

**Changes in Anxiety and Somatisation
in Young Children with
and without Asthma**

Submitted by
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Post Graduate Diploma of Psychology

A Thesis Presented in Part Fulfilment of the
Requirements for the Degree of:
Doctor of Psychology (Clinical Psychology)
School of Psychology
Faculty of Arts, Education and Human Development
Victoria University

August 2009

Acknowledgements

I would like to thank my supervisor, Professor Sandra Lancaster, who inspired my interest in this area of study. Sandra, I thank you for always offering your much welcomed wisdom and encouragement from this project's conception to completion.

A special thank you to Associate Professor Nicholas Freezer, the associate researcher for this work. Nick, thank you for your support of this project, and especially for your kindness and generosity with your time.

My warm thanks also to Ian Gomm, whose encouragement and praise helped me recognise my accomplishments and believe in what I could achieve. Ian, thank you for your help with the statistics and your kindness and support.

Thank you to Simone for being a good friend throughout the completion of this course.

Finally, I would also like to thank my husband Harry for his support and unwavering belief in me.

Abstract

Research studies have investigated the presentation and prevalence of anxiety problems in children and found that anxiety is very common among young children. However, there is a substantial gap in research regarding correlates of anxiety problems in this population. Given established research associations between childhood somatisation and anxiety, the current study focused on somatisation as well as anxiety per se in its investigation.

The primary aim of this research was to examine changes over time in anxiety and somatisation in group of children with and without a diagnosis of asthma, using baseline data from an earlier study (Siddons, 2004). The current study also examined parental, psychosocial, and illness related factors associated with anxiety in children.

The sample comprised parents (n=44) of children with and without asthma aged between 6 and 10 years, who had participated in the previous study. Participants completed a number of the same questionnaires that they completed for the earlier study to allow for a longitudinal investigation. An extension of the baseline study was introduced via the inclusion of an additional informant regarding child anxiety and somatisation. Children's teachers were also asked to complete one of the questionnaires parents completed to allow for investigation of any differences in perceptions of child anxiety, or differences of presentation of anxiety in different settings.

Results indicated an increase in children's level of anxiety and somatisation from Time 1 to Time 2. Further support was also established for the association between somatisation and anxiety in children, and between parental anxiety and child anxiety. Investigations regarding differences between children with and children without asthma indicated that children with asthma had higher levels of anxiety than their asthma free peers. Informant differences suggested that parent rankings of child anxiety were higher than teachers; suggesting either different perceptions of child anxiety or a difference in child behaviour and presentation of anxiety in different settings.

The findings from this study were compared and contrasted with results from the baseline study (Siddons, 2004), and published research in this area. The limitations of the present study were discussed and recommendations were made regarding potential future research that could elucidate some of the inconsistencies in the research findings to date in the area of study addressed by this work.

Declaration of Authenticity

I, Michelle Popovski, declare that the Doctor of Psychology (Clinical Psychology) thesis entitled Changes in Anxiety and Somatisation in Young Children with and without Asthma is no more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature:

Date:

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1 Introduction

Anxiety is extremely common among children (Bell-Dolan, Last, & Strauss, 1990; Bernstein, Borchardt, & Perwien, 1996; Kendall, Stafford, Flannery-Schroeder, & Webb, 2004). However, as noted by Siddons (2004), there have been relatively few studies that have specifically examined anxiety in very young children (under 5 years of age), and that have looked at the correlates of anxiety problems in young children.

Childhood presentations of anxiety can differ from expressions of anxiety in adults. Past studies have indicated that children's tendency for physical expression of their emotions often results in somatisation (Masi, Favilla, Millepiedi & Mucci, 2000; Masi, Mucci, Favilla, Romano, & Ploi, 1999). Research also indicates that children living with a chronic illness such as asthma are particularly vulnerable to developing anxiety (Lavigne & Faier-Routman, 1992; Oraka, King, & Callahan, 2010). It is of particular concern that research to date indicates there is an increased prevalence of psychological problems, including anxiety, among populations of chronically ill children, and specifically children with asthma (Bennett, 1994; McQuaid, Kopel & Nassau, 2001; Sawyer, Spurrier, Kennedy & Martin, 2003). McQuaid et al., (2001) found that children with asthma had more overall adjustment problems compared with healthy children ($d_{mn} = .57$, 95% CI = .42-.72), and more behavioural difficulties than healthy children "with the effect for internalising behaviours being greater than that for externalising behaviours ($d_{mn} = .73$ vs .40). It has also been suggested that a child's health status may further contribute to development of somatisation (Adam, Streisand, Zawaki & Joseph, 2002). Further understanding of anxiety in the context of a chronic illness such as asthma is particularly important because both

family factors and children's emotional adjustment have been shown to influence functional morbidity (e.g. Klinnert et al., 2000; Mrazek et al., 1991).

While the benefits of obtaining information from multiple informants when ascertaining the presence of emotional problems in children are undoubtedly important, in very young children assessment of anxiety has generally been restricted to parental report and typically maternal report. With increasing age and commencement of school information from teachers can provide an additional perspective on childhood anxiety. Entry to school also represents an important change for a child with asthma because management of the illness must then occur without parental involvement. Research has not investigated how this change may impact on children's adjustment.

The current study examined parental and psychosocial factors associated with anxiety in children with and without a diagnosis of asthma. In her study of children less than five years of age Siddons (2004) found that children diagnosed with asthma had higher levels of anxiety than children without a diagnosis of asthma. Following up with the children recruited to her study made it possible to explore changes over time (with the increase of age and achievement of the major developmental task of school entry) in anxiety and somatisation. Given the earlier study had provided strong support for relationships between parent adjustment and child anxiety, and over protective parenting and child anxiety, the current study also investigated the relationship between these variables.

Apart from providing a longitudinal aspect on the measures previously collected, the current research included children's teachers as informants of child anxiety. This aspect of the study offered an extension of the baseline study and the information obtained was used to develop a more complete picture of the child's life and the effects of asthma on child adjustment (with a focus on anxiety and somatisation). The use of a teacher as an informant was also valuable because it allowed investigation of any differences in perception of the child's anxiety levels between informants. Information regarding changes over time and comparison of consistencies and inconsistencies in informant reports can enhance understanding of the dynamics involved in families dealing with childhood asthma and anxiety.

OVERVIEW OF ASTHMA

1.1 Asthma as a Chronic Illness

1.1.1 Definition

Asthma is a chronic illness that is characterised by intermittent respiratory symptoms. Wheezing, chest tightness, cough, and shortness of breath are characteristic symptoms considered to be suggestive of asthma (National Asthma Council – NAC, 2006). These symptoms have particular diagnostic relevance if they are worse at night or early in the morning, are recurrent, triggered by allergens, irritants, exercise or viral infection (Australian Centre for Asthma Monitoring - ACAM, 2005). Despite the wide spread acknowledgment of the above noted features of asthma, diagnosis and research regarding the illness has been complicated by past debate over a consistent definition. In the last decade the following definition has been widely accepted:

“Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, macrophages, neutrophils and epithelial cells. In susceptible individuals this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an increase in existing bronchial hyper responsiveness to a variety of stimuli” (NAC, 2006, p.4).

There are various classifications that apply to asthma. Asthma severity is usually referred to in terms of a classification system based on mild, moderate or severe asthma symptoms. Rating of asthma severity is seen as particularly complicated because symptoms and general expression of the disease are continually modified by external variables, such as medication and environment, as well as organic based variation in lung function. Other relevant classifications refer to subgroups within the asthma population. These include exercise-induced asthma, childhood asthma, aspirin sensitive asthma and occupational asthma (ACAM, 2005). The term “current asthma” is also used to refer to people who have “ever been diagnosed with asthma by a doctor or nurse and who additionally report experiencing symptoms or taking treatment for asthma in the last 12 months” (ACAM, 2005, p.6).

1.1.2 Treatment and Management of Asthma in Children

Although there are various behavioural, psychological and environmental interventions known to facilitate positive asthma outcomes, treatment of asthma is usually confined to medical / pharmacological intervention (NAC, 2006). There are a large number of different types of asthma medication that have different roles in the treatment of asthma (e.g. Reliever Medications & Preventer Medications), which is another aspect of the illness that illustrates the burden it presents to its sufferers. Long term treatment aims for asthma are usually described in the context of asthma management, and include different approaches for the management of acute asthma and long term management of asthma. NAC (2006) guidelines suggest medical intervention for the management of an acute asthma episode in children. In contrast, long-term asthma management requires identification of the severity of the disease and the patterns of the illness in order to

determine the need for preventative therapy. Continual assessment of interval asthma and lung function monitoring as well as implementation of an Asthma Action Plan are required. Asthma Action Plans are individually tailored guidelines written and given to patients as a hard copy they can carry with them. These guidelines include information on areas such as identifying worsening symptoms and provide clear instructions on how to respond to changes in the control of asthma symptoms (NAC, 2006).

Asthma management invariably coincides with medical treatment of the disease. One of the many difficulties children with asthma experience is the day to day variability in lung function and symptoms. Effective and safe use of medication requires matching of the current needs of the child with correct medication type and dosage. Despite the irrefutable importance of medication in asthma management, non-compliance is a major concern (ACAM, 2005; McQuaid, Kopel, Klein & Fritz, 2003; Spector, 2000). In research that included assessment and treatment of non-compliance to medication in children with chronic illness Cluss, Epstein, Galvis, Fireman, and Friday (1984) found that two main features of asthma (wheezing and lung function) were not managed as well in asthmatic children who were not compliant with their medication than in those who were compliant. A more recent study suggests that “on average, children are taking approximately half of their regulatory prescribed inhaled medication” (McQuaid et al., 2003, p.331). This research which was focused on children aged between 8 and 16 years also indicated that adherence with preventative asthma medication is negatively associated with age. That is, adherence to medication is higher among younger children than in adolescents. This finding was established despite the older children (adolescents) knowing more about their condition and assuming more responsibility in its management (McQuaid et al., 2003).

A recent study (Bokhour et al., 2008) that focused on parents of children with asthma examined parental non-concordance with recommendations for prescribed asthma medication for their children. The authors argued that to understand non-adherence to asthma medication it was necessary to consider the explanatory models used by parents in their management of their child's asthma. The term non-concordance was used to indicate a lack of alignment between the use of medication and parental beliefs about giving medication. Their findings identified three types of non-concordance; 1) unintentional: parents believed they were following recommendations; 2) unplanned: parents reported intending to give medications but were not able to; 3) intentional: parents reported they believed giving medication was the wrong course of action. These findings illustrate some of the difficulties asthma management can present for families.

1.1.3 Prevalence, Social and Community Issues

Worldwide, in excess of 150 million people have asthma, including over 2.2 million Australians (Asthma Victoria 2007). Australia has one of the highest asthma prevalence rates in the world, with more than 10% of the population effected (ACAM 2005). In Australia asthma is the most common childhood chronic illness and the leading cause for childhood hospitalisation. The childhood asthma rate in Australia is high compared with international standards, with the illness affecting 14-16% of children (National Asthma Organisation, 2008). Perhaps the most alarming statistic available today is that up to 2 in 5 primary-school aged children are affected by this chronic illness (NAC, 2008). Gender differences in asthma prevalence rates have also been identified, with the illness being more prevalent among primary-school aged boys than girls. However, this gender trend is

reversed in later life, with asthma being more common among females from adolescence onwards.

Research has indicated that children who have a history of respiratory infections are at risk for developing asthma (Busse, 1990; Busse, Lemanske & Dick, 1992; Cypcar, Stark, Lemanske, 1992; Folkerts & Nijkamp, 1995; Sarafino & Dillon, 1998; Pullan & Hay, 1982). Findings reported by Sarafino and Dillon (1998) suggested that “each additional bout with respiratory infection in early childhood tends to increase both the child’s susceptibility to later infection, and the severity of the asthma condition the child may develop” (p.500). Sarafino and Dillon (1998) also found that the frequency with which a child experienced respiratory infections in the past year and prior to the onset of asthma, as well as their asthma severity, increased the likelihood of subsequent respiratory infections acting as triggers for an asthma attack. This association between respiratory infections and asthma attacks is also supported by the National Asthma Council of Australia: “In children, infection with common respiratory viruses is the most common trigger for acute exacerbations of asthma” (NAC, 2006, p. 72).

Childhood asthma is often resolved completely, or decreases in severity, with age. Thus, some children diagnosed with asthma may simply ‘grow out of it’ (NAC, 2006). Some research has indicated that the impact of some triggers may also change in accordance with age. More specifically, it was found that in younger children asthma episodes were associated with night-time hours and respiratory infection, while in older children illness episodes were more likely to be influenced by allergies and physical activity (Sarafino, Paterson, & Murphy, 1998). Over the last decade statistics reveal a

decline in asthma related General Practice (GP) medical consultations, hospitalisations and deaths. However, Australian mortality rates remain high when compared with other countries. Asthma mortality in Australia has also been associated with socioeconomic status, as asthma deaths have been found to be more common in low socioeconomic status regions (ACAM, 2005). Young children (aged between 0-4 years) represent the age group that most frequents doctors, hospital emergency departments, and is most frequently admitted to hospital for asthma. Despite a higher frequency of hospitalisation for this age group, the length of admission for children with asthma is typically one day. Australian figures indicate that more than a quarter of total asthma expenditure and nearly half of all hospital expenditure for asthma was for children aged 0-14 years. In particular, boys aged 5-14 years accounted for the highest proportion of all asthma expenditure. In adults expenditure is higher for females than males, due to increased prevalence in adult woman (ACAM, 2005).

The emotional, financial, social, physical and medical costs associated with asthma are substantial. Research has demonstrated that people with asthma perceive their general health as being more limited than those without asthma (ACAM, 2005). People with asthma have reported that their illness impacts on their psychological and social quality of life, as well as their physical well being (ACAM, 2005). When considering childhood and adolescent asthma, it is also widely acknowledged that the illness also places a heavy burden on an individual's education (ACAM, 2005). There is no known cure for asthma. However, education, development of beneficial coping strategies, and advances in medication mean that it can be effectively managed.

