

**ATTACHMENT RG 9**

This is the attachment marked "**RG 9**" referred to in the witness statement of Rebecca Giallo dated 7th July 2015.

# Maternal postnatal mental health and later emotional–behavioural development of children: the mediating role of parenting behaviour

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## Abstract

**Background** Maternal postnatal mental health difficulties have been associated with poor outcomes for children. One mechanism by which parent mental health can impact on children’s outcomes is via its effects on parenting behaviour.

**Method** The longitudinal relationships between maternal postnatal distress, parenting warmth, hostility and child well-being at age seven were examined for 2200 families participating in a population-based longitudinal study of Australian children.

**Results** The relationship between postnatal distress and children’s later emotional–behavioural development was mediated by parenting hostility, but not parenting warmth, even after accounting for concurrent maternal mental health. Postnatal distress was more strongly associated with lower parenting warmth for mothers without a past history of depression compared with mothers with a past history of depression.

**Conclusions** These findings underscore the contribution of early maternal well-being to later parenting and child outcomes, highlighting the importance of mental health and parenting support in the early parenting years. Implications for policy and practice are discussed.

## Keywords

child well-being, mothers, parenting, postnatal distress

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## Introduction

Maternal mental health difficulties in the first year post partum have been associated with poor developmental outcomes for children (Murray *et al.* 1999; Grace *et al.* 2003; Halligan *et al.* 2007). One pathway by which mental health may impact upon children’s outcomes is via its effects on parenting. While there is clear cross-sectional evidence for these associations (i.e. McLearn *et al.* 2006), studies examining the longer-term impact of postnatal distress on parenting and child outcomes are scarce. Therefore, the present study sought to investigate whether parenting behaviour mediates the relationship between postnatal distress and psychosocial outcomes for children at age seven in a large sample of mothers participating in Growing Up in Australia: Longitudinal Study of Australian Children (LSAC).

## Postnatal mental health and child outcomes

Estimates of postnatal mental health difficulties are high with 13% of women affected by depression (O’Hara & Swain 1996) and 17% by anxiety (Yelland *et al.* 2010). Postnatal distress can be long lasting for many women, with an Australian study reporting that 56% of 127 mothers experienced persistent depressive symptoms for 1–4 years following depression during the first year post partum (McMahon *et al.* 2008). This is of concern as postnatal depression has consistently been associated with a range of negative outcomes for both mothers and their children (Scottish Intercollegiate Guidelines Network 2002).

Maternal depression can have short-term effects on infant development. A review of 13 studies reported small effects of postnatal depression on cognitive development (Grace *et al.*

2003) and others have reported problems with insecure infant attachment (Murray 1992; Teti *et al.* 1995). The impact is enduring for some children, with longitudinal studies demonstrating that postnatal depression is associated with later child psychosocial problems. A study of 146 women reported that the risk of emotional or behavioural disorders at age 11 was four times greater for children of postnatally depressed mothers compared with non-depressed mothers (Pawlby *et al.* 2008). This study, however, did not account for concurrent maternal depression when 11-year outcomes were assessed.

The relationship between postnatal depression and subsequent child outcomes is less clear when accounting for concurrent mental health and contextual factors that may contribute to children's difficulties. Sinclair and Murray (1998) found that although postnatal depression was associated with children's school adjustment at age five, socio-economic status and recent maternal depression were stronger predictors of child outcomes. In contrast, in a clinical sample of 53 mothers, postnatal depression was not associated with depression during adolescence after accounting for concurrent maternal mental health (Halligan *et al.* 2007). While the impact of postnatal depression may vary by child age or outcomes of interest, these findings are based on small clinical samples, raising concerns about their broader generalizability. To date, one study with a representative community sample of 693 mothers found that, after controlling for concurrent mental health and parental conflict, postnatal depression remained a strong significant predictor of children's behaviour difficulties at age five (Murray *et al.* 1999). Further work with large population-based longitudinal studies is needed, along with research to understand how postnatal distress is associated with emotional and behavioural difficulties for children later in the childhood period.

