agreement was shown to be of a moderate range. Inter-parental agreement on the CBCL has been consistently shown to be of high range ($r > .70$; Walker & Bracken, 1996). The much lower coefficients presented here might be attributed to

the very young age of the infants, with some of the behaviours on the scale being difficult to observe. It was hypothesized that children's externalizing behaviours would be higher in families with a depressed father. Differences between the two groups (children of depressed and non depressed fathers) were examined using both paternal and maternal reports. Maternal reports revealed no significant differences, paternal reports however, were different in the externalizing scale as well as the oppositional and overactive subscales. Paternal depression predicted externalizing symptoms only when paternal reports were used.

Research that has employed parental reports for assessment of child behaviour has often been criticized for possible rater bias due to parental psychopathology. This, it is argued, may result in elevated levels of behaviour problems being reported. This was the reason why report of child externalizing symptoms was collected from both parents to avoid rater bias by using a more independent rater. However, it should be noted that in this sample, depression was found to be present in both mothers and fathers as was discussed in the methods section. Therefore, rater bias due to parental depression might have affected both the maternal and paternal ratings. A comprehensive review though by Richters (1992) challenges the evidence of distortion due to depression and reports that, of the studies reporting the depression distortion bias none met the necessary criteria. It is important to note here that parental reports highlight the caregiver's vantage point in providing information on their child's behaviour as they are assumed to know them best and are able to provide insight on behaviour that is not necessarily observable in a laboratory setting. Rothbart and Hwang (2002) further pointed out that convergence between parental reports and observations is also dependent on the measures being used. The lack of

difference in maternal reports on the CBCL perhaps does indicate a need to further investigate this, however, a report by an additional rater was not possible in the present study to resolve this.

If this association is partly found to be significant here due to a depression distortion bias it is important to also consider how that may impact on the child. As indicated by Whiffen and Gotlib (1989), in congruence with their mood, individuals will present negatively distorted perceptions and so may perceive their parenting behaviour or that of their infants in a more negative way. In order to test this hypothesis, researchers compared their assessment of neonates to that made by mothers at delivery and one month post-partum. Depressed mothers rated their neonates as more negative than researchers and one month later researchers' ratings were as negative as those of the mothers. Non-depressed mothers were more favourable in their infants' ratings than depressed mothers and researchers. At one month researchers' ratings were equivalent to those of the non-depressed mothers (Hart, Field, & Roitfarb, 1999). This illustrates how negative expectations of infant behaviour were mirrored and expressed by the infant. Applied to this context this would imply that if fathers perceive their children's behaviour as more negative or disruptive, children in turn may adapt to fit this perception or expectation.

4.3 Mediation Models

The role of EE as a mediator between paternal depression and child behavioural outcomes was examined. As no differences were found in the original classification of parents in High/Low EE, positive comments were entered as a mediator and paternal report of child externalizing behaviour as the dependant factor. Three

mediational models were calculated using the externalizing scale as the dependent variable for the first model and the oppositional and overactive subscales for the second and third models. In all three models positive comments did not act as a substantial mediator.

This finding contradicts previous research looking at EE as a mediator between parental psychopathology and child internalizing and externalizing behaviours. It may be interpreted in two ways. Firstly, positive comments may not be a strong enough factor to mediate the relationship. So far evidence from fathers suggests conflict to be a more important factor in the context of paternal depression (Kane & Garber, 2009). In the previously discussed studies of Jacob and Johnson (1997; 2000) *positivity suppression* did not mediate or moderate the effects of paternal depression on child depression and did not act as an independent risk factor for child depression. It is possible that decreased positivity may have an effect on the father-child interaction but does not mediate the relation between depression and child externalizing behaviour.

Secondly, the lack of significant findings might be the result of a methodological limitation. The study consists of two groups depressed and non depressed fathers, the former of which included fathers who had suffered an episode of depression at some point during the first postnatal year. The data on EE and the CBCL were collected twelve months postpartum. So at the time of data collection some fathers were depressed whereas others might have been depressed and have subsequently remitted. Current symptoms of depression may have impacted more negatively on their scores and EE speech sample. Furthermore, one of the requirements necessary to establish mediation is to establish a time frame, in this case between paternal

depression and occurrence of externalizing behaviours during which EE would have mediated the relationship. This time frame could not be established due to the predominantly cross-sectional nature of the data for the present study.