OVERVIEW OF ANXIETY

1.2 Anxiety in Young Children

1.2.1 Definition and Identification of Childhood Anxiety

The term anxiety is commonly used in contemporary vernacular in reference to an emotion or emotional state. It is generally understood to be an unpleasant emotion, often encompassing features of “apprehension, dread, distress, and uneasiness” (Reber, 1995, p.45). Anxiety is a natural human reaction which involves the mind and body and is widely acknowledged to be experienced, albeit in varying degrees, by all people, thus making it universal. Despite often being associated with negative features, anxiety can also be very useful and an adaptive response to threat, providing a protective or survival function in threatening situations. This survival function explains the universality of anxiety (House & Stark, 2002). Various manifestations of anxiety are successfully managed most of the time by many people. However, despite the commonality, and often normality of anxiety, it has a pathological potential, that depending on its frequency of occurrence and severity in presentation, can result in dysfunctional behaviour and psychopathology (Birmher et al., 1997; Manassis & Hood, 1998).

Anxiety is common among children, with younger children in particular experiencing the emotion (Bell-Dolan et al., 1990; Bernstein et al., 1996; Kendall et al., 2004). It has been reported that the prevalence of childhood anxiety disorders “ranges from 5.7% to 17.7%” (King, Heyne, & Ollendick, 2005, p. 242). Costello, Mustillo, Erkanli, Keeler and Angold (2003) found that 2.4% of children / adolescents aged between 9 and 16 years met the criteria for at least one anxiety disorder. Childhood presentations of anxiety

are often normal, age-dependent reactions that emerge and later dissipate as part of emotional development (Grills-Taquechel & Ollendick, 2007; Gullone, 1996; Silverman, LaGreca & Wasserstein, 1995). However, as with adults, anxiety in children can cause significant distress resulting in impaired functioning and emotional development (Manassis & Hood, 1998). One of the difficulties that arise out of the complex nature of this emotion is the differentiation between normal anxiety and problematic anxiety or anxiety disorders (Bell-Dolan et al., 1990; King, Heyne, & Ollendick, 2005). As such, guidelines are used to identify the presence and determine the degree of anxiety. One such guideline suggests that it becomes clinically relevant if the anxiety experienced and / or displayed is developmentally inappropriate or excessive (March, Parker, Sullivan, Stallings & Conners, 1997). It has also been suggested that “if the anxiety response is elicited by a situation or object that is not truly dangerous, then the anxiety and the avoidance associated with it are no longer adaptive. A diagnosis of an anxiety disorder is warranted if the anxiety response is excessive in frequency, intensity and/or duration, and if it results in significant impairment in functioning” (Grills-Taquechel & Ollendick, 2007, p. 197).

Despite such guidelines, identification of anxiety in children can be somewhat difficult as it often manifests in a different manner than adult anxiety. For example, anxiety in children has been associated with sleep disturbance / nightmares (Mindell & Barrett, 2002), and somatic complaints (Reynolds & Kamphus, 1992). Bell-Dolan et al (1990) found that fear of the dark, fear of harm to an attachment figure, over-concern about competence, excessive need for reassurance, and somatic complaints were the most endorsed anxiety symptoms in non-referred / never-psychiatrically-ill children. Many childhood fears and anxieties are considered normal and simply age related. Grills-

Taquechel & Ollendick, (2007) outlined examples of anxiety provoking stimuli and how it changes and progresses in normal children, highlighting the transitory nature of normal anxiety. They highlight that in young (pre-school) children normal anxiety emerges with fear of animals, the dark and solitude. They contend that consistent with their cognitive development older children's fears go on to include imaginary or abstract things, as well as anticipatory fears (e.g. failure, death, injury). In contrast, pathological fears persist over time and are often inappropriate in relation to the child's age and developmental stage (Grills-Taquechel & Ollendick, 2007; King, Heyne, & Ollendick, 2005).

Presentations of anxiety such as those referred to above may occur in part because of young children's limitations in verbal expression, vocabulary, and general language skills, as well as their difficulty identifying and understanding their emotions. Previous research indicates that children's reduced ability to verbally express their anxiety may lead to a physical expression of their emotions in the form of somatisation (Masi et al., 2000; Masi et al., 1999). Physical symptoms such as feverishness, sweating, vomiting, headaches and other pain and discomfort can be indications of anxiety in children (Winnicott, 1987). The commonality and frequency of somatic complaints in children is widely acknowledged (Beidel, Christ & Long, 1991; Hodges, Kline, Barbero & Wardruff, 1985; Last, 1991; Livingston, Taylor & Crawford, 1988; Walker & Greene, 1989; Wasserman, Whittington & Rivara, 1988). Furthermore, a strong correlation between anxiety and somatisation in young children has been demonstrated in past research (Reynolds & Kamphaus, 1992; Siddons, 2004). Siddons (2004) found that a significant proportion of children with clinical levels of anxiety also had clinical levels of somatisation. Of the 34% of children (n= 35) identified

with at risk levels of anxiety, approximately 16% (n=16) were also identified with at-risk levels of somatisation. The impact of somatic illnesses on children appears substantial. Walker and Greene (1989) found that children who experience somatic complaints can experience similar levels of psychological distress to children with organic physical health problems. Thus, measuring levels of somatisation in young children may provide an indication of the anxiety levels they are experiencing.

1.2.2 Assessment of Childhood Anxiety

Assessment of anxiety in both adults and children is complex as it requires objective, external measurement of a subjective, internal emotional state. In adults this process usually occurs, or is aided, by self report. However, assessment of anxiety in children is complicated by various age related constraints. For example, children's limited language skills, cognitive memory, and attention span can preclude accurate assessment of anxiety (Murphy et al., 2000; Shaw, Keenan, Vondra, Delliquadri & Giovanelli, 1997).

Assessment of anxiety in children is further complicated by the ways which the emotion can be expressed by them, and as such be identified by either the child themselves, a clinician, or by a carer. Interview and self report-measures are simple and common methods used in psychology to elicit information from a person regarding their thoughts and emotions. However, in research pertaining to children, information is usually sourced from adults involved in the children's care, i.e. parents/carers, physicians, and teachers. As such, carer report and direct observation are the primary methods used for assessing anxiety in young children. Carer report raises the question of accuracy concerning the information

provided about a child. This avenue of assessment also has a potential for eliciting differences in informant / assessor perception, bias, and differences in the child's presentation with different people and in different settings.

Differences in information elicited from informants regarding children have been consistently reported (Achenbach, McConaughy & Howell, 1987; DiBartolo & Grills, 2006; Klein, 1991; Lapouse & Monk, 1964; Smith & Prior, 1995; Walton, Johnson & Algina, 1999; Zbikowski & Cohen, 1988). Early research regarding children's fears by Lapouse and Monk (1964) indicated that compared to child reports, mothers often underestimated their child's fears. Similar informant differences have been evidenced in other research (e.g. Klein, 1991). In more recent research, Smith and Prior (1995) found informant based differences in research results regarding child resilience, with teachers rating children's behaviour more positively than their mothers. The authors interpreted this finding as suggesting that teachers may make more objective judgments of children than mothers and concluded that "teachers provided more balanced and consistent views of the child's functioning in the school context" (Smith & Prior, 1995, p.10). However, the authors also acknowledged that the children may have actually functioned better at school which was outside a potentially stressed home environment. In recognition of this problem a recent study investigated who is best at predicting a child's anxiety. DiBartolo and Grills (2006) examined child, parent and teacher reports of child social anxiety. Results suggest poor agreement across informants, with children showing evidence of predicting their own anxiety when parents and teachers did not.

In a study of the temporal stability and convergent validity of the BASC when administered to kindergarten and first grade students Merydith (2001) found that teachers provided more stable ratings of children's externalising behaviours and attention problems than parents. Merydith (2001) found that although teachers and parents were similar with their ratings on the clinical and adaptive scales with a six month interval, teacher ratings on the adaptive scales at Time 2 exceeded parent ratings by almost one-half standard deviation.

However, in recent research, Kendall, Puliafico, Barmish, Choudhury, Henin and Treadwell (2007) found that use of the Child Behavior Checklist (CBCL) Parent and Teacher Report Form improved prediction of anxiety status despite differences between them. Kendall et al., (2007) also highlighted the importance of using informants from different settings "For example, a socially phobic youth may not display anxiety at home, but may be excessively fearful of evaluation in a classroom setting" (Kendall et al., 2007, p.1005).

Research specifically relating to children with asthma has also elicited evidence for informant based differences. Zbikowski and Cohen (1988) examined parent and peer reports regarding social competence of children with mild asthma. Both informant groups (parents & peers), perceived reduced social competence in these children compared to children without asthma, however, parents were found to have considerably underestimated their child's social competence compared to peers. In a study by Klein (1991) poor agreement between child and parent reports of anxiety was also evidenced. In other research, Brook (1996) investigated congruence between parent, child, and teacher

estimates of child anxiety and depression. Overall, low congruence among all informants was found. Results specifically relating to anxiety estimates showed that parent-child congruence was higher than teacher-child congruence. A later study of children with asthma (Klennert, McQuaid, McCormick, Adinoff & Bryant, 2000) used both parents and clinicians as informants regarding child behaviour. Findings indicated that mothers of children with asthma reported more behavioural problems in their children than mothers of children without asthma. Furthermore, the problems reported by mothers of the children with asthma were not apparent to investigators through observations and interviews.

The possibility that such findings may reflect that child behaviour is situation-specific cannot be dismissed, nor can the potential for informant bias, or individual / subjective differences in perception. Thus, the research noted above clearly demonstrates potential complications in assessment of childhood anxiety. The possibility of anxiety being masked by or expressed as somatic complaints and informant based differences in assessment are all potential obstacles in the accurate assessment of this common childhood problem. In light of these issues, it has been suggested that assessment of childhood anxiety should be based on a variety of methods and instruments, including; self-report measures, parental report measures, and diagnostic interview (Bernstein et al., 1996).

1.2.3 Progression of Anxiety

Research suggests that the nature of children's anxiety changes over time and with age. Young, pre-school aged children are more likely to fear "sudden, intense, and novel stimuli, separation from caretakers, and supernatural beings" (Bell-Dolan et al., 1990, p.759). In contrast, older children's fears tend to be related to school, peers, and health

issues (Bell-Dolan et al., 1990). The prevalence of anxiety appears to be influenced by gender, along with age variables, with anxiety being more prevalent among girls and in younger children (Bell-Dolan et al., 1990; Klein, 1991).

Research relating to the progression of anxiety, indicates that anxiety problems in general decrease over time and with age. It also suggests that once a child has experienced anxiety it is likely to remain present to some degree into their later life. However, people who did not experience anxiety in their childhood are less likely to develop it in adolescence or adulthood. In a longitudinal study of children aged 5-6 years Ialongo, Edelson, Werthamer-Larsson, Crockett and Kellam (1995) found that self-reported anxiety symptoms were associated with anxiety in later childhood. Other research has suggested an association between childhood anxiety and severity of adult anxiety. Bell-Dolan et al. (1990) found that anxiety in later life was more severe in individuals who experienced anxiety problems in their childhood than in those who were not anxious as children.

A more recent longitudinal study found that anxiety symptoms were moderately stable during childhood and adolescence, supporting a developmental model of the etiology and maintenance of childhood anxiety (Bosquet & Egeland, 2006). The study also found that risk for anxiety was influenced by different variables at different stages and ages of life. Risk in early childhood was associated with earlier physiological / temperamental reactivity / regulation variables, while risk for anxiety in preadolescence was associated with a history of developmental incompetence in transition to school and the peer environment.

Despite this trend, research has also indicated that childhood anxiety problems can be alleviated with psychological intervention (Barrett, Duffy, Dadds & Rapee, 2001; Elliot, Prior, Merrigan & Ballinger, 2002). However, left untreated anxiety can remain stable, may develop into a chronic condition, may increase in severity over time, and can potentially lead to other problems like depression (Last, Hersen, Kazdin, Finkelstein & Strauss, 1987) and substance abuse (Kendal, Stafford, Flannery-Schroeder & Webb, 1997). Kendall et al. (2004) completed a follow up to their earlier research (Kendall, Stafford, Flannery-Schroeder & Webb, 1997) in which the original sample comprised 94 participants aged 9-12 years diagnosed with Diagnostic and Statistical Manual of Mental Disorders (DSM) primary anxiety disorder. Participants in the original study received a 16-week CBT intervention for anxiety after which they were determined to have gained significant improvements in symptoms. At follow up (Kendall et al., 2004), 86 of the original participants, then aged 15-22 years, participated 7.4 years later. Results showed that most participants maintained their gains from the earlier CBT anxiety treatment and experienced a “reduced degree of involvement and problems associated with substance use” (Kendall et al., 2004, p. 283). However, results failed to distinguish differences between participants with successful treatment and those with none or less successful treatment regarding development of depression. Despite this, the rate of depression at follow up was “fairly equivalent to the rates found in the general population of adolescents” (Kendall et al., 2004, p. 283).

1.2.4 Anxiety in Children with a Chronic Illness

Another factor that appears to contribute to anxiety in young children is their health status. Research suggests that children living with a chronic illness exhibit poorer psychological adjustment than healthy children (Christiaanse, Lavigne & Lerner, 1989; Gerhardt, Walders, Rosenthal & Drotar, 2004; Graham, Rutter, Yule & Pless 1967; Perrin & MacLean, 1988; Perrin, MacLean & Perrin, 1989; Svavarsdóttir, & Örlygsdóttir, 2006; Venning, Elliott, Whitford & Honnor, 2007), and in particular are more vulnerable to developing anxiety than their relatively healthy peers (Lavigne & Faier-Routman, 1992).