### Pathways between postnatal mental health and child outcomes: the role of parenting

A theoretical framework for guiding research into the mechanisms by which postnatal distress affects children's emotional and behavioural development has been offered by Goodman and Gotlib (1999), who posit that there are three mediating and transactional pathways. The first pathway draws upon on a biological and bio-developmental theories of child development. It focuses genetic influences, prenatal vulnerabilities, and early experiences of adversity that affect children's developing brain via the overactivation of the biological systems responsible for stress, ultimately predisposing them to poor developmental outcomes (Shonkoff 2010). The second mechanism is via psychosocial pathways, that is, the influence of the family environ-

ment, in particular parent-child interactions and parenting behaviours, in shaping children's development. Via this pathway, postnatal mental health difficulties may directly interfere with the development of optimal parenting behaviours such as responsiveness to child cues, warmth, affection, and the provision of age-appropriate learning activities, that ultimately promote children's social, emotional and behavioural development. The final mechanism focuses on structural or contextual variables such as socio-economic disadvantage that may adversely affect parent stress, psychological functioning, family access to resources and child well-being. According to Goodman and Gotlib, these broad contextual influences may also moderate other biological, developmental and family pathways of influence. Our focus here is on the second pathway posed by Goodman and Gotlib, the influence of the family environment on children's development. Specifically, we investigate the relationship between postnatal distress on subsequent children's outcomes via the potential mediating pathway of parenting behaviours and parent-child interactions. We also assess the moderating influences of socio-economic disadvantage, child gender and past history of maternal depression.

To date, several cross-sectional population-based studies have shown that compared with non-depressed mothers, depressed mothers are less responsive and sensitive to their baby's cues (Gelfand & Teti 1990), and less likely to breastfeed, follow routines, and engage in early learning activities such as reading within the first year post partum (McLearn *et al.* 2006; Paulson *et al.* 2006). Although depression may influence the accuracy of self-reports, a meta-analysis of 46 observation studies also found that depressed mothers engaged and played less with their baby and displayed less warmth than non-depressed mothers within 3 months post partum (Lovejoy *et al.* 2000).

Warm parenting behaviours such as displays of affection, acceptance and responsiveness (Waylen & Stewart-Brown 2009) have been associated with a range of positive cognitive, behavioural, emotional and physical outcomes for children across the early childhood period (Dallaire & Weinraub 2005; Landry *et al.* 2006). Specifically, a lack of maternal warmth has been associated with externalizing behaviours among boys (Blatt-Eisengart *et al.* 2009), suggesting that pathways between parenting behaviour and child outcomes are moderated by child gender. Maternal depression has also been associated with increased harsh, angry and frustrated reactions such as yelling at the child during infancy (Gelfand & Teti 1990; Cornish *et al.* 2006), which are also known risk factors for externalizing behaviour difficulties, poor academic achievement, and poor physical health among children and adolescents (Patterson *et al.* 1989; Low & Stocker 2005).

Despite well-established cross-sectional associations between parent mental health, parenting and child outcomes, studies examining the relationship between parent mental health in the postnatal period and later parenting difficulties are scarce. In a study of 3412 mothers, depression at 2–4 months post partum was associated with less play, reading and talking to their children at 30–33 months, even when accounting for concurrent mental health (McLearn *et al.* 2006). Similarly, a study with 4109 fathers revealed that depressive symptoms at 9 months post partum was associated with decreased reading and learning activities and children's language development at 2 years of age (Paulson *et al.* 2009). Taken together, these studies suggest that the postnatal period may be a critical time when mental health interferes with the development of positive parenting behaviours important for children's optimal development.

Few studies, however, have investigated whether parenting behaviour specifically mediates the relationship between postnatal mental health and later child outcomes. One Australian study of 40 women in an inpatient mother–baby setting found that the effects of postnatal depression on cognitive deficits for children aged 3.5 years were mediated by maternal responsiveness at 6 months post partum (Milgrom *et al.* 2004). In contrast, a study of 164 mothers found that the relationship between depression at 14 months post partum and child behaviour problems at age 3.5 years was not mediated by lack of expressiveness or disengagement with the child, but rather by parenting stress, relationship difficulties, and limited social support (Dawson *et al.* 2003). Given that research to date has produced

mixed findings and is based on small samples, replication with larger representative samples is needed, along with research into the mediating role of other parenting behaviours such as warmth and hostility.

