



Examining potential risk factors for anxiety in early childhood

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ABSTRACT

Anxiety disorders are amongst the most prevalent psychiatric disorders in children and adolescents, with occurrence emerging early in the developmental trajectory. This study was one of the first to investigate potential risk factors for anxiety (i.e., behavioural inhibition, parental negative affect, parenting stress) in early childhood. Examination of risk factors was achieved through structural equation modelling and based on mothers' and fathers' report of 236 preschool aged children (4–6 years) in Brisbane, Australia. The structural model was found to fit the data well. All direct predictors of early childhood anxiety were significant and behavioural inhibition partially mediated parents' negative affectivity and mother's parenting stress. Results highlight the unique contribution of both parents in the aetiology of early childhood anxiety and assist in informing the development of intervention and prevention programs for young children.

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1. Introduction

It is widely acknowledged that anxiety disorders are amongst the most prevalent psychiatric disorders occurring in children and adolescents (Andrews, Hall, Teesson, & Henderson, 1999; Costello, Egger, & Angold, 2004; Kashani & Orvaschel, 1990; Sawyer et al., 2000) with emergence occurring early in the developmental trajectory (Egger & Angold, 2006). Recently, evidence has demonstrated that clinically significant anxiety can exist during the early years (e.g., preschool-aged) with DSM (Diagnostic and Statistical Manual of Mental Disorders; American Psychological Association, 2000) nosology similar to that of older children (Egger & Angold, 2006). Recent prevalence rates indicate that 10–15% of young children experience internalizing problems (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004; Egger & Angold, 2006) and such rates of anxiety and internalizing problems tend to increase across childhood and adolescence (Beesdo et al., 2007; Bongers, Koot, van der, & Verhulst, 2003) with long-term consequences of this continuity impacting on academic, vocational, and social domains of functioning, reaching into adulthood (Rapee, Schniering, & Hudson, 2009). Investigating the factors that precede, maintain, or exacerbate these trajectories is essential for the development of empirically

based prevention and intervention programs (Degnan, Almas, & Fox, 2010). Recent reviews of the literature (e.g., Degnan et al., 2010) have stressed the importance of considering the interplay between child temperament and environmental risk factors (e.g., parental psychopathology, parenting stress) in order to better understand the development of anxiety in children. Given that the family context is an important environmental factor in young children's lives, researchers have explored the role of family factors in the development of child anxiety. In the present study, the relationship between the such family environment factors (i.e., parenting stress, parental anxiety and depression), behavioural inhibition (BI) and anxiety will be examined. Below, we provide a brief overview of BI, parental psychopathology and parenting stress as risk factors for the development of anxiety.

1.1. Behavioural inhibition

One factor highlighted in the literature as contributing to the early development of internalizing disorders is the temperament style of behavioural inhibition or BI. BI is characterised by the consistent tendency to show marked behavioural restraint or fearfulness with unfamiliar people, situations, or events (Kagan, Reznick, & Snidman, 1988). Approximately 15% of typically developing children display this temperament (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). Research has indicated that children who are behaviourally inhibited are at increased risk for multiple anxiety disorders, phobic disorders (e.g., Biederman et al., 1990, 2001; Gar, Hudson, & Rapee, 2005; Gladstone, Parker,

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Mitchell, Wilhelm, & Malhi, 2005; Hirshfeld et al., 1992; Kagan, Snidman, Zentner, & Peterson, 1999; Rosenbaum et al., 1991; Shamir-Essakow, Ungerer, & Rapee, 2005) and more specifically, the development of social anxiety symptoms (Biederman et al., 2001; Hirshfeld-Becker, Micco, et al., 2008; Muris, van Brakel, Arntz, & Schouten, 2011; Schwartz, Snidman, & Kagan, 1999). Additionally, consistently high levels of BI from toddlerhood through to middle childhood have been linked to increased risk for phobias in childhood (Hirshfeld et al., 1992) and social anxiety in early adolescence (Chronis-Tuscano et al., 2009).

Using a preschool aged sample, Shamir-Essakow et al. (2005) assessed BI, child-mother attachment and anxiety disorders in 104 young children (21 months to 6 years of age). Their results indicated that BI and insecure attachment were both independently associated with child anxiety, with inhibited children displaying higher levels of anxiety than uninhibited children. Other studies have demonstrated that children who are behaviourally inhibited and have an insecure attachment display the highest levels of anxiety disorder symptoms (e.g., Calkins & Fox, 1992; Mannasis, Bradley, Goldberg, Hood, & Swinson, 1995; Muris & Meesters, 2002; Muris et al., 2011).

Despite the risk for internalizing problems in children displaying this temperament, not all children with BI develop anxiety disorders. Relations between BI and anxiety vary by study, and even within studies that do find a significant association, a certain amount of discontinuity between these measures remains (see Degnan & Fox, 2007; for a more detailed review). Degnan and Fox (2007) suggested that the discontinuity found in childhood BI may be inherent to the child, may be influenced by environment factors, or may be evidence of a resilience process that alters trajectories over time.