In research investigating the impact of childhood chronic illness on the family Hamlett, Pellegrini and Katz (1992) interviewed mothers of chronically ill children with asthma or diabetes and mothers of healthy children. Mothers of the children with asthma reported more internalising behavioural problems in their children than the other groups. Results also suggested that “family functioning, maternal social support, and chronic illness were significantly related to the psychological adjustment of the child” (Hamlett et al., 1992, p. 33). In acknowledging that the increased rate of psychological problems among chronically ill children may be a reflection of problems adjusting or adapting to the illness rather than psychopathology per se, the authors highlighted the ambiguity regarding the direction of the relationship between chronic illness and poor psychological adjustment in children.

Many aspects of living with a chronic illness can potentially influence the development, maintenance, and severity of childhood anxiety. Daily activities of children with chronic illness have been demonstrated to be restricted in multiple ways compared with those of healthy children. For example, chronic illness has been linked with decreased school attendance, sleep disturbance, and reduced involvement in activities like bike riding and organised sports (Lenny, Wells & O'Neill, 1994; Sawyer & Fardy, 2003). Restrictions in daily activities may occur because of limitations due to the nature of the illness, but may also be a result of parental or child anxiety stemming from worry and fear relating to real or perceived health related vulnerability.

Compliance with medication is another area of concern that has been recognised as a significant issue among patient populations suffering a chronic illness and / or requiring long-term treatment (ACAM, 2005; Bokhour et al., 2008; Cluss et al., 1984; McQuaid et al., 2003; Sackett & Snow, 1979). Children with a chronic illness and their families have more to cope with compared to families of children without a chronic illness, for example the responsibility of the medical management of the chronic illness. The issue of medication is complex as compliance with medication poses additional stress on the child and their carers; however, non-compliance can result in negative health outcomes (Cluss et al., 1984). This work suggests that the pressures of medical management of asthma may contribute to the development of anxiety or exacerbate pre-existing parental or child anxiety. However, no research has been identified that has explored any direct relationship between the two.

Research suggests that the health status of a child may also influence the way in which they express their anxiety (Adams et al., 2002). More specifically, children with a chronic illness may be more likely to physically express anxiety because they are more aware of physical sensations than relatively healthy children. Thus, children suffering a chronic illness may develop a tendency for emotional expression via physical symptoms i.e. somatisation (Last, 1991; Reynolds & Kamphus, 1998; Tonge, 1994). This tendency combined with the previously discussed already existent potential for young children to experience and express anxiety via somatisation, suggests increased vulnerability of chronically ill young children to experience somatic complaints and disorders.

1.2.5 Anxiety in Children with Asthma

Substantial research has investigated the possible relationship between childhood asthma and psychological problems. Some research findings have suggested that children with asthma have more psychological problems than those without asthma. Evidence suggests that children with asthma have higher levels of internalising behaviours and problems such as anxiety and depression than children without asthma, and than children with other chronic illness (Bennett, 1994; MacLean et al., 1992). Bennett (1994) found that children with asthma were more likely to develop depressive symptoms than children with cystic fibrosis, cancer, and diabetes mellitus. Research has also shown support for the presence of increased behavioural problems (Bussing, Halfon, Benjamin & Wells, 1995), lower self esteem (Donnelly 1994), and increased social isolation, feelings of anger and frustration (Juniper, 2001), among children diagnosed with asthma. More recent studies

have produced similar evidence. Sawyer et al. (2001) found that social functioning and mental health, as well as physical health, was significantly worse among Australian children aged 7 to 12 years with asthma than among those without asthma. Congruous results were reported by McQuaid et al. (2001) whose findings indicated that children with asthma displayed more behavioural problems when compared to healthy children. Furthermore, investigators found that children with asthma showed more of both internalising (i.e. anxiety & depression) and externalising (i.e. oppositional & hyperactive) behaviours than children without asthma, with the difference being greater with respect to internalising problems. MacLean et al., (1992) examined psychological adjustment in 81 children (aged 6 to 14 years) with asthma and found that 11.5% of the children had Total Behaviour Problems scores above the 98th percentile according to the Child Behavior Checklist (CBCL). This finding suggests that it is especially important to identify anxiety in young children with asthma because of potential psychological vulnerability.

Some other research set out to elucidate findings regarding the relationship between childhood asthma and behaviour problems and determine the prevalence of behavioural comorbidity with asthma in a community-based urban sample. Halterman, Conn, Forbes-Jones, Fagnano, Hightower and Szilagyi (2006) compared children with no asthma symptoms, intermittent asthma symptoms, and persistent asthma symptoms across several behavioural domains (positive peer social skills, negative peer social skills, task orientation, shy/anxious behaviour). Results showed that children with persistent asthma symptoms exhibited more behavioral problems across the board compared with children with no symptoms.

In another recent study, Feldman, Ortega, McQuaid and Canino (2006) explored comorbidity between asthma attacks and internalising disorders in Puerto Rican children. An association was identified and replicated after a one year interval, suggesting that comorbidity between asthma attacks and internalising problems may be a consistent finding across time. However, it is important to note that in this research asthma diagnosis was based on parent report and no information was gathered on asthma severity. Furthermore, the researchers highlight the possibility that asthma and internalising problems like anxiety “may simply be two chronic, coexisting conditions that do not reciprocally influence one another” (Feldman et al., 2006, p. 338).

Other research has looked at older children and younger adults (youth aged between 11 & 17 years). Katon, Lozano, Russo, McCauley, Richardson and Bush (2007) investigated the prevalence of DSM-IV anxiety and depressive disorders among youth with asthma compared to their asthma free peers. Results indicated that youth with asthma had almost twice as high prevalence rates of comorbid anxiety and depressive disorders as asthma free youths, with 16.3% of youth with asthma meeting the DSM-IV criteria for one or more anxiety and depressive disorder compared with 8.6% of youth without asthma.

A relationship between asthma and anxiety has also been evidenced in adult populations. Cooper et al., (2007) found a high prevalence of generalised anxiety and depression in adults with asthma. Furthermore, a recent study that reviewed data collected between 2001 and 2007 regarding adults with asthma found that the prevalence of serious psychological distress among adults with asthma was 7.5% (Oraka, King, & Callahan, 2010). Research on the co-occurrence of asthma and anxiety in adult populations gives

further weight to a potential association in children. In a meta-analytic review of data from 15 independent studies, Weiser (2007) found “a strong relationship between the two conditions” (Weiser; 2007, p. 297). The results indicated an average prevalence of anxiety disorders of 34% among adults with asthma.

A literature and clinical review recently undertaken in a multidisciplinary conference by the The Anxiety Disorders Association of America concluded that although not as thoroughly researched compared with depression, “robust epidemiological and clinical evidence shows that anxiety disorders play an equally important role” in terms of comorbid associations with chronic illness like asthma, and self-care, complications and mortality (Roy-Byrne et al., 2008, p. 467). In other work, Katon, Richardson, Lozano, and McCauley (2004) reviewed literature from the two previous decades using MEDLINE to examine research that explored asthma with anxiety, depression, panic, and psychological disorders. Their analyses revealed that both child and adult populations with asthma appeared to have a high prevalence of anxiety disorders, with up to one third of children / adolescents with asthma having a comorbid anxiety disorder.

Despite the research noted above indicating that children with asthma are at greater risk of developing psychological problems than children living with other types of chronic illness, research in the area has evidenced conflicting findings. Bender-Berz, Klein-Murdock, and Koinis-Mitchell (2005) investigated if asthma could be determined as a risk factor for higher levels of psychological problems in a sample of urban, school-aged children. Their results failed to evidence a significant association between asthma and increased psychological problems. Some other studies (Graham, 1985; Perrin et al., 1989;

Nemzer, 1990) have found that children with asthma do not have higher rates of psychopathology when compared with other chronically ill children. As such, discrepant findings between studies discounts any contention of a definite or substantial association between asthma and anxiety, however, empirical evidence does suggest that children with asthma are at increased risk of developing difficulties in psychological adjustment, especially internalising problems such as anxiety, compared with healthy peers.

Investigations into the association between childhood asthma and psychological problems are longstanding. A significant area of investigation has related to the direction of any such association, i.e. Does childhood asthma lead to psychological problems or do psychological problems influence the development of asthma? Early considerations of psychological variables associated with childhood asthma focused on psychoanalytic concepts such as separation anxiety and individuation, which were thought to manifest in various forms of anxiety (Alexander, 1950; French & Alexander, 1941). Subsequent research has suggested that other psychosocial factors such as family dynamics, stress and management of medication, may have particular influence on the psychological adjustment of children with asthma (Klennert et al., 2000; Markson & Fiese, 2000; McQuaid et al., 2001; Wamboldt et al., 1998).

Severity of the illness, age of symptom onset, and, timing and duration of early hospitalisation are three key illness specific variables that have been identified as potential predictors of pathology in young children with asthma (Mrazek, Schuman, & Klennert, 1998). In regard to age of onset, Mrazek et al. (1998) found that children who developed asthma prior to three years of age had “significantly more behaviour problems at age four

than children who developed asthma later in childhood (between 3 and 6 years of age)” (Mrazek et al., 1998, p.247). This pattern continued with children who had an onset prior to age three having significantly more problems at age six than children with a later onset or children without asthma. Overall, findings indicated that early onset of asthma was associated with greater risk for behavioural problems (Mrazek et al., 1998). Mrazek et al. (1998) contend that one explanation for this is based on child cognitive development, as prior to age three children primarily use sensorimotor mode of thinking and as such cannot comprehend “causal or temporal relationships that can place their symptoms and treatment in a more limited and less threatening perspective” (Mrazek et al., 1998, p. 248). Also developmental related language limitations may preclude articulation of their distress and therefore need for support and assurance, suggesting that younger children are more emotionally vulnerable. Mrazek et al. (1998) also contend that younger children are at greater risk because parents do not cope well with young children being ill. Furthermore, they suggest that the severity and intensity of stressors that lead to adjustment problems may take more time to emerge and as such later onset may follow the same pattern. Mrazek et al. (1998) also found support for high levels of depressive symptoms in young children with mild asthma. Other research has also indicated a link between age of asthma related hospitalisation and psychological adjustment, with results showing that children who were hospitalised between age 2 and 3 are at increased risk for problems with psychological adjustment, compared to children who are older when hospitalised (Prugh & Eckhardt, 1980).

Although the concept of psychological influences on asthma has historically been controversial, support for an inverse relationship has been relatively strong. That is, a diagnosis of asthma has been linked to the development of depression and anxiety symptoms (Harrison 1989; Osman, 2002; Rand & Butz, 2000). This finding is not surprising when the difficulties of living with asthma are considered. Traditional health measures used in asthma research have focused on prevalence, mortality, and hospitalisation. More recent measures of the impact of asthma have also examined the impact on quality of life. Research has reported that in children with asthma health related quality of life is significantly worse than that experienced by their asthma free peers (ACAM, 2005; Svavarsdóttir & Örlygsdóttir, 2006). The link between asthma and anxiety can arguably be demonstrated in many ways. For example, statistical trends indicate that child asthma related visits to emergency departments in Australia increase by over 50% in the few weeks after the beginning of each school term. This trend has been hypothesised to be due to increased exposure to respiratory infections with the return to school (ACAM, 2005). However, given the association between asthma and anxiety it seems plausible to consider the role anxiety may play in triggering or exacerbating asthma symptoms at this commonly anxiety provoking time for young children. The start of the school term is associated with separation from the carer and a return to a performance based environment, which can be anxiety provoking for many children.

Due to the inherent nature of internalised problems, there is high potential for such problems to be unrecognised or misdiagnosed. Similarities between physical symptoms of asthma and childhood expressions of anxiety are evident. For example, chest tightness and shortness of breath can be symptoms of both asthma and anxiety (ACAM, 2005; DSM-IV-

TR, 2000). However, differentiating between organic and psychological causes of such symptoms is very important given the inherent vulnerability to psychopathology of chronically ill children (as discussed above), and specifically of children with asthma (Donnelly 1994; Hamlett, Pellegrini & Katz, 1992; Kashani, Konig & Shepperd, 1988; Klinnert et al., 2000; MacLean et al., 1992; McQuaid et al., 2001; Mrazek, Anderson & Strunk, 1985; Wamboldt, Fritz, Mansell, McQuaid & Klein, 1998). Although the current study has focused on the role of asthma in anxiety the potential for an inverse relationship between these variables should be considered. That is, anxiety may impact on asthma and asthma symptoms or attacks.

1.2.6 Role of Asthma Severity in Anxiety

It seems plausible to assume there is a relationship between asthma severity and the degree of child and parent anxiety, as well as other emotional or psychological problems. In terms of risk to general health and morbidity, medication, activity restrictions, and overall quality of life, asthma means that the child and family have more to cope with. Thus, it might be expected that more severe asthma would be related to an increased level of anxiety and behavioural problems in the child. Empirical support for the relationship between asthma severity and level of anxiety has been previously reported (Klinnert et al., 2000; Wamboldt et al., 1996 & 1998). Wamboldt et al. (1996) found that levels of anxiety in children with asthma were related to asthma severity, with more anxious children rated as having more severe asthma. Subsequent research (Klinnert et al., 2000; McQuaid et al., 2001; Wamboldt et al., 1998) further supported this association with results indicating that increased severity in asthma correlated with increased behavioural difficulty. In other

research, McQuaid et al. (2001) found that increased asthma severity correlated with greater behavioural difficulty and Sawyer et al (2001) found that compared to asthma free peers, children with more severe asthma had the poorest Health Related Quality of Life (HRQoL) outcomes.

Despite the research cited above, overall the findings from research examining the association between asthma severity and behavioural adjustment have been inconsistent. For example, MacLean et al. (1992) found children with asthma who had mild and severe symptoms (on a mild, moderate, & severe rating scale) had more psychological problems than those with moderate severity ratings. In other research Kashani, Konig, Shepperd, Wilfley, and Morris (1988) compared children with asthma and controls on various measures. They found no significant difference between groups in relation to self-concept, but findings suggested that children with asthma were more vulnerable to developing psychopathology. However, severity of asthma was not associated with psychopathology. Later studies (Bender et al., 2000; Siddons, 2004) have also failed to find any relationship between severity of asthma and child behavioural adjustment.