Further investigation of the EE subscales revealed no significant correlations with paternal reports of CBCL. In particular, what this data indicates is that the amount of caregiver's positive EE did not correlate to behavioural outcomes. St John-Seed and Weiss (2002) report similar results and discuss that parental positivity and warmth may not be essential for infants as long as the caregivers express sensitive and responsive care to the infants' cues. In a different setting, Vaughn and Leff (1976) examined positive remarks and warmth as predictors of relapse of psychiatric symptoms but found no evidence of an association.

4.4 Maternal EE in families with a depressed father

Maternal EE was investigated in the context of paternal depression. Most studies in EE have largely ignored the role not only of the father but of other family members. This is one of the few studies of EE to date to include both parents. Research on family systems re-iterates the importance of studying the family as a whole as depression will not only impact on the individual but will also affect subsystems in the family.

In the present study no differences were found in EE in mothers with a depressed and non-depressed partner. EE was examined both in terms of High/Low EE and in terms of the subscales separately. The very low number of mothers scoring high on EE indicates that perhaps further adaptations are necessary to the FMSS to detect differences in very young children. This could suggest that the lack of differences in

depressed and non depressed fathers previously discussed is not related to fathers specifically but to the young age of children. In a similar way that paternal EE was compared to results of other studies, maternal EE was also examined in terms of rates reported elsewhere. As pertains to High/Low EE, the present study found lower rates of High EE compared to Wamboldt et al. (2000) in a group of young children with asthma, Rogosch et al. (2004) in a group of preschoolers with depressed and non depressed mothers and Hibbs et al. (1993) in a sample of non-referred children. Similar rates of High/Low EE were found when using the guidelines by Magana (1993), with St Jonn-Seed and Weiss (2002) in infants with low birth weight, six months postpartum. Lower scores on critical comments were found in this study compared to Vostanis and Nicholls (1992) and Barnes et al. (2007). In terms of positive comments the study found similar results to those reported in Vostanis and Nicholls (1992) and Wamboldt et al. (2000).

From the comparison of both maternal and paternal EE scores to other studies several conclusions can be drawn. Rates of High EE in the present study are lower compared to those reported elsewhere. In terms of the EE subscales positive comments were at a similar level to others studies, however, critical comments were consistently lower. Comparison was limited to studies qualifying in one of two criteria: EE data was collected from fathers or EE was collected for children of preschool age. The comparison was further limited due to studies presenting results in a way where direct evaluation was not possible. The rates of positive comments did not seem to be affected by the very young age of infants but critical comments were. This could be interpreted as a reluctance of the parents to express critical comments towards their young infants. The infant's behaviour at this young age might be interpreted by the

parents as involuntary to a certain degree. As children grow older and gain more autonomy, the more pronounced behavioural problems may be construed as more intentional behaviours and therefore, trigger more critical comments.

The addition of intermediate comments for the categories of positivity and negativity in the present study were included to detect potential forms of more subtle criticism and positivity. The inter-correlations of maternal EE reveal strong associations of the intermediate critical comments to the other subscales. However, they failed to show differences in the depressed vs. non depressed categories. Further research is needed to examine whether alternative guidelines are necessary for classification of High/Low EE when this refers to children of very young age.

While no significant differences were found in terms of maternal EE in families with a depressed and non depressed partner some inferences can be made about the associations of positivity and negativity in a family from the correlations of maternal and paternal EE. It is not possible to establish whether they are initiated as a reaction to their partner's positivity or negativity, or as a reaction to child characteristics, which are not measured here, however results seem to indicate that as maternal intermediate critical comments increase, paternal initial statement is more negative, intermediate critical comments also increase and, positive comments decrease. Furthermore, as paternal intermediate critical comments increase maternal relationship scores decrease. This seems to indicate an additive effect of negativity towards the child. However, maternal positive comments positively correlated to paternal expressed negativity. That is to say, results suggest as maternal positive comments increase so do paternal negative comments. It is difficult to infer what this might mean for the child as the correlations show both a compensatory and additive

model of interaction; this is likely to reflect a complex set of interactions within the family system.