1.2. Parental psychopathology

Research has implicated parental anxiety as being a risk factor for childhood anxiety problems (reviews: Bögels and Brechman-Toussaint, 2006; Bögels & Phares, 2008). Family aggregate studies indicate that children of anxious parents have an elevated rate of anxiety disorders (Beidel & Turner, 1997; Biederman et al., 1996; Merikangas et al., 1998; Petty et al., 2008; Turner, Beidel, & Costello, 1987) and parents of children with anxiety disorders experience higher rates of anxiety disorders (Last, Hersen, Kazdin, Francis, & Grubb, 1987; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991). A recent modelling study investigating risk factors for childhood anxiety found that anxious rearing significantly predicted symptoms of anxiety disorders at 1 year follow-up and trait anxiety of both parents at 1 year follow-up made independent contributions to child anxiety symptoms at 2-year follow-up (Muris et al., 2011). Studies have also documented connections between parents' anxiety disorders and children's BI (Rosenbaum et al., 1991, 2000) suggesting that behaviourally inhibited children who have a parent(s) with an anxiety disorder, may be most at risk for developing anxiety disorders. It is possible that BI is linked to a general family risk for internalizing disorders rather than to one specific type of disorder (Degnan et al., 2010).

Over the past two decades, a number of empirical studies and reviews have concluded that children of depressed mothers are at increased risk for internalizing and externalising problems (Goodman & Gotlib, 1999; Goodman et al., 2011; Hammen, 1991; Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005). However, not all research with this population has supported a relation between parental depressive symptoms and negative child outcome. It is unclear whether parental anxiety and depression represent independent risks although, twin and family studies point to a common vulnerability (Eley & Stevenson, 1999), suggesting that both increase the risk for child anxiety.

Recent meta-analyses (Connell & Goodman, 2002; Kane & Garber, 2004) have shown that when depression in fathers occurs, it is significantly associated with emotional and behavioural problems in their children, although, evidence remains limited in quantity and in generalisability. Other studies (Conger, Patterson, & Ge, 1995; Jacob & Johnson, 1997) have shown that depression in fathers is related to internalizing and externalising symptoms in children, even when controlling for mother's past and current depression (Kane & Garber, 2009). Kane and Garber (2009) suggest that the relationship between paternal depression and children's symptoms may be apparent throughout childhood as studies have documented this link at preschool age (e.g., Marchand & Hock, 1998; Ramchandani, Stein, Evans, O'Connor, & Group, 2005) and during middle childhood (Kane & Garber, 2009).

1.3. Parenting stress

Family stressors linked to children's internalizing problems include traumatic events (e.g., death of a loved one), conflict between parents, low social support, daily hassles with parenting, and low socioeconomic status (Cicchetti & Toth, 1998). Bayer, Sanson, and Hemphill (2006) examined predictors of 2- and 4-year-old ($N=112$) child internalizing difficulties. Parental report and independent observation of mothers ($n=110$) and fathers ($n=2$) led to results showing that parenting stress predicted early childhood internalizing difficulties.

Costa, Weems, Pellerin, and Dalton (2006) found that the parent-child dysfunctional interactions factor of parenting stress as measured by the Parenting Stress Index (Abidin, 1995) showed specificity to child and adolescent internalizing symptoms when parental psychopathology was controlled for. In Ashford, Smit, van Lier, Cuijpers, and Koot (2008) longitudinal study of early childhood risk factors, results demonstrated that parenting stress at the child's age of 4–5 years predicted internalizing problems of the child at the age of 11 years. This is supported by previous research indicating that parenting stress is associated with child behaviour and emotional problems (Crnic et al., 2005). Similarly, Mesman and Koot (2000) found that parenting stress was a generic predictor in both child internalizing and externalising psychopathology.

Other studies have indicated that anxious children from families where mothers rated themselves high in parenting stress did worse in anxiety treatment programs (Crawford & Manassis, 2001) when compared to families not characterised by high maternal parenting stress. Dadds and Roth (2001) proposed that anxious children may place excessive demands on parents in terms of reassurance and comfort seeking behaviours, which over time, go beyond parental tolerance levels. This reassurance seeking often results in the parent attempting to push the child away towards more independence (Fox & Calkins, 1993) which results in increased anxiety in the child and increased pressure for the parent to provide comfort and reassurance, leading to further parental stress and frustration.

This brief review of the literature described several factors associated with the development of anxiety, including BI, parental psychopathology (anxiety and depression) and parenting stress. Although research has established that BI and such family environment factors (i.e., parental psychopathology and parenting stress) are associated with child anxiety, research remains scarce examining multiple risk factors of early childhood anxiety, particularly utilizing a sample of preschool aged children (4–6 years). Recent reviews (see Degnan et al., 2010; Degnan & Fox, 2007) have highlighted the importance of examining the interplay between temperament, psychopathology (e.g., anxiety), and familial environmental factors.

The identification of risk factors in the early years is important in informing and guiding the development and fine tuning of prevention and intervention efforts for this understudied age group,

particularly when considering long life course of anxiety. Recent research has highlighted the potential advantages to treating anxiety disorders earlier in development with cognitive-behavioural protocols (e.g., Freeman et al., 2008; Hirshfeld-Becker, Masek, et al., 2008; Pahl & Barrett, 2010; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005) however, there is a demand for more randomised controlled trials examining the efficacy and effectiveness of such interventions, with this young age group. Both mothers and fathers were included in this study to examine the influence of both parents on child anxiety. The investigation of paternal factors is particularly warranted as very few studies have included fathers, yet research on normal child development suggests that fathers play an important role in the socialisation of children and in the protection against severe anxiety (Bögels & Perotti, 2011).

