



Parenting self-efficacy: Links with maternal depression, infant behaviour and adult attachment

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ABSTRACT

Background: This study examined predictors of parenting self-efficacy (PSE) in a sample of first-time mothers during the first year after childbirth and evaluated the effect of a brief, intensive, mother–infant residential intervention on PSE and infant behaviour.

Methods: 83 primiparous women with infants aged 0–12 months admitted to a residential parent–infant program participated in a structured clinical interview for DSM-IV diagnosis of depressive and anxiety disorders and completed questionnaires assessing psychological distress, adult attachment and childhood parenting experiences. During their residential stay, nurses recorded infant behaviour using 24-hour charts.

Results: Results showed PSE to be inversely correlated with maternal depression, maternal anxiety and attachment insecurity. Low levels of parental abuse during childhood, avoidant attachment, male infant gender and depressive symptom severity were found to predict low PSE. Major depression mediated the relation between attachment insecurity and PSE, but there were no links between PSE and infant behaviour. After the intervention, there was a significant improvement in PSE, with abusive parenting during childhood and depressive symptom severity being predictive of change.

Conclusions: This study highlights the links between maternal psychopathology and maternal background factors such as childhood parenting experiences and attachment style in the development of postnatal PSE. Directions for future research are discussed.

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1. Introduction

Self-efficacy can be described as an individual's belief in his or her ability to successfully perform a given task. Bandura [1,2] viewed self-efficacy as a core determinant of human behaviour, affecting whether individuals attempt a task, how much effort they put into it, and for how long they persist in the face of obstacles and aversive experiences. Given that the task of parenting is one of significant physical, emotional and psychological challenge, the construct of parenting self-efficacy (PSE) has received increasing clinical and research attention. Defined as the “beliefs a parent holds of their capabilities to organise and execute the tasks related to parenting a child” (p. 390) [3], PSE has been linked with a number of important parental and child outcomes. Various risk factors have also been identified but there is a lack of understanding about the role of underlying psychological factors in the development of PSE. The current study sought to bridge this gap, with a particular focus on the roles of early childhood parenting experiences and adult attachment insecurity.

The two variables that have been linked most definitively with PSE are parental depression and ‘difficult’ infant behaviour. Numerous cross-sectional analyses have identified inverse correlations between

PSE and maternal depression and between PSE and difficult infant behaviour, and longitudinal studies have provided further support [4]. For example, Gross [5] assessed two cohorts of postnatal women over a 1-year period and found evidence to support a model linking PSE with maternal depression and the mother's perception of how difficult her infant was compared to other infants of the same age. Leerkes and Burney [6] studied predictors of PSE at 6 months postpartum in a sample of 115 primiparous mothers and found the most robust predictors to be antenatal PSE and how difficult the mother perceived her infant to be. Most studies of PSE have focused on mothers, but Leerkes and Burney also examined predictors of PSE in the male partners ($n = 73$) of the women in their study and found postnatal paternal PSE to be a function primarily of the father's involvement in parenting tasks and social support. In another study, Seigny [7] studied 62 cohabitating couples whose first-born child was 18–36 months old. For mothers in this study, PSE was predicted by general self-efficacy and relational functioning (i.e., marital satisfaction and family functioning) whereas for fathers, PSE was predicted by parenting stress and relational functioning. Unexpectedly, variables representing the characteristics of the child or parental depression did not emerge as statistically significant predictors of PSE, for mothers or fathers. Some studies have failed to find a link between PSE and maternal depression [8], but taken together, the balance of evidence suggests relations among PSE, parental psychological functioning (particularly for mothers)

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and difficult infant behaviour [4]. A limitation of many studies in this area has been the reliance on maternal perceptions of difficult infant behaviour, rather than objective measures.

Bandura [1] viewed the relationship between self-efficacy and performance as bi-directional – a notion that is clearly applicable to the domain of parenting. Rather than direct causal pathways between PSE and parental depression or between PSE and infant difficulty, a dynamic and transactional relationship between parent and child variables is likely to be at play [4]. Indeed, coping with an unsettled infant may lead to a gradual erosion of PSE; but low PSE may also mean that the parent is less likely to use positive parenting and problem-solving strategies, and is more likely to give up, make internal attributions for failure, and experience anxiety and/or depression in response to challenging situations [1]. In turn, the infant may be more likely to respond in ‘difficult’ ways (e.g.), cry more, appear to be more tense and fussy, and less interactive [9]. Evidence supports this multi-dimensional conceptualisation of early parent–child difficulties. For example, Cutrona and Troutman [10] examined maternal mood, social support, infant temperament and PSE in 55 women and their infants during pregnancy and at 3 months postpartum. Results showed a direct link between ‘difficult’ infant temperament and maternal depressive symptomatology, with infant difficulty accounting for 30% of the variance in postpartum depression scores. Results, however, also supported a model in which difficult infant behaviour and maternal social support were linked to postpartum depression through their effects on PSE.

This leads to questions about possible underlying parental factors leading to the development of such difficulties. Adverse early childhood experiences including parental loss, inadequate care and over-protectiveness have long been held as factors predisposing an individual to psychological difficulties in adulthood [11,12], and John Bowlby’s [13] attachment theory provides an important theoretical rationale for how this process might occur. Bowlby suggests that interactions with caregivers in infancy, childhood and adolescence develop into a generalised mental representation or ‘internal working model’ of the self in relation to others. The internal working model comprises expectations about the availability and responsiveness of important others, and beliefs about personal worthiness of love and support. It guides affect, cognition, and behaviour in subsequent attachment situations such as adult friendships or romantic relationships. A variety of methods for measuring adult attachment states-of-mind have been described [14], and several self-report questionnaires focusing on attachment, for example, in adult romantic relationships, have also been developed [15]. Self-report attachment scales typically measure two dimensions of attachment insecurity in adulthood: avoidance and anxiety. Attachment avoidance is concerned with discomfort with closeness and dependence on others, preference for emotional distance and self-reliance, and use of de-activating strategies to deal with insecurity and distress. Attachment anxiety is concerned with a strong desire for closeness and protection, intense worries about the availability of others and one’s own value to others, and use of hyper-activating strategies to deal with insecurity and distress [15].

