



Prematurity and parental self-efficacy: The Preterm Parenting & Self-Efficacy Checklist

Claire Pennell^a, Koa Whittingham^{b,*}, Roslyn Boyd^b, Matthew Sanders^c, Paul Colditz^d

^a School of Psychology, The University of Queensland, Australia

^b Queensland Cerebral Palsy and Rehabilitation Research Centre, The University of Queensland, Australia

^c Parenting and Family Support Centre, The University of Queensland, Australia

^d Perinatal Research Centre, The University of Queensland, Australia

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ABSTRACT

There is a lack of research investigating parental self-efficacy in parents of infants born preterm as well as a paucity of parental self-efficacy measures that are domain-specific and theoretically grounded. This study aimed to compare parental self-efficacy in parents of infants born term, preterm and very preterm as well as to test whether parental self-efficacy mediates the relationship between psychological symptoms and parental competence. In order to achieve this, a new measure of parental self-efficacy and parental competence relevant for the preterm population and consistent with Bandura's (1977, 1986, 1989) conceptualisation of self-efficacy was developed. Participants included 155 parents, 83 of whom were parents of very preterm (GA < 32 weeks), 40 parents of preterm (GA < 37 weeks) and 32 parents of term born infants. Parents completed the Preterm Parenting & Self-Efficacy Checklist (the new measure), Family Demographic Questionnaire, Depression Anxiety Stress Scale and Self-Efficacy Questionnaire. This initial study indicates that the Preterm Parenting & Self-Efficacy Checklist has adequate content validity, construct validity, internal consistency and split half reliability. Contrary to expectations, parents of very preterm infants did not report significantly lower overall levels of parental self-efficacy or significantly higher levels of psychological symptoms compared to parents of preterm and term infants. Parental self-efficacy about parenting tasks mediated the relationship between psychological symptoms and self perceived parental competence as predicted. Clinical implications of the results and suggestions for future research are discussed.

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An infant is considered preterm if they are born before 37 weeks gestational age and very preterm if born before 32 weeks gestational age (Goldberg & DiVitto, 1995). It is estimated that premature births account for about 8% of total births in developed countries and up to 25% in developing countries (Steer, 2005). Of the 300,000 babies born in Australia each year, approximately 21,000 (8.4%) are born prematurely and more than 2500 (1%) are born very preterm (Australian Bureau of Statistics, 2007). As gestational age decreases, an infant's mortality and health complications risk clearly increases (Wilcox & Skjærven, 1992).

Recent medical and technological advances in preterm infant care have ensured the survival of smaller and more biologically vulnerable infants (Halpern, Brand, & Malone, 2001). However, this also means that more preterm infants are spending

* Corresponding author at: Queensland Cerebral Palsy and Rehabilitation Research Centre, Department of Paediatrics and Child Health, School of Medicine, The University of Queensland, Level 3 Foundation Building Royal Children's Hospital, Herston, Brisbane 4029, Australia. Tel.: +61 7 3636 5539; fax: +61 7 3636 5538.

E-mail address: koawhittingham@uq.edu.au (K. Whittingham).

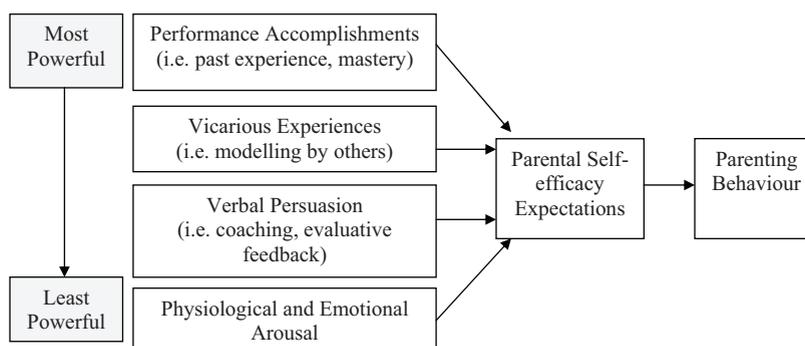


Fig. 1. Self-efficacy theory as it relates to parenting (Bandura, 1977).

longer in special care nurseries (SCN) for observation and neonatal intensive care units (NICU) for long term care (Miles, 2007). Although medically necessary this is associated with parental distress (Miles, 2007). Preterm birth is associated with many unique challenges for parents including the unexpected timing of the birth and the demanding and stressful hospital experience (Goldberg & DiVitto, 1995). Further, infants who are born preterm are at a heightened risk of lung dysfunction, seizure disorders, cerebral palsy and vision and hearing impairment (Greco et al., 2005). At least 10% of preterm infants develop major disabilities and 50% develop behavioural and education related problems (Bacharach & Baumeister, 1998).

A review of preterm infant behaviour concluded that preterm infants were less likely to instigate interaction, were less attentive and displayed less positive emotion and more negative emotion than term born babies (Goldberg & DiVitto, 1995). Furthermore, preterm infants display less responsive behaviour in parent–infant interactions compared to term infants and were also viewed as less rewarding social partners (Harrison & Magill-Evans, 1996; Malatesta et al., 1989). Thus, parents of infants born preterm may have greater difficulty acquiring a sense of mastery and self-efficacy in relation to parenting tasks.

1. Self-efficacy

Self-efficacy can be defined as an individual's sense of being able to manage a task effectively and successfully (Bandura, 1982). A self-efficacy belief involves the assertion of capability and also the degree of strength of that belief (Bandura, 1997; de Montigny & Lacharité, 2005). When an individual feels capable, they are more likely to persevere, set goals and commit to achieving mastery of a task (Bandura, 1982; Dennis & Faux, 1999). Thus, self-efficacy predicts actual competence or success at a task. Self-efficacy is measured in four levels of specificity including global self-efficacy (judgments about their capability in general), domain-general self-efficacy (parent's judgments about their capability in parenting role), domain-specific self-efficacy (parent's judgments about their ability in all the common tasks of parenting) and task-specific self-efficacy (parent's judgment about their ability in a specific task) (Bandura, 1997).