4.5 EE and other measures of family functioning

Finally, the present study examined how EE relates to other measures of family functioning. The measures used assessed marital quality and perceived criticism expressed towards partners. Only paternal reports were used here as the main aim was to examine how paternal EE might relate to measures of marital quality. The rationale behind this aim lies with research looking at what characteristics contribute to a parent being high in EE. Research so far has focused on parental psychopathology and individual characteristics; however, very little research has focused on aspects of the family environment which may impact on EE. For this purpose fathers high and low in EE were compared in measures of family functioning. The only item with significantly different scores was the question on “How critical you are of you partner”. This was an unexpected finding because of the direction of the results. Fathers in the high EE category scored significantly lower on the question than fathers low in EE. That is to say, they perceived themselves as significantly less critical of their partner. Because of the small number of participants in this category the findings should be interpreted with caution. Nevertheless, it is very interesting to consider why this is the case. Perhaps high EE fathers do not perceive themselves to be critical or are attempting to mask this negativity in their responses. Items on marital functioning were also correlated to the EE subscales. Several significant correlations revealed that the two aspects, EE towards the child and marital functioning are related. Critical comments in particular, negatively

correlated to satisfaction and affectional expression on the DAS, with fathers who reported more dissatisfaction and less affection also expressing more critical comments towards their children.

To our knowledge, this is the first study to report such associations. The role of marital quality in child development has received a lot of attention. Research has shown marital conflict to have deleterious effects on child development and behaviour (Cummings & Davies, 2002; Kouros et al., 2008). Depression and deterioration in marital quality will commonly co-exist in families especially in the early postnatal year. Further research is necessary to examine how marital quality contributes to negative EE.

4.6 Strengths and Limitations

This study has several strengths. To our knowledge, this is the first study to look at EE and paternal depression. Research in paternal depression and particularly in the postnatal period has only recently started to emerge. As it has been shown to be a particularly important and sensitive period for infant development, further research is necessary to explain the mechanisms of transmission of risk from parent to child.

To date, research in EE has focused primarily on clinical child samples or on children at high risk of developing emotional and behavioural problems. This is likely to have resulted in elevated high EE rates and behavioural problems reported. An advantage of this study is the use of a community sample.

The inclusion of both fathers and mothers in assessment of EE presents as a strength to the study. Most research tends to ignore fathers both as a source of information and as a source of impact on child development. To explore EE in fathers and their

infants while excluding mothers would have limited our understanding of the family environment. Increasingly research provides us with evidence indicating that in the presence of a depressed individual in the family, subsystems, such as mother-child relations, will also be affected either directly or indirectly.

The use of clinical diagnosis for the allocation of parents in the depressed and non-depressed categories presents as an additional strong point of the study. The majority of studies looking at paternal depression have used screening questionnaires which invariably will have included fathers who were not clinically depressed. Assessment of depression with the SCID further strengthens the study as it allowed for the formation of two groups depressed and non-depressed while excluding fathers with a history of depression from the control group. Research in EE has suggested that high levels of criticism remain even after depression has remitted (Hilsman, 2001). If this were true in the present sample, the inclusion of fathers with a history of depression in the non-depressed group may have altered EE levels. As it was unknown, how history of depression would exactly impact on EE this group was excluded from analysis.

Assessment of EE presented as both a strength and limitation to the study. The pFMSS has been shown to correlate with data from mother-child interactions and was the most appropriate measure to be used since it has been adapted for use with children of preschool age (Daley et al., 2003). Inter-rater reliability which was examined in this study was shown to be high and this presents as strength of the study. However, further assessments of the psychometric properties of the pFMSS are necessary in terms of both the validity and reliability of this measure when used with infants 1 year old. Possible ways to address this in the future would include

examining associations of the pFMSS with parent-child interactions in terms of validity, as well as to examine the test-retest and code-recode reliability of the measure. In the present study conclusions should be drawn with caution until the psychometric properties are more fully established.