1.3 Parental Factors Associated with Childhood Anxiety

Considerable research has highlighted the parent-child (particularly the mother-child), relationship as having etiological significance in the development of emotional and psychological problems such as anxiety (Bowlby, 1969; Hudson & Rapee, 2001; Manassis & Hood, 1998; Patterson, 1982; Rapee, 1997, 2001). In particular, protective parenting attitudes and parental adjustment have been linked to child anxiety (Abidin, Jenkins & McGaughey, 1992; Shainir-Essakow, Ungerer & Rapee, 2005; Thomasgard, 1998). More generally, parental over-protectiveness, restriction of activities, inconsistent disciplinary practices and parental psychological adjustment have been associated with childhood chronic illness (Cappelli, McGrath, MacDonald, Katsanis & Lascalles, 1989; Minuchin et al., 1975; Parker, 1983), and specifically with childhood asthma (Parker, 1983). The various associations between these variables (protective parenting, parental adjustment, childhood chronic illness, childhood anxiety and childhood asthma) and the potential directional pathways of any evidenced links are discussed below.

1.3.1 Protective Parenting

Protective parenting as a theoretical concept intuitively makes sense given that an important role of parenting is child protection. However, key to this current investigation is the differentiation between normal parenting styles which encompass features of child protection and overprotective parenting in which protective parenting boundaries are exceeded, by way of excessive control over the child, unnecessarily high measures of protection and excessive restrictions placed on the child.

Some important research in this area (Thomasgard, Metz, Edelbrock & Shonkoff, 1995) has referred back to past evaluations of the types of behaviours that constitute protective or overprotective parenting. Understanding the difference between normal parenting and overprotective parenting is important given that past research has indicated that the parent-child relationship may influence the development and maintenance of child anxiety (Hudson & Rapee, 2001; Manassis & Hood, 1998). In a seminal paper, Levy (1962) identified parental behaviour that was excessive in physical or social contact, prolonged infantilisation, actively discouraged child independence and social maturity, and was excessively controlling or significantly lacking in parental control, as the main features of overprotective parenting.

One concern with parental overprotection is that some coinciding parental behaviours are developmentally inappropriate, and as such, may hinder a child's natural progression towards autonomy and individuation. Parental recognition of a child's increasing need for autonomy as they become older is important for a child's overall emotional development and in particular to facilitate adaptive emotional self-regulation (Crockenberg & Leerkes, 2000; Seifer & Dickstein, 2000). Controlling and protective parenting styles have been linked with child behavioural problems, and have been correlated with increased child anxiety (Crook & Lewis, 1990; Patterson, 1982; Rapee, 1997, 2001; Stark, Humphrey). When comparing the parenting received by children who later in life developed an anxiety disorder with anxiety-free controls, Rapee (1997) found that a clinical sample of adults with anxiety reported their parents as having been more controlling than the non-clinical sample.

Research has investigated possible explanations for how and why overprotective parenting behaviour develops. Rapee (2001) contended that through their attempts to reduce their own anxiety, overprotective parents may in fact sensitise their child to threat and reduce their sense of self-control, effectively resulting in increasing their vulnerability to anxiety. Other researchers have hypothesised that overprotective parenting occurs because of parental perceptions of child vulnerability (Green & Solnit, 1964; Thomasgard & Metz, 1995). The concept of Vulnerable Child Syndrome was developed by Green and Solnit (1964) who found that first born children, children with a medical condition, and children with a previous life threatening illness or injury, were viewed by their parents as most vulnerable. This research on the topic offers plausible explanations for the development of overprotective parenting, but there is no clear cut causal relationship that has been established.

Despite its theoretical and intuitive validity, a relationship between parental overprotection and parental perceptions of child vulnerability has not received consistent empirical support (Parker & Libscome, 1981; Thomasgard & Metz, 1997; Thomasgard, Metz, Edelbrock & Shonkoff, 1995; Thomasgard, Shonkoff, Metz, & Edelbrock, 1995). In a study that was inconsistent with their earlier findings Thomasgard and Metz (1997) found that parental overprotection was not always linked with either parental perception of increased child vulnerability or child health status. Results from this study indicated that parental overprotection was not associated with “any health related variables such as coming to the clinic (used in recruitment) for a sick visit or parental report of the child having either a medical condition or a previous life-threatening condition” (Thomasgard & Metz, 1997, p. 331). Overprotective parenting was however correlated with lower levels of

parental education, younger child age, and having an only child. The association between child age and parental overprotection has been a consistent finding between studies (Thomasgard & Metz, 1997; Thomasgard, Metz, Edelbrock, & Shonkoff, 1995).

More recent research in this area has highlighted the complexity of the association between parental overprotection and child anxiety. Ollendick and Horsch (2007) examined the relationships among maternal phobic anxiety, maternal over-control, child anxiety sensitivity, and child level of fear. These four variables were also analysed separately in relation to age, gender and diagnostic status. Results indicated that age, gender, child anxiety sensitivity, and maternal over-control were significant predictors of child level of fear. Furthermore, maternal over-control was found to be a significant predictor of child level of fear for younger girls but not for older children or boys. When analyses were run taking into account diagnostic status, maternal over-control was a marginally significant predictor of level of fear in children with anxiety but not for those without anxiety. Further support has been established for the relationship between overprotective parenting and anxious child behaviour in other recent research investigating overprotective parenting, anxiety sensitivity, and child anxiety (Schwartz, 2008).

Some research that has focused on correlates of overprotective parenting amongst children with a chronic illness seems to have elucidated findings in this area. Research by Anthony, Gil, and Schanberg (2003) indicated that parents of children with chronic illness have increased perceptions of child vulnerability. Research findings indicating parental perceptions of increased child vulnerability for chronically ill children intuitively makes sense given the child's diagnosed medical condition, however, it also raises the issue of the

impact of parental beliefs and attitude on parenting behaviour, the parent-child relationship, and in turn, child psychological adjustment. Anthony et al. (2003) examined the extent to which parental perceptions of child vulnerability predicted school and social adjustment in children with chronic illness. Parent reports of perceived child vulnerability were compared with child self-reports of social adjustment, school attendance records, and physician's global assessment of the child's disease severity. Results indicated that parental perceptions of increased child vulnerability were related to increased social anxiety, with children who reported higher levels of social anxiety having parents who perceived them as being more vulnerable. Furthermore, they found that children who were perceived by their parents as more vulnerable reported more generalised social distress and more distress when responding to novel situations. Parental education was also linked with perception of child vulnerability and school absences, with parents who had lower levels of education reporting increased perceptions of child vulnerability and school records indicating a correlation with their child's increased school absences. Based on their results Anthony et al. (2003) concluded that health care use, quality of life, and parental overprotection were the "mechanism by which perceptions of child vulnerability influence child anxiety" (Anthony et al., 2003, p. 187). Although these findings may suggest a level of over-concern or overprotection in parents of chronically ill children, it is important to note that perceptions of increased vulnerability and increased school absences were also correlated with greater physician rated disease severity. The fact that a true medical vulnerability was present may mediate these findings, as they may be a direct reflection of risk. However, the issue that seems most relevant to the current study is the potential influence of parental perception of vulnerability on child anxiety, rather than whether or not the perception is justified or accurate.

This pattern of parental perceptions of increased child vulnerability being associated with psychological problems in chronically ill populations was also demonstrated by Estroff, Yando, Burke and Snyder (1994) who examined parents of children born prematurely or with low birth weight. Results suggested that perception of increased child vulnerability in this sample was linked with internalising problems in the child. Also, in research using Icelandic parents of 12 year olds (Svavarsdóttir & Örlygsdóttir, 2006), parents of chronically ill children perceived their children as having lower HRQOL than parents of children without a chronic illness. Again, it is important to note that these parental perceptions and behaviours may be in line with the risks associated with the illness. Corroboratory findings have also been reported in research relating to children with asthma. As noted previously, support for an association between overprotective parenting and child anxiety was demonstrated in a retrospective study of young adults who had been diagnosed with asthma during their childhood, with participants reporting that their parents were overly protective (Parker, 1983). As such, the above research again raises the issues of whether having a child with a chronic illness such as asthma influences parenting styles. Eiser, Eiser, Town, and Tripp (1991) examined child rearing practices, specifically discipline and control, of parents who have a child with asthma. Results suggested that there were no significant differences between parents of children with asthma and parents of children without asthma in terms of discipline practices. However, parents of children with asthma reported experiencing more everyday situations as stressful, than parents whose children did not have asthma, and perceived their children as being less healthy than children without asthma.

Overall, research findings regarding an association between parental overprotection and child psychopathology have been inconsistent. Despite some empirical support for the contention that overprotective parenting may influence child anxiety (Parker, 1983; Patterson, 1982; Rapee, 1997, 2001; Schwartz, 2008; Stark, Humphrey, Crook & Lewis, 1990), other research has failed to support such a link (Bowen, Vitaro, Kerr & Pelletier, 1995; Perry & Millimet, 1977). However, it is noteworthy, that the inconsistencies in research may be due to methodological differences (e.g. varying age of children sampled), and as such do not allow for equivalent comparative analysis. Although the literature in this area is complex and often contradictory, overall it does indicate that a child's adjustment to a chronic illness such as asthma and their subsequent psychological well-being can be mediated by their parent's perceptions about their illness and their interactional or parenting style with their child.

1.3.2 Parental Adjustment

1.3.2.1 Associations between parental adjustment and child anxiety.

The association between parental anxiety and child anxiety has been well established with research showing that the children of anxious parents have an inflated risk of developing anxiety (Beidel & Turner 1997, Manassis & Hood, 1998; Shainir-Essakow et al., 2005). This association appears to particularly relate to anxious mothers (Bernstein, Layne, Egan, & Nelson, 2005; McClure, Brennan, Hammen & LeBrocque, 2001). McClure et al. (2001) found that maternal anxiety disorders significantly predicted anxiety disorders in children but no significant association was found for paternal anxiety and child anxiety. As discussed earlier, Rapee (2001) highlighted a possible connection between parental

overprotection and psychological adjustment in the development and maintenance of child anxiety, suggesting that parental overprotection may stem from parental desire to reduce their own anxiety. Similar associations have also been indicated in research regarding parental adjustment and child somatisation. Last (1991) found that parents with poor psychological adjustment reported that their children experienced more somatic problems than children of parents who were assessed as comparatively well adjusted.

The mechanism by which this association occurs seems relatively transparent given what is known about childhood learning and parental modelling (Fisak & Grills-Taquechel, 2007). It has long been accepted that children look to their parent's responses whilst evaluating situations. They refer to various cues unconsciously communicated from their parents (including physical expression), and use these cues to make their own appraisal of a situation and develop a response. This parental modelling has been shown to play a significant role in the development of childhood fears, with young children essentially adopting their parent's expressed responses to various stimuli (Gerull & Rapee, 2002). It has also been suggested that an intergenerational, cyclical pattern of parenting may be involved, so that parental anxiety or depression impacts on parenting attitudes and may result in over controlling parenting, which in turn increases the risk of child anxiety, and as such creates a repetitive cycle (Caspi & Elder, 1988; Elder, Caspi & Downey, 1986). These research findings are congruous with previous research that found mothers of children with poor adjustment were often classified as overprotective and controlling (Parker, 1983). Other research has demonstrated that attachment patterns may be repeated in offspring, and that maternal insecure attachment may be a risk factor for the development of childhood anxiety disorders (Manassis, Bradley, Goldberg, & Swinson, 1994). Other recent research

evidenced a relationship between mothers' stress level and anxiety ratings in children. Anderson (2007) examined the relationship between mothers' stress level and anxiety in their children to determine if level of maternal stress is significantly correlated with mothers' and teachers' rating of child anxiety. Results indicated that both mothers' and teachers' rating of child anxiety were significantly positively correlated with maternal stress levels, suggesting that child anxiety may be influenced by maternal stress.

Despite longstanding research in this area, controversy regarding this issue has been fuelled by conflicting research findings (Bartlett et al., 2004; Lavigne et al., 1996; Smith & Prior, 1995). Smith and Prior (1995) found no significant correlation between mother's psychological adjustment and child problem behaviours. In other research, Lavigne et al. (1996) failed to find an association between parental adjustment and internalising problems in their child.

However, in some recent research, Pelligrino (2007) investigated the mechanisms of transmission of anxiety from mother to child during the preschool period. Consistent with other earlier studies, support was found for an association between maternal anxiety during childhood and later development of anxiety. Pelligrino (2007) found that it was a lack of positive parenting behaviours that mediated the relationship between maternal anxiety in early childhood and later development of child anxiety. The research noted above suggests that there is a strong relationship between parental adjustment and child anxiety and this may provide some support for the association between child anxiety and child asthma being mediated by parent anxiety.

1.3.2.2 *Historical overview of the role of the parent in asthma development.*

Empirical interest regarding the role of parental adjustment in the chronic illness of asthma has been long standing. Research during the mid twentieth century implicated the mother-child relationship as having etiological significance in the development of asthma (French & Alexander 1941). French and Alexander (1941) contended that most of the children in their research had experienced early maternal rejection. They also suggested that mothers of children with asthma had experienced their own childhood conflicts which were left unresolved and went on to influence their own relationship with their offspring again suggesting a cyclical pattern. Subsequent research also indicated support for this association between maternal rejection and childhood asthma (Coolidge, 1956; Dunbar, 1938; Gerad, 1946; Jessner et al., 1955; Miller & Baruch, 1951; Monsour, 1960). Other early research further implicated the role of mothers in the development of child anxiety with Spurling (1949) suggesting that mothers of children with asthma unconsciously sought to maintain their child's vulnerability and dependency. Green and Solnit (1964) offered a less controversial view contending that it is the parent's anxiety about their child's health that can result in maladaptive parent-child interactions and in child behavioural problems.