A person's self-efficacy judgments about a task originate from four main informational sources: changes in physiological/emotional arousal upon anticipating or attempting the task, verbal persuasion (e.g. a realistic positive appraisal from a credible and believable individual) and feedback from others, vicarious experience of watching others complete the task and past experience with the task. Direct experience with the task is the most effective method of building self-efficacy (Bandura, 1977, 1986, 1989; see Fig. 1).

1.1. Construct issues with parental self-efficacy research

Most of the literature on parental self-efficacy uses the concepts of parental self-efficacy, parental confidence and parental self esteem interchangeably and this is a major flaw in the current literature that presents challenges for drawing meaning from the literature (de Montigny & Lacharité, 2005). In some studies, research tools intended to specifically measure parental sense of competence have been misused to measure parental self-efficacy (Hanson, Henggeler, Rodrigue, Burghen, & Murphy, 1988; Tessier, Piche, Tarabulsky, & Muckle, 1992). Further, in a systematic concept analysis of the literature from 1980 to 2000, de Montigny and Lacharité (2005) concluded that the majority of research on parental self-efficacy did not use a definition of self-efficacy consistent with self-efficacy theory.

Self-efficacy is a theoretically defined construct referring to an 'affirmation of capability and strength of that belief' (Bandura, 1997, p. 382) in contrast to self confidence which is a nebulous, colloquial term unrelated to a specific theory. Measures of self confidence often include items unrelated to self-efficacy that tap into parental distress and parental satisfaction. Therefore, the existing literature on parental self-efficacy must be considered with caution and there is a need to develop self-efficacy measures that are theoretically grounded in self-efficacy theory.

1.2. Domain-general parental self-efficacy

Domain-general parental self-efficacy is defined as parent's judgments about their capability to parent their child and be successful in the parenting role (Hess, Teti, & Hussey-Gardner, 2004). Domain-general parental self-efficacy beliefs have been found to play an important mediational role in connecting various parent (depression), child (infant temperament) and situational factors (social support) with behavioural competence and quality of parenting (Coleman & Karraker, 2000; Cutrona & Troutman, 1986; Teti & Gelfand, 1991).

Teti and Gelfand (1991) found that maternal self-efficacy mediated the relationship between various psychosocial risk factors (including socio-demographic status, infant temperament, social marital support and depression) and maternal competence in mothers of 3–13-month-old infants. Low parental self-efficacy has been associated with parental depression (Cutrona & Troutman, 1986; Teti & Gelfand, 1991), high levels of parental stress (Wells-Parker, Miller, & Topping, 1990), low social support, poor infant health status (Shea, 1984) and infants who are fussy, irritable and difficult to read (Cutrona & Troutman, 1986). Parents of infants born preterm may be vulnerable to decreased maternal confidence, particularly in the infancy period (Seashore, Leifer, Barnett, & Leiderman, 1973). Quality of care provided by parents is strongly influenced by their parental self-efficacy (Coleman & Karraker, 1997). When parental self-efficacy is high, parents are more likely to provide a healthy, nurturing environment for their children. Sensitive and receptive parenting is associated with an infant's intellectual and socio-emotional development (Campos, Barrett, Lamb, Goldsmith, & Stenberg, 1983).

1.3. Domain-specific self-efficacy

Infants have specific developmental needs and effective parenting involves performing particular tasks to meet these needs (Ballenski & Cook, 1982; Duvall, 1971). Domain-specific parental self-efficacy refers to the parent's self-efficacy in all the common tasks of parenting (Barnes & Adamson-Macedo, 2007). In contrast to domain-general parental self-efficacy, it is measured at a specific level for particular tasks, under certain conditions (Sanders & Woolley, 2005). Domain-specific self-efficacy measures have superior predictive validity compared to global self-efficacy measures for predicting competence at a given task (Beck & Lund, 1981; Multon, Brown, & Lent, 1991; Pajares & Miller, 1995). Domain-specific self-efficacy beliefs direct action and predict performance and actual behaviour (Bandura, 1997). While little research has been done on domain-specific self-efficacy in parents of preterm infants, some literature does exist outside the parenting domain. This research in dental care, mathematics performance and academic outcomes highlight the advanced predictive validity of domain-specific self-efficacy over domain-general and global self-efficacy measures (Beck & Lund, 1981; Multon, Brown & Lent, 1991; Pajares & Miller, 1995).

To the author's knowledge a domain-specific self-efficacy measure (about parenting tasks) for parents of preterm infants that is appropriate after discharge from hospital does not exist. Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool is a robust domain-specific self-efficacy measure, however, it is only relevant while the preterm infant is in hospital (Barnes & Adamson-Macedo, 2007).

The Karitane Parenting Confidence Scale (KPCS) was developed to measure perceived parenting self-efficacy in parents of children aged 0–12 months (Črnčec, Barnett, & Matthey, 2008). Although it was developed and tested in the Australian context, it was not designed to capture the responses of parents of preterm infants specifically.

A recent review of the parental self-efficacy literature identified seventeen task-specific scales of parenting confidence designed for parents of infants, however none of the scales were recommended for parents of preterm infants aged 0–24 months of age (Črnčec, Barnett, & Matthey, 2010). The "What Being the Parent of a New Baby is Like-Revised (WPL-R) scale was identified as being validated only for mothers of preterm infants aged 0–3 months old (Pridham & Chang, 1989). The Maternal Self-Confidence Paired Comparisons (MSPC) was originally tested with mothers of preterm infants aged 0–several months old; however the scale was rated by reviewers as having unacceptable psychometric properties (Seashore, Leifer, Barnett, Leiderman, 1973). The Maternal Confidence Questionnaire (MCQ) was developed specifically for mothers of premature infants, however, the tool measures a number of different concepts in addition to self-efficacy including satisfaction and distress and was recognized by reviewers as having no specific theoretical underpinning (Parker & Zahr, 1985; Zahr, 1991).