In addition, EE does not provide us with a direct assessment of family interactions. The fundamental concept is that EE measures underlying negative attitudes towards the child, which are also expressed during interaction. This is supported by studies where EE is associated to observational measures. However, assessment of EE is unidirectional as the individual in question (the child) is not present. In an actual interaction, it would be possible to observe the parents reaction to the child's behaviour. In terms of coding of the pFMSS the use of a coder blind to the depression status of the parents is a strong point of the study. As examination of EE was conducted when children were very young, child to parent effects are likely to be less significant compared to studies examining older children and adolescents where EE may reflect more of a reciprocal pattern of interaction. Assessment of EE usually focuses on negative aspects such as criticism, hostility and over involvement. The measurement of EE does include positive attributes however; only limited work has been done to examine the beneficial effects to child development. Vostanis and Nicholls (1994) were the first to highlight warmth as a protective factor of EE when assessing children. Research in adults has shown that an emotionally expressive and supportive environment is predictive of improvement in patient psychopathology (Halford, Schweitzer, & Varghese, 1991).

There are a number of limitations to consider. First, the use of the externalizing symptoms scale of the CBCL has only been validated in use with one year old infants

in one previous study and this may present as a limitation. Also the extent to which these behaviours reflect actual externalizing problems and the strength of their association to later externalizing problems still needs to be established. However, the measure, when used in older populations has shown strong predictive validity and high inter-parental agreement (Walker & Bracken, 1996).

Second, the small number of fathers in the depressed group may have impacted on the power of the study to detect differences. This is not the only research to report small numbers of depressed fathers (Dave, Nazareth, Sherr, & Senior, 2005; Field, 1999). It has been reported as harder to engage fathers in research. In this sample, attrition rate and willingness to participate did not seem to be affected by severity of symptoms on a screening questionnaire; however, the small numbers indicate they might be masking their symptoms or have avoided participating in the study from the very first point of contact.

An additional limitation of the study is the measurement of EE and externalizing symptoms concurrently. This does not allow for a clear time sequence to be established within which EE would have mediated the relationship between paternal depression and externalizing symptoms. One aim of the study was to examine whether EE acted as a mediator. However, previous research has shown a different relationship in which externalizing and internalizing symptoms actually mediated the relationship between maternal depression and maternal criticism (Frye & Garber, 2005). History of maternal depression and adolescent externalizing and internalizing symptoms were examined at two time points, sixth and eighth grade. Interestingly in this sample maternal criticism was not found to mediate the relationship between history and severity of depression, and adolescent externalizing and internalizing

symptoms. In contrast, it was the externalizing and internalizing symptoms which mediate the relationship between maternal depression and criticism in sixth grade. This is one of the few studies to take into account child effects and investigate the transactional nature of family relations. The above research provides clear evidence for the effects of child behaviour on EE. Due to the concurrent assessment of EE and externalizing behaviours in this study it would not have been possible to further investigate whether decreased positivity which was found is associated to child characteristics and behaviour.

4.7 Clinical Implications

This study provides evidence that fathers' depression is associated with reduced positive comments towards their child; a finding which had not been demonstrated previously for very young children. This decreased positivity which seems to be specifically associated to paternal rather than maternal depression underscores the importance of studying the specific effects of paternal depression rather than generalizing findings from maternal depression. This further highlights, that interventions should consider both mothers and fathers, and target interventions appropriately. Furthermore, the study confirms a previously reported association between paternal depression and externalizing symptoms. Whether this reflects actual elevated levels of externalizing symptoms or a more negative perception of infant behaviour, there is a clear need to carefully consider this issue. Two steps can be implemented. First, including screening of depression for fathers in routine practice will help identify children more at risk of adverse outcomes. Secondly, interventions in the early postnatal period could be introduced to alleviate paternal

symptoms of depression and increase positive parenting. Parents could thus be identified by health professionals and referred to a range of support strategies.

4.8 Future Research

The majority of existing research in this field has focused on mother-infant interaction, while ignoring the possible effect of the father and other family members on both the mother-infant interaction and the well being of the family. Future research should centre around two areas; first, the inclusion of the whole family in research and secondly, the study of how family members interact to produce a complex structure of interactions. Research that continues to isolate and study subsystems within a family can provide only a limited understanding of family interactions. Future research should also aim to include assessment of child-to-parent effects. In line with systems theory, and with current research child characteristics such as temperament, gender and cognitive skills will impact on the nature and course of an interaction with the potential to even exacerbate depression symptoms.

In terms of EE, further research is required to establish the use of the pFMSS with parents of young children. More specifically, assessment of the psychometric properties of the pFMSS is necessary before drawing firm conclusions from the results.

Some changes to the coding may be required in the youngest children. In addition, further investigation is necessary to examine the use of EE across different cultures. Finally, in circumstances where both parents are depressed it would be interesting to study whether an additive model or compensatory one is evident.