In other research, Margolis (1961) highlighted that even if (based on this early research), the association between the maternal and child relationship and asthma is accepted, the direction of the association remained unclear. That is, the issue of whether the mother's interactional style with the child stemmed from the difficulties arising out of caring for a chronically ill child or whether the child's chronic illness developed or was impacted on in response to their relationship with their mother was unclear. Margolis

(1961) examined the role of the mother-child relationship as part of an investigation into the aetiology of asthma in a sample consisting of mothers of children with asthma, mothers of chronically ill but non-psychosomatic children (children with rheumatic heart illnesses), and a second control group comprising mothers of relatively healthy children. Findings provided some support for the contention that the mother-child relationship is associated with childhood asthma. Results suggested that mothers of the children with asthma were more emotionally disturbed than the mothers of other chronically ill children and controls. This was determined by higher scores on measures assessing various areas including oedipal relationships, and higher overall dimensional scores which were used as an indicator of greater psychopathology. However, the results could also undermine previous psychoanalytic speculations in that they also indicated that the association may derive from maternal reaction to the burden of living with a chronically ill child.

In earlier research by Miller and Baruch (1951), 97% of mothers of children diagnosed with allergies and asthma were found to verbally express rejecting attitudes towards their child, compared with less than half of the mothers of the control group. Although this finding is statistically compelling, it is problematic because findings were based on the examiners' subjective evaluations. As such, bias or differences in perception may have influenced findings. Some more recent research regarding children with asthma has revisited concepts previously associated with a psychoanalytic theoretical orientation. Research by Caroselli-Karinja (1990) and Hookham (1985) suggested that the mother-child relationship in families with childhood asthma was more anxious, dependent and difficult. Similarly, Carson and Schauer (1992) found that maternal overprotection, rejection and overindulgence were higher in families of children with asthma than in control families.

Research in the last decade has continued to demonstrate an association between parental adjustment and childhood asthma. One study reported an association between parent adjustment and childhood asthma finding that parents of children with asthma were more anxious than parents whose children did not have asthma (Sawyer & Fardy, 2003). In a recent study (Berz et al., 2007) the physical as well as mental health of parents was linked with child asthma and wheezing, with associations established between maternal anxiety and childhood wheezing, as well as maternal depression and childhood asthma. In other recent research, the role of parental major depression in child respiratory illness was investigated. Goodwin, Wickramaratne, Nomura, and Weissman (2007) found that there was a statistically significant association between parental major depression and increased likelihood of respiratory illness in their offspring. This study provided further evidence that children whose parents are depressed may have a heightened vulnerability to respiratory illnesses like asthma.

1.3.2.3 Parental adjustment and asthma outcomes.

In more recent research the focus has shifted from psychodynamic etiological theories to more focus on practical aspects such as health related outcomes. Parent adjustment issues are also of importance and relevance to this area of investigation because research suggests that they may influence asthma outcomes.

Recent research has indicated there is a strong relationship between parental mental health and asthma morbidity (Fehrenbach, Peterson, 1989; Mrazek, Klinnert, Mrazek & Macey, 1991; Weil, Wade, Bauman, Lynn, Mitchell & Lavigne, 1999). In research by Mrazek et al. (1991), genetic vulnerability, parenting issues and coping skills were found to

be linked with illness outcomes. Reduced levels of illness symptoms in children were associated with mothers who were evaluated as coping well, while parenting difficulties were found to be predictive of asthma. In their research Weil et al. (1999) found that children with asthma whose carers had clinically significant mental health problems were hospitalised for their asthma more often than children with carers without significant mental health issues. However, in other research (Bartlett, Krishnan, Riekert, Butz, Malveaux, & Rand, 2004) maternal depressive symptoms were not associated with their child's asthma morbidity. In spite of this finding, higher depressive symptoms correlated with decreased confidence in medication application and with the ability to cope with acute asthma episodes. In this research, mothers who had high depressive symptoms reported that their child's asthma caused greater emotional distress and more interference with daily activities than mothers with no / lower levels of depressive symptoms. Thus, although the study failed to support the correlation between maternal depression and child asthma morbidity, there was evidence of an association between maternal depression and asthma management.

Despite some research implicating maternal adjustment in child anxiety and behavioural problems, psychological causation could not be suggested through any of these studies. However, the potential role of parenting style and parent-child relationships influencing various aspects of asthma (e.g. management) appears to be relevant, albeit complex.

1.3.2.4 *Parent adjustment and perception of child vulnerability.*

There is a greater potential for parents of chronically ill children to be confronted with more stressful situations than parents of relatively healthy children (Kazak, 1989). Logic suggests that the presence of any parental psychological issues would only exacerbate an already difficult situation. The effects on parents of having a child with a chronic illness are direct and indirect; they include pragmatic issues such as medication and doctors' appointments as well as increased stress on the family unit. Parents have a central role in the management of a child's chronic illness and as such are themselves vulnerable to physical and psychological problems. The burden of long-term illness on children and families has been extensively studied and reported on (Adams, Streisand, Zawacki & Joseph, 2002; Eksi, Molzan, Savasir & Güler, 1995; Kazak, 1989; Venning, Elliott, Whitford & Honnor, 2007). A recent study provided further support for the negative emotional effects on families living with a child who has a chronic illness. Venning et al. (2007) investigated the impact of chronic illness on parents and children's hope scores and found that chronically ill children and their parents reported lower hope scores than children without chronic illness and their parents.

Research also suggests that parental perceptions of their child's vulnerability after being diagnosed with a chronic illness may affect their parenting. Some studies suggest that parent's anxiety may influence their reports of their child's psychological adjustment (Cobha, Dadds & Spence 1999; Engel, 2000; Last, 1991; Najman et al., 2001). Frick, Silverthorn and Evans (1994) found an association between mothers over-reporting the presence of anxiety symptoms in their children and increased maternal anxiety. One

explanation for the link between parental adjustment and increased reports of child anxiety may be that the parent's anxious or depressive state colours their perception of their child's adjustment, resulting in them interpreting behaviour more negatively or simply being more attuned to negative behaviour than positive behaviour.

It seems that the majority of research to date suggests that the pathways of any associations between maternal adjustment and child anxiety seem most likely to occur in the opposite direction from that proposed in early psychodynamic works (French & Alexander, 1942; Sperling, 1949). That is, the psychosocial variables develop in response to a child's diagnosis with a chronic illness. Specific findings supporting this interpretation have shown an increased risk for the development of maternal depression in families where the child has a chronic illness (Bartlett et al., 2001; Heneghan, Silver, Bauman & Stein, 2000).

Overall, the discussion above illustrates the potential for multiple variables to influence the development and maintenance of child anxiety. Furthermore, the role of childhood chronic illness such as asthma has been shown to further influence child anxiety, and *visa versa*.

1.4 The Current Study

1.4.1 Rationale

Anxiety has long been recognised to be a substantial problem among young children (Bell-Dolan et al., 1990; Bernstein et al., 1996; Kendall et al., 2004). Numerous studies have identified both child and family variables that influence child anxiety but these have not always been examined together within the one study.

Children with chronic illness have been identified as being particularly vulnerable to developing anxiety related psychological problems (Adams et al., 2002). Furthermore, research has shown an association between a diagnosis of asthma and childhood anxiety (Osman, 2002; Rand & Butz, 2000; Siddons, 2003). The above review provides evidence of a growing body of literature on childhood anxiety but there has been relatively little research attention to younger children, particularly very young children with asthma. Consequently there is limited information concerning whether anxiety identified in early childhood persists over time. Many cases of childhood asthma resolve with time (NAC, 2006) so in spite of the established association between asthma and anxiety it is not known whether this association is stable across time. It is notable that there have also been no published Australian studies that have examined comorbidity of asthma and anxiety in young children. Given the empirical link between children with asthma and anxiety, questions regarding the endurance of anxiety in this population remain unanswered.

The current study aims to address the gap in research by investigating changes in anxiety and somatisation in young children with and without asthma. The sample of participants that was used in research by Siddons (2004) was used to provide baseline data to be compared to current data on anxiety, somatisation, protective parenting, and parental adjustment. These variables were investigated as potential correlates of anxiety and / or asthma. The comparison of results from the two time points allowed a longitudinal investigation into this important area of research. The addition of teacher reports on child anxiety and somatisation was expected to offer insights into potential differences in perceptions regarding child behaviour and the possibility of children's presentations varying across different settings.

1.4.2 Aims and Hypotheses

a) The primary aim of this research was to examine changes in anxiety and somatisation over time in a group of children with and without asthma using baseline data from an earlier study.

b) The second aim of the study was to examine the unique contribution of variables (asthma status, asthma severity, child somatisation, protective parenting, and parent adjustment) to child anxiety based on previously reported associations.

c) The third aim of the current research was to investigate if there were any differences between parent and teacher reports / perceptions of child anxiety.

Specifically, it was hypothesised that:

- 1) Levels of child anxiety in both child samples (children with asthma and controls) at Time 2 would be lower than at Time 1 (Hypothesis 1).
- 2) Levels of somatisation at Time 2 in both child samples (children with asthma and controls) would be lower than at Time 1 (Hypothesis 2).
- 3) The number of children with a current diagnosis of asthma would have decreased over time (Hypothesis 3).
- 4) Children with asthma would have higher levels of anxiety, as measured by parental report, than children without asthma (Hypothesis 4).
- 5) Asthma severity as measured by parental and physician report would be positively associated with child anxiety (Hypothesis 5).
- 6) Child somatisation as measured by parental report would be associated with child anxiety (Hypothesis 6).
- 7) Protective parenting, as measured by parental self-report, would be associated with child anxiety (Hypothesis 7)
- 8) Parental adjustment, as measured by parental self report (GHQ), would be associated with child anxiety (Hypothesis 8)
- 9) There would be a difference between parent and teacher perceptions of child anxiety, with parents being more likely to report higher levels of child anxiety. (Hypothesis 9).

2 Method

2.1 Participants

2.1.1 Inclusion / Exclusion Criteria

Only people who participated in the previous research on this topic were contacted for the current, follow-up study. In order to examine changes over time and provide a longitudinal aspect to this research, participation in the original research was a pre-requisite. All participants comprising the asthma group in the previous study (Siddons, 2004) were recruited from a private asthma clinic in the Respiratory Medicine Department at the Monash Medical Centre. Prospective participants were initially invited to participate by the respiratory specialist Associate Professor Nicholas Freezer. Parents of children with asthma who were interested in participating then met the researcher in the waiting room to discuss the study further and provide their contact details. The majority of the participants in the control group were recruited through childcare centres and a kindergarten located near Monash Medical Centre. Recruitment was initiated by distribution of a flyer to eligible families. Interested parents were asked to provide their contact details for follow up. Parents at one child-care centre were personally approached by the researcher and invited to participate.

2.1.2 Sample Recruitment

Participants were non-randomly selected volunteers from the following sources:

- Parents of children with asthma who participated in the previous study (Siddons, 2004). Asthma status was based on diagnosis by the family GP, paediatrician, or paediatric respiratory specialist from Monash Medical Centre – Associate Professor Nicholas Freezer.
- Parents of children without a diagnosis of asthma who were previously recruited as a control group in the research study by Siddons (2004). Asthma status was based on parental / caregiver notification of no prior diagnosis of asthma.

The total number of participants involved in the current research was 51. Ninety two percent of the primary caregivers who were included in the study identified themselves as the biological mother of the child for which they completed the questionnaires ($n=47$). Eight percent of the sample identified themselves as the biological father of the child ($n=4$). Participants from this sample whose child continued to meet the criteria for a diagnosis of asthma at the time the current data was collected comprised 53% of the participant pool, ($n=27$). Participants recruited from the control sample used in the original study (children without a diagnosis of asthma) whose children continued to be asthma free at the time of the current study's data collection comprised 37 % of the participant pool, ($n=19$).

Participants recruited from the original study that at the time of that study were included in the asthma group (i.e. Their child had received a diagnosis of asthma) but at the time of the current study their child no longer met the criteria for asthma (based on either parent or doctor report), comprised 12% of the participant pool (n=6). Of the participants included in the control group of the original study (i.e. their child did not have a diagnosis of asthma), one child was reported to have developed asthma since the completion of the previous study. To allow for matched sample comparisons the 7 children whose asthmatic status changed from Time 1 to Time2 were excluded from the analyses. As such, the total sample used for all analyses other than that related to hypothesis 3 (re: changes in asthma status) comprised 44 participants (26 parents of children with asthma & 18 parents of children without asthma). The children were aged between 6 years (72 Months) and 10 years (123 Months) of age, with a mean age of 7 years and 9 months (95.82 months) (SD: 12.85 months).

2.2 Measures

2.2.1 Behavioural Assessment System for Children (BASC)

The BASC (Reynolds & Kamphaus, 1992) is an omnibus measure which is designed to identify and evaluate personality and behavioural problems, and assess emotional disturbance in children and adolescents aged between 2 and 18 years. There are 8 different versions of the BASC, each designed for a specific setting and age range. The Parent Rating Scale (PRS) and Teacher Rating Scale (TRS) are each available in 3 different age ranges, Preschool (P) for children aged 2.5 to 5 years, Child (C), for children aged 6 to 11 years, and Adolescent (A), for children aged between 12 and 18 years. There is also a Self-Report of Personality (SRP) scale available for ages 8-11 years, and 12-18 years. The original study used the Preschool version of the BASC (PRS-P) for all participants. However, given the time since the initial study, participants no longer met the age requirement for the Preschool version of the questionnaire (for ages 2.5-5). The two versions that were employed in the current study were the Parent Rating Scale - Child version: BASC – PRS-C (Appendix A) and the Teacher Rating Scale - Child version: BASC - TRS-C (Appendix B). The use of the teacher rating scale was an additional aspect introduced for the current research and would not have been relevant in the original study given that the children included in the previous study were not of school age at the time of data collection.