Maternal Efficacy Questionnaire was developed for mothers of term infants and taps broader, domain-general parental self-efficacy (Teti & Gelfand, 1991). Therefore, a new measure of domain-specific self-efficacy suitable for administration to both mothers and fathers of preterm infants is needed. The tasks of parents of preterm infants are likely to be different to the tasks of parents of term infants.

1.4. The current study

This study aimed to address the paucity of literature on parental self-efficacy in parents of infants born preterm and in particular, to ascertain whether parents of very preterm infants have lower levels of parental self-efficacy and higher levels of psychological symptoms as compared to parents of preterm and term infants. In addition, the aim was to ascertain whether domain-specific self-efficacy mediates the relationship between psychological symptoms and self perceived parental competence and the relationship between social risk and self perceived parental competence in parents of infants born preterm. In order to achieve this, a new measure was developed, a measure of domain-specific parental self-efficacy

Table 1
Parent/child characteristics.

Demographic variable	Total sample	Very preterm	Preterm	Term
Infant				
Gestational age (weeks)	30.21 (3.65)	28.00 (2.13)	34.04 (1.35)	37.93 (0.70)
Corrected age (months)	12.75 (6.08)	13.05 (7.73)	12.00 (6.61)	–
Mean age (actual age) in months	14.08 (6.72)	15.69 (6.35)	13.24 (6.87)	10.95 (6.35)
Gender				
Female	96	57	21	18
Male	75	37	24	14
Birth weight (g)	1461.04 (715.20)	1093.15 (392.26)	2239.58 (613.42)	–
Parent				
Age (years)	31.60 (5.27)	31.74 (4.93)	31.73 (5.52)	31.09 (5.93)
Gender				
Female	152	82	38	32
Male	3	1	2	0
Parent type				
First time	78	51	14	13
Previous parent	77	32	26	19
Type of birth				
Single	134	67	35	32
Multiple	21	16	5	0
Total (N)	155	83	40	32

Note: For continuous variables the values are presented as means with standard deviations in parentheses, for categorical variables the values are presented as frequencies. Dashes indicate that item was not measured for term infants.

for parents of preterm infants up to 24 months of age. Initial reliability and validity analysis on this measure was conducted in accordance with self-efficacy theory.

2. Method

2.1. Participants

A total of 155 parents (of whom 83 were parents of very preterm infants, 40 parents of preterm infants and 32 parents of term infants) participated. In order to be considered the parent of an infant, their child needed to be less than 24 months corrected age. Parents of term and preterm infants were recruited through agencies/organisations, parenting groups/play groups, child care centres, church groups and online support groups. The characteristics of the sample are summarised in Table 1.

An apriori power analysis indicated that a total sample of 68 parents of preterm infants was necessary to test domain-specific self-efficacy as a mediator with 0.80 power. In addition, apriori power analyses indicated that a total sample size of 150 participants was necessary to test the differences between term, preterm and very preterm groups with 0.80 power and recruitment approached this number.

2.2. Design

This study employed a correlational, cross sectional design, where the survey was conducted online via the Internet.

2.3. Measures

2.3.1. Family Demographic Questionnaire

The Family Demographic Questionnaire was developed for the purposes of this study to collect demographic information such as gender, age, ethnicity, as well as indicators of SES and social risk (Appendix 1). Items were also included specifically for parents of very preterm and preterm infants. These collected information on birth weight, complications at birth, medical condition, disability and developmental delay. A social risk composite was created using methods similar to that used in previous research, for example Treyvaud et al. (2009). The social risk composite was created by summing: (1) parental age at birth (0: 20 years and older, 1: 17–19 years old, 2: 16 years and younger); (2) relationship status (0: married or de facto, 1: separated or divorced, 2: single), (3) people in support network (0: four or more people, 1: 2–3 people, 2: 0–1 people), (4) income (0: more than \$50 000, 1: \$25 000–\$50 000, 2: less than \$25 000) and parental highest level of education (0: Tertiary education – TAFE, Trade, University undergraduate and postgraduate program, 1: Year 12, 2: Less than Year 12. This total produced a social risk score ranging from 0 to 7.

2.3.2. Depression Anxiety Stress Scale (DASS-21)

The DASS is a 21-item standardised, self report questionnaire designed to measure three related negative emotional states of depression, anxiety and tension/stress (Lovibond & Lovibond, 1995). The DASS-21 generates three subscales of depression, anxiety and stress. Appropriate psychometric properties of the DASS-21 have been found with reported internal consistencies of 0.94, 0.87 and 0.91 for depression, anxiety and stress respectively (Antony, Bieling, Cox, Enns, & Swinson, 1998).

A DASS-21 total score (sum of the three subscale totals) was used for the purposes of this study as an indication of general psychological symptoms. The DASS-21 total score was found to have suitable internal consistency in this study with a Cronbach's alpha of 0.94 (Lovibond & Lovibond, 1995).

2.3.3. Self-Efficacy Questionnaire

The Self-Efficacy Questionnaire is a 10-item measure that was adapted from the Maternal Self-Efficacy Scale (Teti & Gelfand, 1991) to include both mothers and fathers responses. The Maternal Self-Efficacy Scale has a satisfactory internal consistency with a Cronbach's alpha of 0.79 and 0.86 (Teti & Gelfand, 1991). Parents are asked to rate "how good" they are at the 10 general areas of parenting and "how good" they are at 10 general areas of parenting in comparison to other parents in general. The 20 ratings were summed together to obtain a total score (out of 80), a measure of parental self-efficacy. This questionnaire was considered to measure domain-general parental self-efficacy. It was developed for parents of infants born at term.

