The Socioemotional Development of 5-year-old Children of Postnatally Depressed Mothers

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A community sample of depressed and well mothers, recruited at 2 months postpartum and assessed through to 18 months, was followed up at 5 years. The quality of mother–child interactions was assessed, as was the children’s behavioural and social adjustment, using maternal reports and observations of child behaviour during free play at school. Several aspects of child outcome were found to be associated with postnatal depression, even when taking account of current adverse circumstances (maternal depression and parental conflict). These included the child’s behaviour with the mother, the presence of behavioural disturbance at home, and the content and social patterning of play at school. These associations with postnatal depression were independent of the child’s gender. The child’s relationship with the mother appeared to be mediated by the quality of infant attachment at 18 months. The mother’s behaviour with her child was more affected by current difficulties, in particular by conflict with the child’s father. Together these findings suggest that, while maternal behaviour varies with changing circumstances, exposure to maternal depression in the early postpartum months may have an enduring influence on child psychological adjustment.

Keywords: Attachment, behaviour problems, longitudinal studies, maternal depression, parent–child interaction, school.

Abbreviations: SADS-L: Schedule for Affective Disorders and Schizophrenia Lifetime version.

Introduction
The long-term development of children of mothers who experience postnatal depression is an issue of considerable importance. A number of epidemiological studies have been conducted over the past 20 years, and the prevalence of depression in the first 3 months postpartum has been consistently shown to be around 10–15% (Cooper & Murray, 1998; O’Hara, 1997). These episodes occur at a time when the infant is maximally dependent on others’ care, and when the infant is highly sensitive to the quality of the parent’s communication (see Trevarthen, Murray, & Hubley, 1981; and Stern, 1985, for reviews). Depression arising at any time is associated with a range of difficulties in interpersonal communication, and a substantial body of research has shown that, in the context of significant social adversity, depression occurring in the first few months postpartum is associated with marked impairments in maternal interactions with the infant. These include withdrawn, disengaged behaviour, but also hostile and intrusive communication. Correspondingly, infants from these high-risk populations are likely to evidence clear disturbance during the interactions with their depressed mothers, typically showing avoidance and distress (see review by Field, 1992). Even in populations that are not so disadvantaged, where the extreme patterns of maternal withdrawal and hostile intrusiveness seen in high-risk samples are not so evident, depression has been found to be associated with insensitive and negative maternal interactions with the infant in the early postpartum months (Murray, Fiori-Cowley, Hooper, & Cooper, 1996; Stanley, Murray, & Stein, 1999), particularly if the depression persists (Campbell, Cohn, & Meyers, 1995).

The possibility that these early episodes of maternal depression, and the associated difficulties in the mother–infant relationship, may be linked to longer-term difficulties in infant development has been addressed in a number of studies. These have shown a range of adverse outcomes in infants between 12 and 21 months, including
behaviour problems (Murray, 1992), cognitive impairments (Lyons-Ruth, Zoll, Connell, & Grunebaum, 1986; Murray, 1992), particularly in boys (Murray, Fiori-Cowley, et al., 1996), interaction difficulties (Stein et al., 1991), and insecurity of attachment (Lyons-Ruth et al., 1986; Teti, Gelfand, Messinger, & Isabella, 1995; Murray, 1992; Hipwell, Goossens, Melhuish, & Kumar, 1999). It is notable that the adverse outcome of postnatally depressed mothers’ infants was found in some studies to obtain even though maternal depression had, in the majority of cases, remitted by the time of the infant assessment (Murray, 1992; Murray, Fiori-Cowley, et al., 1996; Stein et al., 1991). Thus, poor cognitive outcome appears to be mediated by impairments in maternal interactions with the infant that are evident as early as 2 months postpartum (Murray, Fiori-Cowley, et al., 1996; Murray, Kempton, Woolgar, & Hooper, 1993). This raises the question of whether there may be longer-term effects of maternal postnatal depression on the child. Indeed, there have been claims that the early postpartum months may constitute a “sensitive period” for cognitive development (Hay, 1997). Some support for this position derives from two British studies that have examined the performance on the McCarthy Scales of Children’s Abilities of the 4-year-old children of postnatally depressed and well mothers (Cogill et al., 1986; Sharp et al., 1995). In one (Cogill et al., 1986), poorer cognitive outcome was evident in both the boys and girls of index women, whereas in the other (Sharp et al., 1995), the cognitive deficit was confined to boys. In both studies the poor cognitive performance associated with the postnatal episode was independent of any current mood disorder and, indeed, depression occurring at any time beyond the first postnatal year. In the prospective, longitudinal study of a low-risk sample conducted by Murray and colleagues, the cognitive decrement identified in the boys of postnatally depressed mothers at 18 months was no longer evident in performance on the McCarthy Scales at 5 years, although those children whose mothers had shown particularly marked impairments in interactions at 2 months did show a persistence of poor cognitive functioning (Murray, Hipwell, Hooper, Stein, & Cooper, 1996).

Although there is substantial evidence of a deleterious impact of maternal depression in general on child social and emotional development (see reviews by Cummings & Davies, 1994; Downey & Coyne, 1990), there have been few studies concerned with the risks associated with postpartum depression. Three small longitudinal studies of British community samples have been carried out, all relying on maternal reports of child behaviour. Ghodsi, Zajicek, and Wolkind (1984) monitored the mental state of a community sample of 108 postpartum women at intervals over 42 months. Depression at 4 months, as well as that at 14 months, was associated with maternal reports of behaviour problems at 42 months, but only the effects of the 14-month depression remained significant when current mental state was taken into account. Caplan and colleagues (1989) similarly investigated maternal reports of child behaviour in a community sample of 92 women followed up from pregnancy. The occurrence of depression at 3 months was associated with reports of increased child disturbance, but this was principally accounted for by chronic family difficulties associated with the disorder (marital discord and paternal psychiatric history). Finally, Wrate, Rooney, Thomas, and Cox (1985), in a community sample of 91 women, found that postpartum depressive episodes of relatively short duration (1 month) were associated with maternal reports of child behaviour problems at 3 years, even when controlling for current and recent depression. In this study, neither longer postnatal episodes, nor later occurrences of depression were, by contrast, associated with later child behaviour problems. The authors suggest that this somewhat surprising finding may have been due to the fact that those mothers with brief depressions were particularly anxious about their role as mother, whereas those with chronic episodes had more general preoccupations that were not specifically focused on the child.