4.9 Conclusion

The current study found depressed fathers to express fewer positive comments than non-depressed fathers. It further showed paternal depression to predict child externalizing outcomes at one year. The study also provides evidence of paternal criticism expressed towards their child to be linked to marital dissatisfaction and affection. The study is the first to examine EE in the context of paternal depression and has given insight into possible methodological limitations of the current measures when applied to very young infants. The results may contribute to identifying depressed parents early in the postnatal period and designing interventions to promote positive parenting.

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APPENDICES

Oxford Fathers Project Documents

1. Consent form
2. Demographics Sheet

Questionnaires and Measures

3. SCID screening questionnaires
4. pFMSS
 - a) Instructions
 - b) Coding manual
 - c) Template coding sheet
5. Maternal CBCL report
6. a) Dyadic Adjustment Scale
 - b) Perceived Criticism scale

1. Consent Form



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CONSENT FORM

Oxfordshire Research Committee A

OXFORD FATHERS PROJECT

Fathers and their children in the postnatal period

Please circle Please initial
Yes/no boxes

Have you read the information sheet?

Yes / No

☐

Have you had the opportunity to ask questions
and discuss the study?

Yes / No

☐

Have you received satisfactory answers to all
of your questions?

Yes / No

☐

Do you understand that you are free to withdraw from the study,
at any time, without having to give a reason and without it
affecting your future medical care

Yes / No

☐

Do you agree to your GP being informed of

☐

your involvement in this study?	Yes / No	
Do you agree to the audio-taping of our conversation?	Yes/No	☐
Do you agree that words and phrases you say can be used anonymously in the presentation of this research	Yes / No	☐
We would like to video-tape you and your baby playing. Do you agree to us videotaping you and your baby and to us keeping the video for the duration of this study?	Yes / No	☐
Do you agree to take part in this study?	Yes / No	☐

.....		
YOUR NAME (MOTHER)	Signature	Date
.....		
RESEARCHER'S NAME	Signature	Date

2. Demographics Sheet

Your baby



1 Baby's birth weight

2 Gestational age

3 Problems with delivery?

No ☐ Yes ☐

4 Was your baby in SCBU?

No ☐ Yes ☐ If yes, for how long?

5 Has your baby visited the GP or hospital since birth?

No ☐ Yes ☐ If yes, how many times?

6 How is your baby being fed?

Breastfed ☐ Bottle-fed ☐ Both ☐

7 When did you stop breastfeeding?

Your family details

8 What is your first language?

9 What is the main language you use with your baby?

10 Your ethnicity

11 Marital Status: Single ☐ Married ☐ Living together ☐ Stable relationship ☐

12 Length of time of your relationship:

13 Your highest qualification:

14 Are you currently on maternity leave?

Yes ☐ No ☐

15 Past employment status

Full-time ☐ Part-time ☐ Student ☐ No job ☐

16 Are you currently: Self employed ☐ Employed ☐

17 Your current or last job If not current: date of last job

18 Are you going back to work?

Yes ☐ No ☐ If yes, when will you return?

Family structure

Household constitution

Do you have other children residing with you?

Yes ☐ No ☐

If yes, how many?

Sibling 1..... Date of Birth.....

Sibling 2 Date of Birth.....

Sibling 3 Date of Birth.....

Do you have any other family members residing with you?

Yes ☐ No ☐

If yes, how many?

Relationship to mother:

GP contact details

Name:

Address & telephone details:

Telephone numbers

Mobile numbers/email:

Work numbers:

3. SCID screening questions

I would now like to ask you some questions. I read them out to you last time – they are questions about thoughts, feelings and experiences you may have been having. I'd like to read you them again to see whether things are the same or different, more of a problem or less of a problem, or whether there is anything new you'd like to tell me. Please bear with me, as not all the questions may be relevant to you, but I have to read the questions to everybody.

B1. I asked you if you have ever had a panic attack, when you suddenly felt frightened or anxious, or suddenly developed a lot of physical symptoms. Last time you said:

Has anything changed?

1 2 3

C1. I asked you were you ever afraid of going out of the house alone, being in crowds, standing in a queue, or travelling on buses or trains. Last time you said:

Has anything changed?