2.3.4. Preterm Parenting & Self-Efficacy Checklist

The Preterm Parenting & Self-Efficacy Checklist was created for the current study in order to measure the parental self-efficacy for specific parenting tasks of parents of infants born preterm. The 36 item checklist was created based on a review of the literature and identification of general care principles for parents prior to an infant's discharge from hospital (Macdonald, Seshia, & Mullett, 2005). Parent education tools used in the Grantley Stable Neonatal Unit in the Royal Brisbane & Women's Hospital Health Services District were also used to generate the checklist. Specialist knowledge was sought and a first draft of the Preterm Parenting & Self-Efficacy Checklist was reviewed by experts in the field.

A total of three subscales were developed that measured parent's self-efficacy, importance of tasks and self-perceived parental competence (i.e. successful performance of the tasks). For example "How confident were you at bathing your baby? (1 = not at all confident and 7 = very confident), "How important do you feel this skill was for you to be a good parent to your baby?" (1 = not at all important and 7 = very important), and "How successful do you feel you were at bathing your baby?" (1 = not at all successful and 7 = very successful). The self-efficacy items were summed to form the self-efficacy subscale. The task success items were summed to form the self-perceived parental competence subscale. The importance questions were used as a validity check and were used to compare the importance of tasks across the very preterm, preterm and term groups to identify if particular tasks were preterm specific. A copy of this measure is provided in Appendix 2.

2.4. Procedure

Ethical clearance for the present research project was granted from the University of Queensland's School of Psychology Ethical Review Committee (PSYCH-4-24-BA). Participants were required to access and complete the survey online. Parents began the web based survey by reading an introduction letter. The letter advised parents of the purpose of the research, that participation was voluntary and they were free to withdraw at any time. Parents were also informed that their responses were strictly confidential. Participants agreed to informed consent by clicking their mouse on the icon I Agree and completing the online survey.

2.5. Analysis

Initial validity and reliability analyses were conducted on the new measure, the Preterm Parenting & Self-Efficacy Checklist. A non-parametric independent groups *t*-test was completed to compare domain-specific self-efficacy for first time parents with that of parents who have had children previously. One-way non-parametric ANOVA analyses were conducted to assess whether domain-specific self-efficacy, domain-general parental self-efficacy and psychological symptoms varied between the three parent groups (very preterm, preterm and term). A standard multiple regression was completed to assess the effects of social risk and psychological symptoms on domain-specific self-efficacy. A second standard multiple regression assessed the effects of social risk and psychological symptoms on self perceived parental competence. A mediational model of domain-specific self-efficacy was conducted.

Table 2
Means, standard deviations, and intercorrelations for all variables.

Variables	Domain-specific self-efficacy	Self perceived parental competence	Domain-general parental self-efficacy	Psychological symptoms	Actual age of infant
Domain-specific self-efficacy					
Self perceived parental competence	0.80**				
Domain-general parental self-efficacy	0.28**	0.38**			
Psychological symptoms	−0.19*	−0.27**	−0.27**		
Actual age of infant	−0.08	−0.20*	0.03	0.03	
Means	63.40	63.17	64.39	21.56	14.08
Standard deviations	9.86	7.82	5.48	21.13	6.02

* $p < 0.05$.

** $p < 0.001$.

3. Results and discussion

3.1. Data screening and diagnostics

Raw data were examined for missing values prior to data analyses being conducted. Parents were excluded if they did not meet inclusion criteria. Participants with more than 30% missing data for a particular questionnaire were excluded from analyses in order to eliminate parents who did not complete the survey. This was necessary due to the online delivery. For participants with 30% or less missing data, an average of each participant's scores on the other specific questionnaire items was used and inserted to replace the missing data. Apart from parents failing to proceed with the survey the pattern of missing data was random and less than 5%.

Nonparametric statistics were conducted in order to account for skewness. This included Spearman's rank order correlations, Mann–Whitney U test, Kruskal–Wallis tests and bootstrapping.

Bootstrapping methods are robust against multivariate assumptions as repeated random sampling of individual cases generates an estimate of the distribution of the statistic (Preacher & Hayes, 2008).

3.2. Psychometric properties of the Preterm Parenting & Self-Efficacy Checklist

3.2.1. Reliability: internal consistency

Cronbach's coefficient alpha was used to calculate internal consistency reliability estimates for the self-efficacy (0.75) and self perceived parental competence (0.56) subscales. The reliability estimate for the self-efficacy subscale exceeded the recommended 0.70 for new instruments. This result is important as this self-efficacy subscale is the focus of the newly developed measure (Bland & Altman, 1997). The reliability estimate for the parental competence was less than ideal.

3.2.2. Reliability: split half reliability

Two split half reliability tests for the domain-specific self-efficacy subscale (0.75) and the self perceived parental competence subscale (0.58) were conducted. Split half reliability is the correlation between two halves of a test (Brown, 1910; Spearman, 1910). Both subscales were found to have appropriate split half reliability estimates.

3.2.3. Construct validity

The domain-specific self-efficacy subscale of The Parenting and Self-Efficacy Checklist was assessed for construct validity by checking the correlations it had with other theoretically related constructs. The Preterm Parenting & Self-Efficacy Checklist was significantly correlated with the Self-Efficacy Questionnaire and domain-specific self-efficacy and self-perceived parental competence on the Preterm Parenting & Self-Efficacy Checklist were significantly correlated (see Table 2 for specific values).

This positive correlation provides support for the concurrent validity of the newly developed self-efficacy measure because the parental self-efficacy subscale (belief in capability to perform a task) predicted self perceived parental competence (success at performing a task) consistent with Bandura's (1982) self-efficacy theory. A Spearman's rank order correlation testing the relationship between age of infant and domain-specific self-efficacy was not found to be significant. Lastly, a Spearman's rank order correlation testing the relationship between age of infant and self perceived parental competence was significant.

3.2.4. Non-parametric independent groups t -test analysis

A non-parametric independent groups t -test was performed to compare the mean domain-specific self-efficacy score for first time parents with that of parents who have had children previously. This Mann–Whitney U test was found to be statistically significant $Z = -4.78$, $p < 0.001$. Parents who have had children previously ($M = 89.56$) had significantly higher domain-specific self-efficacy compared to first time parents ($M = 56.21$). This result is consistent with self-efficacy theory

as parents who have had children previously would have had more opportunity to experience performance successes and build their self-efficacy.