### Aims of the study

Using data from the LSAC, the aim of the study was to investigate whether parenting warmth and hostility mediates the longitudinal relationship between maternal postnatal distress and psychosocial outcomes for children at age seven after accounting for concurrent maternal psychological distress (see Fig. 1). It was hypothesized that postnatal distress would be associated with lower parenting warmth and higher parenting hostility when the children were aged seven, and that these in turn would be associated with higher emotional and behavioural difficulties in children. The second aim was to assess whether child gender, past history of maternal depression, and socio-economic position moderated any of the pathways between maternal psychological distress, parenting, and child outcomes.

### Method

#### Study design and sample

Data were drawn from waves one and four of the LSAC infant cohort. Study design information is detailed elsewhere (Soloff *et al.* 2005); however, in brief, a two-stage sample design was

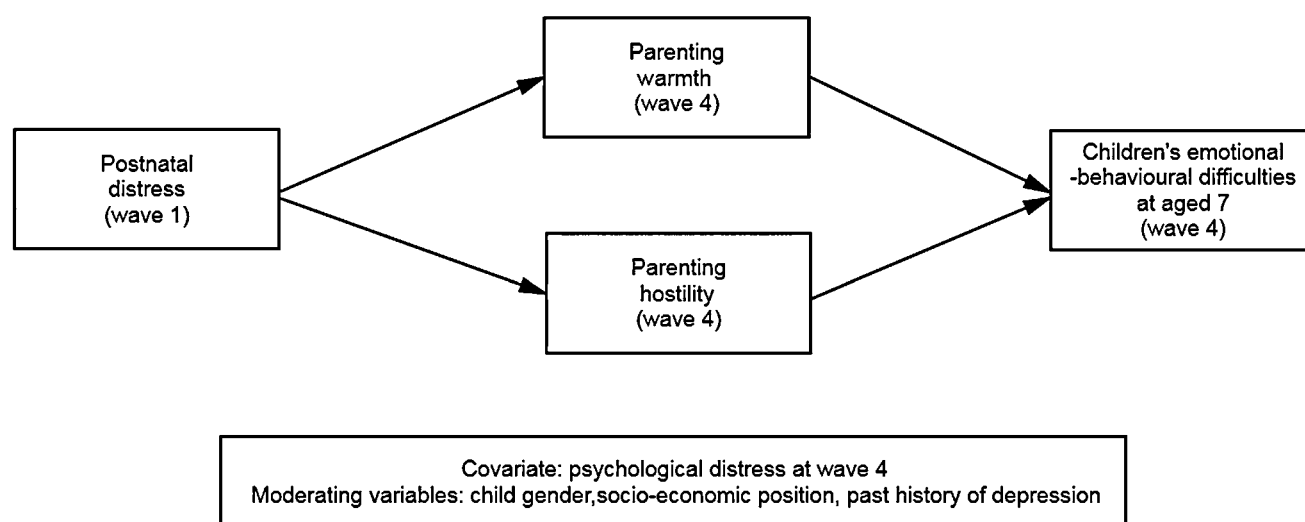


Figure 1. Hypothesized conceptual model.

used. Approximately 10% of all postcodes were selected, and then a number of children proportional to population size were randomly selected from each postcode using the Medicare database. The infant cohort at wave 1 consisted of 5107 infants aged 3–12 months. Children with more highly educated parents were over-represented, while single parent, non-English speaking families, and those living in rental properties were under-represented. The cohort was reassessed when children were aged 2–3, 4–5, and 6–7 years. The sample for the present study consisted of biological mothers, who participated in all waves and had less than 20% missing data.

## Measures

*Mental health* was assessed at wave 1 and wave 4 using the Kessler-6 (K6; Kessler *et al.* 2003), which measures symptoms of nervousness, hopelessness, restlessness and sadness in the last 4 weeks. The K6 has been used in national surveys because of its brevity, strong psychometric properties, and ability to identify mood and anxiety disorders against DSM-IV criteria (Furukawa *et al.* 2003). The six items, rated on a 5-point scale, were summed with higher scores indicating greater distress.

*Parenting warmth* was assessed at wave 4 using five items from the Child Rearing Questionnaire (Paterson & Sanson 1999). Mothers indicated how often they express warmth toward their child (e.g. ‘Hug or hold this child for no particular reason’) on a 5-point scale. Scores were summed, with higher scores indicating greater warmth.