Evidence to support the proposed links between attachment insecurity and psychopathology in adulthood is strong [16]. There has also been research focusing on the perinatal period. For example, in a study of 204 childbearing women, Bifulco et al. [17] found insecure attachment to be associated with diagnosis of depression in both the antenatal and postnatal periods. McMahon et al. [18] studied a sample of 111 mothers over the postnatal period (at 4, 12 and 15 months), and found that mothers diagnosed as ‘depressed’ were more likely to have an insecure state-of-mind regarding attachment. Importantly, maternal state-of-mind regarding attachment was found to mediate the relationship between maternal depression and negative child outcomes at 15 months. Studies using self-report measures of adult attachment have also shown links between attachment insecurity and PND. For example, Meredith and Noller [19] examined 20 ‘depressed’ and 47 ‘non-depressed’ mothers and found the depressed

group significantly more likely to have an insecure attachment style. McMahon et al. [20] assessed depressive symptoms and attachment style in 100 first-time mothers admitted to a residential program for unsettled infant behaviour. Results showed an attachment style characterised by anxiety about relationships (assessed at 4 months postpartum) to be a significant predictor of clinically elevated depression scores at 12 months postpartum. In this same study, attachment insecurity was found to mediate the relation between recollections of low maternal care in childhood and depressive symptoms at 12 months postpartum, while other cognitive and interpersonal factors contributed additionally in maintaining depression.

While the roles of adverse parenting experiences in childhood and attachment insecurity in the development of maternal depression are well understood, less is known about relations among adverse parenting experiences, attachment insecurity and PSE. To our knowledge there have been only two published studies in this area. Leerkes and Crockenberg [21] studied 92 primiparous mothers and their 6 month-old infants, and found PSE to be predicted by remembered maternal care, through the mediating effect of global self-esteem. Caldwell et al. [22] studied 76 ‘at-risk’ mothers and found that childhood maltreatment predicted PSE through mediating pathways involving attachment anxiety and maternal depression. Given the known links between PSE, maternal depression and ‘difficult’ infant behaviour, as well as the negative longer-term impacts of these for children, thorough understanding of pre-disposing maternal factors is vital, especially as it may provide information to inform clinical interventions. In particular, there is a need for further research about predictors of low PSE, especially the roles of adverse childhood parenting experiences and adult attachment styles.

A central aspect of Bandura’s [1] theory was that self-efficacy influences emotional reactions (i.e., anxiety and stress), in response to unfamiliar or potentially aversive events. Despite Bandura’s emphasis on anxiety, the majority of studies examining psychological correlates of PSE have focused solely on ‘depression’. There are exceptions such as the study by Porter and Hsu [8] which found that PSE at 1 month postpartum was negatively correlated with maternal anxiety symptom severity at 1 month postpartum. Interestingly, in this study, PSE and maternal anxiety were not significantly correlated at 3 months postpartum. Failure to examine anxiety has been a shortcoming of PSE research conducted to date, particularly given the known prominence of anxiety in the psychological distress experienced by many postnatal women [23].

A final area in need of research is that of clinical interventions to improve PSE. As maintained by Coleman [24], interventions that bring about enhancement in PSE may not only help parents to enjoy and feel more satisfied in the parenting role, but may also be important in “reversing intergenerational transmission of ineffective and detrimental parenting behaviours” (p. 72). Unfortunately, apart from a few published studies [25,26], there has been little research focusing specifically on the effectiveness of early parenting interventions in enhancing PSE.

This study sought to address these gaps in the literature and in doing so had two major aims. The first aim was to elucidate predictors of PSE in first-time mothers during the first year after childbirth. We hypothesised (i) that low PSE would be associated with maternal depression, maternal anxiety, ‘difficult’ infant behaviour, adverse childhood experiences and adult attachment insecurity, (ii) that maternal depression would mediate the relations between adult attachment insecurity and PSE and between PSE and ‘difficult’ infant behaviour. The second aim of this study was to examine changes in PSE in mothers with an infant aged <12 months, following participation in a brief, intensive, residential intervention for unsettled infant behaviour.

2. Method

2.1. Participants

Participants in this study were 83 primiparous women with infants aged 0–12 months admitted to the Karitane Residential Family

Care Unit (RFCU), a residential parent–infant unit located in South Western Sydney, Australia. The RFCU is staffed by a multidisciplinary team of nurses, psychologists, social workers, a visiting psychiatrist and a visiting paediatrician, and provides a 4-day residential program for families with children aged 0–4 years experiencing complex early parenting difficulties. In most cases, difficulties relate to infant sleep, settling or feeding. Participants were recruited as part of a larger study involving a 6-month post-discharge follow-up component. Women who were less than 18 years of age, who were not proficient in speaking and writing English, or who lived in rural areas and so were unable to participate in the follow-up component of the larger study were excluded. In total, 126 women met the eligibility criteria and were invited to participate. Of these, 10 (7.9%) agreed but did not complete the questionnaires or the interview during their admission, 5 (4%) agreed to participate but were subsequently prevented from participating because of practical constraints associated with the admission or because they went home early, 10 (7.9%) declined because they had twins and were consequently too busy to participate, and 18 (14.3%) declined for other reasons (e.g., did not want to answer questions about their childhood, too stressed or tired to complete questionnaires). This left a final sample of 83 women (66% response rate). The mean maternal age was 32.2 years (S.D. 5.1, range 22–47). The majority were in a married or de-facto relationship (91.6%) and spoke English at home (96.4%). The mean infant age was 5.3 months (S.D. 3.2, range 0–11) and 52.4% were male. There were 3 sets of twins in the sample.