3.2.5. Task importance

Task importance was checked to make sure parents considered all task items included in the Preterm Parenting & Self-Efficacy Checklist to be relevant and important. After examining mean parent group scores on the task importance subscale, it is clear that participants from all three parenting groups considered all of the tasks to be important aspects of parenting. For some participants, question 11 and question 12 were not applicable as these questions referred to having a partner and having previous children. These participants' responses were not included in the evaluation of task importance. From eyeballing the data there appeared to be adequate face validity and no major differences between parenting groups on ratings of task importance were evident. For this reason no statistical analyses were conducted and the parenting tasks chosen were considered to have face validity.

3.3. Prematurity and parental self-efficacy

3.3.1. One way non-parametric ANOVA analyses

A one-way non-parametric between subjects analysis of variance was conducted to evaluate whether domain-specific self-efficacy (as measured by the Preterm Parenting & Self-Efficacy Checklist) varied between the three parent groups (very preterm, preterm and term). The alpha level was 0.05. This Kruskal–Wallis test was not found to be significant, $0.2 = 0.43$, ns.

A one-way non-parametric between subjects ANOVA was conducted to evaluate whether domain-general parental self-efficacy (as measured by the Self-Efficacy Questionnaire) varied between the three parent groups (very preterm, preterm and term). The alpha level was 0.05. This Kruskal–Wallis test was also not significant, $0.2 = 0.39$, ns.

Lastly, a one-way non-parametric between subjects ANOVA was conducted to evaluate whether psychological symptoms varied between parent groups (very preterm, preterm or term). The alpha level was 0.05. This Kruskal–Wallis test was not significant, $0.2 = 3.35$, ns.

3.3.2. Regression analysis 1

The first standard multiple regression was conducted to assess the effects of social risk and psychological symptoms (predictors) on domain-specific self-efficacy (the criterion). This regression was conducted with parents of preterm and very preterm infants only. Social risk ($M = 0.95$, $SD = 1.23$) was not significantly correlated with domain-specific efficacy ($M = 62.19$, $SD = 9.21$), $r = -0.01$, ns. Psychological symptoms had a significant zero order correlation with domain-specific self-efficacy (from the new measure), $r = -0.19$, $p = 0.009$. There were no collinearity effects between the predictors of psychological symptoms and social risk, $r = 0.24$, $p = 0.004$.

The overall analysis of regression approached significance, $R = 0.22$, $F(2, 115) = 2.99$, $p = 0.054$. Results suggest that 5% of the variance in domain-specific self-efficacy was accounted for by the predictors, while adjusted R^2 accounted for 3.4% of the variance. As an individual predictor, psychological symptoms made unique and significant contributions to the model ($\beta = -0.21$, $t = -2.20$, $p = 0.03$, $CI = -0.17$ to -0.02). As an individual predictor, social risk did not make a unique and significant contribution to the model ($\beta = -0.05$, $t = -0.50$, $p = 0.618$, $CI = -0.153$ to 0.82). Results suggest that 4.08% of the variance in domain-specific self-efficacy was uniquely attributable to psychological symptoms. The percentage of shared variance was 0.71%.

3.3.3. Regression analysis 2

The second standard multiple regression was conducted to assess the effects of social risk and psychological symptoms (predictors) on self perceived parental competence (criterion). This regression was conducted with parents of preterm and very preterm infants only. Social risk ($M = 0.95$, $SD = 1.23$) was not significantly correlated with self perceived parental competence ($M = 62.39$, $SD = 7.66$), $r = 0.05$, ns. Psychological symptoms ($M = 20.97$, $SD = 20.86$) had a significant zero order correlation with self perceived parental competence, $r = -0.24$, $p = 0.001$. There were no collinearity effects between the predictors of psychological symptoms and social risk, $r = 0.24$, $p = 0.004$.

The overall analysis of regression was significant, $R = 0.30$, $F(2, 115) = 5.59$, $p = 0.005$. Results suggest that 9% of the variance in self perceived parental competence was accounted for by the predictors, while adjusted R^2 accounted for 7.4% of the variance. As an individual predictor, psychological symptoms made unique and significant contributions to the model ($\beta = -0.31$, $t = -3.30$, $p = 0.001$, $CI = -0.18$ to -0.04). As an individual predictor, social risk did not make a unique and significant contribution to the model ($\beta = 0.12$, $t = 1.33$, $p = 0.186$, $CI = -0.16$ to 1.70). Results suggest that 8.76% of the variance in self perceived parental competence was uniquely attributable to psychological symptoms. The percentage of shared variance was 1.18%.

3.3.4. Mediation model analysis 1

A mediation model of domain-specific self-efficacy as a mediator of the effects of psychological symptoms on self perceived parental competence was conducted. This was not tested for social risk as social risk was not found to be significantly related to psychological symptoms or parental competence. Results revealed that the proposed model was significantly different from zero, $F(2, 120) = 80.70$, $p < 0.001$, with R^2 at 0.57. The adjusted R^2 value of 0.57 indicated that 57% of the variability