*Parenting hostility* was measured at wave 4 using six items from the National Longitudinal Survey of Children (Statistics Canada 1995). Mothers rated how often they experience irritability and anger during interactions with the study child (e.g. ‘How often are you angry when you punish this child?’) on a 5-point scale. Items were summed with higher scores indicating greater irritable parenting behaviour.

*Child behavioural and emotional problems* were measured at wave 4 using mother report on the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997). The SDQ Total Difficulties scale is comprised of 20 items assessing emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems. Items were rated on a 3-point scale, with higher scores indicating more emotional and behavioural difficulties.

*Socio-economic position (SEP)* was rated using a composite variable, ranking each family’s relative SEP based on parental income, education and occupational prestige (Blakemore *et al.* 2009).

## Data analysis strategy

Path analysis using MPlus Version 6 (Muthen & Muthen 1998–2011) was conducted to test a series of models. First, the relationships between maternal postnatal distress and children’s emotional–behavioural outcomes (using the SDQ Total Difficulties score) at age seven were explored. Second, the hypothesized model (Fig. 1) where parenting warmth and hostility mediated the relationship between maternal distress and children’s emotional–behavioural outcomes (using the SDQ Total Difficulties score) was estimated along with direct, indirect and total effects. We chose to model children’s outcomes using the SDQ Total Difficulties score as it had better psychometric properties than the separate SDQ subscales, which had Cronbach’s alpha coefficients less than the acceptable cut off of 0.7. However, we did conduct a sensitivity analysis to assess the robustness of the model when considering emotional (internalizing) and behavioural (externalizing) outcomes separately, as measured by the SDQ Emotional symptoms and Conduct problems subscales. These results are presented briefly; however, a full copy of the results is available from the authors.

Maximum likelihood estimation was used to test all models, and assessed using the chi-squared test ( $\chi^2$ ), and other practical fit indices including the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). Indices for the TLI and CFI should exceed 0.90 for an acceptable fit (Bentler 1990), and values close to or below 0.05 for the RMSEA were considered acceptable (Hu & Bentler 1999).

Finally, multi-group analyses were conducted to test whether the models differed significantly by child gender, SEP, and past history of depression. For each analysis, a model with all parameters freely estimated was compared with a model with all parameters constrained to be equal using the chi-squared difference test. Significant differences between the models provide evidence of moderation.

## Results

### Sample characteristics

Of the 5107 families recruited into the study, 376 (7.4%) were excluded because caregivers were not biological mothers living with their children, and 865 (16.9%) were lost to attrition. A further 1666 (32.6%) of the 3866 mothers who met inclusion criteria were removed from the final sample because of data missing one or more waves. Demographic characteristics for the

final sample ( $n = 2200$ ) are presented in Table 1. The majority of mothers were born in Australia, had an educational level of Year 12 or above, and were from two-parent families. The child's mean age at waves 1 and 4 was 8.8 months ( $SD = 2.6$ ) and 81.9 months ( $SD = 3.5$ ), respectively.

Significant differences between mothers in the final sample and those excluded were observed at  $P < 0.001$ . Excluded mothers were more likely to be born outside Australia, from non-English speaking and Aboriginal or Torres Strait Islander backgrounds, one-parent families, and have low SEP and educational attainment.

### Descriptive statistics

After excluding the cases described above, there was less than 2% missing data across all variables. Missing data were imputed

**Table 1.** Demographic characteristics for final sample

Demographic characteristic	<i>n</i> (%)
Maternal characteristics	
Age*	32.20 (4.53)
Country of birth – Australia	1786 (81.2)
Language other than English at home	209 (9.5)
Aboriginal or Torres Strait Islander	21 (0.9)
Education level – Year 12 and above	1726 (78.5)
Employment status	
Unemployed/not in the labour force	1232 (56.2)
Work part-time (1–34 h/week)	743 (33.8)
Work full-time (30+ h/week)	220 (10.0)
Infant & family characteristics	
Study child gender – male	1150 (52.3)
Number of children in household*	0.89 (0.96)
Family structure – two-parent family	2192 (99.6)
Socio-economic position	
Low	550 (25.0)
Middle	1100 (50.0)
High	550 (25.0)

\*Mean (SD).