2.2. Procedure

During the RFCU admission, participants completed self-report questionnaires and participated in a structured interview for diagnosis of DSM-IV mental disorders. Nurses recorded infant behaviours for the duration of the admission using 24-hour charts. Written informed consent was obtained from all participants and the study was approved by the South Western Sydney Local Health District Human Research Ethics Committee.

2.3. Measures

The *Karitane Parenting Confidence Scale* (KPCS) [27] is a validated 15-item scale designed to measure perceived parenting efficacy in parents with infants aged 0–12 months. The KPCS comprises 15 ‘task-specific’ items, each scored on a 4-point scale, with higher scores indicating higher levels of parenting self-efficacy. Example items include, “I am confident about feeding my baby”, “I know what to do when my baby cries”, “I am confident about playing with my baby”. KPCS scores <40 are considered indicative of low parenting self-efficacy. The KPCS has been shown to have acceptable test–retest reliability ($r = .88$), internal consistency (Cronbach’s $\alpha = .81$), and convergent and discriminant validity [27]. The Cronbach alphas for the KPCS in the current sample were .84 and .82 (admission and discharge, respectively).

The *Mini International Neuropsychiatric Interview* (MINI) [28] is a structured, clinician administered diagnostic interview for DSM-IV and ICD-10 psychiatric disorders. The MINI has been shown to have acceptable levels of inter-rater and test–retest reliability [28]. It has also been shown to be reliable and valid when compared against longer, commonly used structured psychiatric interviews, for example, the CIDI and the SCID-P [28–30]. For this study, the following MINI modules were administered: Major Depressive Episode, Panic disorder, Social Phobia, Obsessive–Compulsive Disorder (OCD), Posttraumatic Stress Disorder (PTSD) and Generalised Anxiety Disorder (GAD).

The *Measure of Parental Style* (MOPS) [31] is a validated self-report questionnaire used to assess perceived parenting styles during the first 16 years of life, across three domains: abuse, indifference and over-control. The MOPS is an abbreviated version of the well-known Parental Bonding Index (PBI; [32]), but it also assesses parental abuse. The MOPS comprises 15 items (e.g., ‘overprotective of me’, ‘unpredictable towards

me’ and ‘made me feel unsafe’), each answered on a 4-point scale where 0 = ‘not true at all’ and 3 = ‘extremely true’. Items are answered separately for the mother and the father and can be summed to yield total subscale scores, with higher scores indicating more dysfunctional parenting. The MOPS has been shown to be a valid and reliable instrument [31]. The Cronbach alphas for the abuse, indifference and over-control subscales of the MOPS in the current sample were .88, .92 and .77, respectively.

The *Attachment Style Questionnaire* (ASQ) [33] is a validated self-report scale designed to assess attachment style in adults. Participants are asked to rate the extent to which items describe their feelings and behaviour in close relationships using a 6-point scale where 1 = ‘totally disagree’ and 6 = ‘totally agree’. The ASQ has been shown to have both 5-factor and 3-factor solutions, with the 3-factor solution yielding ‘Security’, ‘Anxiety’ and ‘Avoidance’ factors to correspond with previous self-report attachment models [34]. Example items include “I prefer to depend on myself rather than on other people” and “I find it easy to trust others” (avoidance subscale); “It’s important to me that others like me” and “I often feel left out or alone” (anxiety subscale); and “I find it relatively easy to get close to other people” and “I feel confident about relating to others” (security subscale). The ASQ 3-factor solution has been shown to have acceptable test–retest reliability ($r_s > .73$), internal consistency (Cronbach alphas $> .82$), and convergent and discriminant validity [33]. The Anxiety and Avoidance subscales of the 3-factor solution were used in the current scale. The Cronbach alphas for these two scales in the current sample were .83 and .79, respectively.

The *Edinburgh Postnatal Depression Scale* (EPDS) [35] is a validated 10-item self-report screening tool for depressive symptoms in the perinatal period. Although the EPDS was originally described as a uni-dimensional measure of depression, there is growing indication that it also assesses anxiety, and that separate subscales measuring depression (items 1, 2, 6–10) and anxiety (items 3, 4 & 5) can be utilised [36]. Higher EPDS subscale scores indicate greater symptom severity. The Cronbach alphas for the depression and anxiety subscales of the EPDS in the current sample were .85 and .73, respectively.

Infant behaviours for all of the singleton infants in the study were recorded on 24-hour infant behaviour charts similar to those described, validated and used in previous studies [37,38]. The charts were completed by RFCU nurses for the duration of the admission and coded by the first author, who was blind to participants’ scores on other study variables. Total sleep and unsettled times were calculated for the first and last full 24-hour/day at the unit. All episodes of crying, screaming and grizzling were combined to obtain the total ‘unsettled’ time; unsettled behaviours occurring within a 12-minute period considered to represent a single unsettled episode. Similarly, total sleep time only included periods of sleep > 12 minutes. Night awakenings were defined as any awake period during the evening/night time period (6 pm–6 am), however awakenings occurring within a 12-minute period were considered to be the same episode. To ensure coding reliability, 20% of the charts were re-coded by the same coder 6 months after the charts were first coded (Pearson correlation $r_s > .91$, $p_s < .001$).