The child’s adaptation to the demands of school represents an important area of investigation in determining the impact of postpartum depression. Starting school is a universal, normative event, permitting comparison between different groups of children. It is also a potentially stressful experience which may, therefore, elucidate any vulnerability in the child. The demands of starting school include interacting with a large group of peers, significant separation from the family, and adaptation to an unfamiliar set of rules and expectations (Belsky & MacKinnon, 1994; Dunn, 1988). These adjustments are not only considered to be a foundation for later individual competence (Sylva, 1994), but they have also been found to be predictive of later psychological adjustment (Parker & Asher, 1987), with children experiencing difficulties in their first years at school being at increased risk for long-term developmental problems (see review by Bennett, Lipman, Racine, & Offord, 1998). Two studies have reported teacher ratings of the behaviour in school of children whose mothers were depressed in the child’s infancy. Alpern and Lyons-Ruth (1993) examined teacher reports of the adjustment of 64 5-year-old children from low-income U.S. families whose mother’s mental state had been assessed at 18 months. Recent and chronic maternal depression was, as expected, associated with elevated rates of behaviour problems. Of particular note, however, was the finding that maternal depression in late infancy, but not at 5 years, was associated with raised levels of child anxiety. Teacher reports of child adjustment to school were similarly examined in the study of Murray and colleagues (Sinclair & Murray, 1998). Child gender and family social class were found to have the most pervasive effects on adjustment: girls were judged more adaptable, outgoing, and prosocial than boys, and were rated more favourably in terms of their general readiness for school, their persistence, and their ability to ignore distractions. On these last three measures children from middle-class, as opposed to lower-class families, were also rated as better adjusted. With regard to the effects of maternal depression, recent episodes were associated with more immature, emotionally aroused, and distractible behaviour (particularly in children from lower-class families), and an increase in hyperactive behaviour, especially in boys. The effects of postnatal depression, independent of subsequent episodes, were also most evident among boys...
and those from lower-class families. Thus, boys of postnatally depressed mothers showed raised rates of behaviour disturbance, hyperactive behaviour and, in the context of low social class, high rates of distractibility. The girls of postnatally depressed mothers, on the other hand, were seen as the least active and distractible children in the sample, and to have the lowest rates of behaviour disturbance.

Although the various studies outlined above provide evidence of enduring difficulties in emotional and behavioural adjustment at home and at school in the children of postnatally depressed mothers, a number of central questions require further investigation. First, it is important that the issue of maternal reports of child behaviour disturbance at home be examined using an adequate sample size. Next, while previous work has focused on teacher and maternal reports of child behaviour disturbance, examination of the children's wider functioning, preferably by direct observation, is required to establish whether exposure to early maternal depression influences more general aspects of the children's adjustment. In particular, there is a need to investigate the children's interpersonal functioning and their capacity, as they enter the domain of school, to use educational opportunities for constructive, personal experience.

A further key issue for investigation concerns the processes that might mediate any effects of early maternal depression. Previous studies have emphasised the chronic social difficulties that often accompany episodes of postnatal depression. To the extent that such adversity does, indeed, mediate any association between postnatal depression and adverse child outcome, there is a need to identify which specific aspects of the family situation pose particular risks (e.g. the child's exposure to parental conflict, or the presence of material disadvantage: Emery, 1982; Rutter & Quinton, 1984). Some studies of the impact of maternal depression have emphasised the role of the chronicity of the disorder (e.g. Campbell et al., 1995), whereas others have found current and recent symptoms to be of more significance (e.g. Gordon et al., 1989). Thus, there is a need to take account of the duration and timing of the child's exposure to maternal depression beyond the postnatal period.

A further question concerns the role of the child's earlier developmental trajectory. As has already been noted, a number of studies have identified cognitive difficulties in late infancy and early childhood, particularly among boys and those from lower-class families, as associated with postnatal depression. Impaired cognitive functioning may render the child vulnerable, particularly in the context of adjustment to school, because some aspect of the cognitive impairment, such as poor concentration, may be an important element in certain forms of behaviour disturbance. Alternatively, faced with the demands of the school curriculum, children with poor cognitive functioning may develop low self-esteem that, in turn, may lead to behaviour difficulties (Goodman, Simonoff, & Stevenson, 1995; Rutter, Tizard, & Whitmore, 1970). Attachment insecurity has been reported to be a risk factor for a range of later difficulties in emotional and social adjustment, including problems in mother–child interactions, behaviour disturbance, and a reduction in the quality of the child's play (see Carlson & Sroufe, 1995; Greenberg, Speltz, & De Klyen, 1993, for reviews); and such insecurity occurring in the context of postnatal depression can, therefore, be hypothesised to play a role in mediating any long-term effects of the early maternal mood disorder.

The current study addressed these issues. The 5-year-old children of a community sample of postnatally depressed and well mothers who had been assessed periodically from the early postpartum period, including teacher reports of their adjustment to school at 5 years, were assessed in a range of situations. These included direct observations of mother–child interactions and maternal reports of child behaviour problems at home. In addition, we investigated further the child's behaviour in school. In particular, we focused on the nature of the child's spontaneous play and social relationships, making observations of each child during a period of free play in the classroom.