The current study examines potential risk factors of anxiety during the early childhood years (4–6 years), as reported by both mothers and fathers. Based on previous theory and research, a hypothesised model was tested specifying that BI, parental negative affect (anxiety and depression), and parenting stress would be significant independent predictors (or risk factors) of early childhood anxiety. The model also predicted that parental negative affect and parenting stress would significantly predict early childhood BI. That is, BI would mediate part of the “effect” of these risk factors on child anxiety. This study examines reports from both mothers and fathers.

2. Method

2.1. Participants

The current study is part of a larger research project examining the implementation of an anxiety prevention program for preschool-aged children, delivered as a universal prevention program. Participants were 236 children (female = 116, male = 120) ranging in age from 4 to 6 years (\bar{x} = 4.54, SD = .51). Participants were enrolled in 1 of 16 preschool classes in Brisbane, Australia. Schools volunteered to participate in the study following a presentation at an early childhood development conference. Participation was offered on a voluntary basis. The participating preschools were matched on socioeconomic status, class size and gender balance. Of the families who participated, 232 parents completed information regarding annual income. Fifteen percent had an annual income between 0 and \$40,000, 41.1% between \$40,001 and \$80,000, and 41.5% between \$80,000 and over \$100,000. Children in the study with language impairments and pervasive developmental disorders were excluded from statistical analysis (n = 20) but participation in the intervention program was still offered for ethical reasons. Such impairments were assessed by parent and teacher report followed by the examination of school files (e.g., medical reports), with full parental consent.

2.2. Measures

2.2.1. The Preschool Anxiety Scale (PAS; Spence, Rapee, McDonald, & Ingram, 2001)

The PAS is a 34-item parent report (total score range = 0–112) assessing DSM-IV child anxiety symptoms for preschool children (2.5–6.5 years) and is comprised of five subscales: separation anxiety, personal injury fears, social phobia, obsessive compulsive disorder, and generalised anxiety disorder. The PAS is not a diagnostic tool and high scores indicate psychological distress rather than a psychiatric disorder. The PAS has adequate psychometric properties against the Child Behaviour Checklist (CBCL; Achenbach, 1992) with correlations between the PAS total score and the CBCL

Internalizing scale at .68 for mothers and .59 for fathers (Spence et al., 2001). This measure was completed by parents conjointly.

2.2.2. The Behavioural Inhibition Questionnaire (BIQ; Bishop, Spence, & McDonald, 2003)

The BIQ provides a total measure of behavioural inhibition (total score range = 30–180) together with scores on six factors reflecting specific BI contexts including peer situations, physical challenge, separation/preschool, performance situations, unfamiliar adults and general novel situations. The BIQ has good psychometric properties with high internal consistency with Cronbach's alpha ranging from .80 (physical challenge) to .95 (total BI) for mother's report, and .72 (physical challenge) to .94 (total BI) for father's report (Bishop et al., 2003). The measure also has strong convergent validity with the inhibition scale of the Temperament Assessment Battery for Children–Revised (Presley & Martin, 1994), with correlations of .87 for mother report and .86 for father report. Mother and father total BI scores were found to be significantly correlated (r = .69, p < .001) (Bishop et al., 2003). This measure was completed by parents conjointly.

2.2.3. Depression Anxiety Stress Scales–Short Form, Parent Report (DASS-21; Lovibond & Lovibond, 1995)

The DASS-21 is a 21-item questionnaire with three subscales assessing adult symptoms of depression (range = 0–42), anxiety (range = 0–42) and stress. For the purposes of this study, the anxiety and depression subscales of the DASS-21 were combined to create a ‘negative affect’ score for both mothers and fathers. The stress subscale was not used in the analyses. The DASS-21 has good reliability with Cronbach's alpha for the anxiety subscale ranging from .73 to .82 and .82 for depression (Clara, Cox, & Enns, 2001; Henry & Crawford, 2005; Lovibond & Lovibond, 1995). Evidence of good convergent and discriminant validity has also been found when comparing the DASS-21 with other validated measures of anxiety and depression. This measure was completed by mothers and fathers separately.

2.2.4. Parenting Stress Index–Short Form (PSI-SF; Abidin, 1995)

This is a 36-item questionnaire (total score range = 29–145) which measures the magnitude of stress in the parent–child relationship. Studies of test-retest reliability (r = .84) and internal consistency (α = .91) demonstrate high to excellent reliability (Abidin, 1995). The PSI-SF Total Stress score correlates strongly with the Total Stress score on the full-length PSI (r = .95) (Abidin, 1995). This measure was completed by mothers and fathers separately. The total stress score was used in the analyses. The total stress score provides an indication of the stress level experienced within the role of the parents and is comprised of items examining parental distress, parent–child dysfunctional interaction and difficult child. Raw scores of 90 or above indicated clinically significant levels of stress.