1 2 3

D1. I asked is there ever anything that you have been afraid to do, or felt uncomfortable doing in front of other people such as speaking, eating, or writing. Last time you said:

Has anything changed?

1 2 3

E1. I asked are there other things that you have been especially afraid of like flying, seeing blood, getting an injection, heights, closed places, or certain kind of animals or insects. Last time you said:

Has anything changed?

1 2 3

F1. I asked have you been bothered by thoughts that didn't make any sense but kept coming back to you even when you tried not to have them. Last time you said:

Has anything changed?

_____ 1 2 3

F5. I asked was there ever anything that you had to do over and over again and couldn't resist doing like washing your hands again and again, counting up to a certain number, or checking something several times to make sure you had done it right. Last time you said:

Has anything changed?

_____ 1 2 3

G1. I said that sometimes things happen to people that are extremely upsetting – things like being in a life-threatening situation like a major disaster, very serious accident or fire; being physically assaulted or raped; seeing another person killed or dead, or badly hurt or hearing about something horrible that has happened to someone you are close to. Since the last visit, have any of these things happened to you? Last time you said:

Has anything changed?

_____ 1 2 3

H1. I asked if, in the six months before my visit, you had been particularly nervous or anxious or worried a lot. Last time you said:

Has anything changed?

_____ 1 2 3

A1. Last time I asked if, in the month before my visit, you had had a period of time when you were feeling depressed or down most of the day, nearly everyday, or how about losing interest or pleasure in things you usually enjoyed. Last time you said:

Has anything changed?

_____ 1 2 3

4. pFMSS

a) Instructions

Instructions for Five Minutes Speech Sample (FMSS)

I would like to hear your thoughts and feelings about (*child's name*) over the last six months. When I ask you to begin I would like you to talk for five minutes without me interrupting you with any questions or comments. I would like you to talk for five minutes telling me what sort of child (*child's name*) is and how the two of you have been getting along together over the last six months. But before we begin do you have any questions?

Notes:

1. Please ensure that you collect the Five Minutes Speech Sample before the interview.
2. During the Five Minutes Speech Sample, try to avoid eye contact with the parent.
3. If there are long pauses, you can say to the parent “you have x minutes left” or “tell me your thoughts and feelings about (*child's name*)”.

b) Coding of pFMSS

The coding of the pFMSS here follows the exact guidelines from Daley (2001).

Description of scale		Type of data	Examples
Global scales			
Initial Statement The first thought expressed by the parent which is specifically about the child.	Positive and negative initial statements fall under two categories: <i>i)description or ii)relationship</i> Neutral initial statements provide descriptive or factual information. They can be subcategorized as follows: <i>neutral description, neutral relationship, conditional statements, statements of improvement, statements in the past, positive and negative statements.</i>	Categorical: <i>0 = positive</i> <i>1 = neutral</i> <i>2 =negative</i>	<i>She is a bright child</i> <i>Jack is three years old</i> <i>I dread it when it is just him and me together</i>
Warmth The intensity of sentiment or feelings which parents express about their child.	when coding it is important to consider: <i>i) tone of voice</i> (this is the most important criterion- interpretation of warmth is based solely on content of speech rather than non-verbal behaviour) <i>ii) spontaneity</i> <i>iii) concern and empathy</i> (the ability to demonstrate concern for the child and the ability to see things from the child's point of view) Caveats relevant to the coding of warmth:a)the frequency of critical comments should not influence ratings of warmth, b)stereotyped endearments (eg love, poppet etc) should not necessarily be interpreted as evidence of warmth, c) even if rater knows participant is depressed, this knowledge should be discounted when rating warmth	Categorical: <i>0 = Low</i> <i>1 = Moderate</i> <i>2 = High</i>	