**Table 2.** Descriptive statistics and correlations for the study variables ( $n = 2200$ )

Indicator variables	1	2	3	4	5
1 Psychological distress – wave 1	–				
2 Psychological distress – wave 4	0.48	–			
3 Parenting warmth	–0.07 <sup>a</sup>	–0.10	–		
4 Parenting irritability	0.18	0.20	–0.38	–	
5 Emotional-behavioural difficulties	0.18	0.21	–0.19	0.44	–
Range	6–29	6–30	6–30	6–24	2–15
M	9.17	8.73	27.18	11.65	6.60
SD	3.06	3.01	2.95	3.05	1.71
Skewness	1.77	2.08	–1.18	0.56	1.35
Cronbach's $\alpha$	0.82	0.86	0.89	0.70	0.76

All correlations significant at  $P < 0.001$  except <sup>a</sup> $P < 0.01$ .

using the expectation-maximization algorithm option available in SPSS 16.0 (Schafer & Graham 2002). Descriptive statistics are presented in Table 2. Correlations among the study variables were significant at  $P < 0.001$ .

### Relationship between postnatal distress and child emotional-behavioural outcomes

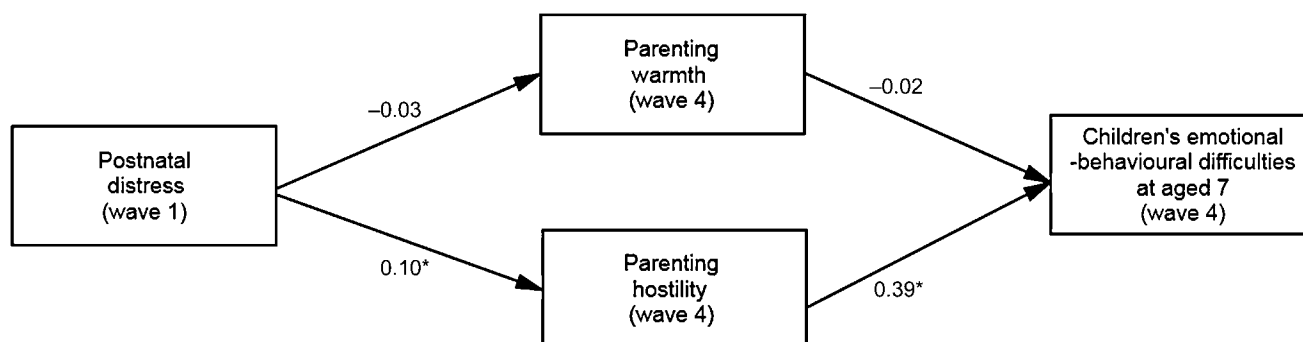
A model estimating the direct relationship between postnatal distress and children's emotional-behavioural outcomes at wave 4 revealed that high postnatal distress was significantly associated with increased emotional-behavioural difficulties when the children were age seven, ( $\beta = 0.18$ ,  $t = 8.55$ ,  $P < 0.001$ ). The relationship remained significant even after accounting for mothers' concurrent distress at wave 4 ( $\beta = 0.05$ ,  $t = 2.36$ ,  $P < 0.001$ ).

### Testing the hypothesized mediating model

The hypothesized model was an excellent fit to the data,  $\chi^2(1, n = 2200) = 0.43$ ,  $P = 0.51$ , CFI = 1.00, TLI = 1.00, and RMSEA = 0.00 (95% CI 0.00–0.05). Figure 2 presents the standardized parameter estimates for the model. High postnatal distress was significantly associated with high hostility at wave 4, but not parenting warmth. High hostility was in turn associated with increased emotional-behavioural difficulties. Conversely low warmth was not associated with emotional-behavioural difficulties.

The total indirect effects of postnatal distress on emotional-behavioural difficulties were small but significant (0.17,  $t = 13.32$ ,  $P < 0.001$ ), and the specific indirect pathways are provided in Table 3. The strongest indirect pathways were via parenting hostility and concurrent distress at wave 4. The indirect pathways via parenting warmth were not significant. This model accounted for 23% of the variance in children's emotional-behavioural difficulties ( $R^2 = 0.23$ ,  $P < 0.001$ ), 6% of





**Figure 2.** Standardized parameter estimates for the hypothesized mediating model. \* $P < 0.001$ .

**Table 3.** Specific indirect pathways from postnatal distress on children's emotional-behavioural difficulties adjusted for distress at wave 4