As well as examining the association between these 5-year outcomes and postnatal depression, we were also concerned to identify the role of other aspects of family adversity (parental conflict, chronic social or economic difficulties, later maternal depression), both in terms of their direct effects on the child, but also in terms of their possible role in mediating any impact of the postnatal episode. In addition, since previous reports regarding the development of the children in this and, indeed, other similar samples, had shown social class and child gender to be important, the direct effects of these variables on child outcome were examined, as was their role in moderating the impact of postnatal depression. Finally, we sought to establish the extent to which earlier difficulties in the child's development associated with postnatal depression (i.e. insecure attachment and, in boys, poor cognitive functioning) may have contributed to later problems in the mother–child relationship and child outcome. Thus, where 5-year child outcomes showed the same pattern of association with postnatal depression as attachment and cognitive functioning in infancy, having taken other family difficulties into account, the issue was addressed of the extent to which functioning at 5 years may have been mediated by either of these earlier developmental routes.

Method

Sample

A representative community sample (N = 693) of primiparous mothers of full-term healthy infants was screened for depression using the Edinburgh Postnatal Depression Scale (J. L. Cox, Holden, & Sagovsky, 1987) at 6 weeks postpartum. Those women whose scores indicated probable depression were interviewed at 2 months using the Standard Psychiatric Interview (Goldberg, Cooper, Eastwood, Kedward, & Shepherd, 1970) to establish whether the mother had experienced an episode of depressive disorder meeting Research Diagnostic Criteria (Spitzer, Endicott, & Robbins, 1978) since delivery. Sixty-one women were identified as depressed, of whom 58 were recruited, along with 42 well women from the same postnatal population. Index and control groups did not differ according to child gender or social class (see Murray, 1992, for full details of recruitment). With few exceptions, the mothers and their
children were assessed again at 18 months and 5 years. At 18 months the quality of infant attachment to the mother was assessed, using Ainsworth’s Strange Situation (Ainsworth & Wittig, 1969), and cognitive development was assessed using the Bayley Scales of Mental Development (Bayley, 1969). The mother’s psychiatric history was also taken, using the Schedule for Affective Disorders and Schizophrenia Lifetime version (SADS-L; Endicott & Spitzer, 1978) covering the period since the previous interview (see Murray, Fiori-Cowley, et al., 1996, for full details of the data at 18 months). The numbers assessed at each point, and the characteristics of the sample, are set out in Table 1.

**Table 1 Sample Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Index</th>
<th>Control</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. recruited at 2 mths</td>
<td>58</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>No. assessed at 18 mths</td>
<td>56</td>
<td>42</td>
<td></td>
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<tr>
<td>No. assessed at 5 years</td>
<td>55</td>
<td>39</td>
<td></td>
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<tr>
<td>Proportion of boys</td>
<td>54%</td>
<td>47%</td>
<td>$\chi^2(1) = 0.39$</td>
</tr>
<tr>
<td>Social class I, II and III nonmanual</td>
<td>64%</td>
<td>67%</td>
<td>$\chi^2(1) = 0.76$</td>
</tr>
<tr>
<td>Age of child at assessment of mother–child interaction (months: SD)</td>
<td>60.3 (0.84)</td>
<td>60.5 (0.94)</td>
<td>$t(92) = 1.08$</td>
</tr>
<tr>
<td>Age of child at school assessment (months: SD)</td>
<td>60.8 (0.74)</td>
<td>60.9 (1.00)</td>
<td>$t(92) = 0.55$</td>
</tr>
<tr>
<td>Maternal depression in the 12 mths prior to 5-year assessment</td>
<td>24%</td>
<td>8%</td>
<td>$\chi^2(1) = 4.10^*$</td>
</tr>
<tr>
<td>Duration of depression in the 5 years postpartum (months: SD)</td>
<td>13.0 (11.54)</td>
<td>1.5 (3.40)</td>
<td>$t(66.6) = 6.99^{***}$</td>
</tr>
<tr>
<td>Chronic discord with child’s father at 5 years</td>
<td>44%</td>
<td>13%</td>
<td>$\chi^2(1) = 10.15^{**}$</td>
</tr>
<tr>
<td>Severe events/chronic difficulties at 5 years</td>
<td>36%</td>
<td>26%</td>
<td>$\chi^2(1) = 1.20$</td>
</tr>
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* $p < .05$; ** $p < .01$; *** $p < .001$.

**Five-year Assessment Procedure**

The mother and child visited the research unit together. Visits generally took place in the afternoon, after school. On arrival, the study procedures, including the video recording of the interaction, were explained to the mother, and mother and child were shown into a play room that was equipped with toys and various research materials. A researcher brought in a tray with various research materials. The mother and child were left to have the refreshment together for a 10-minute period before the researcher carried out various activities with the child. A video recording was made of the interaction from the adjoining room through a one-way mirror.

Following the refreshment, while the child completed a range of tasks with a researcher, the mother was interviewed. Her mental state was assessed, as was the quality of her relationship with the child’s father, and the occurrence of stressful events and chronic difficulties was recorded. The mother also completed a questionnaire concerning the child’s behaviour. Her consent to approach the child’s school to arrange an assessment was sought.

The children were assessed at school one term after school entry. Observations were made of the child in the classroom during a period of free play. This situation was chosen because it was common to all reception classes, and because it allowed maximum opportunity to observe the child’s social relationships and the quality and complexity of relatively unconstrained play. Children were observed for a 15-minute period by a researcher who was unaware of all other information collected concerning mother and child, including the mother’s postpartum and subsequent mental state.