2.3. Procedure

Ethical clearance was obtained prior to commencement of this study. Schools who volunteered their participation were contacted by the research team. An information evening describing the project was held for principals, teachers, and parents before the study commenced and informed consent was obtained. Only one child was not granted consent by his/her parents. Following consent, preassessment screening began which involved parents completing self-report questionnaires in their own time. Certain questionnaire measures requested that parents complete them conjointly (i.e., PAS, BIQ), and others required completion separately by a mother or a father (i.e., DASS, PSI-SF). Questionnaires

were returned to the researchers via a provided postage paid envelope before program commencement. Parents were informed that all questionnaire responses were confidential. Participants were provided with a debriefing letter in their questionnaire package. This letter outlined multiple avenues to contact the researchers if need be (e.g., phone, email, fax). Participants were also invited to attend an information evening prior to questionnaire completion and after completion. Members of the research team were frequently present at the children's school following questionnaire completion to attend to any queries or concerns raised by the parents.

3. Results

3.1. Descriptive statistics and correlations

In Table 1, means, standard deviations and correlations are presented for all variables. As expected, many risk factors significantly correlated with the predictors. Strong correlational relationships were found between parental factors (e.g., father's parenting stress and mother's parenting stress = $r = .60$), between parental variables and child anxiety, between mother's depression and mother's anxiety ($r = .60$) and father's depression and father's anxiety ($r = .51$). Due to the strength of the latter relationships and the need to decrease the number of pathways within the structural model, latent factors were formed between mother's depression and mother's anxiety to create mother's negative affect. Latent factors were also formed between father's depression and father's anxiety to create father's negative affect.

3.2. Assumptions

The assumptions were evaluated through SPSS version 15. Prior to conducting analyses, the data were assessed for completeness and normality. There were some missing data: mother's depression (2.4%), mother's anxiety (2.4%), father's depression (14%), father's anxiety (14%), mother's parenting stress (2.4%), father's parenting stress (14%). However, it is important to note that the pattern of "missingness" in the data has greater bearing on the reliability of the results than does the amount (Graham, 2009). Missing values analysis was conducted using SPSS and Little's Missing Completely at Random (MCAR) test was non-significant $\chi^2(32) = 45.69$, $p = .55$. This demonstrated that the data were missing at random. The Expectation Maximisation (EM) procedure in the SPSS missing values module was implemented to replace missing values. EM is a technique shown to be robust in structural equation modelling (SEM) analyses (Tabachnick & Fidell, 2007).

All variables were examined for outliers. At an item level, mean substitution was used to replace missing values as long as more than half of the items on a variable were not missing. Three extreme cases that were defined as having a z score above 3.29 (Tabachnick & Fidell, 2007) were removed. The measurement models of each of the constructs were tested prior to the final structural model (Kline, 2005). There was significant multivariate non-normality and log transformations were computed for highly skewed variables (mother's and father's anxiety and depression scores, physical challenge BI subscale). All measurement models fit well, except for mother's and father's parenting stress (PSI), which instead had to be modelled as single-indicator latent variables, using the total scale score and the measurement error set to $SD^2(1 - \text{Cronbach's } \alpha)$, as recommended by Bollen (1989).

The hypothesised structural model showed significant multivariate non-normality, Mardia's Normalised coefficient = 14.11, $p < .001$ (Kline, 2005). To correct for this, the Bollen–Stine bootstrap p , a bootstrap modification of χ^2 , was also used to evaluate model

Table 1
Descriptive statistics and correlations.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Sad	–																
2. Pif	.40*	–															
3. SP	.39*	.35*	–														
4. OCD	.46*	.22*	.35*	–													
5. Gad	.60*	.25*	.40*	.49*	–												
6. Peer	.20*	.13*	.12	.12	.17*	–											
7. Pfy	-.02	.02	-.06	.04	-.02	-.06	–										
8. Sep	.17*	.11	.07	.02	.04	.09	.11	–									
9. Perf	.14*	.06	.12	.11	.08	.08	.05	.20*	–								
10. Adult	.13*	.06	.06	.09	.12	-.01	.05	.22*	.08	–							
11. Nov	-.06	-.08	-.19*	-.05	-.11	.04	.16*	.26*	.05	.23*	–						
12. Dep Mother	.20*	.27*	.20*	.20*	.22*	.18*	-.01	-.03	.08	.05	-.04	–					
13. Anx Mother	.24*	.22*	.18*	.26*	.24*	.15*	-.02	-.04	.12	.02	-.05	.60*	–				
14. Dep Father	.13*	.10	-.03	.07	-.02	.06	-.13	-.14*	-.08	.08	-.01	.38*	.18*	–			
15. Anx Father	.12	.12	.01	.13*	.03	.00	-.02	-.04	-.02	.04	.08	.21*	.08	.51*	–		
16. PSI Mother	.40*	.30*	.27*	.33*	.35*	.20*	.04	-.04	.13*	.05	-.27*	.45*	.42*	.19*	.14*	–	
17. PSI Father	.30*	.24*	.18*	.17*	.26*	.11	-.09	-.08	.04	.06	-.20*	.28*	.29*	.38*	.27*	.60*	–
N	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236
Mean	3.49	6.47	5.96	1.39	3.21	4.30	16.11	15.53	15.24	15.94	35.83	2.20	1.20	1.75	.97	66.70	65.96
SD	3.25	4.23	4.27	1.73	2.91	1.10	1.85	1.90	1.89	2.21	3.25	2.75	1.19	2.21	1.54	16.71	15.26