Specific indirect pathways	Indirect effect
Postnatal distress → parenting warmth → emotional-behavioural difficulties	0.001
Postnatal distress → parenting hostility → emotional-behavioural difficulties	0.04*
Postnatal distress → concurrent distress (wave 4) → emotional-behavioural difficulties	0.10*
Postnatal distress → concurrent distress (wave 4) → parenting warmth → emotional-behavioural difficulties	0.001
Postnatal distress → concurrent distress (wave 4) → hostility → emotional-behavioural difficulties	0.03*

\* $P < 0.001$ .

the variance in parenting hostility ( $R^2 = 0.06$ ,  $P < 0.001$ ), 1% of the variance in parenting warmth ( $R^2 = 0.01$ ,  $P = 0.008$ ).

### Sensitivity analysis to assess emotional and behavioural outcomes separately

A sensitivity analysis was conducted to assess the model where emotional and behavioural difficulties were modelled separately by the SDQ Emotional symptoms and Conduct problems subscales. This model was also an excellent fit to the data,  $\chi^2(2, n = 2200) = 2.06$ ,  $P = 0.357$ , CFI = 1.00, TLI = 1.00, RMSEA = 0.004 (95% CI 0.00–0.04). The pattern of results was the same as using the SDQ Total scale score. High postnatal distress was significantly associated with high hostility at wave 4, but not parenting warmth, and high hostility was in turn associated with increased emotional and behavioural difficulties. Conversely low warmth was not associated with emotional and behavioural difficulties. The total indirect effects of postnatal distress on emotional and behavioural difficulties were small but significant (Emotional symptoms: 0.14,  $t = 13.03$ ,  $P < 0.001$ ;

**Table 4.** Multi-group comparisons for child gender, SEP, and past history of depression

Multi-group analyses	$\chi^2$	d.f.	$\Delta\chi^2$ (d.f.)	$P$
Child gender: male ( $n = 1150$ ) vs. female ( $n = 1050$ )				
Unconstrained	2.05	2		
Constrained	14.58	9	12.53 (7)	0.084
SEP: low ( $n = 550$ ) vs. middle ( $n = 1104$ ) vs. high ( $n = 550$ )				
Unconstrained	1.24	3		
Constrained	20.20	17	18.96 (14)	0.166
Past history of depression: past history ( $n = 586$ ) vs. no past history ( $n = 1608$ )				
Unconstrained	0.17	2		
Constrained	14.89	9	14.72 (7)	0.040

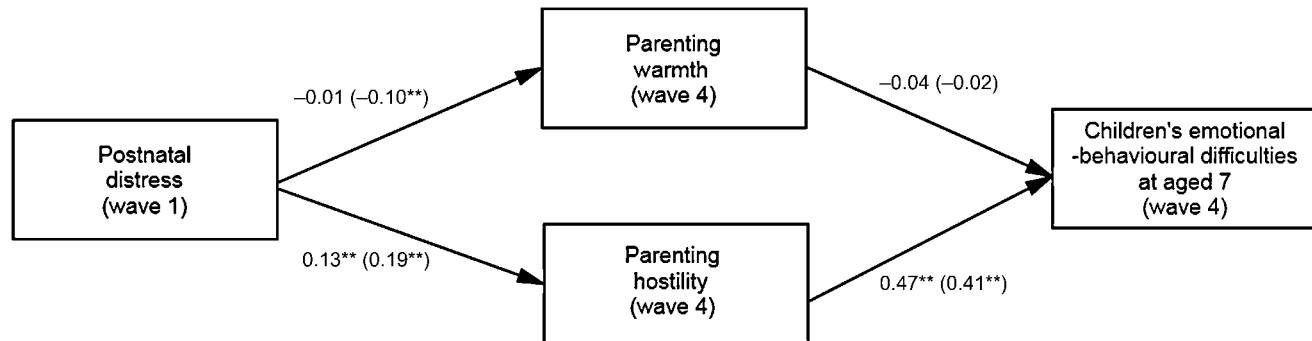
SEP, socio-economic position.

Conduct problems: 0.12,  $t = 9.26$ ,  $P < 0.001$ ). The strongest indirect pathways for both emotional and behavioural difficulties were via parenting hostility, while the indirect pathways via parenting warmth were not significant. Finally, the proportion of the variance in children's emotional and behavioural difficulties accounted for by the model was 10% and 24%, respectively (Emotional symptoms:  $R^2 = 0.10$ ,  $P < 0.001$ ; Conduct problems:  $R^2 = 0.10$ ,  $P < 0.001$ ).