**Measures**

**Mother–Child interaction.** Time-sampled ratings were made from the videotape using three ordinal scales (1–7), each of which was scored for five 2-minute periods. Scales for both maternal and child behaviour were based on the literature concerning similar mother–child interactions in this age group (e.g. Moss, Rousseau, Parent, St-Laurent, & Saintonge, 1998), and our analyses of earlier interactions in this sample (Murray, Fiori-Cowley, et al., 1996). Behaviour on each scale was computed as the mean score for the five 2-minute periods. The mother’s behaviour was scored on a scale of general sensitivity. This concerned the mother’s warmth and acceptance of the child, her sensitivity to the child’s perspective, and the degree to which she responded in a way that was appropriately adjusted to the child’s behaviour. These ratings were designed to take the child’s behaviour into account. Thus, a mother who managed a difficult child in an appropriate fashion, possibly needing to be firm with the child, could receive similar ratings of sensitivity to one who behaved quite differently with a child whose behaviour presented no problem.

Child behaviour was scored on two scales. The first measure was of the child’s responsiveness to the mother. This concerned the extent to which the child listened to the mother, responded to her communications, and complied with her suggestions or requests. The second measure was of the child’s sustained attention. This concerned the extent to which the child maintained focus of attention, and finished one activity before moving on to the next.

The videotapes were rated by two coders. They were unaware of maternal psychiatric state, either in the postpartum period or subsequently, and of any other data concerning the child. Following training, a random subsample of 10 tapes was scored by both coders: intraclass correlation coefficients for maternal sensitivity, child responsiveness, and sustained attention were $.94$, $.93$, and $.91$, respectively. Scores on the two child scales were highly correlated (Spearman rank correlation $= .83$), and they were therefore merged to give a measure of responsive, maintained engagement. Since the distribution of scores was skewed, logarithms were taken to give a normally distributed variable.

**Maternal depression.** Maternal psychiatric history was taken using the SADS-L. Episodes of major depressive disorder occurring since the previous administration of this interview at the 18-month assessment were recorded, along with the timing of onset and remission. This was used to confirm whether or not the child had been exposed to maternal depression within the previous 12 months and, together with information from the 18-
Variables were therefore simply treated as binary (i.e. the observations for each child, were highly skewed, and the distributions of these activities, based on the total number of – the free play session was 3 negative.

Approaches, the nature of their response—either positive or children and, for the subgroup of children who received such social relationships: (1) Social play. This consisted of play with other children. (3) Interacting with the teacher. In other three time-sampled behaviours concerned the children's physical rather than cognitive component, such as sand and play. This comprised low-level play activities with a strong exclusive, collectively exhaustive categories. The first three concerns individual, rather than social, play: (1) Structured activity. This concerned behaviour that was constrained, such as doing jigsaws, reading, tidying up, board games. (2) Physical play. This comprised low-level play activities with a strong physical rather than cognitive component, such as sand and water play, playing with bubbles, or gross motor play (jumping, climbing). (3) Creative play. This was always painting. The occurrences of such events and difficulties has been shown to be significantly associated with the onset and duration of depressive episodes (Brown & Harris, 1978). Those events and chronic difficulties occurring within the 12-month period prior to the interview that were classified as severe in the LEDS system were recorded. In addition, it was felt desirable to have a measure of those aspects of parental functioning that have been found to be most detrimental to child outcome, i.e. the child's direct exposure to parental discord, particularly overt aggression, and whether or not the child was a focus of conflict (Jenkins & Smith, 1991). This information was also obtained in the context of the LEDS interview, using specific probes to determine the nature of the child's experience, and note was taken of the occurrence of conflict within the preceding 12 months that involved either the child's exposure to overt aggression, or that was focused on the child. A number of parents had separated by the time of the 5-year assessment (all eight in the index group); contextualised LEDS ratings were made of any difficulties these mothers experienced with the child's father, and the same criteria concerning child exposure were applied.

Maternal reports of child behaviour. Mothers completed the Rutter A2 questionnaire (Rutter et al., 1970). This measure yields three scales, a general measure of behavioural disturbance from the total score, and two subscales concerning neurotic and antisocial behaviour. The questionnaire has been widely used in research; it has been found to be reliable, and is a valid screen for child psychiatric disorder (Rutter et al., 1970).

Child behaviour in school. Time-sampled ratings were made of the children's behaviour during free play in school, following the system developed by Sylva and colleagues (Sylva, Roy, & Painter, 1980). For each 30 seconds the child's principal activity, or the theme of their play, was noted, using six mutually exclusive, collectively exhaustive categories. The first three concerned individual, rather than social, play: (1) Structured activity. This concerned behaviour that was constrained, such as doing jigsaws, reading, tidying up, board games. (2) Physical play. This comprised low-level play activities with a strong physical rather than cognitive component, such as sand and water play, playing with bubbles, or gross motor play (jumping, climbing). (3) Creative play. This was always painting. The other three time-sampled behaviours concerned the children's social relationships: (1) Social play. This consisted of play with other children, including social pretend play. (2) Passively watching other children. (3) Interacting with the teacher. In addition to these ratings, two events were recorded, namely, the occurrence of friendly approaches to the study child by other children and, for the subgroup of children who received such approaches, the nature of their response—either positive or negative.

The mean number of activities the children engaged in during the free play session was 3.4 (SD 1.0). Some themes, or activities, were shown by few children: for example, only 20 children engaged in physical play (21.5%), 24 (25.8%) did painting, and 38 (40.9%) interacted with the teacher. In addition, the distributions of these activities, based on the total number of observations for each child, were highly skewed, and the variables were therefore simply treated as binary (i.e. the

Results

Overview of Data Analysis

A number of approaches were employed, following the procedures outlined by Baron and Kenny (1986). First, in order to inform the inclusion or otherwise of potential mediating variables in the main multivariate analyses, the distributions of the variables were examined, and univariate correlational analyses were performed concerning the associations between postnatal depression and the measures of later maternal and family difficulties. Any mediator variables excluded from the multivariate analyses (see below) were examined in further univariate correlations in relation to the mother and child outcomes to ensure that their significance was not neglected. Logistic and multiple regressions were then used to investigate the effects of the remaining measures on the mother and child outcomes, together with the moderating effects of social class and child gender, and the mediating effects of recent and chronic adversity. Finally, where relevant, further regressions were carried out to determine whether aspects of infant development at 18 months mediated the association between postnatal depression and 5-year outcome.