Preschool Anxiety Scale = Sad (separation anxiety), Pif (personal injury fears), SP (social phobia), OCD (obsessive compulsive disorder), Gad (generalized anxiety disorder), Behavioural Inhibition Questionnaire = Peer (peer situations), Pfy (physical challenge), Sep (separation), Perf (performance situations), Adult (unfamiliar adults), Nov (novel situations), Depression Anxiety and Stress Scale = Dep Mother (depression mother), Anx Mother (anxiety mother), Dep Father (depression father), Anx Father (anxiety father), Parenting Stress Index-SF = PSI Mother (parenting stress mother), PSI Father (parenting stress father).
* $p < .05$.

fit. Additionally, standard errors of parameter estimates were calculated using the bootstrap bias-corrected method (1000 samples), and significance tests were conducted using 95% confidence intervals derived from this method (Efron, 1988; Neal & Simons, 2007). Such adjustments have been shown to adequately correct for non-normality of this type (Efron, 1988; Neal & Simons, 2007).

3.3. Model estimation

In addition to the Bollen–Stine bootstrap χ^2 test, several fit indexes were used to evaluate model fit, including the standardised root-mean square residual (SRMR), the root-mean square error of approximation (RMSEA) and the comparative fit index (CFI). Hu and Bentler (1999) suggested that SRMR values under .08 are desired and represent a good fit whilst a RMSEA value of .06 or less is indicative of a good fit. A value exceeding .05 for the CFI indicates a good fit (Hu & Bentler, 1999).

Using these criteria, the hypothesised structural model was found to fit the data well (see Figure 7.2), $\chi^2(106) = 170.39$, Bollen–Stine $p = .019$, SRMR = .07; RMSEA = .05; CFI = .92.

3.4. Direct effects

As hypothesised, higher levels of anxiety in early childhood was predicted by higher levels of parenting stress in mothers (unstandardised coefficient = .059, CI95% = .056–.061) and fathers (unstandardised coefficient = .018, CI95% = .017–.019), and by higher negative affect in mothers (unstandardised coefficient = 1.740, CI95% = 1.646–1.845). Higher child behavioural inhibition also predicted higher child anxiety (unstandardised coefficient = 4.106, CI95% = 3.854–4.390). Unexpectedly, higher negative affect in fathers predicted significantly less childhood anxiety. Although, this effect was small (unstandardised coefficient = -.217, CI95% = -.292 to -.158). Higher negative affect in fathers also predicted lower child behavioural inhibition (unstandardised coefficient = -.141, CI95% = -.150 to -.129), whereas mothers' negative affect predicted higher inhibition (unstandardised coefficient = .103, CI95% = .092–.112). By contrast, mother's parental stress predicted lower child behavioural inhibition (unstandardised coefficient = -.001, CI95% = -.001 to -.0008). Fig. 1 also reveals that the predictors were highly correlated with each other. Overall, the predictors explained 35% (CI95% = 34.5–35.5) of the variance in children's anxiety and 7% (CI95% = 6.7–7.4) of the variance in behavioural inhibition.

3.5. Mediation

The results suggest several indirect or mediated effects on child anxiety, given that most of the parental variables predicted behavioural inhibition, which itself predicted child anxiety. Mediation was therefore formally tested using the joint significance test. In testing mediation, a review by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) found that the joint significance test was superior to all other methods, including Baron and Kenny's (1986) approach. According to this test, mediation exists if there is a significant relation between the IV and mediator (path α) and a significant relationship between the mediator and DV (path β). In other words, there does not need to be a significant direct association between the independent and dependent variables. In addition to this, MacKinnon, Fairchild, and Fritz (2007) recommend calculating confidence intervals from the bootstrap distribution of the mediation effect (i.e., $\alpha \times \beta$) to evaluate the magnitude of the mediated effect. Cheung and Lau (2008) found that the best method for testing mediation effects in SEM is with bias-corrected bootstrap confidence intervals. This procedure revealed that child behavioural inhibition partially mediated

the effects of parents' negative affect (standardised indirect effect [mother] = .045, CI95% = .042–.048; standardised indirect effect [father] = -.064, CI95% = -.067 to -.061), and mother's parental stress (standardised indirect effect = -.024, CI95% = -.027 to -.021). Mediation was also tested using Holmbeck's (1997) method, which involves comparing nested models specifying full and partial mediation. Consistent with the joint significant test, the full mediation model provided a poorer fit to the data than the partial mediation model, $\Delta\chi^2(3) = 28.17, p < .001$.

4. Discussion

Predictive risk factors for middle childhood and adolescent anxiety have been investigated within the literature; however research is minimal examining risk factors of anxiety within early childhood. Identifying risk factors specific to early childhood (4–6 years) is important in understanding the aetiology of early childhood anxiety and in the future fine-tuning of effective preventative intervention programs for young children. Within the presented structural model examining early childhood risk factors of anxiety and BI, all of the predictors were highly correlated with each other with child anxiety accounting for a reasonable amount of variance (37%) and BI accounting for a smaller proportion of the variance (7%) within the model.