The PRS and TRS comprise 10 subscales, however only 2 (Anxiety & Somatisation) were the focus of this research. Given the variation in ways that anxiety can manifest in young children, the authors of the BASC (Reynolds & Kamphaus, 1998) recommend that the somatisation subscale be considered in addition to the anxiety subscale in order to obtain a more comprehensive assessment of anxiety. Each item describes potential emotional and behavioural expressions by children. Parents (PRS) and Teacher (TRS) raters are asked to indicate the frequency of occurrence of each item within the last 6 months using a four-point Likert scale (1=never, 2= sometimes, 3= often, 4= almost always).

The somatisation subscales were modified for use in the current study as some items could potentially be confounded with a diagnosis of asthma. For example the statements “complains of shortness of breath” (item # 11 PRS-C) and “makes frequent visits to the doctor” (item #70 – PRS-C), are respectively, a symptom and possible result of asthma (Asthma Australia, 2007). Therefore, potentially all children with asthma would be scored for these (and the other items) on the somatisation subscale. These and other confounding items therefore were excluded (PRS-C excluded items: 11, 68, 70, 93,115; TRS-C excluded item: 26). Analyses were run with both the inclusion and exclusion of item number 103 (Gets sick) of the PRS-C and item number 100 (Gets sick) of the TRS-C. Siddons (2004) excluded item 119 of the PRS-P (gets colds) because it was considered it could be a symptom or result of asthma. However, this item was replaced with “gets sick” in the PRS-C which the current researchers considered to be much broader than to the item “gets colds”.

The PRS-C comprises 138 items. The anxiety subscale comprises 11 items and the somatisation subscale comprises 7 items (8 including item 103). Items comprising the anxiety and somatisation subscales are presented in Table 1.

Table 1
Items Comprising the Anxiety and Somatisation Subscales on the BASC-PRS-C

Anxiety

- 3. Worries.
- 15. Is too serious.
- 38. Worries about what parents think.
- 50. Says, "I get nervous during tests".
- 61. Tries too hard to please others.
- 73. Is afraid of dying.
- 85. Worries about things that cannot be changed.
- 96. Worries about what teachers think.
- 107. Says, "I'm afraid I will make a mistake."
- 119. Says, "I'm not very good at this."
- 130. Worries about school work.

Somatisation

- 11. Complains of shortness of breath.*
- 23. Complains of dizziness.
- 33. Complains of being cold.
- 46. Complains of pain.
- 58. Vomits.

- 68. Has ear infections.*
- 70. Makes frequent visits to the doctor.*
- 81. Has headaches.
- 93. Has allergic reactions.*
- 103. Gets sick.**
- 115. Has difficulty breathing.*
- 127. Complains of heart beating too fast
- 137. Has stomach problems.

* Excluded from subscale for the current study

** Analyses run with and without item

The TRS-C comprises 148 items. The anxiety subscale comprises 8 items and the somatisation subscale comprises 6 items (7 including item 100). Items comprising the anxiety and somatisation subscales are presented in Table 2.

Table 2
Items Comprising the Anxiety and Somatisation Subscales on the BASC-TRS-C

Anxiety

- 3. Bites nails.
- 17. Worries about things that cannot be changed.
- 40. Is nervous.
- 54. Says, "I'm afraid I will make a mistake."
- 77. Is fearful.
- 91. Expresses self-doubt before tests.

114. Gets ill before a major school test.

128. Says, "I'm not very good at this."

Somatisation

12. Complains of being cold.

26. Complains of shortness of breath.*

49. Complains about health

63. Complains of being hot

72. Uses medication *

86. Complains of pain.

100. Gets sick**

137. Has fevers

123. Has headaches.

* Excluded from subscale for the current study

** Analyses run with and without item

Reynolds and Kamphaus (1992) reported high internal consistency coefficients averaging .80. Acceptable concurrent validity, criterion-related validity, and convergent validity have also been demonstrated (Doyle, Ostrander, Skare, Crosby, & August; 1997; Flanagan, Alfonso, Primavera, Poval, & Higgins, 1996; Merenda, 1996).

2.2.2 Parent Protection Scale (PPS)

The PPS (Thomasgard, Metz, Edelbrock & Shonkoff, 1995) is designed to measure parental attitudes and behaviour in relation to three developmental areas: child autonomy, individuation, and separation. The scale comprises 25 items for which participants were asked to indicate the frequency of occurrence of each item using a four-point Likert scale (0 = never, 1 = sometimes, 2 = most of the time, 3 = always). Items 5, 6, 10, 14, 16, 19 and 25 were reverse coded. A total score was obtained by summing all 25 items, with higher scores indicating greater levels of protective parenting.

Using a normative sample of 1172 parents of children aged between 2 and 10 years (892 of which were aged between 2 & 5 years) Thomasgard, Metz, et al. (1995) evidenced an internal consistency coefficient of .73, and high test-retest reliability of (.86). Thomasgard et al. (1995) also assessed criterion validity of the PPS by comparing total scores with clinicians' judgments of parental over-protectiveness. They reported results of 71% sensitivity, 94% specificity, and 92% positive predictive value. In subsequent evaluations of the psychometric properties of the PPS, Thomasgard and Metz (1996) found that high parental protection remained stable over a two year period for 37% of the sample. (Appendix C).

2.2.3 General Health Questionnaire - 28 (GHQ-28)

The GHQ (Goldberg, 1978) is a self-report questionnaire used to detect minor psychiatric illness and non-psychotic mental illness in community settings. There are 5 versions of the questionnaire each comprising a different number of items. The 28-item

version was used in this research to assess psychological functioning of the participating parent. The GHQ-28 (Appendix D) was employed in the original study and it is the only version that provides sub-scale scores for four dimensions (somatic symptoms, anxiety/insomnia, social dysfunction & severe depression). Respondents were asked to provide a self-rating which indicates the degree to which they have experienced each item (symptom) over the past few weeks. A 4-point Likert-type severity scale is employed, providing scores ranging from 0 to 3.

The GHQ-28 can be scored using various methods. For this study the Likert-type scoring method was used for and responses were summed yielding a score ranging from 0 to 21 for each subscale. A total severity score ranging between 0 and 84 was calculated by summing all subscale scores. This method was used to ensure consistency between the original and current study, as it was the method used by Siddons (2004).

The GHQ has previously shown robust psychometric properties, with good validity and reliability evidenced (Goldberg, 1978; Goldberg & Hillier, 1979; Rabin & Brook, 1981; Robinson & Price, 1982). Rabins and Brook (1981) conducted a validity study of the GHQ-28 based on a correlational analysis between the GHQ-28 and psychiatric interview measures. They reported a high correlation coefficient of .83. Robinson and Price (1982) reported that test-retest reliability of the GHQ-28 was high, with a correlation >0.90 .

2.2.4 Demographics Questionnaire (DQ)

The DQ (Appendix E) was designed for the purposes of the original study and was used to obtain information pertaining to age, health status, gender, race, and to confirm the child's asthma status and elicit some information regarding the management of asthma, types and severity of symptoms, number of hospital visits. The same questionnaire was administered to participants in the original study. The DQ also included items from the Asthma Functional Severity Scale (Rosier et al, 1994). Rosier et al. (1994) differentiated between functional severity of asthma and physiological severity of asthma and burden of illness. They contended that the scale investigates "disease activity" and the "functional impact or impairment resulting from asthma" (Rosier et al., 1994, p. 1439. The sum of parental responses on the five items was used to determine functional severity of asthma for each child. The scale was modified for use in the original study (Siddons, 2004) by the elimination of one question. The remaining five questions were incorporated into the DQ (questions 5-9), and were used to assess the degree of asthma severity. Rosier et al. (1994) reported an item reliability of the scale of .89, and found moderate convergent validity with functional disability and burden of care. The DQ also included a question that directly gave participants the choice of rating their child's asthma severity as mild, moderate, or severe (question 11). A separate question included on the DQ also asks participants for a rating regarding their perception of the degree to which the child's asthma is managed or controlled on a scale of 1 (poorly managed) to 5 (completely managed). This is the same scale that the physician (Associate Professor Nicholas Freezer) used to rate the management of the children's asthma (question 12).

2.2.5 Physician Questionnaire (PQ)

The PQ (Appendix F) is a short questionnaire containing eight questions that was completed by the treating physician of the children from the previous study who had a diagnosis of asthma. Some questions (2-8) were asked of the physician by the previous researcher, while question number 1 was introduced to confirm the asthmatic status of the child (Appendix G). The treating medical professional who provided the physician asthma rating in the previous research (Siddons, 2004), Associate Professor Nicholas Freezer (Head of Respiratory Medicine Monash Medical Centre) provided (for those children whose parent consented) a rating of asthma severity (mild, moderate, or severe). This rating was determined in accordance with reported / present symptoms and prescribed medication. Associate Professor Freezer also provided information regarding the number of asthma related appointments he had had with the child, the age at which the child was diagnosed, and the types of symptoms the parent / child reported at the most recent consultation.

2.3 Procedure

2.3.2 Sample Recruitment

Families who participated in the previous study ($N=103$) were sent a letter by the investigators for that study (Siddons, 2004) asking if they were willing to be contacted for follow-up research (Appendix G). A cut-off section of the letter listed two tick-box options which prospective participants were asked to use to indicate their permission or disallowance to be contacted by telephone regarding the follow-up research. All letters were accompanied by reply-paid return envelopes which could be used to return the reply slip with no cost incurred to the respondent. Parents / caregivers who indicated on the return slip that they were willing to be contacted to discuss participation in the current study were then contacted by the student researcher via telephone on the number they provided on the return slip. As many of these introductory letters were not responded to other resources (e.g. electoral role & white pages) were used to find current contact details and an introductory phone call was made by the current student researcher. For further details on the recruitment process refer to Figure 1.

At the time of the telephone discussion parents were advised that one component of the study included a letter and questionnaire being sent to their child's teacher (BASC-TRS). Any issues or concerns raised about this prospect were addressed during the telephone call and verbal consent was obtained to send a written consent form to the participant which when signed would allow the researchers to contact their child's teacher. For prospective participants who were parents of children previously diagnosed with asthma, the telephone call was also used to discuss the request that the Associate Professor Nicholas Freezer or the child's current treating physician complete a questionnaire

regarding their asthma status (E.g. confirming diagnosis, measure of severity of condition, medication use). If their child's treating physician was the family GP or paediatrician respondents were asked to have the doctor complete the Physician Questionnaire at the child's next visit. If the child was still a patient of Associate Professor Freezer at the Monash Medical Centre, verbal consent was obtained to send a written consent form which when signed would allow Associate Professor Freezer to complete the form regarding their child's current asthma status and management.

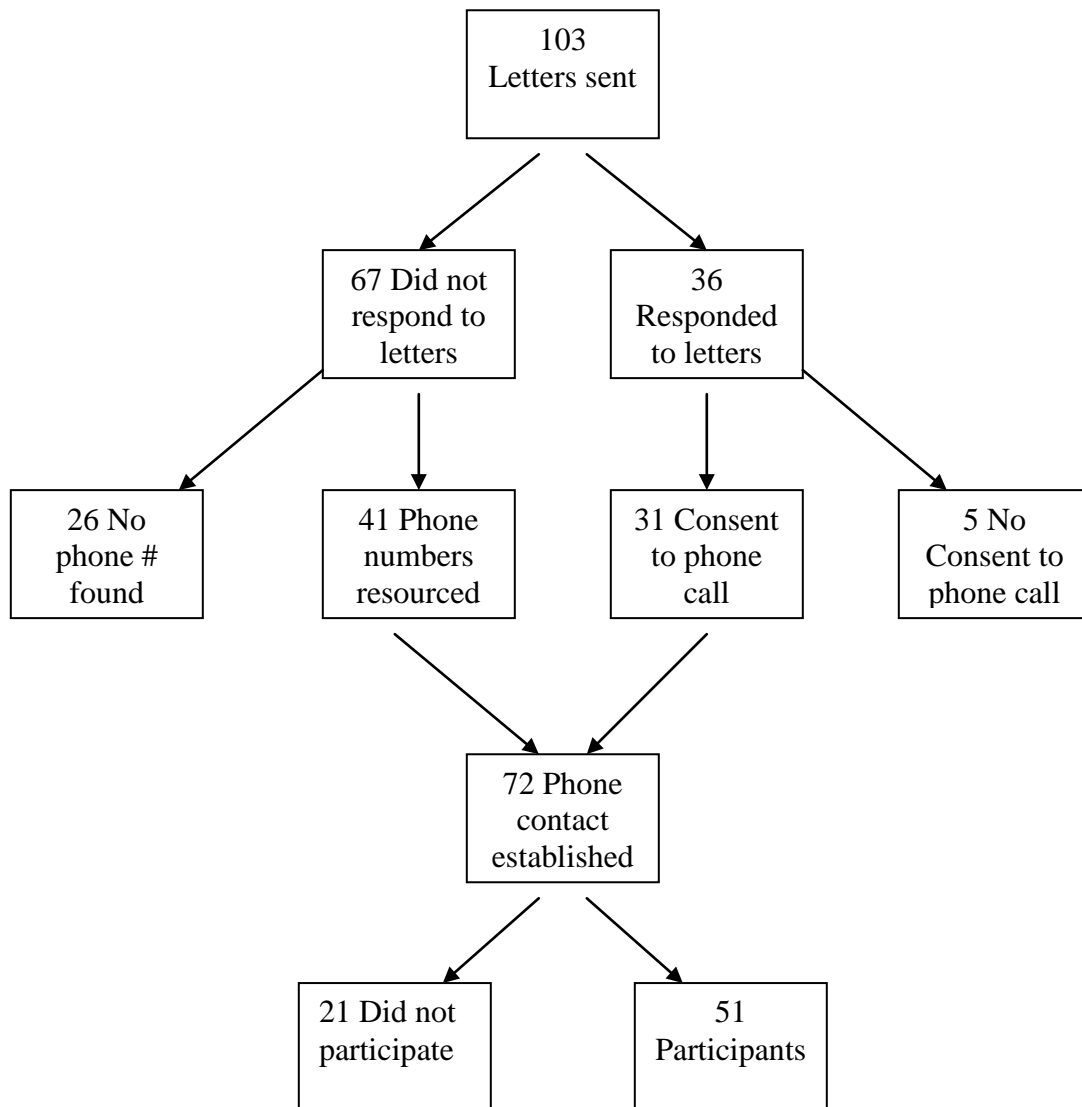


Figure 1. Flow chart of recruitment process

2.3.2 Data Collection

The respondents who agreed to participate were then mailed the consent forms, questionnaires and a reply paid return envelope. The consent forms and questionnaires sent to participants comprised the following:

Consent Forms

- Participant Information and Consent Form (2 copies – 1 to return and 1 for participants to keep).
- Consent to Contact Teacher Form (Appendix H)
- Letter to Teacher (copy- to read only) (Appendix I)
- Physician Consent Form – for participants in Asthma group only (Appendix J)
- Physician Questionnaire (copy-to read only) (Appendix F)

Questionnaires

- BASC-PRS-C Form – (Questionnaire # 1)
- Demographics Questionnaire (Questionnaire # 2)
- Parental Protection Scale (Questionnaire # 3)
- General Health Questionnaire (Questionnaire # 4)

All packages sent to participants included a pre-stamped and addressed return envelope.