Sample Characteristics at 5 Years

Women who were postnatally depressed were more likely than control group women to have experienced depression within the 12-month period prior to the 5-year assessment, and the overall duration of depression during the child's lifetime was longer. In addition, index group women were more likely than controls to experience conflict with the child's father, although the rates of other chronic difficulties and severe events did not differ between the two groups (see Table 1).

Identification of Mediating Variables for Multivariate Analyses

The distribution of the measure of chronicity of maternal depression (i.e. the number of months depressed in the 5-year period) was highly skewed due to the substantial number of women who had not experienced any depression (N = 29). This measure was, as a consequence, confounded with the occurrence of postnatal depression, and as such it could not be included in the multivariate analyses. In fact, when maternal and child outcomes were examined in univariate analyses in relation to the overall duration of the disorder in the 5-year period (among those who had experienced depression), no significant associations were found. The distributions of the remaining variables were unproblematic.
association with postnatal depression, and this variable was, therefore, excluded; univariate analyses revealed no relationship between this measure and maternal and child outcomes.

**Multivariate Analyses**

Data analysis then proceeded as follows. First, main effects of postnatal depression, child gender, and social class were examined, and the interactions of social class and gender with postnatal depression subsequently added to test for moderating effects [denoted as (a) in Tables 3–5]. In the second phase we examined main effects of current and recent adversity (i.e. maternal depression and parental conflict), social class and gender, and subsequently the moderating effects on recent depression and parental conflict of class and gender were tested by adding interaction terms. For the measure of the child’s behaviour with the mother, maternal sensitivity was also included in these analyses [denoted as (b) in Tables 3–5]. In instances where both current factors and postnatal depression appeared to be of relevance, further regressions were conducted in which these variables were considered together in order to determine whether the influence of more recent difficulties mediated the association between postnatal depression and mother and child outcome [denoted as (c) in Tables 3–5]. Finally, where relevant, further simultaneous regressions were conducted to test for partial moderation.
used to address the question whether the quality of infant attachment to the mother, or performance on the Bayley Scales of Mental Development at 18 months, mediated any effects of postnatal depression. The results of these analyses are shown in Tables 3–5.

**Mother–Child Interaction**

The results of the analyses of the mother–child interaction are shown in Table 3. Maternal sensitivity to the child at 5 years was unrelated to the experience of postnatal depression, either directly or in interaction with family social class and child gender. Similarly, no influence of recent depression on maternal behaviour was apparent. However, there was a significant effect of conflict with the child’s father, with mothers who were in conflictual relationships being significantly less sensitive than those who were not (M = 3.77, SD = 0.94; M = 4.34, SD = 0.98 respectively).

The child’s behaviour was, not surprisingly, strongly related to the quality of the mother’s communication, with children whose mothers were sensitively adjusted to the child’s agenda being more responsively engaged. Having taken the mother’s behaviour into account, the child’s behaviour was found to be significantly associated with maternal postnatal depression, children of index mothers being less responsively engaged than were controls (M = 8.38, SD = 2.29; M = 9.29, SD = 1.91, respectively). When current and recent family influences other than the mother’s communication were examined, no effects were found.

Having identified a link between postnatal depression and the child’s behaviour with the mother at 5 years, we then addressed the issue of whether aspects of development in infancy may have mediated this association. In fact, the question of mediating effects arose only in relation to infant attachment which, unlike infant outcome on the Bayley Mental Development Index, had shown a direct effect of postnatal depression (Murray, Fiori-Cowley, et al., 1996). This association, and the subsequent steps in the test of the mediating effects of attachment, are shown in Fig. 1. Thus, the association between infant attachment status at 18 months and the child’s subsequent behaviour with the mother at 5 years was found to be significant, with children who had been insecure as infants being less responsively engaged at 5 years than those who were secure. In the final step of this test of the mediating effect of attachment, the child’s behaviour with the mother was considered in relation to both attachment and postnatal depression: only the effect of attachment remained significant, indicating that the impact of postnatal depression on child responsiveness was, indeed, mediated by insecurity in infancy.

**Maternal Reports of Child Behaviour**

Scores on the Rutter A2 scales were skewed. A normal distribution was achieved for the total score by means of a square root transformation. Scores on the neurotic and antisocial subscales were not amenable to transformation. Since these subscales were highly correlated with the total score (r = .70, p < .001; r = .77, p < .001, respectively), the latter scale alone was used in the multivariate analyses. (Fathers were also asked to complete Rutter A2 scale questionnaires, and these were obtained for 78 [83%] of the children. The correlations between father and mother scores were high: .70 for the total score, .63 for the neurotic subscale, and .73 for the antisocial subscale, indicating the maternal reports were reliable.)

The results of the multivariate analyses of the Rutter Scale Total scores are shown in Table 4. Maternal reports of the child’s behaviour at home showed a strong effect of postnatal depression: those who had been depressed reported significantly higher levels of disturbance than well mothers. Total scores were M = 13.55 (SD = 6.35) and M = 8.77 (SD = 4.44) for index and control groups respectively. No effects of social class or child gender were apparent. Univariate analyses also showed a significant effect of postnatal depression on both subscales; neurotic scores were, for the index and control groups respectively, M = 3.18, SD = 1.72 and M = 1.90, SD = 1.43 (Z = −3.67, p < .001), and antisocial scores were M = 1.82, SD = 1.70 and M = 1.13, SD = 1.22 (Z = −2.15, p < .05). Half (50.9%) of the index group children scored above the cutoff used to define clinically significant levels of disturbance (scores > 12), compared to only 15% of control children (χ² = 11.0, p < .001). Five children, all from the index group, had been referred for psychiatric or psychological treatment.