### Testing for moderating effects

Multi-group analyses revealed that the model pathways were moderated by past history of depression, but not child gender and SEP. The chi-squared difference test results are presented in Table 4.

Figure 3 shows the standardized parameter estimates for mothers with and without a past history of depression. The largest difference between the groups was for the pathway



**Figure 3.** Standardized parameter estimates for mothers with and without a past history of depression. \* $P < 0.01$  \*\* $P < 0.001$ . Model for no past history of depression in brackets.

between postnatal distress and parenting warmth, where distress was more strongly associated with lower parenting warmth for mothers without a past history of depression than mothers with a past history of depression.

## Discussion

This study demonstrated that the relationship between maternal postnatal psychological distress and emotional-behavioural outcomes for children at age seven was mediated by hostile or irritable parenting behaviours such as losing temper and yelling at the child, after accounting for concurrent maternal mental health. Although it is not possible to infer causality, our longitudinal modelling provides empirical support for parenting as a mechanism by which postnatal mental health may impact upon children's well-being later in childhood in a larger and more representative sample of mothers than has previously been available.

Specifically, we found evidence that distress symptoms such as depressed mood, stress and anxiety in the year after having a baby may have an enduring influence on later hostile parenting behaviour. It is possible that this pattern of parenting behaviour begins early in the postnatal period, when high levels of distress may reduce mothers' capacity to respond to challenging interactions with their infants in a positive way. They may become angered and frustrated more easily, reacting with yelling, and smacking. These behaviours might be reinforced over time as the child develops, becoming part of their repertoire of parenting behaviours or style. This is somewhat supported by research indicating that depressed parents continue to experience parenting difficulties even after their mood improves (Brown & Harris 1978). Evidence for a lasting effect of postnatal distress on warm and affectionate parenting behaviour, however, was not found in this study. This suggests that the development and

course of parenting warmth may be less sensitive to early distress than parenting hostility. It may be that responsive and warmth towards their child is more readily recovered by mothers once distress is ameliorated, or that it is perhaps more influenced by factors other than those assessed in this study. This is an important finding alongside extant literature. Current research has to date has primarily focussed on the relationships between postnatal distress and concurrent maternal nurturance, responsiveness, warmth and attachment (Lovejoy *et al.* 2000; Dallaire & Weinraub 2005; Landry *et al.* 2006). Our findings suggest that this relationship is not prolonged, or likely to adversely affect children's development in the longer term.

Another key finding of this study was that parenting hostility, but not warmth, was associated with increased child emotional and behavioural difficulties at age seven. This is contrary to studies documenting cross-sectional relationship between the lack of warm and nurturing parenting behaviours and poorer emotional and behavioural outcomes for children across the early parenting period (Lovejoy *et al.* 2000; Dallaire & Weinraub 2005; Landry *et al.* 2006). It is important to note, however, that while the zero-order correlation between parenting warmth and child emotional-behavioural difficulties at age seven was significant, this association was no longer significant when considering the hypothesized model including hostile parenting. This underscores the importance of examining the relative contribution or influence of different parenting behaviours on child outcomes when they are considered together in a model, rather than discretely. Our findings are somewhat consistent with previous research indicating that harsh and hostile parenting is a stronger predictor of child outcomes than lack of warm and nurturing parenting behaviour (Pettit *et al.* 1997; Lovejoy *et al.* 2000; Low & Stocker 2005).

These findings also highlight the complex interactions between hostile and warm parenting behaviours, and the need



for furthering our understanding of the relationships between postnatal distress, different parenting styles and outcomes for children. Our findings suggest that postnatal distress has little influence on warm parenting behaviours and that there was a small to moderate correlation between warmth and hostility, so it is possible that distressed mothers who engage in increased hostile parenting behaviours could be either high or low on parenting warmth. This, in turn, may result in different outcomes for children. For example, high parenting warmth may mitigate or buffer some of the effects of maternal distress and parenting hostility, resulting in better emotional and behavioural outcomes for children compared with children of mothers who are high on distress and hostility but low on warmth. Further research is needed to ascertain the influence of combined parenting behaviours, or 'styles' on specific children's outcomes.