Once the researcher received the completed questionnaires and consent forms from the parents / caregivers, the introductory letter and a questionnaire (BASC – TRS) were sent via mail to teachers with a copy of the signed parental consent form and a reply paid envelope.

2.3.3 Data Entry and Analysis

The student researcher entered all the data into SPSS Version 17.0 for statistical analysis. A power analysis was conducted to determine the optimal number of subjects required for the proposed research. The analysis indicated that a sample size of around 82, with an alpha level of 0.05 (allowing 5 predictors in the multiple regression) resulted in 75% power to detect an R^2 as small as 0.14, which is considered to be a medium effect size (Cohen, 1983). Given that the original research was conducted approximately two years prior to the commencement of recruitment for this study, allowance was made for sample attrition. Based on figures from previous research (Boys, Marsden and Stillwell, 2003; Cotter, Burk, Loeber & Navratil, 2002; Pfeifer, 1989; Vandeer-Stoep, 1999), it was decided that to allow for an attrition rate of around 20% would be more than sufficient. However, this was not the case as the original sample size was 103, and although several attempts were made to contact all original participants, the sample size for the current study was 51. The statistical implications of such a high attrition rate primarily affected the number of predictors that could be used in multiple regression analyses. As such, Multiple Regression Analysis with only three predictors was performed to determine the degree to which variables (somatisation, parental protection, and parental adjustment) predict anxiety.

Due to violations of assumptions of normality, linearity, and homoscedasticity, almost all analyses performed were non-parametric tests. A Wilcoxon's Signed Ranks Test, which is the non-parametric alternative to a T-test, was used to test if there was a change in participants' anxiety scores from time 1 to time 2. A MANOVA was also performed to examine the difference in time on these variables in a multivariate analysis.

The Mann Whitney Test (a non-parametric alternative to an Independent Samples T-test) was used to determine any differences in levels of somatisation and anxiety for children with and without asthma. Spearman's Rank Order Correlation (ρ) was used as a non-parametric alternative to Pearson's Product moment Correlation (r) to explore any relationships between child anxiety and asthma severity, child somatisation, protective parenting, and parental adjustment. Wilcoxon's Signed Ranks Test was again used to determine any difference between parent and teacher perceptions of child anxiety.

2.3.4 Ethics Approval

The Southern Health Research Ethics Committee A granted a certificate of approval for the project on 12 July 2005 (Project No. 04185A). The Victoria University of Technology Human Research Ethics Committee granted approval for the project on 17 December 2004 (application No. HRETH. 043/04).

3 Results

3.1 Descriptive Statistics

3.1.1 Sample Characteristics

The sample used comprised 44 participants, 26 (59.1%) were parents of children with asthma (asthma group) and 18 (40.9%) were parents of children without asthma (control group). There were slightly more males than females in the total sample, with 54.5% of the children being boys ($n=24$) and 45.5% being girls ($n=20$). The gender composition of the two groups differed with the asthma group comprising more boys ($n=19$, 73.1%) than girls ($n=7$, 26.9%), while the control group comprised more girls ($n=13$, 72.2%) than boys ($n=5$, 27.8%). All participants were either the child's biological mother ($n=41$, 93.2%) or biological father ($n=3$, 6.8%). Participants were asked to identify their child's birth country in the Demographics Questionnaire. The majority of the sample, comprising 95.5% of the participant pool ($n=42$) reported that their child was born in Australia. Two children (4.5%) were born outside Australia, one in India and one in New Zealand.

3.1.2 Behaviour Assessment System for Children – Parent Rating Scale

3.1.2.1 Questionnaire Descriptives

All participants completed the BASC-PRS questionnaire from which the BASC Anxiety and Somatisation Scales were used for analyses. Descriptive statistics, including, possible score range, minimum and maximum score for the total group, the asthma group and the control group are presented in Table 3.

Table 3

BASC-PRS Anxiety and Somatisation Scale Descriptives

	Total Sample (N=44)	Asthma Group (n=26)	Control Group (n=18)
<i>Anxiety Scale</i>			
Possible Range	0-33	0-33	0-33
Minimum Score	3	4	3
Maximum Score	26	26	20
<i>Somatisation Scale</i>			
Possible Range	0-21	0-21	0-21
Minimum score	0	0	0
Maximum Score	16	16	5

3.1.2.2 *Mean level of anxiety and somatisation*

A direct matched sample ($n=44$) was used for comparison (i.e. only those participants from the original study who remained in the same groups (asthma or control) at Time 2 were used in analyses. Mean anxiety scores for the total sample, asthma group, and control group were higher than in the original study (Siddons, 2004). The mean levels of the revised somatisation subscale were slightly higher at Time 2 (current study) than Time 1 (original study) for the total sample, the control group, and the asthma group. The means and standard deviations for the BASC anxiety and (revised) somatisation subscales are reported in Table 4.

Table 4

Mean Raw Scores (M) and Standard Deviations (SD) of the BASC Anxiety Subscale and the Somatisation Subscale for the Total Group, Asthma Group, and Control Group from Time 1 to Time 2.

Dimension	Total	Total	Asthma	Asthma	Control	Control
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
	($N=44$)	($N=44$)	($n=26$)	($n=26$)	($n=18$)	($n=18$)
Anxiety						
<i>M</i>	7.61	9.43	8.65	10.81	6.11	7.44
<i>SD</i>	5.18	4.91	5.61	4.78	4.19	4.50
Somatisation						
<i>M</i>	4.11	4.18	5.38	5.46	2.28	2.33
<i>SD</i>	3.06	3.21	3.16	3.41	1.71	1.68

3.1.2.3 *At-risk levels of anxiety and somatisation*

At-risk levels of clinical anxiety were defined as a T-score greater than 59 (Reynolds & Kamphaus, 1998). This cut-off score was also used in the original study (Siddons, 2004). Based on this cut-off score, 9.1% of the children ($n=4$) were identified as having at-risk levels of anxiety. Of the 9.1% that were in this category, 6.8% ($n=3$) were from the asthma group, and 2.3% ($n=1$) were from the control group. These analyses were also run with the complete data available for the current study, which included the 7 cases where asthma status changed since the original study by Siddons (2004). When this sample was considered (i.e. $n=51$), 11.7% of the children ($n=6$) were identified as having at-risk levels of anxiety. Of the 11.7% that were in this category, 5.85% ($n=3$) were from the asthma group and 5.85% ($n=3$) were in the control group. However, of the 3 children in the control group two had been previously diagnosed with asthma and were in the original study's asthma group.

As was the case with the original study, the normative cut-off score could not be used for the current somatisation scale because the scale had been modified. The same method used in the previous study (Siddons, 2004) was employed to determine an at-risk cut-off score for the revised somatisation scale. The cut-off score for the somatisation scale was determined by using the same percentile rank that was used to determine the anxiety scale cut-off score. As a t-score of 60 on the anxiety scale was at around the 90th percentile, at-risk levels of somatisation were determined by identification of scores greater than the 90th percentile (i.e. a raw score ≥ 8.5). Accordingly, 9.1% of the children ($n=4$) were identified as having at-risk levels of somatisation. All of the children identified as at-risk

were in the asthma group (i.e. had a current diagnosis of asthma). One case was determined to be at risk for both anxiety and somatisation. These analyses were conducted also on the larger sample ($n=51$). For this sample, a t-score of 60 on the anxiety scale was at around the 87th percentile, at-risk levels of somatisation were determined by identification of scores greater than the 87th percentile (i.e. a raw score ≥ 7). Accordingly, 17.6% of the children ($n=9$) were identified as having at-risk levels of somatisation. All of the children identified as at-risk were again from the asthma group.

3.1.3 Behaviour Assessment System for Children – Teacher Rating Scale

3.1.3.1 Questionnaire Descriptives

A total of 32 teachers participated in the study by completing the BASC-TRS questionnaire from which the BASC-TRS Anxiety and Somatisation Scales were used for analyses. Information received from 2 teachers could not be used because the completed BASC-TRS questionnaire related to children who had changed asthmatic status from Time 1 to Time 2 and as such were excluded from the analyses. Descriptive statistics, including, possible score range, minimum and maximum score for the total groups and the asthma and control groups are presented in Table 5.

Table 5

BASC-TRS Anxiety and Somatisation Scale Descriptives

	Total Sample (<i>N</i> =30)	Asthma Group (<i>n</i> =16)	Control Group (<i>n</i> =14)
<i>Anxiety Scale</i>			
Possible Range	0-24	0-24	0-24
Minimum Score	0	0	0
Maximum Score	17	17	7
<i>Somatisation Scale</i>			
Possible Range	0-21	0-21	0-21
Minimum score	0	0	0
Maximum Score	6	6	6

3.1.3.1 Mean level of anxiety and somatisation

Of the total number of participants who completed all questionnaires (*N*=51), less than 18% (*n*=9) declined to provide consent for their child's teacher to be contacted or to participate in the study. Over 82% (*n*=42) of parents provided signed consent for their child's teacher to be contacted regarding participation in the current research and consent to complete the BASC-TRS questionnaire. Despite this positive response from parents, only 76% (*n*=32) of the teachers who were sent information about the study and the BASC-TRS questionnaire returned the form. As noted above two cases were excluded from the analyses to ensure matched sample comparisons on all variables from Time 1 to Time 2. Of the 30 BASC-TRS questionnaires utilized in the analyses 53.3% (*n*=16) were completed regarding

children from the asthma group and 46.6% ($n=14$) were completed for children included in the control group. Given that a teacher report regarding child anxiety was not used in the original study, means and standard deviations were compared with the BASC normative sample. Anxiety levels for the entire sample were slightly higher than the BASC-TRS normative sample (Reynolds & Kamphaus, 1998). The mean anxiety score for the asthma group was clearly higher than the mean score reported for the BASC normative sample. In contrast, the mean anxiety score for the control group was lower than that found for the BASC normative sample. Levels of somatisation for the current sample could not be compared with the BASC-TRS normative sample because a revised version of the scale was used (Reynolds & Kamphaus, 1998). The means and standard deviations for the BASC anxiety and (revised) somatisation subscales are reported in Table 6.

Table 6

Mean T-Scores (M) and Standard Deviations (SD) of the BASC-TRS Anxiety Subscale and the Mean Raw Scores (M) for the Somatisation Subscale.

Dimension	US Norms ($N=90$)	Total Sample ($N=30$)	Asthma Group ($n=16$)	Control Group ($n=14$)
Anxiety				
<i>M</i>	52.7	53.30	56.44	49.71
<i>SD</i>	10.4	12.55	15.07	7.97
Somatisation				
<i>M</i>	—	1.53	1.88	1.14
<i>SD</i>	—	1.81	1.93	1.66

3.1.4 Parent Protection Scale

3.1.4.1 Questionnaire descriptives

All participants completed the Parent Protection Scale (PPS) which provided scores for protective parenting. Descriptive statistics, including, possible score range, minimum and maximum score for the total group, the asthma and control groups are presented in Table 7.

Table 7

Parent Protection Scale Descriptives

	Total Sample (<i>N</i> =44)	Asthma Group (<i>n</i> =26)	Control Group (<i>n</i> =18)
Possible Range	0-75	0-75	0-75
Minimum Score	23	26	23
Maximum Score	44	44	39

3.1.4.2 Mean level of protective parenting

Analysis of the total sample demonstrated the mean level of protective parenting, as determined by the score on the PPS was 33.84 (*SD* =4.81, *N* = 44). Mean level of protective parenting for the asthma sample was slightly higher, 35 (*SD* = 5.04, *n* = 26), than the mean for the control sample, 32.17 (*SD* = 4, *n*=18). The mean level of protective parenting was

higher for the total sample, asthma sample, and control sample when compared to the normative sample comparable age groups. Means and standard deviations of the PPS by age group for the current sample and normative sample are presented in Table 8.

Table 8

Means and Standard Deviations of the PPS by Age Group for the Current Sample and Normative Sample (Thomasgard, Metz, et al 1995).

Age Months	<i>M (n)</i>				<i>SD</i>			
	Norms	Control ^a	Asthma ^b	Total ^c	Norms	Control	Asthma	Total
60-72	30.9	–	30 (1)	30 (1)	4.7	–	–	–
73-84	30.0	34.2 (6)	37 (2)	34.9 (8)	5.4	4.4	7.1	4.7
85-96	28.7	30 (3)	33.9 (11)	33.1 (14)	4.9	2	6.1	5.7
97-108	27.6	32 (6)	37.1 (8)	34.9 (14)	6.5	4.9	3.2	4.7
109-120	28.0	30.5 (2)	37 (1)	32.7 (3)	4.8	2.1	–	4
121-132	25.6	–	33 (3)	33 (3)	4.5	–	4.6	4.6

^a*n*= 18 ^b*n*= 26 ^c*N*= 44

Comparison of mean PPS scores between Time 1 and Time 2 suggests an overall increase. At both Time 1 and Time 2 the means for protective parenting behaviours were higher for children with asthma than children without asthma. Means and standard deviations of overall PPS scores for both time points are presented in Table 9.