2.4. Analysis

Data were analysed using SPSS, version 19 for Windows. For all analyses, alpha was set at $p = .05$. Analysis of residuals indicated that assumptions necessary for statistical analysis were met. Pearson’s correlations were conducted to examine relations between variables, followed by multiple regressions to identify the overall contribution of predictor variables to PSE on admission. Hierarchical multiple regressions were then conducted to test the mediating effects of current depression on the relations between attachment insecurity (anxious and avoidant) and PSE [39]. Mediation effects were assessed using Baron and Kenny’s [39] conditions for mediation, namely (i) that the IV significantly affects the mediator, (ii) that the IV significantly affects the DV in the absence of the mediator, (iii) that the mediator has a significant unique effect on

the DV, and (iv) that in the presence of the mediator, the effect of the IV on the DV is decreased or zero. Sobel's test for significance [40], using unstandardised regression coefficients and their standard errors, was conducted to test the significance of mediating effects. Three repeated measures ANOVAs were conducted to assess changes in PSE and infant behaviours over two 24-hour time conditions (baseline: RFCU Day 1; end of treatment: RFCU Day 4), with infant age as a covariate. Change scores for PSE, infant sleep and infant unsettled behaviour were computed by subtracting baseline from end-of-treatment scores and then multiple regressions were conducted to identify the overall contribution of predictor variables to change in PSE and infant behaviours over the course of the admission.

3. Results

Of the 83 women who participated in the study, 32.5% ($n=27$) met criteria for diagnosis of a current major depressive episode. Rates of current anxiety disorders were as follows: panic disorder: 2.4% ($n=2$); social phobia: 10.8% ($n=9$); OCD: 8.4% ($n=7$); PTSD: 3.6% ($n=3$); GAD: 15.7% ($n=13$). Twenty women (24%) met criteria for at least one current anxiety disorder. Mean (S.D.) scores on the study questionnaires were as follows: KPCS: 33.70 (5.92); EPDS depression items: 6.12 (3.62); EPDS anxiety items: 4.54 (2.13); ASQ avoidance subscale: 2.98 (.61); ASQ anxiety subscale: 3.13 (.83); MOPS Indifference subscale: 3.58 (6.78); MOPS over-control subscale: 6.55 (5.51); MOPS abuse subscale: 2.24 (4.37). (There were two participants who reported not having had any contact with their father during childhood. For these cases, scores given with respect to the mother were doubled in order to calculate total MOPS scores). The mean amount of infant sleep and unsettled time in the first full 24 hours at the RFCU was 251.82 (39.62) min and 43.11 (24.67) min, respectively.

Results of bivariate correlations are shown in Table 1. As shown, PSE on admission was inversely correlated with depression symptom severity, diagnosis of current major depression, anxiety symptom severity, anxious attachment and avoidant attachment. In contrast, PSE on admission was unrelated to infant age, infant gender, maternal age, maternal anxiety disorder diagnosis, or any of the three child behaviour variables. Infant sleep time in 24 hours was inversely correlated with infant age, infant unsettled time in 24 hours and avoidant attachment;

infant unsettled time was positively correlated with maternal anxiety symptoms; and number of infant night awakenings was positively correlated with recollections of indifferent parenting during childhood. Attachment avoidance was positively correlated with current depression diagnosis, anxiety disorder diagnosis and each of the three of the recalled parenting variables, but not with depression or anxiety symptom severity. Attachment anxiety was positively correlated with current depression diagnosis, anxiety disorder diagnosis, depression and anxiety symptom severity, parental over-control and abuse, but not parental indifference. Attachment avoidance and anxiety were also positively correlated.

A multiple regression was conducted to identify the overall contribution of predictor variables to PSE. The criterion variable was total KPCS score and the variables entered into the model were: parental abuse, parental indifference, parental over-control, attachment avoidance, attachment anxiety, maternal age, infant age, infant gender, infant sleep time in 24 hours, infant unsettled time in 24 hours, number of infant night-time awakenings, current depressive symptom severity, current anxiety symptom severity, diagnosis of current major depression and diagnosis of a current anxiety disorder. Overall, the model contributed significantly to PSE [$F(15, 77) = 3.973, p < .001$], accounting for 49% of the variance in KPCS score. As shown in Table 2, the significant predictors of PSE were recollections of parental abuse, attachment avoidance, infant gender and depressive symptom severity. This suggests that women with higher PSE were more likely to report parental abuse during childhood and to have a female infant, and less likely to report avoidant attachment style traits and depressive symptoms. When each of these 4 independent predictors were entered into the model alone, with all other variables being free to vary, all remained as significant independent predictors ($ps < .05$).