The second phase of analysis showed an effect of parental conflict, with mothers who were in conflictual relationships reporting higher rates of behaviour difficulty than those who were not (M = 14.03, SD = 7.90; and M = 10.46, SD = 4.75, respectively). There was no evidence, however, that this effect of parental conflict accounted for the association between postnatal depression and child behaviour, as when Rutter scale scores were regressed on postnatal depression and parental conflict simultaneously, the effect of the latter ceased to be significant, whereas that of postnatal depression remained. Having established, therefore, that the occurrence of postnatal depression gave the best account of the presence of behavioural difficulty at 5 years, the
question was addressed whether infant insecurity of attachment may have mediated this association. Scores on the Rutter A2 scale were therefore examined in relation to infant attachment status, but no association was found.

**Child Behaviour in School**

The results of the analyses of the children’s play are set out in Table 5. With regard to the children’s nonsocial activities, play with structured materials showed no effects of maternal depression or parental conflict, and nor were there effects of these variables that were moderated by social class or gender. The other two individual play activities, physical and creative play, did show effects of family experiences. Thus, the occurrence of low-level, physical play was significantly related to postnatal depression, with index children being more likely to engage in this kind of play than controls (31% and 8% respectively). A similar effect of recent or current maternal depression was evident (43% exposed children engaged in physical play, compared to 17% of those who were not exposed). Nevertheless, there was no evidence that this effect of the child’s recent exposure accounted for the association between the postnatal episode and the occurrence of low-level physical play: when recent and postnatal depression were considered simultaneously in relation to physical play, only the latter was significant. The occurrence of individual creative play was also associated with postnatal depression, as well as with family social class: index mothers’ children were significantly less likely to engage in this kind of play than controls (14% and 42% respectively), as were children from lower-class, compared to middle-class, families (9% and 35%). No effects on creative play of recent maternal depression or parental conflict, either alone or in interaction with class and gender, were apparent.

With regard to the children’s social interactions, whether or not they engaged at all in social play with other children, or received friendly approaches for play, was unrelated to any of the independent variables. However, for those children who received friendly approaches from others, the quality of responsiveness differed according to whether or not the mother had experienced postnatal depression, with index children being more likely to respond negatively (in fact, none of 28 control group children who received friendly approaches did so, compared to 9 of the 30 index children). There were no significant effects of recent

---

### Table 4

*The Relationship between Maternal Reports of Child Behaviour at 5 Years and Postnatal Depression, Gender, Social Class, Parental Conflict, and Recent Maternal Depression*

<table>
<thead>
<tr>
<th>Predictors and moderators</th>
<th>b</th>
<th>SE (b)</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postnatal depression (PND)</td>
<td>0.71</td>
<td>0.17</td>
<td>0.41***</td>
</tr>
<tr>
<td>Gender</td>
<td>0.01</td>
<td>0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Class</td>
<td>0.00</td>
<td>0.18</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>R² = 0.17</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Moderating effects</th>
<th>b</th>
<th>SE (b)</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender*PND</td>
<td>-0.37</td>
<td>0.34</td>
<td>-0.20</td>
</tr>
<tr>
<td>Class*PND</td>
<td>0.26</td>
<td>0.36</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>ΔR² = 0.04, F(2,88) = 0.92</strong></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictors and moderators</th>
<th>b</th>
<th>SE (b)</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental conflict (PC)</td>
<td>0.44</td>
<td>0.20</td>
<td>0.24*</td>
</tr>
<tr>
<td>Recent depression (RD)</td>
<td>0.29</td>
<td>0.24</td>
<td>0.13</td>
</tr>
<tr>
<td>Gender</td>
<td>0.02</td>
<td>0.18</td>
<td>0.01</td>
</tr>
<tr>
<td>Class</td>
<td>-0.09</td>
<td>0.19</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>R² = 0.08</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Moderating effects</th>
<th>b</th>
<th>SE (b)</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender*PC</td>
<td>-0.27</td>
<td>0.40</td>
<td>-0.12</td>
</tr>
<tr>
<td>Class*PC</td>
<td>-0.17</td>
<td>-0.42</td>
<td>-0.07</td>
</tr>
<tr>
<td>Gender*RD</td>
<td>-0.42</td>
<td>0.52</td>
<td>-0.16</td>
</tr>
<tr>
<td>Class*RD</td>
<td>-0.69</td>
<td>0.49</td>
<td>-0.21</td>
</tr>
<tr>
<td><strong>ΔR² = 0.04, F(4,85) = 0.92</strong></td>
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<table>
<thead>
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<th>Predictor and mediator</th>
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<th>SE (b)</th>
<th>β</th>
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<tr>
<td>Parental conflict</td>
<td>0.24</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td>Postnatal depression</td>
<td>0.64</td>
<td>0.18</td>
<td>0.37***</td>
</tr>
<tr>
<td><strong>R² = 0.18</strong></td>
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</table>

+ p ≤ .1; * p ≤ .05; ** p ≤ .01; *** p ≤ .001.
Table 5
The Relationship between Child Behaviour During Free Play at School and Postnatal Depression, Gender, Social Class, Parental Conflict, and Recent Maternal Depression