Relationship The quality of relationship and joint activities undertaken between parent and child over the previous six months	if the relationship isn't addressed a neutral rating is assigned when coding it is important to consider: i) parents' report of their relationship with their children ii) parents' reports that they enjoy and value time spent with their children	Categorical: <i>0 = positive</i> <i>1 = neutral</i> <i>2 = negative</i>	<i>We get along very well</i> <i>We get on fairly well together</i> <i>We don't seem to get along</i>
Frequency Counts			
Critical Comments Negative comments about the child's behaviour and/or personality	(scored on the basis of: i) <i>tone</i> ii) <i>critical phrases</i>) do not include stereotyped descriptions unless they are accompanied by a critical tone critical comments must be the opinion of the respondent	Frequency	<i>She is a horrible girl</i> <i>He is very hard work</i>
Positive Comments Statements of praise, approval or appreciation	(scored on the basis of: i) <i>tone</i> ii) <i>positive phrases</i>) do not include qualified comments i.e. "pretty good" or "fairly bright" do not rate positive comments coined in the negative (ie he is a great kid, not)	Frequency	<i>She is very intelligent</i> <i>He is very loving</i>
Additional scales			
Intermediate Positive Comments	To include qualified comments Examples of qualifiers (e.g. pretty, fairly, seems, quite, probably, sometimes, usually, when, occasionally, most of the times	Frequency	<i>She is sometimes very social</i>
Intermediate Critical Comments		Frequency	<i>He is quite a grumpy boy</i>

c) Template Coding Sheet

FMSS Coding Sheet Participant: _____ Mother _____ Father _____ Date of coding: _____ Counterbalance order: _____ Coded by: _____ Other notes: _____	For data entry: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>IS</td><td></td></tr> <tr><td>W</td><td></td></tr> <tr><td>R</td><td></td></tr> <tr><td>CC</td><td></td></tr> <tr><td>Intermediate CC</td><td></td></tr> <tr><td>PC</td><td></td></tr> <tr><td>Intermediate PC</td><td></td></tr> <tr><td>Ratio of P/N</td><td></td></tr> </table> *0=positive 1=neutral 2=negative	IS		W		R		CC		Intermediate CC		PC		Intermediate PC		Ratio of P/N	
IS																	
W																	
R																	
CC																	
Intermediate CC																	
PC																	
Intermediate PC																	
Ratio of P/N																	

Initial Statement

.....

Positive ₍₀₎	Neutral ₍₁₎	Negative ₍₂₎
Description	Description	Description
Relationship	Relationship	Relationship
	Conditional statement	
	Statements of improvement	
	Statements in the past	
	Positive & negative statements	

Warmth

	High ₍₀₎	Moderate ₍₁₎	Low ₍₂₎
1. Tone of Voice (*most important aspect)			
2. Spontaneity			
3. Concern and Empathy			
4. Laughter			
5. Monotonous			
6. Lots of detail			

Relationship(R)

* quality of R and joint activities, if there is no mention of R give neutral rating

**consider parent's reports on R with the child as well as that they enjoy and value time spent together

Positive ₍₀₎	
Neutral ₍₁₎	
Negative ₍₂₎	

1.
2.
3.

Critical Comments (scored on the basis of either **Tone** or **Critical phrases**)

Frequency: _____

1.
2.
3.

Intermediate Critical Comments (*words like: seems, quite, sometimes)

Frequency: _____

1.
2.
3.

Positive Comments (scored on the basis of either **Tone** or **Positive phrases**)

Frequency: _____

1.
2.
3.

Intermediate Positive Comments

Frequency: _____

1.
2.
3.

Maternal CBCL report

CBCL questions	Sometimes or somewhat True (%)	Very true or Often True (%)	Total
Oppositional			
3. Can't stand waiting; wants everything now	61.8	14	75.8
5. Cries a lot	22.3	5.1	27.4
7. Demands must be met immediately	60.5	6.4	66.9
11. Easily frustrated	58	10.8	68.8
12. Easily jealous	25.5	5.1	30.6
13. Feelings are easily hurt	22.7	3.2	25.9
15. Gets into everything	37.6	50.3	87.9
18. Angry moods	28.7	0.6	29.3
22. Screams a lot	21.7	2.5	24.2
23. Selfish or won't share	21	0.6	21.6
24. Stubborn, sullen, or irritable	23.6	1.9	25.5
25. Sudden changes in mood or feelings	34.6	1.9	36.5
26. Sulks a lot	4.5	0	4.5
27. Temper tantrums or hot temper	42	3.8	45.8
28. Uncooperative	31.2	0.6	31.8
30. Wants a lot of attention	56.7	16.6	73.3
31. Whining	44.2	1.9	46.1
Aggressive			
6. Cruel to animals	2.5	0	2.5
8. Destroys his/her own things	14	0	14
9. Destroys things belonging to his/her family or other children	14.6	0	14.6
10. Disobedient	39.7	1.3	41
14. Gets in many fights	3.2	1.3	4.5
16. Hits others	19.7	0.6	20.3
17. Hurts animals or people without meaning to	31.2	2.5	33.7
19. Physically attacks people	4.5	0.6	5.1