Hierarchical multiple regressions were conducted to test whether major depression (MINI diagnosis) mediated the relation between attachment security (ASQ-attachment anxiety and ASQ-attachment avoidance) and PSE (KPCS), with all other variables being free to vary. As shown in Fig. 1, the first regression showed that attachment anxiety predicted both major depression and PSE. When major depression was entered into the model (step 2), the pathway between attachment anxiety and PSE was decreased (although still statistically significant), and PSE was no longer predicted by major depression. Results of Sobel's

Table 1
Bivariate correlations among predictor variables in multiple regression ($n=83$).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Maternal age	1.000	-.033	.144	-.051	-.036	.008	.113	.037	.160	.118	-.092	-.068	-.074	.003	.005	.020
2. Infant age		1.0	.017	-.325*	.012	-.159	.109	.035	.052	-.006	.189	.091	.047	-.031	-.017	-.028
3. Infant gender			1.0	.000	-.135	-.054	.086	.141	-.045	.056	.148	.056	.152	.025	-.077	-.002
4. Infant sleep time				1.0	-.645**	-.044	-.113	-.075	-.173	-.115	.010	-.255*	-.125	.077	-.054	.055
5. Infant unsettled time					1.0	.204	.107	.084	.264*	.190	-.163	.140	.001	-.015	.095	-.058
6. Infant night awakenings						1.0	.036	-.089	-.026	-.057	-.144	.046	-.078	.077	.251*	.113
7. Major depression (MINI-Dep)							1.0	.571**	.526**	.562**	-.257*	.252*	.384**	.151	-.014	.094
8. Anxiety disorder (MINI-Anx)								1.0	.414**	.333*	-.134	.312*	.409**	.209	.186	.113
9. Anxiety symptoms (EPDS-Anx)									1.0	.681**	-.404**	.091	.360*	.101	.070	-.104
10. Depression symptoms (EPDS-Dep)										1.0	-.452**	.007	.271*	.074	.013	-.034
11. Parenting self-efficacy (KPCS)											1.0	-.248*	-.327*	.046	-.020	-.060
12. Attachment avoidance (ASQ-Avoid)												1.0	.561**	.467**	.463**	.429**
13. Attachment anxiety (ASQ-Anx)													1.0	.259*	.101	.247*
14. Abusive parenting (MOPS-A)														1.0	.693**	.502**
15. Indifferent parenting (MOPS-I)															1.0	.341*
16. Over-controlling parenting (MOPS-O)																1.0

* $p < .05$; ** $p < .001$; Note. Infant gender coded as male (-1), male and female twins (0) and female (1); Sleep time = Sleep time in 24 hours (pre); Unsettled time = Unsettled time in 24 hours (pre); Night waking = Number of night awakenings (pre); Major depression (MINI) and Anxiety disorder (MINI) coded as no (0) and yes (1).

[40] test for significance confirmed that the relation between attachment anxiety and PSE was significantly mediated by major depression. The second regression also showed that attachment avoidance predicted major depression and PSE. When major depression was entered into the model (step 2), the pathway between attachment avoidance and PSE was decreased and no longer statistically significant. Results of Sobel's test for significance confirmed that the relation between attachment avoidance and PSE was significantly mediated by major depression. Given that none of the infant behaviour variables was significantly correlated with PSE (KPCS), no further tests of mediation were conducted.

Repeated measures ANOVAs were conducted to examine changes in PSE and infant behaviours (sleep time in 24 hours, unsettled time in 24 hours and number of night awakenings) from baseline (RFCU Day 1) to end-of-treatment (RFCU Day 4), controlling for infant age. For PSE, there was a significant main effect for time, $F(1, 81) = 41.07, p < .001, \eta^2 = .336$, but not time by infant age, $F(1, 81) = .77, p = .384, \eta^2 = .009$. Similarly, for infant sleep and unsettled behaviour there were significant effects for time [sleep time in 24 hours: $F(1, 71) = 5.02, p < .05, \eta^2 = .066$; unsettled time in 24 hours: $F(1, 71) = 4.88, p < .05, \eta^2 = .064$] but not for time by infant age [sleep time in 24 hours: $F(1, 71) = .17, p = .678, \eta^2 = .002$; unsettled time in 24 hours: $F(1, 71) = 1.21, p = .275, \eta^2 = .017$]. For number of night awakenings there were no significant effects for time, $F(1, 71) = .01, p = .922, \eta^2 = .000$ or time by infant age, $F(1, 71) = .742, p = .392, \eta^2 = .010$.

Finally, three separate multiple regressions were conducted to identify the overall contribution of predictor variables to change in (i) PSE, (ii) infant sleep and (iii) unsettled infant behaviour, from baseline to end-of-treatment. Overall, the regression model contributed significantly to change in PSE, $F(12, 77) = 2.028, p < .05$, accounting for 27.2% of the variance in PSE-change scores. As shown in Table 3, the significant predictors of PSE change were abusive parenting in childhood and current depressive symptom severity. That is, women who reported greater improvements in PSE over the course of the intervention were less likely to report parental abuse during childhood and more likely to report depressive symptoms at baseline. The full regression model did not contribute significantly to change in infant sleep, $F(12, 71) = 1.449, p = .170$, or change in unsettled infant behaviour, $F(12, 71) = .875, p = .576$. The model accounted for 22.8% and 15.1% of the variance in infant sleep and infant unsettled behaviour change scores, respectively. As shown in Table 3, the significant individual predictors of change in infant sleep time were avoidant attachment and anxiety symptom severity. That is, infants who showed greater improvements in total sleep time over the course of the admission were more likely to have a mother with avoidant attachment traits and elevated anxiety symptoms at baseline. There were no significant predictors of change in infant unsettled behaviour.

Table 2
Multiple regression: criterion variable initial KPCS score ($n = 78$).