Based on previous research and theory, it was predicted that BI would directly predict anxiety. This assumption was supported in the model, which demonstrated that children higher on BI experienced higher levels of anxiety. This is consistent with a large proportion of research that has found an association between BI and anxiety, even in preschool aged samples (e.g., Shamir-Essakow et al., 2005), and supports developmental models claiming the independent contribution of BI to child anxiety.

The majority of the direct predictions were supported in the model. Results demonstrated that higher levels of parenting stress in mothers and fathers predicted higher levels of child anxiety. These results suggest that both parents' stress may contribute to the development of child anxiety. Consistent with previous findings (e.g., Ashford et al., 2008; Bayer et al., 2006; Costa et al., 2006; Crnic et al., 2005; Mesman & Koot, 2000), it may be that certain behaviours/interactional patterns (e.g., familial conflict, difficult relationships/dysfunctional interactions, excessive demands, parenting distress) within the family increase parenting stress leading to increased anxiety in children. High levels of parenting stress may impact on children by eliciting perceptions of low control, negative expectations, self-blame and hopelessness (Denham, 1998). Interestingly, mother's parenting stress directly predicted lower BI. Father's parenting stress was not related to BI and therefore, could not act as a mediator for the effects on child anxiety.

Results indicated that mother's negative affect directly predicted child anxiety. These findings are consistent with the literature indicating that children of parents with anxiety and/or depression are at increased risk for developing an anxiety disorder (Beidel & Turner, 1997). However, it remains unclear whether the link between parental negative affectivity and child anxiety is due to genetic or environmental influences. Previous studies have provided evidence supporting both genetic factors and shared environmental factors in the expression of child anxiety (Eley & Stevenson, 2000). It may be that children model anxious behaviours by their parents and experience overprotective responses (Wood, McLeod, Sigman, Hwang, & Chu, 2003). Children of depressed parents may experience less warmth, less engagement and more authoritarian parenting impacting on their responsively and sensitivity (Pelaez, Field, Pickens, & Hart, 2008) and increasing anxiety in their children.