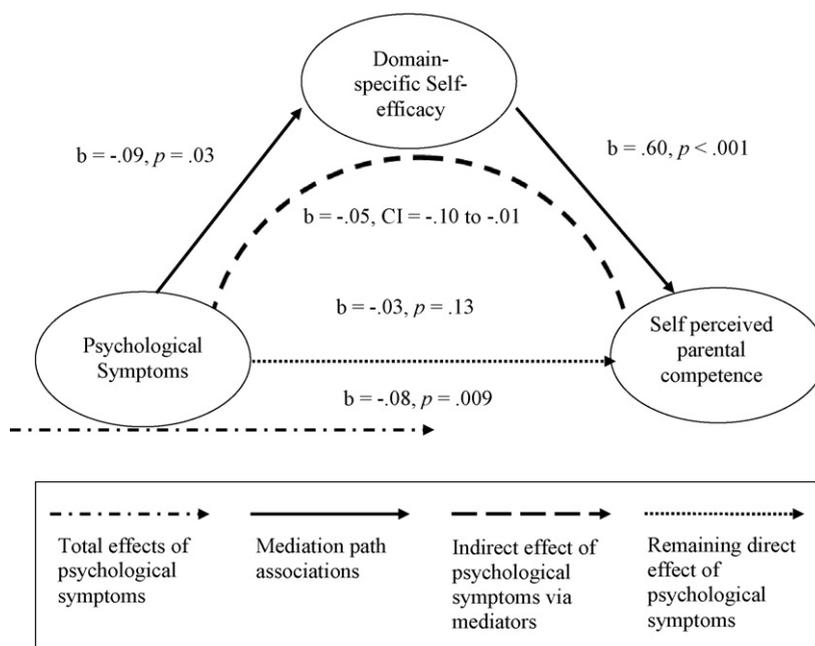


Fig. 2. Mediation bootstrap analysis of relationship between psychological symptoms and self-perceived parental competence as mediated by domain-specific self-efficacy.

in self perceived parental competence was predicted by knowing the level of domain-specific self-efficacy and psychological symptoms. As Fig. 2 illustrates, the effect on self perceived parental competence attributed to psychological symptoms was reduced from -0.08 (refer to total effect of psychological symptoms in Fig. 2) to -0.03 (refer to direct effect in Fig. 2) by the mediator variable, therefore showing the presence of a mediation. Results indicated that domain-specific self-efficacy significantly mediated the relationship between psychological symptoms and self perceived parental competence as the CI (-0.10 to -0.01) did not include zero.

4. General discussion

4.1. Psychometric properties of the Preterm Parenting & Self-Efficacy Checklist

A new measure of domain-specific parental self-efficacy relevant to parents of infants born preterm was developed in response to a paucity of measures in the current literature. A number of hypotheses were structured to validate the newly developed measure and each hypothesis was consistent with Bandura's (1977, 1982, 1989) self-efficacy theory. Both domain-specific self-efficacy and self perceived parental competence subscales were significantly correlated with an existing measure of domain-general parental self-efficacy developed for parents of infants born at term. Domain-specific self-efficacy scores were found to be significantly correlated with self perceived parental competence scores. Self perceived parental competence scores were significantly higher for parents of older children (within the 0–24-month age bracket) compared to parents of younger infants (within the 0–24-month age bracket). Parents who already had another living child were found to have higher domain-specific self-efficacy than first time parents. It can be assumed that parents of older children (within the 0–24-month age bracket) and parents who already have a living child would have spent more time parenting, which would have allowed for more opportunities for performance achievement and mastery (Bandura, 1977).

Each of these findings is consistent with Bandura's (1977, 1986, 1989) self-efficacy theory. These results therefore suggest that the newly developed measure of domain-specific self-efficacy and self-perceived parental competence (self-perceived success in performing the tasks) has been constructed in a way that is consistent with Bandura's (1977) original conceptualisation of self-efficacy.

It was thought that parents of older children would have increased self-efficacy as they had experienced increased time to master parenting tasks. Contrary to predicted, domain-specific self-efficacy scores were not significantly higher for parents of older children (within the 0–24-month age bracket) compared to parents of younger infants (within the 0–24-month age bracket). It is likely that this is because parents from all groups (very preterm, preterm and term) are having sufficient opportunities to practice, master tasks and build adequate domain-specific self-efficacy in the first couple of months of their

infant's life. Parents may reach a point where they have mastery over the parenting tasks and at this time more opportunities to practice do not serve to further increase self-efficacy.

The Preterm Parenting & Self-Efficacy Checklist is the first tool capable of measuring domain-specific parental self-efficacy and self-perceived parental competence for parents of preterm infants in Australia. Self-efficacy theory was used as the overarching theoretical framework for this study and the new measure is grounded in this theory which makes it unique compared to other parent attitude measures (Bandura, 1977, 1986, 1989). Many other parent attitude measures in the current literature are not based on this theory, which limits their successful practical application and interpretation (Parker & Zahr, 1985).

4.2. Prematurity and self-efficacy

These results are consistent with previous literature suggesting there are no significant differences in maternal distress and parental self-efficacy of mothers of preterm and term infants at 4, 7 and 9 months (Gennaro, 1988; Halpern & McLean, 1997; Trause & Kramer, 1983). As the average age of infants in our current sample was 14 months, it can be inferred that distress levels can reduce to a level comparable to parents of healthy term infants, after parents have recovered from the hospitalisation period and adjusted to caring for their preterm infant (Halpern, Brand, & Malone, 2001). The results also give strength to the notion that initially, a parent's stress is likely to be concerned with her preterm infant's health status but as the infant grows older, the focus of parent's stress is likely to shift to more commonly experienced parental stressors (Thompson, Oehler, Catlett, & Johndrow, 1993).

The preliminary regression result suggesting that psychological symptoms are a significant predictor of domain-specific self-efficacy is consistent with previous research on mothers of preterm and term born infants at 4 months corrected age (Halpern & McLean, 1997), mother of term infants at 3 months of age (Cutrona & Troutman, 1986), women ages 22–64 years (Wells-Parker, Miller, & Topping, 1990) and depressed and non depressed mothers of term infants (Teti & Gelfand, 1991). The mediation result suggesting that domain-specific self-efficacy mediated the relationship between psychological symptoms and self-perceived parental competence (self-perceived success in performing parenting tasks) is consistent with Bandura's (1989) self-efficacy theory. The mediation result is also consistent with previous literature suggesting that maternal self-efficacy mediated the relationship between various psychosocial risk factors (including socio-demographic status, infant temperament, social marital support and depression) and maternal competence for depressed and non depressed mothers of term infants (Teti & Gelfand, 1991).