Variable	β	p
Parental abuse (MOPS-A)	.341	.026*
Parental indifference (MOPS-I)	.028	.858
Parental over-control (MOPS-O)	-.033	.762
Avoidant attachment (ASQ-Avoid)	-.421	.004*
Anxious attachment (ASQ-Anx)	-.150	.260
Maternal age	-.096	.335
Infant age	.070	.512
Infant gender	.205	.041*
Infant sleep time in 24 hours	-.281	.055
Infant unsettled time in 24 hours	-.117	.389
Infant number of night awakenings	-.159	.129
Current depressive symptom severity (EPDS-Dep)	-.419	.004*
Current anxiety symptom severity (EPDS-Anx)	-.185	.221
Current major depression (MINI-Dep)	.116	.415
Current anxiety disorder (MINI-Anx)	.065	.601

* $p < .05$. Note: Categorical variables coded as follows: infant gender: male (-1), female (1), male/female twins (0); major depression: yes (1), no (0); current anxiety disorder: yes (1), no (0).

4. Discussion

This study examined predictors of PSE in first-time mothers during the first year after childbirth and evaluated the effectiveness of a brief, intensive, residential intervention in terms of effects on PSE and unsettled infant behaviour. The major findings were first, that PSE was inversely correlated with maternal depression, maternal anxiety and attachment insecurity. Contrary to prediction, PSE was not significantly correlated with recollections of adverse parenting experiences during childhood or infant behaviour. Second, poor PSE was predicted by lower levels of parental abuse during childhood, avoidant attachment traits, male infant gender and higher depressive symptom severity. Third, major depression mediated the relation between attachment insecurity (anxiety and avoidance) and PSE. Finally, this study showed that there were improvements in PSE after the intervention, with the two factors that predicted PSE improvement being lower levels of reported parental abuse male infant and higher depressive symptom severity. Avoidant attachment and anxiety symptoms predicted increase in infant sleep, but none of the variables in the model significantly predicted change in infant unsettled behaviour.

This study highlights the role of adult attachment insecurity in the development of PSE. This is an important contribution because while there is strong evidence showing attachment insecurity to be associated with both maternal depression [17–20] and sub-optimal care-giving behaviours [41–43], the links between attachment insecurity and PSE are less understood. This study builds upon the previous work of Caldwell et al. [22] and Leerkes and Crockenberg [21] who identified associations between early maladaptive parenting experiences and PSE. It also adds to understanding of the link between maternal depression and attachment insecurity in the development of PSE. Specifically, the finding that attachment anxiety and avoidance predicted low PSE through the mediating pathway of depression both supports the findings of Caldwell et al. [22] and highlights the prominent role that underlying maternal attachment vulnerability can have in predisposing women to early parenting self-efficacy difficulties, particularly in the presence of maternal depression.

Attachment anxiety and attachment avoidance were moderately correlated in this study ($r = .56$), indicating connection between the two sets of traits. It is nevertheless interesting to note that despite this, there were meaningful differences. Attachment avoidance was the only one of the two to emerge as a predictor in the regression models, and while both variables were significantly positively correlated with depression and anxiety disorder diagnosis, attachment anxiety was the only one to show significant correlations with depression and anxiety symptom severity. Given that individuals with an avoidant attachment style characteristically block or suppress negative emotions and put up a defensive façade of strength, independence and composure [15], women in this study high in avoidant attachment traits may not have reported the full extent of their distress in the self-report questionnaire, particularly one that they are familiar with (the EPDS is administered routinely in Australian antenatal and postnatal wards and clinics). Nevertheless, when asked face-to-face in the structured clinical interview for DSM-IV diagnosis, they may have been more willing and able to report symptoms.

Parental abuse during childhood was positively correlated with high PSE. This is a somewhat surprising result given the findings in previous studies of an inverse correlation between childhood maltreatment and PSE [22], as well as more general evidence about the poor long-term psychological and social outcomes associated with childhood abuse [44]. The finding in this study could be due to the fact that childhood abuse was measured retrospectively and by self-report, i.e., it is possible that some women may have either over- or under-reported childhood abuse. Alternatively, it is possible that women in this study with a history of childhood abuse may have truly felt efficacious in their role as a parent. This could be for a variety of reasons including positive parenting received from the non-abusive parent or another important attachment figure during