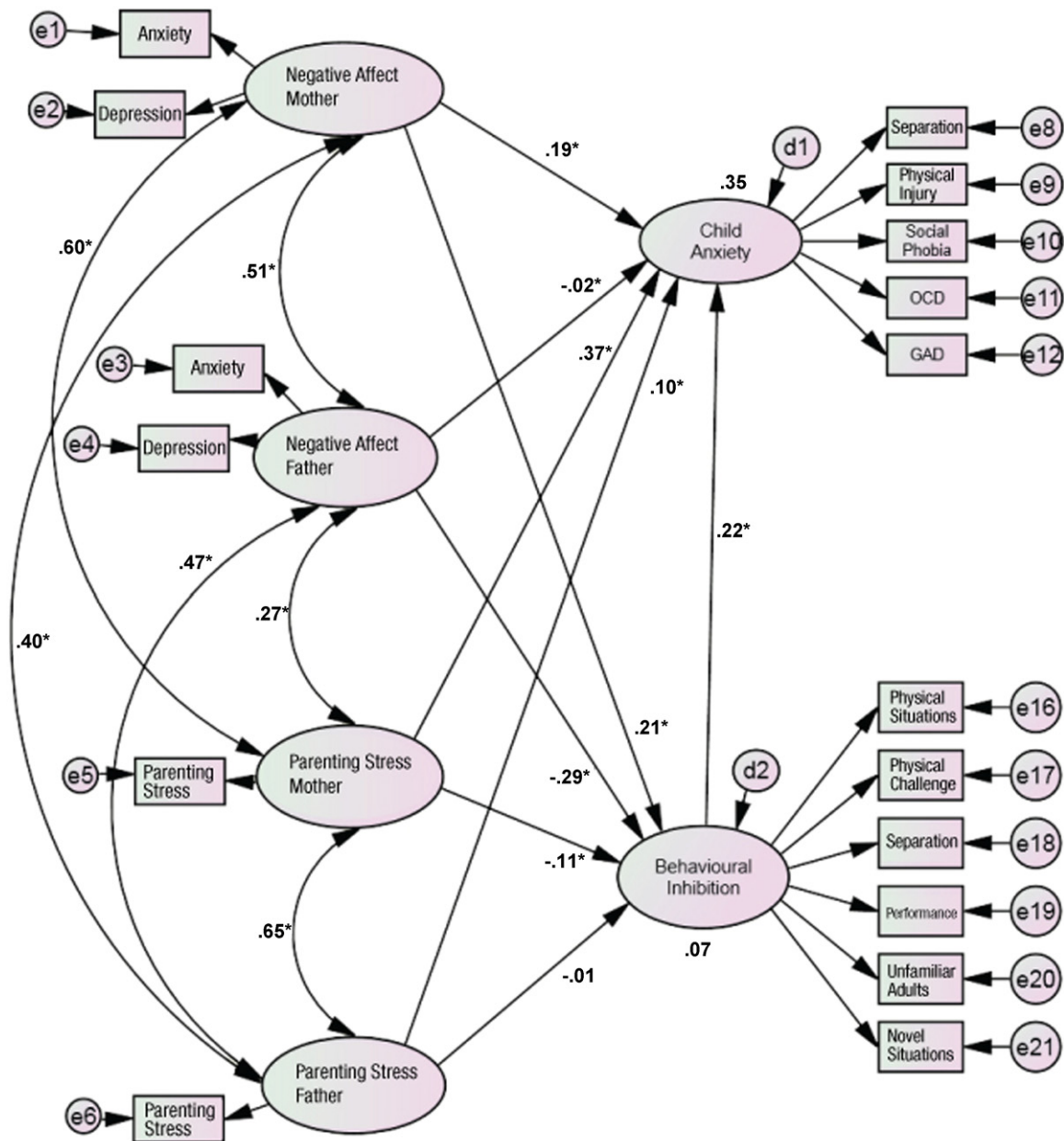


Fig. 1. The structural model for risk factors for early childhood anxiety and behaviour inhibition. * $p < .005$.

Mother's negative affect also predicted higher BI indicating that children high in BI may also have mothers high in negative affectivity (anxiety and depression). These results are consistent with the literature suggesting that anxious parents may hinder their behaviourally inhibited children from developing effective coping strategies and from developing adequate social skills (Rapee, 1997), which may result in avoidance of anxiety provoking situations and longstanding inhibition (for review see: Rubin, Coplan, & Bowker, 2009).

Consistent with our predictions and previous research, mediational analyses revealed that BI partially mediated the effects of mother's and father's negative affectivity and mother's parenting stress. This finding is consistent with causal claims outlined in the literature that such parental variables may be related to an increase in anxiety, partly through BI, and partly through other variables not explained in the model. Our findings present a piece of a complex developmental process in which other environmental, child

and parental factors may be playing a role. Future investigations may consider examining other family environmental factors (e.g., conflict, overprotective behaviours), child factors (e.g., attachment, temperament), and parental factors.

Some unexpected findings revealed that higher negative affectivity in fathers predicted less anxiety and BI in children. These findings are somewhat surprising considering the recent literature highlighting the unique contribution of fathers on child anxiety (for review: Bögels & Phares, 2008) and the suggestions that anxious fathers may be less effective in their role of autonomy and encouragement, resulting in increased child anxiety (Bögels, Bamelis, & van der Bruggen, 2008). Instead, our results (although the effect was small) suggest that increased negative affectivity in fathers does not directly predict the development of child anxiety.

These results provide useful information in guiding intervention programs for young children with anxiety. The results highlight the unique contributions of mothers and fathers in the development

of early childhood anxiety. Our results demonstrated high levels of parenting stress for both mothers and fathers impact on child anxiety. This suggests that involving both parents in the intervention process may be of importance to provide assistance to parents in managing their own parenting stress and psychological distress. This may involve the incorporation of stress management techniques for parents, revolving around issues pertaining to parenting, parental distress, parent–child interactions, managing difficult behaviours, and managing personal stress. The inclusion of both parents in treatment has been associated with greater improvements in both children and in their parents (Bögels & Phares, 2008; Ginsburg & Schlossberg, 2002; Ginsburg, Silverman, & Kurtines, 1995). It has been suggested that engaging fathers in cognitive-behavioural treatments with their children may be more effective than maternal involvement due to their differing role and their ability to act as effective change agents during exposure tasks and because of their ability to provide security through sensitive and challenging support (Bögels & Phares, 2008).

Our results demonstrated that higher negative affectivity in mothers was related to higher child anxiety and BI, whereas father's had the opposite impact. This discrepancy in mothers and fathers impact highlights the potential varying roles between parents, in terms of how their own negative affectivity impacts on their children. In terms of intervention, these results suggest that mother's may benefit from more intensive parenting sessions that include anxiety and mood management techniques. Parenting sessions (with both parents) investigating varying roles within the family and individual approaches to anxiety management may also be warranted. Involving parents in psychological treatment and intervention would entail both parents taking an active role in the treatment/intervention process by learning strategies to manage their child's anxiety and to manage their own anxiety and stress. Some early intervention programs have begun to incorporate parental involvement into the intervention protocol. For example, the *Fun FRIENDS* program (Barrett, 2007) is an anxiety prevention program for preschool-aged children aimed at building social-emotional competence and resilience (Pahl & Barrett, 2007, 2010). This 12-session program actively involves parents by teaching them the program skills and subsequent self-management strategies for anxiety and stress.

Considering the direct effect between BI and anxiety in the presented model, it is also suggested that treatment packages be tailored to accommodate children with a behaviourally inhibited temperament. Such interventions could focus on the promotion of known protective factors (including BI) to buffer children against the development of psychopathology. Such skills may include: self-awareness, self-regulation, empathy training, confidence enhancing activities, problem-focused coping strategies, and the enhancement of social support (Brown, O'Keefe, Sanders, & Baker, 1986; Cicchetti & Toth, 1998; Shure & Spivack, 1980). In a long-term examination of BI in young children, Hirshfeld-Becker et al. (2007) suggested that young inhibited children may benefit from preventative cognitive-behavioural interventions to reduce social anxiety and improve coping along with parenting strategies (empathizing with discomfort, discouraging avoidance, encouraging graduated exposure to feared situations, and immediate rewards). These could be incorporated into intervention programs for young children and their parents.