29. Unusually loud	18.5	5.7	24.2
Overactive			
1. Can't concentrate, can't pay attention for long	47.8	10.2	58
2. Can't sit still, restless, or hyperactive	40.1	12.7	52.8
4. Constantly seeks help	29.3	3.2	32.5
20. Quickly shifts from one activity to another	55.8	21.8	77.6
21. Refuses to play active games	9	0	9

5. Marital Quality

a. Dyadic Adjustment Scale (DAS)

		Always agree	Almost always agree	Occasionally disagree	Fre-quently disagree	Almost always disagree	Always disagree
1	Handling family finances						
2	Matters of recreation						
3	Religious matters						
4	Demonstrations of affection						
5	Friends						
6	Sex relations						
7	Conventionality (correct and proper behaviour)						
8	Philosophy of life						
9	Ways of dealing with parents or in-laws						
10	Ways of bringing up children						
11	Aims, goals and things believed to be important						
12	Amount of time spent together						
13	Making major decisions						
14	Household tasks						
15	Leisure time interests and activities						

16	Career decisions						
17	Child discipline						

		All the time	Most of the time	More often than not	Occasionally	Rarely	Never
18	How often do you discuss or have you considered divorce, separation, or terminating your relationship?						
19	How often do you or your partner leave the house after a fight?						
20	In general, how often do you think that things between you and your partner are going well?						
21	Do you confide in your partner?						
22	Do you ever regret that you married/lived together/began the relationship?						
23	How often do you and your partner quarrel?						
24	How often do you and your partner “get on each others’ nerves”?						

Most persons have disagreements in their relationships. Please indicate below the approximate extent of agreement between you and your partner for each item on the following list. (please **tick** the answer the most applies to you)

25	Do you kiss your partner?	Every day	Almost every day	Occasionally	Rarely	Never
----	---------------------------	------------------	-------------------------	---------------------	---------------	--------------

26	Do you and your partner engage in outside interests together?	All of them	Most of them	Some of them	Very few of them	None of them
----	---	--------------------	---------------------	---------------------	-------------------------	---------------------

How often would you say the following events occur between you and your partner?

		Never	Less than once a month	Once or twice a month	Once or twice a week	Once a day	More often
27	Have a stimulating exchange of ideas						
28	Laugh together						
29	Calmly discuss something						
30	Work on a project together						

These are some things about which couples sometimes agree and sometimes disagree. Indicate if either item below caused differences of opinion or were problems in your relationship during the past few weeks

31. Being too tired for sex

Yes ☐ No ☐

32. Not showing love

Yes ☐ No ☐

33. The dots on the following line represent different degrees of happiness in your relationship. The middle point, “**happy**” represents the degree of happiness of most relationships. Please **circle** the dot which best describes the degree of happiness of your relationship.

• • • • • • •
Extremely **Fairly** **A little** **Happy** **Very** **Extremely** **Perfect**
unhappy **unhappy** **unhappy** **happy** **happy** **happy**

34. Which of the following statements best describes how you feel about the future of your relationship?

I want desperately for my relationship to succeed, and would go to almost any length to see that it does

I want very much for my relationship to succeed, and will do all that I can to see that it does

I want very much for my relationship to succeed, and will do my fair share to see that it does

It would be nice if my relationship succeeded, but I can't do much more than I am doing now to help it

succeed

It would be nice if it succeeded, but I refuse to do any more that I am doing now to keep the relationship

going

My relationship can never succeed, and there is no more that I can do to keep my relationship going

On a scale of 0 to 10, please indicate by **circling**

How confident you are that your relationship will succeed.

35

0 1 2 3 4 5 6 7 8 9 10

Not at all
confident

Completely
confident it will
succeed

b. Perceived Criticism

1 How critical do you think you are of your partner?

0 1 2 3 4 5 6 7 8 9 10

Never
Critical

Very critical
indeed

2 How critical do you think your partner is of you?

0 1 2 3 4 5 6 7 8 9 10

Never
critical

Very critical
indeed