There are some issues pertaining to the external validity of the results of the current project. Firstly, although every effort was made in recruitment, the sample was self selecting and only included three fathers. For this reason, the results obtained can only be generalised to mothers. This is a common problem in the parenting literature where the majority of participants are mothers (McGrath, Boukydis, & Lester, 1993; Olafsen et al., 2007). Some tasks on the new measure may not be as relevant to fathers and other unmentioned tasks may pertain more specifically to the father role. It can be concluded that the new tool may in fact be developed further by gaining insight from fathers. Secondly, there was very little variability in ethnicity in the sample and the majority of parents were Caucasian. Further research is necessary to identify whether the results generalise to parents with other ethnic backgrounds. Although a number of psychometric properties of the new measure were tested, test–retest reliability was not assessed as the information was collected from participants online, only at one time point. The present study utilised a correlational design where no variables were experimentally manipulated and no causal pathways could be tested or established. Longitudinal research with parents, involving several measurement opportunities is necessary to elucidate the causal relationships between psychological symptoms, domain-specific self-efficacy and self perceived parental competence.

This study has developed a unique, new measure of domain-specific self-efficacy and self perceived parental competence specific to parents of infants born preterm. The measure appears to be highly user friendly and could potentially be very useful in clinical settings. The new measure is sensitive to the specific challenges of parenting a preterm infant. After using the new measure, clinicians can identify specific tasks that challenge parents and provide individualised intervention and support.

The findings from the mediation model of the present study suggest that interventions aimed at improving parent's domain-specific self-efficacy may reduce the effects of psychological symptoms on parent's self perceived parental competence. Self-efficacy theory suggests that self-efficacy can be acquired in four ways: physiological and emotional arousal, verbal persuasion, vicarious experience and actual performance accomplishments or mastery of tasks (Bandura, 1977). An intervention targeting any or all of these four specific informational sources is likely to improve parental self-efficacy. Such an intervention may involve increasing parent's positive conceptions of physiological and emotional arousal, encouragement and positive feedback from others, modelling of parenting tasks, role play and observations from other parents and providing the parent with experiences to practice specific parenting tasks in different settings. The Preterm Parenting & Self-Efficacy Checklist could be used to measure parent's self-efficacy both before and after such an intervention.

5. Conclusions

A tool to measure the domain-specific self-efficacy and self perceived parental competence in parents of preterm infants has been developed in this study. The tool is sensitive to the parenting of preterm infants in Australia and the tool also appears

to be robust and valid for the sample studied. The results of this study suggest that domain-specific self-efficacy mediates the relationship between psychological symptoms and self perceived parent competence, consistent with self-efficacy theory. This has implications for early parenting interventions. Although further testing of the measure is necessary, it has a strong theoretical basis and appears to have many potential practical applications.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.infbeh.2012.07.009>.