The current sample was a universal sample, with the majority of participants scoring within the normal range on all measures. Interestingly, despite the majority of parents scoring within the normal range on the DASS and PSI-SF, significant relationships were still found. This indicates, that even within a relatively normal population, parental symptoms of depression, anxiety and parenting stress, can have a significant impact on the development of

anxiety symptoms in young children. This suggests that mother's and father's experiencing symptoms (rather than clinical levels) of psychopathology and/or parenting stress, may also benefit from involvement in early intervention programs, giving support to the usefulness of universal intervention and prevention programs, targeting wider populations (e.g., schools, community centres, etc.). These interventions have the potential to be of enormous benefit in terms of reducing the prevalence of childhood anxiety disorders. This approach to prevention focuses on acquiring skills to cope, enhancing peer support and reducing psychosocial difficulties within the classroom or peer-group, thus promoting learning and healthy emotional development in all children (Evans, 1999; Kubiszyn, 1998). Furthermore, since all children are targeted, regardless of risk level, those who do need assistance to overcome emotional or behavioural problems, but who may never come to the attention of mental health professionals, are engaged in a positive program of change.

4.1. Limitations

A drawback of the study was the small number of measures used to examine each construct within the structural model due to the limited number of appropriate assessment measures available for preschool-aged children at the time of research commencement and because of the difficult task of requesting parents to complete long assessment packages. In future models, it is recommended that several assessment measures be used to measure each construct to increase the power and generalisability of the results. Additional assessment measures would allow for the examination of parental anxiety and depression as separate constructs, providing a more in-depth examination of specific parental psychopathology risk factors. The study utilised a cross-sectional design where participants were assessed at a single time point making it difficult to determine the direction of effects.

The assessment measures used in the current study were based on parental self-report which raises reliability issues commonly encountered in research with young children. The reliability of parent report can be questionable as parental report is susceptible to the biased perceptions or motivations of the parent (Rapee, 2002). For the purposes of the current study, children did not complete assessment measures or undergo any form of observation. It remains unclear as to whether preschoolers have the cognitive capabilities to provide valid self-report data on emotional and behavioural problems. Recommendations for future research are to examine alternate means of assessment including interviews and observations with multiple informant including parents, teachers, and children.

The current study assessed BI using one parent-report assessment measure. A recent review on BI (Hirshfeld-Becker, Micco, et al., 2008) has recommended that the assessment of BI include both observation and questionnaire measures. Observational protocols (as used in Shamir-Essakow et al., 2005) expose the child to a series of novel settings, objects, people, and tasks, whilst assessing their responses to the unfamiliar situations. Perhaps, the additional component of observational assessment is imperative for the assessment of BI in early childhood as this would allow for evidence that avoids the biases of parent self-report. It may also be important to collect other data assessing characteristics such as temperament and physiological arousal to gain a greater understanding of the sensitivities pertinent to the child.

Procedurally, limitations arose in the structure of the questionnaire package. Two measures (PAS, BIQ) were supposed to be completed by mothers and fathers conjointly, but it was not determined whether this conjoint completion occurred or whether one parent completed the measures. Some of the measures (DASS, PSI-SF) were provided for mothers and fathers to complete separately

(as noted at the top of the questionnaire) however, these measures were within the same questionnaire package, which may have lent to biased reporting. It is recommended that future research provide two separate questionnaire packages for mothers and fathers in order to produce increased anonymity and confidentiality in reporting.

Another limitation in regards to assessment is the lack of diagnostic data for the anxiety factor in the model. Diagnostic interviews were not used in the present study and therefore, children could not be referred to as having an anxiety disorder but rather experiencing psychological distress (i.e., anxiety symptoms). Future research could consider the use of diagnostic interviews (e.g., PAPA, Egger & Angold, 2004) whilst being mindful of the current diagnostic uncertainty for early childhood anxiety disorders (DelCarmen-Wiggins & Carter, 2004; Egger & Angold, 2006). In addition, future models examining universal populations ought to consider incorporating measures examining constructs such as happiness, resilience, and positive coping. These measures are now increasingly becoming available within the literature. Finally, the participants in the sample were primarily middle to upper class which limits the generalisability of the findings to other sociodemographic groups. Future research examining risk factors of early childhood anxiety and BI needs to examine varying socioeconomic groups within larger sample sizes.

4.2. Summary

This study examined potential risk factors for early childhood anxiety and BI and attempted to examine the relationship between mother, father, and child variables. Several parental variables were found to directly predict child anxiety and BI was found to partially mediate the effects of parental negative affectivity and mother's parenting stress on child anxiety. Our results have provided insight into the unique role of both parents on child anxiety and can provide information in informing the development of intervention and treatment programs for young children and their families. Continuous research is needed to examine the mediating and moderating impact of additional environmental factors on early childhood anxiety and BI, to investigate differing roles of both parents and their contributions to child anxiety, along with the construction of multimeasure, multi-informant, and longitudinal models to further explore potential risk factors of early childhood anxiety.

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