<table>
<thead>
<tr>
<th></th>
<th>Physical</th>
<th></th>
<th>Positive response to friendly approaches (N = 58)</th>
<th>Creative</th>
<th></th>
<th>Passive watching</th>
<th>Interacting with the teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE (b)</td>
<td>Wald^p</td>
<td>b</td>
<td>SE (b)</td>
<td>Wald</td>
<td>b SE (b)</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Postnatal depression (PND)</td>
<td>1.70</td>
<td>0.68</td>
<td>6.28**</td>
<td>-2.64</td>
<td>0.55</td>
<td>8.97**</td>
<td>0.19</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.35</td>
<td>0.54</td>
<td>0.42</td>
<td>-1.79</td>
<td>1.05</td>
<td>2.93^</td>
<td>0.76</td>
</tr>
<tr>
<td>Class</td>
<td>0.79</td>
<td>0.54</td>
<td>2.17</td>
<td>-1.13</td>
<td>0.98</td>
<td>1.33</td>
<td>-1.77</td>
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<td></td>
<td></td>
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<tr>
<td>(b) Predictors and moderators</td>
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<td></td>
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<tr>
<td>Parental conflict (PC)</td>
<td>0.74</td>
<td>0.56</td>
<td>1.80</td>
<td>-1.45</td>
<td>0.86</td>
<td>2.88^</td>
<td>-0.77</td>
</tr>
<tr>
<td>Recent depression (RD)</td>
<td>1.31</td>
<td>0.64</td>
<td>4.22*</td>
<td>-0.75</td>
<td>0.90</td>
<td>0.71</td>
<td>-0.38</td>
</tr>
<tr>
<td>Gender</td>
<td>0.49</td>
<td>0.56</td>
<td>0.76</td>
<td>-1.54</td>
<td>0.94</td>
<td>2.67</td>
<td>0.66</td>
</tr>
<tr>
<td>Class</td>
<td>-0.53</td>
<td>0.55</td>
<td>0.91</td>
<td>-0.21</td>
<td>0.89</td>
<td>0.06</td>
<td>-1.53</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Predictor and mediator</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Parental conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent depression</td>
<td>1.08</td>
<td>0.61</td>
<td>3.12^</td>
<td>-0.79</td>
<td>0.83</td>
<td>0.90</td>
<td>1.49</td>
</tr>
<tr>
<td>Postnatal depression</td>
<td>1.49</td>
<td>0.68</td>
<td>4.81^</td>
<td>-2.43</td>
<td>0.55</td>
<td>8.97**</td>
<td>0.19</td>
</tr>
</tbody>
</table>

* For some of the parameter estimates, the Wald statistic was replaced by a p-value of an exact test due to zero cells. Interactions involving these factors were not computed.
* p ≤ .1; * p ≤ .05; ** p ≤ .01; *** p ≤ .001.

Moderating effects

Gender*PND
Class*PND

ADev. $\chi^2(2) = 5.93^*$

$\Delta Dev. \chi^2(2) = 2.56$

$\Delta Dev. \chi^2(2) = 0.80$

$\Delta Dev. \chi^2(2) = 4.67$

Moderating effects

Gender*PC
Class*PC
Gender*RD
Class*RD

ADev. $\chi^2(2) = 3.83$

$\Delta Dev. \chi^2(2) = 4.79$

$\Delta Dev. \chi^2(2) = 7.76$

$\Delta Dev. \chi^2(2) = 8.52^*$

$\Delta Dev. \chi^2(2) = 10.18^*$

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depression or parental conflict, or of social class and gender, on the nature of children’s social responses. Passively watching while other children played was not associated with postnatal depression, but a possible effect of recent depression, moderated by social class, was indicated: thus, among children who had been exposed to recent maternal depression, a high proportion of those from lower-class families (86%) spent time passively watching others, whereas less than half of those from middle-class families did so (44%). For children whose mothers had not been depressed within the previous 12 months, the proportions of children passively watching in the two social class groups were similar (69% and 74% for children from lower- and middle-class families respectively).

Finally, interacting with the teacher was not associated with postnatal depression; however, there was an effect of parental conflict that was moderated by social class. For children whose parents were in conflict, social class differences were marked, with very few children from lower-class families engaging socially with their teacher compared to those from middle-class families (7% and 71% respectively). The number of children having contacts with the teacher among those who were not exposed to conflict did not, by contrast, vary by social class (33% and 46% for lower- and middle-class groups, respectively).

Those aspects of the children’s play that were associated with postnatal depression (i.e. physical and creative play, and the response to social approaches) were then examined to determine whether the quality of attachment to the mother at 18 months may have meditated these associations. In each case, when the children’s behaviour was considered in relation to attachment status, no significant association was found. (Although IQ at 18 months was not directly associated with postnatal depression, and could not therefore be examined as a potential mediator variable, we thought it prudent to rule out its influence, and that of IQ at 5 years, on these aspects of the children’s play. In correlational analyses [point biserial] no association was found between IQ at either age and the children’s creative or physical play, or their response to other children.)

**Discussion**

The relationship between a lifetime history of depression in the mother and behavioural difficulties in the offspring is well established (see Cummings & Davies, 1994; Downey & Coyne, 1990, for reviews). However, the question of the influence of postnatal depression on later child adjustment has received little attention. The results of the current study of a low-risk community sample indicate that a number of aspects of child behaviour at age 5 are related to the occurrence of maternal depression in the early postpartum months. Thus, diminished responsiveness in the child’s interaction with the mother, the presence of behavioural disturbance at home, and aspects of the content and social patterning of play at school all showed significant associations with the mother’s postpartum experience, even when taking into account current circumstances likely to impinge on child adjustment (i.e. the occurrence of recent maternal depression and marked conflict between the child’s parents). These associations with postnatal depression occurred independently of the child’s gender and family social class. None of these effects of postnatal depression on 5-year child outcome was explained by earlier impairments in cognitive functioning, and insecurity of attachment in infancy explained only the child’s relationship with the mother at 5 years.

Maternal functioning, by contrast, assessed during an interaction with the child, showed no relationship to postnatal depression, but was related to the presence of current difficulties, namely the presence of conflict with the child’s father. This is consistent with findings of other studies of similar samples (Caplan et al., 1989; Ghodsian et al., 1984; Stein et al., 1991).

The association between insecure attachment in infancy and child behaviour with the mother at 5 years was not surprising: the great majority of insecurely attached infants in this sample had shown an avoidant pattern (Murray, 1992), and the continuity in the associated lack of responsiveness and sustained engagement in the child’s interaction with their mother is unremarkable. The relative failure to engage in interactions on the part of children of previously depressed mothers has also been reported by A. D. Cox, Puckering, Pound, and Mills (1987). In this latter study, as in the current one, maternal depression was associated with later child unresponsiveness, even in cases where the mother’s behaviour had shown some recovery.