References

- Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, *10*, (2), 176–181.
- Australian Bureau of Statistics. (2007). *4102.0 – Australian social trends, 2007: Australia's babies*. Canberra, Australia: Australian Bureau of Statistics.
- Bacharach, V. R., & Baumeister, A. A. (1998). Direct and indirect effects of maternal intelligence, maternal age, income, and home environment on intelligence of preterm, low-birth-weight children. *Journal of Applied Developmental Psychology*, *19*, (3), 361–375.
- Ballenski, C. B., & Cook, A. S. (1982). Mothers' perceptions of their competence in managing selected parenting tasks. *Family Relations*, *31*, (4), 489–494.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.
- Bandura, A. (1982). Self-efficacy in human agency. *American Psychologist*, *37*, 122–147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*, 1175–1184.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.
- Barnes, C. R., & Adamson-Macedo, E. N. (2007). Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool: Development and validation with mothers of hospitalized preterm neonates. *Journal of Advanced Nursing*, *60*, (5), 550–560.
- Beck, K. H., & Lund, A. K. (1981). The effects of health threat seriousness and personal efficacy upon intentions and behavior. *Journal of Applied Social Psychology*, *11*, 401–415.
- Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *British Medical Journal*, *314*, 1–5.
- Brown, W. (1910). Some experimental results in the correlation of mental abilities. *British Journal of Psychology*, *3*, 296–322.
- Campos, J., Barrett, K., Lamb, M., Goldsmith, H., & Stenberg, C. (1983). Socioemotional development. In P. Mussen (Ed.), *Handbook of child psychology, Vol. 2: Infancy and developmental psychobiology* (pp. 783–915). New York: Wiley.
- Coleman, P. K., & Karraker, K. H. (1997). Self-efficacy and parenting quality: Findings and future applications. *Developmental Review*, *18*, 47–85.
- Coleman, P. K., & Karraker, K. H. (2000). Parenting self-efficacy among mothers of school-age children: Conceptualization, measurement, and correlates. *Family Relations*, *49*, 13–24.
- Črnčec, R., Barnett, B., & Matthey, S. (2008). Development of an instrument to assess perceived self-efficacy in the parents of infants. *Research in Nursing and Health*, *31*, 442–453.
- Črnčec, R., Barnett, B., & Matthey, S. (2010). Review of scales of parenting confidence. *Journal of Nursing Measurement*, *18*, (3), 210–240.
- Cutrona, C., & Troutman, B. (1986). Social support, infant temperament, and parenting self-efficacy: A mediational model of postpartum depression. *Child Development*, *57*, 1507–1518.
- de Montigny, F., & Lacharité, C. (2005). Perceived parental efficacy: Concept analysis. *Journal of Advanced Nursing*, *49*, (4), 387–396.
- Dennis, C., & Faux, S. (1999). Development and psychometric testing of the breastfeeding self-efficacy scale. *Research in Nursing & Health*, *22*, 399–409.
- Duvall, E. M. (1971). *Family development* (4th ed.). Philadelphia: Lippincott.
- Gennaro, S. (1988). Postpartal anxiety and depression in mothers of term and preterm infants. *Nursing Research*, *37*, (2), 82–85.
- Goldberg, S., & DiVitto, B. (1995). Parenting children born preterm. In M. H. Bornstein (Ed.), *Handbook of parenting: Children and parenting* (2nd ed., pp. 329–354). Mahwah, NJ: Lawrence Erlbaum Associates.
- Greco, L. A., Heffner, M., Poe, S., Ritchie, S., Polak, M., & Lynch, S. K. (2005). Maternal adjustment following preterm birth: Contributions of experiential avoidance. *Behavior Therapy*, *36*, 177–184.
- Halpern, L. F., Brand, K. L., & Malone, A. F. (2001). Parenting stress in mothers of very low birth weight and full-term infants: A function of infant behavioural characteristics and child rearing attitudes. *Journal of Pediatric Psychology*, *26*, 93–104.
- Halpern, L. F., & McLean, W. E. (1997). Hey Mom, look at me!. *Infant Behavior and Development*, *20*, (4), 515–529.
- Hanson, C., Henggeler, S. C., Rodrigue, J. R., Burghen, G. A., & Murphy, W. D. (1988). Father-absent adolescents with insulin-dependent diabetes mellitus: A population at risk? *Journal of Applied Developmental Psychology*, *9*, (2), 243–252.
- Harrison, M. J., & Magill-Evans, J. (1996). Mother and father interactions over the first year with term and preterm infants. *Research in Nursing & Health*, *19*, 451–459.
- Hess, C. R., Teti, D. M., & Hussey-Gardner, B. (2004). Self-efficacy and parenting of high-risk infants: The moderating role of parent knowledge of infant development. *Applied Developmental Psychology*, *25*, 423–437.
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales*. Sydney, Australia: Psychology Foundation.
- Macdonald, M. G., Seshia, M. M. K., & Mullett, M. G. (Eds.). (2005). *Avery's neonatology: Pathophysiology and management of the newborn*. Philadelphia: Lippincott Williams & Wilkins.
- Malatesta, C. Z., Culver, C., Tesman, J. R., Shepard, B., Fogel, A., Reimers, M., et al. (1989). The development of emotion expression during the first two years of life. *Monographs of the Society for Research in Child Development*, *54*, (1–2), 1–136.
- McGrath, M., Boukydis, C. F. Z., & Lester, B. M. (1993). Determinants of maternal self esteem in the neonatal period. *Infant Mental Health Journal*, *14*, 1.
- Miles, M. S. (2007). Depressive symptoms in mothers of prematurely born infants. *Journal of Developmental and Behavioural Paediatrics*, *28*, (1), 36–44.
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology*, *38*, 30–38.
- Olafsen, K. S., Rønning, J. A., Dahl, L. B., Ulvund, S. E., Handegård, B. H., & Kaarensen, P. I. (2007). Infant responsiveness and maternal confidence in the neonatal period. *Scandinavian Journal of Psychology*, *48*, 499–509.
- Pajares, F., & Miller, M. D. (1995). Mathematics self-efficacy and mathematics outcomes: The need for specificity of assessment. *Journal of Counseling Psychology*, *42*, 190–198.
- Parker, S., & Zahr, L. K. (1985). *The Maternal Confidence Questionnaire*. Boston, MA: Boston City Hospital.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891.
- Pridham, K. F., & Chang, A. S. (1989). What being the parent of a new baby is like: Revision of an instrument. *Research in Nursing and Health*, *12*, 323–329.
- Sanders, M. R., & Woolley, M. L. (2005). The relationship between maternal self-efficacy and parenting practices: Implications for parent training. *Child: Care, Health & Development*, *31*, (1), 65–73.

- Seashore, M. J., Leifer, A. D., Barnett, C. R., & Leiderman, P. H. (1973). The effects of denial of early mother–infant interaction on maternal self-confidence. *Journal of Personality and Social Psychology*: 26., 369–378.
- Shea, E. M. (1984). Maternal self-esteem as affected by infant health, infant behavior, and family support (Doctoral dissertation, University of Massachusetts). *Dissertation Abstracts International*: 45, 379.
- Spearman, C. (1910). Correlation calculated from faulty data. *British Journal of Psychology*: 3., 271–295.
- Steer, P. (2005). The epidemiology of preterm labour. *An International Journal of Obstetrics and Gynaecology*: 112., (1), 1–3.
- Tessier, R., Piche, C., Tarabulsy, G. M., & Muckle, G. (1992). Mothers' experience of stress following the birth of a first child: Identification of stressors and coping resources. *Journal of Applied Social Psychology*: 22., (17), 1319–1339.
- Teti, D. M., & Gelfand, D. M. (1991). Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development*: 62., 918–929.
- Thompson, R. J., Oehler, J. M., Catlett, A. T., & Johndrow, D. A. (1993). Maternal psychological adjustment to the birth of an infant weighing 1,500 grams or less. *Infant Behavior and Development*: 16., (4), 471–485.
- Trause, M. A., & Kramer, L. (1983). The effects of premature birth on parents and their relationships. *Developmental Medicine and Child Neurology*: 25., 459–465.
- Treyvaud, K., Anderson, V. A., Howard, K., Bear, M., Hunt, R. W., Doyle, L. W., et al. (2009). Parenting behavior is associated with the early neurobehavioral development of very preterm children. *Pediatrics*: 123., 555–561.
- Wells-Parker, E., Miller, D. I., & Topping, J. S. (1990). Development of control-of-outcome scales and self-efficacy scales for women in four life roles. *Journal of Personality Assessment*: 54., (3–4), 564–575.
- Wilcox, A. J., & Skjærven, R. (1992). Birth weight and perinatal mortality: The effect of gestational age. *American Journal of Public Health*: 82., (3), 378–382.
- Zahr, L. (1991). The relationship between maternal confidence and mother–infant behaviours in premature infants. *Research in Nursing and Health*: 14., (4), 279–286.