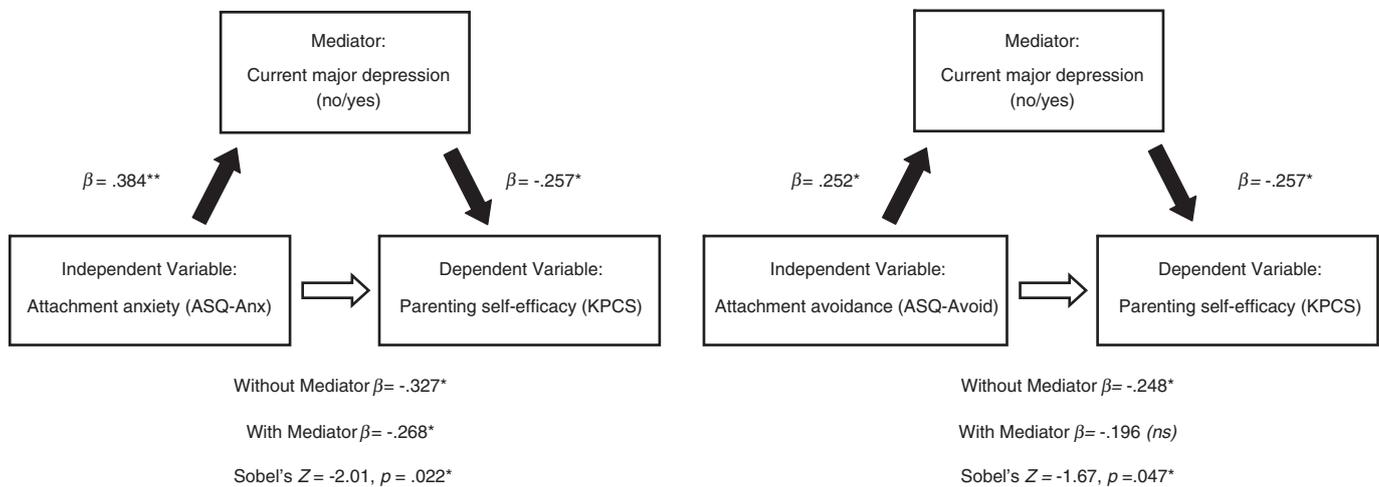


Fig. 1. Mediation model showing that current depression mediates the relationship between attachment anxiety and parenting self-efficacy, and between attachment avoidance and parenting self-efficacy ($n=83$). Note: The standardised regression coefficient (β) is given for each relationship; * $p<.05$; ** $p<.001$; ns = non-significant; major depression (MINI) coded as no (0) and yes (1); Sobel's Z test values calculated at the one-tailed probability level.

childhood. Indeed for some women, high parenting self-efficacy beliefs may in fact correspond with their parenting abilities – but unfortunately for others there may be a significant mismatch between PSE and parenting quality. Psychological defence mechanisms or unresolved issues related to past abuse and trauma may be at play, and poor understanding of the developmental needs of infants or the nature of positive, effective parenting may be lacking. Future research should seek to better understand the relation between PSE and childhood abuse.

One of the aims of this study was to explore associations between anxiety and PSE. Although anxiety symptom severity was significantly inversely correlated with PSE, anxiety disorder diagnosis was not, and neither emerged as significant predictors in the multiple regression model. From this, one could surmise that anxiety has less to do with PSE than does depression, but given the known comorbidity between depression and anxiety [45,46], the real story is probably more complex. Bandura [1] talks about depression being predominantly associated with perceived inefficacy in gaining highly valued outcomes and anxiety as arising in response to perceptions of being ill-equipped to manage potentially injurious events. Bandura himself, however, acknowledges the overlap between depression and anxiety, conceding that there may be some situations in which “perceived inefficacy in gaining highly valued outcomes can be anxiety provoking as well” [1] (p. 141). With respect to parenting and low PSE, anxiety-focused and depression-focused cognitive processes are likely to play a role for different women to different

degrees depending on situational and personal circumstances. It is also possible that anxiety may emerge as a stronger predictor of PSE when a better validated tool for assessing anxiety is used.

It is interesting that having a male infant was a significant predictor of low PSE, because the few studies that have explored the impact of infant gender on PSE have failed to find significant associations. For example, Hudson et al. [47] examined associations between infant gender, PSE and parenting satisfaction in first-time mothers and fathers and found no significant main effects of infant gender at 4 months postpartum, for mothers or fathers. When this same sample was re-assessed at 12 months postpartum, fathers of boys were found to have greater parenting satisfaction and PSE, but there were no significant infant gender-based differences for mothers [48]. Salonen et al. [49] similarly failed to find associations between PSE in the first week postpartum and infant gender in a sample of 863 mothers and 525 fathers. There has been some evidence, mainly in early studies, of infant gender affecting parent–child relationship variables. For example, Tronick and Cohn [50] studied interactions between mother–infant pairs at 3, 6, and 9 months of age, and found significant gender differences in the degree of matching/synchrony, with mother–son pairs spending more time in coordinated states than mother–daughter pairs. Overall, research showing effects of infant gender on any parenting or parent–child relationship variables has been sparse, and if anything, evidence suggests better parenting and/or interactions between mothers and male infants. In this

Table 3

Multiple regression: criterion variables (i) PSE change score ($n=78$), (ii) Infant sleep time change score ($n=72$), (iii) Infant unsettled time change score ($n=72$).

	PSE change		Infant sleep change		Infant unsettled behaviour change	
	B	p	β	p	β	p
Parental abuse (MOPS-A)	-.418	.014*	-.334	.072	.136	.482
Parental indifference (MOPS-I)	.335	.054	.120	.523	-.101	.606
Parental over-control (MOPS-O)	.031	.811	-.025	.863	-.137	.362
Avoidant attachment (ASQ-Avoid)	.092	.563	.454	.010*	-.183	.307
Anxious attachment (ASQ-Anx)	.041	.785	-.298	.075	.318	.070
Maternal age	.034	.767	-.057	.648	.127	.333
Infant age	-.093	.391	-.028	.813	-.146	.243
Infant gender	-.221	.056	.086	.492	-.060	.649
Current depressive symptom severity (EPDS-Dep)	.334	.044*	-.045	.806	-.001	.998
Current anxiety symptom severity (EPDS-Anx)	-.021	.901	.450	.024*	-.345	.096
Current major depression (MINI-dep)	.073	.654	-.169	.324	.009	.960
Current anxiety disorder (MINI-A)	-.095	.502	-.017	.909	-.083	.598

* $p<.05$. Note: Categorical variables coded as follows: Infant gender: male (-1), female (1), male/female twins (0); major depression: yes (1), no (0); at least one anxiety disorder: yes (1), no (0).

study we did not measure aspects of the mother–infant interaction and indeed these may have no relation to a mother's feeling of PSE. Given the novel findings of this study with regard to infant gender and PSE, future studies should investigate these links further.