In contrast, the strong association between postnatal depression and the level of reported child disturbance at home was not mediated by the quality of infant attachment. This lack of association between attachment and behavioural disturbance in the home has been reported in several studies (Bates & Bayles, 1988; Bates, Maslin, & Frankel, 1985; Fagot & Kavanagh, 1990). There are a number of reasons why this may be the case. First, the child’s attachment system may not be specifically challenged in the home environment. Alternatively, it may be that many avenues are open to the child for the expression of insecurity, particularly of the avoidant type, in behaviours that bear no relation to the symptoms of disturbance assessed in the maternal reports, but which are, in that particular context, adaptive (Greenberg et al., 1993). For example, an avoidant child may become an avid bookworm. Finally, it is possible that, in the home environment, more extreme disturbances in the parent–child relationship than those associated with insecurity are required to provoke significant behaviour disturbance. The association between postnatal depression and adverse child outcome, without the mediation of attachment, raises the question of the process by which child disturbance arises. It is well established that the early mother–infant relationship in the context of postnatal depression is characterised by raised levels of maternal hostility and a failure to acknowledge infant autonomy (Field, 1992), even in low-risk samples (Murray et al., 1993). It seems possible that, despite the mother’s subsequent recovery from depression, these initial attitudes to the infant may set up a cycle of particularly marked difficulties that come to influence the subsequent behaviour of the child. This conclusion is consistent with the research of Field and
colleagues, who report postpartum depressed mothers' early perceptions of their infants to be more negative than those of independent observers, and to show considerable continuity throughout the preschool years (Field, Morrow, & Adlestein, 1993; Bendell et al., 1994).

A notable feature of the postnatally depressed mothers' reports of child disturbance at homes is the absence of any effect of child gender or family social class. This finding contrasts markedly with the pattern of results of teacher reports for this sample, where the boys, but not girls, of postnatally depressed mothers were seen to be disturbed, particularly in the context of low social class (Sinclair & Murray, 1998). There were, however, systematic consistencies between mothers' and teachers' perceptions (assessed by the Rutter A2 scale and the Preschool Behaviour Check List—PBCL; McGuire & Richman, 1988—respectively). Thus, with only one exception, where mothers saw no difficulty (Rutter scale score < 13), teachers also perceived the child to be unproblematic (PBCL score < 13). Similarly, where teachers perceived a problem, in all but one case mothers did so too. Discrepancies principally arose because mothers experienced the child's behaviour as problematic at home, whereas teachers saw the child as well adjusted. This applied to girls, regardless of social class, and to middle-class boys. One possibility is that teacher perceptions may be biased by child gender and social class (Rutter et al., 1970). Alternatively, it is possible that girls and middle-class boys, in spite of experiencing difficulties at home, may nevertheless have developed the capacity to regulate their behaviour flexibly, and respond in an acceptable way to the very different demands placed on them by their teacher. This suggestion is supported, at least with regard to the adjustment of girls, by research on early gender differences in self-regulation (Weinberg, Tronick, Cohn, & Olson, 1999), and the research of Zahn-Waxler and colleagues on the ability of girls, but not boys, of depressed mothers to adapt their behaviour in a compliant and conforming manner in demanding circumstances (Zahn-Waxler, 1993).

The processes that mediate the link between postnatal depression and the child's free play in school are not entirely clear. A number of features characterise the kind of play shown preferentially by children from the control group (i.e. creative, art play). For example, as Sylva and colleagues have outlined (Sylva et al., 1980), art is typically associated with prolonged concentration, and is a high yield activity with a definite objective that may entail a number of subgoals. As such, it offers the possibility of a sense of accomplishment, but conversely, entails the risk that it may not “come off”. These characteristics are generally entirely lacking in the preferred physical mode of play of the index children, which included both gross motor activities as well as sand and water play. These types of play are often motivated by desire for the pleasure of the physical experience itself, and have little thread or cohesion; and opportunities for planning, elaboration, feedback, and correction are all minimal. One possibility is that the higher rates of more simple physical play, and the corresponding avoidance of more personally challenging creative play in the index children reflects a relative lack of sense of self-agency. Such a deficit can also be hypothesised to underpin the relative failure of the index children to respond to others' social initiatives. Preliminary analysis of the narratives of a subsample of the study population indicate that the children exposed to postnatal depression, as well as to more prolonged maternal depression have, by age 5, developed schemas in which the sense of self-agency is reduced, and self-negation is increased (Barnard, Scott, & Murray, 1999). It is notable that, therapeutically, in attempts to foster a more robust sense of self-agency in children who are very disturbed, active use is made of play involving immediate physical experience, such as sand or water play, before attempts are made to encourage the child to express themselves at a more demanding representational level, for example through painting or interpersonal discourse (Axline, 1990).

In summary, the results of the present study suggest that depression in the early postpartum months and associated disturbances in the mother–infant relationship can pose a risk to the longer-term behavioural and social development of the child. Although few of the index children had received a psychiatric referral, given the evidence of the stability of early behavioural difficulties, particularly those manifest in poor school adjustment, and their association with eventual adverse educational and social outcomes (Belsky & MacKinnon, 1994; Bennett et al., 1998; Campbell, Pierce, Moore, Mardkovitz, & Newby, 1996; Farrington & West, 1990), these findings present a strong case for early detection and intervention with postpartum populations.

Acknowledgements—This research was supported by the Tedworth Charitable Trust. Lynne Murray was supported by a Medical Research Council Senior Fellowship. We thank Alison Hipwell and Siri Robling for their assistance with data collection and coding mother–child interactions, respectively, and Matt Woolgar for helpful comments on the manuscript.

References


Manuscript accepted 21 May 1999