Another issue for consideration is that the causal directions between psychological distress, parenting behaviour and child outcomes cannot be inferred from the study findings. It is likely that the relationships are transactional, whereby children's behavioural difficulties may also influence reactive and angry responses from parents. The extent to which parents react to their children's behaviour may also depend upon their mental health. Despite the issues of directionality and complex interactions between parenting behaviours, the findings of the present study suggest that promoting positive parenting behaviour, and reducing harsh and punitive parenting behaviours are a potential focus of intervention and support to mothers' experiencing postnatal distress.

A final aim of the study was to assess whether the relationships between mothers' postnatal distress, parenting behaviour and child emotional-behavioural functioning were moderated by child gender, socio-economic background, and past history of depression. While there was no evidence of moderation by socio-economic background or child gender, there was for past history of depression. Postnatal distress was also found to be more strongly associated with lower parenting warmth for mothers without a past history of depression compared with mothers with a past history of depression. It is possible that postnatally distressed mothers who have not experienced depression in the past may be particularly concerned about the impact of well-being difficulties on their parenting, and may negatively appraise their attachment, affection and warmth toward their child. It is also possible that postnatal distress may predispose mothers without a past history of depression to ongoing well-being difficulties across the early parenting period, and this may have a particular impact on warmth and affection in the parent-child relationship. Further research is

needed to better understand these complex interactions over time. Findings suggest that mothers without a past history of depression are also at risk of parenting difficulties, and may therefore benefit from early mental health and parenting support.

### Limitations

Several limitations are worth noting. First, this study tested one potential pathway among the study variables, and alternative models may be possible. The relationships between maternal mental health, parenting, and child functioning are likely to be complex and bidirectional, and there are variables not explored in the study (e.g. child temperament, social support, fathers' parenting, and couple relationship) that may also be relevant here. Second, there were differences between mothers included in and excluded from the study, potentially limiting the generalizability of the findings to mothers from non-English speaking, Aboriginal or Torres Strait Islander, and lower socio-economic backgrounds. Third, this study relied on mothers' self-report of parenting and child outcomes, which may contribute to reporting bias, particularly for mothers experiencing well-being difficulties. Finally, the relatively small effect sizes reported in this study are acknowledged. This study is based on a nationally representative population sample and effects may be more subtle than those reported in clinical samples. Furthermore, the measures used in LSAC were necessarily brief, and a non-specific measure of psychological distress was used. Relationships among the variables may have been stronger if specific measures of depression and anxiety were used.

### Implications and conclusion

Limitations notwithstanding, the current study provides evidence for the psychosocial pathways of Goodman and Gotlib's (1999) model that focus on parenting and parent-child interactions. In particular, these findings highlight the importance of the postnatal period as an important period for the longer-term development of parenting behaviour and the emotional and behavioural development of children. Although further research is needed to explore the mutual influences between mothers' mental health, parenting behaviour and child functioning across the postnatal and early parenting periods, these findings underscore the importance of the early identification and treatment of mental health concerns for the prevention of subsequent parenting and child well-being difficulties.

In particular, mothers may not only benefit from interventions that focus on minimizing distress, but also on strategies

to manage irritability, frustration and anger when faced with difficult parenting situations. Postnatal parenting interventions generally focus on parent–infant attachment, sensitivity and responsiveness to child cues, and play skills to promote children’s early development (Poobalan *et al.* 2007; Barlow *et al.* 2010). While these interventions can improve early parenting behaviour important for promoting child development, it is not well documented whether these interventions also decrease mothers’ use of harsh and hostile forms of parenting when faced with difficulties both in the short and long term. Therefore, research into the effectiveness of early parenting interventions that focus on emotional regulation strategies (i.e. relaxation, mindfulness, and other self-soothing activities) and on decreasing reactive and irritable reactions with their children are needed. This is important for improving the well-being and parenting outcomes for mothers, and promoting the long-term social, emotional and behavioural development of children.

### Key messages

- Maternal postnatal mental health difficulties can impact on children’s well-being via their effects on parenting behaviour.
- Postnatal distress may have an enduring influence on later hostile parenting behaviour.
- Improving maternal well-being and parenting is important for promoting the long-term emotional and behavioural development of children.

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