This study also offers important insights about the impact of a brief, intensive residential intervention for unsettled infant behaviour. First of all, it is encouraging to note the effectiveness of the intervention in bringing about positive changes in both PSE and infant behaviours. Given the brevity of the intervention, it is unlikely that these improvements occurred as a result of infant developmental changes. Bandura [2] identified four antecedents to self-efficacy, namely (i) prior experience of the task, (ii) experiencing low levels of arousal or stress when engaged in the task, (iii) the opportunity to observe others perform the task, and (iv) receiving positive feedback from others. While the mothers in this study were all first-time mothers and so were limited in terms of prior experience of the task (antecedent [i]), the effectiveness of this intervention is still likely to lie in its incorporation of the latter three factors. That is, nurses model sleep and settling and infant care techniques thus providing the opportunity for clients to observe positive and effective care-giving with their child (antecedent [ii]). Nurses also provide encouragement and positive feedback as clients begin to implement these new infant care strategies for themselves (antecedent [iv]). Providing a low-stress learning environment is also a vital part of the intervention program. Staff work holistically with clients to help them feel secure, confident and relaxed in the parenting role. At times this includes addressing psychosocial and mental health issues (antecedent [ii]). Together, these elements combine to create an environment and experience that leads to significant PSE improvements over the course of the 4 days.

The variables most predictive of PSE improvement were depressive symptom severity and recollections of a non-abusive childhood. Interestingly, despite being a significant predictor of PSE on admission, avoidant attachment did not predict improvement in PSE over the course of the admission. This stands in contrast with results of Fonagy et al. [51], who evaluated outcomes of a psychotherapeutic intervention in 82 non-psychotic inpatients and found that patients classified as having a 'dismissive' state-of-mind with respect to attachment were the most likely to benefit from psychotherapy. The differing results, however, are not unexpected given that Fonagy et al. evaluated outcomes after a much longer intervention (average length of admission, 9.4 months), and that they used an interview-based tool to assess adult attachment. It is also important to note that in our study, avoidant attachment was one of only two variables that predicted improvements in infant sleep time, with the other variable being anxiety symptom severity. This suggests that the infants of women with an avoidant attachment style responded well to the intervention, despite initially having more severe sleep difficulties. Given the known transactional nature of mother–infant difficulties, it is possible that the improved sleep outcomes of infants of avoidant mothers may have slowly translated into improved PSE after the intervention. Interestingly, although unsettled infant behaviour improved over the course of the admission, none of the variables in our model were identified as having contributed significantly to this change.

Study limitations must be acknowledged. The first major weakness was the cross-sectional design. Without longitudinal follow-up of clients, it is difficult to draw conclusions about the direction of causation between variables. Furthermore, although the pre- and post-intervention data obtained in this study was informative, the lack of longer-term follow-up data means that we do not know how the families fared in the longer term. The Karitane Residential Unit is a supportive and contained environment, free from many of the complications that can beset life in the 'real' world. In order to draw firm conclusions as to the effectiveness of the intervention program, it would be important to assess PSE and infant behaviour once families had returned home. Second, another potential weakness of this study was the use of the EPDS to measure depression and anxiety symptom severity. As noted earlier, there is a growing body of evidence showing that the EPDS contains

distinct depression and anxiety subscales. Nevertheless, given that demonstrations of the reliability and validity of the subscales have not been definitive, future studies would benefit from use of a more robust measure of anxiety symptoms such as the STAI-state [52]. In the current study, as the EPDS was part of the standard admission assessment at the Unit, we chose to use it for the sake of reducing the burden on participants. The reliability of the EPDS subscales was high (Cronbach alpha coefficients, .85 and .73 for the depression and anxiety subscales, respectively), and face validity was evident in the finding that the two subscales related uniquely to different variables in the study, e.g., EPDS-depression and not EPDS-anxiety was identified as a significant predictor of PSE (initial and changes score) and EPDS-anxiety was identified as a significant predictor of change in infant sleep. Third, the use of a self-report measure of attachment could be considered another weakness. The advantages of self-report measures of attachment include ease of administration and scoring, but their clinical application is limited. Evidence suggests overlap between some aspects of self-report attachment questionnaires and interviews assessing attachment state-of-mind constructs [53,54], however, given that the ASQ (and other self-report attachment scales) do not provide objective information or information as to whether an individual has 'resolved' previous abuse and loss experiences, the use of a self-report attachment measure rather than a state-of-mind interview such as the Adult Attachment Interview (AAI) [55] could be considered problematic. A final limitation of this study was the failure to include examination of other variables shown to be related to PSE such as social support [6,10], the quality of the marital relationship [8], prior experience with children [8], self-esteem [21], general self-efficacy [7,56] and parenting satisfaction [56]. These limitations notwithstanding, this study also had a number of strengths, including utilisation of a range of assessment methods (self-report questionnaires, diagnostic interviews and independent ratings of infant behaviour), and it provides a number of important contributions to the PSE literature.

In sum, this study highlights the links between PSE, maternal depression and anxiety, and adult attachment insecurity. Importantly, it also shows the effectiveness of a brief intensive intervention in bringing about improvements in PSE. The clinical implications of these findings are vast. The study highlights the effectiveness of brief multi-faceted and multi-disciplinary residential programs such as the KRFU in bringing about positive changes in maternal PSE and early infant behaviour difficulties. It also suggests that when assessing PSE in new parents, clinicians should maintain awareness of childhood factors and adult attachment issues, particularly when working with women presenting with early parenting difficulties, unsettled infants or postnatal mood disturbance. Introduction of self-report scales such as the ASQ or MOPS into routine clinical practice could be one way to aid clinical assessment and treatment in this regard. Future research should further investigate relations between PSE and early childhood abuse, between PSE and infant gender, and between PSE, parenting quality and infant attachment. Future studies should also examine the development and impacts of PSE in fathers, and utilise more rigorous measures of anxiety symptoms and an interview-based measure of attachment such as the AAI [55].

Conflict of interest statement

None.

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