Table 9

Comparison of Means (M) and Standard Deviations (SD) for the PPS from Time 1 to Time 2

GROUP	<i>M</i>	<i>SD</i>
Time 1		
Total Sample (n=44)	29.36	7.60
Asthma Group (n=26)	31.19	6.15
Control Group (n=18)	26.72	8.83
Time 2		
Total Sample (n=44)	33.81	4.81
Asthma Group (n=26)	35.00	5.04
Control Group (n=18)	32.17	4.00

3.1.5 General Health Questionnaire

3.1.5.1 Questionnaire descriptives

All participants completed the General Health Questionnaire (GHQ) which was used as an indicator of parental adjustment. Descriptive statistics including possible score range, minimum and maximum score for the total group, the asthma group and the control group are presented in Table 10.

Table 10 *GHQ Descriptives*

	Total Sample (<i>N</i> =44)	Asthma Group (<i>n</i> =26)	Control Group (<i>n</i> =18)
Total Scale			
Possible Range	0-84	0-84	0-84
Minimum Score	4	4	8
Maximum Score	48	48	34
Anxiety			
Possible Range	0-21	0-21	0-21
Minimum Score	0	0	0
Maximum Score	16	16	15
Somatisation			
Possible Range	0-21	0-21	0-21
Minimum Score	1	1	1
Maximum Score	15	15	9
Depression			
Possible Range	0-21	0-21	0-21
Minimum Score	0	0	0
Maximum Score	8	8	3
Social Dysfunction			
Possible Range	0-21	0-21	0-21
Minimum Score	2	3	2
Maximum Score	11	11	11

3.1.5.2 *Parental adjustment (GHQ) means*

Mean scores for the complete GHQ and for all the subtest scores (except Anxiety) for the asthma group were slightly higher compared to the control group. This trend is largely consistent with results from the original study; however at this earlier data collection mean scores for Social Dysfunction as well as Anxiety were slightly higher in the control group compared with the asthma group. Comparison of mean scores from Time 1 to Time 2 illustrates a slight decrease over time in GHQ total scores and all subtest scores except for the Social Dysfunction Subtest. Results from subtest scores in the asthma group indicate a decrease in Anxiety, Somatisation, Depression, and the total score, but an increase over time in Social Dysfunction. Results for the control group indicate a decrease over time in the total score and Anxiety score, while all other subtests suggest an increase.

The means and standard deviations of the GHQ total score and subtests scores are presented in Table 11

Table 11

Means (M) and Standard Deviations (SD) of the GHQ Total score and Subtest Scores for total sample, and the Asthma and Control Groups at Time1 and Time 2

Dimension	Sample					
	Total T1 (N=44)	Total T2 (N=44)	Asthma T1 (n=26)	Asthma T2 (n=26)	Control T1 (n=18)	Control T2 (n=18)
Total Score						
<i>M</i>	18.18	17.25	18.54	17.42	17.67	17.00
<i>SD</i>	8.30	8.65	9.95	9.57	5.28	7.39
Anxiety						
<i>M</i>	6.20	5.16	6.12	5.15	6.33	5.17
<i>SD</i>	2.99	4.03	2.98	4.16	3.09	3.96
Somatisation						
<i>M</i>	5.07	4.84	5.54	4.92	4.39	4.72
<i>SD</i>	3.34	3.29	3.77	3.88	2.57	2.27
Depression						
<i>M</i>	.70	.70	.88	.85	.44	.50
<i>SD</i>	2.35	1.80	2.97	2.19	.92	1.04
Social D*						
<i>M</i>	6.20	6.55	6.00	6.50	6.50	6.61
<i>SD</i>	2.50	1.76	2.55	1.77	2.36	1.79

* Social Dysfunction

3.1.6 Asthma Severity

3.1.6.1 *Functional severity of asthma*

A modified version (5 of 6 items) of the Asthma Functional Severity Scale (Rosier et al, 1994) was included in both the original and current study as part of the Demographics Questionnaire (questions 5-9) to assess the degree of a child's Functional Asthma Severity. Comparison of mean scores of functional asthma severity at Time 1 and Time 2 indicates a substantial reduction in asthma severity from Time 1 to Time 2. Means and standard deviations for the current study's asthma group at both Time 1 and Time 2 are presented in Table 12.

Table 12

Means (M) and Standard Deviations (SD) for Functional Asthma Severity

Asthma Group (n= 26)	<i>M</i>	<i>SD</i>
Time 1	8.27	4.07
Time 2	3.19	2.93

3.1.6.2 *Physician rated asthma severity*

Associate Professor Nicholas Freezer (Department of Respiratory Medicine - Monash Medical Centre) provided a rating of asthma severity for children in the asthma sample whose parents gave consent for him to complete the Physician Questionnaire

($n=11$) for the current study). Ratings for the same measure from Time 1 were compared to current ratings. Based on Associate Professor Freezer's ratings for the current research, 5 children were reported to have mild asthma, 6 to have moderate asthma, and no child was rated as having severe asthma. In contrast, ratings for asthma severity on the same group of children at Time 1 were almost exclusively ($n=10$) severe (rating of 3); missing data on this question for one child precluded complete comparative analysis. See Table 13 below.

3.1.6.3 *Parent rated asthma severity*

The Demographics Questionnaire included an item (Q10) that asked if the participant's child had a diagnosis of asthma. The following question (Q11) asked parents who responded yes to question 10 to indicate the severity of their child's asthma using a rating scale of mild, moderate or severe. Comparison of parent ratings to Associate Professor Nicholas Freezer's ratings of asthma severity in the current study showed similarities. The same rating was allocated for 7 children, while for 2 children Associate professor Nicholas Freezer gave a higher rating than the parent (moderate) and for 2 other children he gave a lower rating than the parent (mild). Neither rater allocated a severity rating of severe in any case. Comparison of parent and physician ratings from the original study (Time 1) shows some disparity. Of the 11 participants whose asthma severity ratings were analysed, all but one (which was due to missing data) had a physician asthma severity rating of severe. Parents of the same children rated 4 as having mild asthma, 6 as having moderate asthma, and only one as having severe asthma. Comparisons of parent and physician ratings for the 11 participants for which both were completed in the current study are presented in Table 13.

Table 13

Parent and Physician Ratings of Child Asthma Severity (n=11)

	Parent Rating Time 1	Parent Rating Time 2	Physician Rating Time 1*	Physician Rating Time 2
Asthma Severity				
Mild	4	7	0	5
Moderate	6	4	0	6
Severe	1	0	10	0

* n=10

3.2 Statistical Analyses

3.2.1 Data Screening and Assumption Testing

Descriptive statistics and frequencies relating to the current sample were generated in SPSS and were used to screen the data and check for errors. No values were identified as out of range and means and standard deviations were within expected ranges. Great care was taken during the data collection process, as such there was no missing data.

As many of the statistical techniques the researcher considered using assumed a normal distribution of scores on the dependent variable, normality, linearity and homoscedasticity were assessed using the Explore and Descriptive Statistics procedures in SPSS. Results from these preliminary analyses indicated that assumptions of normality, linearity and homoscedasticity were often violated, with sample distributions on many variables being skewed. This finding was expected to some degree given the nature of the measures used in this research. Many of the questions were susceptible to socially desirable responses. For example, questions regarding parenting style and behaviour in the PPS questionnaire were quite transparent in their aim and might make it difficult for some parents to answer in a way that they believed may suggest their parenting is questioned. This issue also applies to the completion of other questionnaires used, for example reporting severe depression or somatisation in the GHQ, and representing negative features about one's child in the BASC are all likely to be minimised to some degree by participants. Furthermore, and perhaps most importantly, the current sample was not a clinical sample. Participants were representative of the general community, and as such it is

not surprising that there were few high scores on items such as those in the GHQ. Finally, the small sample size also may have impacted on the distribution of all scores.

In spite of violations of assumptions of normality, many statistical procedures could have been statistically justified, however given various violations were across the board and may have impacted on almost all analyses, it was decided (with advice from a senior statistician) that performing non-parametric statistical analyses that do not require that these assumptions are met would allow for greater confidence in the validity of results.

All statistical analyses were run with the matched sample ($N=44$) and an amended sample ($N=43$) which excluded one case because it presented as an outlier or extreme outlier in the distribution of scores on some measures.

3.2.2 Bivariate Analysis

As noted above, all statistical analyses were run with the matched sample ($N=44$) and an amended sample ($N=43$). Except where otherwise discussed, removal of this case had no impact on results. Only one analysis used the complete sample of participants who completed and returned questionnaires ($N=51$). This analysis related to Hypothesis 3 (changes in asthmatic status over time) and was necessary to identify changes in group status (i.e. control & asthma groups). As noted earlier, 7 cases in this sample were not used in other analyses to allow for a match sample comparison with the baseline data.

The Wilcoxon Signed Ranks Test (non-parametric alternative to a Paired-samples *t*-test) was used to test if there was a change in participants' anxiety and somatisation scores from Time 1 to Time 2. It was hypothesised that levels of child anxiety and somatisation, as measured by the BASC would have decreased over time (Hypotheses 1 & 2). Comparisons of scores for anxiety between the two time points indicated that there was a statistically significant difference between children's anxiety scores at Time 1 and Time 2. However, Hypothesis 1 was not supported as the direction of the difference was contrary to expectation, with anxiety scores being higher for the current research (Time 2) than the previous study (Time 1) $z = -2.961, p = .003$. Findings pertaining to changes in somatisation scores from Time 1 to Time 2 (Hypothesis 2) also failed to support the research hypothesis. Although there was a difference between children's somatisation scores from Time 1 to Time 2, this difference was not statistically significant ($z = -.703, p > .05$). Results suggested a similar trend to that of the anxiety scores, with the difference indicating that levels of somatisation increased (although only very slightly) at Time 2 (current research).

Examination of sample characteristics revealed a decline in the number of children with a diagnosis of asthma. The initial sample comprising all participants who completed questionnaires ($N=51$) was divided into a control group who were not diagnosed with asthma, and a group who were diagnosed with asthma. The number of children in the asthma group declined over time from 32 to 27 between baseline (Siddons, 2004) and follow-up. Three males and two females diagnosed with asthma in the baseline sample were no longer diagnosed with asthma at the time of the current study. In comparison, only one child who was initially in the control group developed the illness between the two time points. This trend in the change of asthmatic status was further explored using a chi-square

analysis to check sample frequencies in group categories. Results indicated that the change in sample proportions in each group over time was significant, [χ^2 (1, $N=51$) =24.66, $p<001$], and supported the research expectations that the number of children with a current diagnosis of asthma would have decreased over time (Hypothesis 3).

The Mann-Whitney Test (a non-parametric alternative to an Independent-samples t -test) was used to determine any differences in levels of anxiety for children with and without asthma. It was expected that children with asthma would have higher levels of anxiety than children without asthma (Hypothesis 4). Results of the Mann-Whitney Test varied depending on the inclusion and exclusion of extreme outliers ($n=1$). Although a difference in levels of anxiety between the two groups (children with asthma and controls) was evidenced, the statistical significance of this difference at the .05 level differed according to this sample amendment. In the complete sample ($n=44$) results indicated that children with asthma were reported to have statistically significant higher levels of anxiety than children without asthma $z = -2.674$ $p=.007$. In the amended sample which excluded an extreme outlier, ($n=43$) this trend remained the same, $z = -2.536$ $p<.05$.

Spearman's Rank Order Correlation (ρ) was used as a non-parametric alternative to Pearson's Product moment Correlation (r) to test four research hypotheses. This analysis was used to explore the strength of relationships between child anxiety and asthma severity (Hypothesis 5), child anxiety and child somatisation (Hypothesis 6), child anxiety and protective parenting (Hypothesis 7), and child anxiety and parental adjustment (Hypothesis 8).

Asthma severity was expected to be positively associated with child anxiety (Hypothesis 5). Asthma severity was determined by three measures, Physician Rated Asthma Severity, Parent Rated Asthma Severity, and Functional Asthma Severity (as determined by parent's responses to the 5-item Rosier scale). Correlations for each were run separately (See Table 14). Asthma Severity (irrespective of rater or scale used) was not significantly correlated with child anxiety (Parent rated asthma severity: $\rho = .17, n=26, p>.05$; Physician rated asthma severity: $\rho = .17, n=11, p>.05$; Functional Asthma Severity: $\rho = .007, n=26, p>.05$).

Table 14

Spearman's Rank Order Correlation Coefficients (ρ) Between Child Anxiety, Asthma Severity, Somatisation, and Parental Adjustment for Asthma Group ($n=26$).

Variable	Child Anxiety
1. Physician Rated Asthma Severity ($n=11$)	.17
2. Parent Rated Asthma Severity ($n=26$)	.17
3. Functional Asthma Severity ($n=26$)	.007

Child somatisation was also expected to be associated with child anxiety (Hypothesis 6). Results supported this hypothesis with a large, positive correlation between the two variables ($\rho = .59, n=44, p<.001$). See Table 15.

Protective parenting was another variable that was expected to be associated with child anxiety (Hypothesis 7). Analysis yielded non-significant results ($\rho = .195$, $n=44$, $p > .05$).

Parental adjustment was expected to be associated with child anxiety (Hypothesis 8). Parental adjustment, as measured by the GHQ, was found to be significantly correlated with child anxiety, supporting the research hypothesis. Correlations were run for all four subtests of the GHQ (as well as the GHQ total score) and child anxiety. This thorough analysis allowed for an in depth understanding of the results. The correlation between child anxiety and the Total GHQ score was highly significant ($\rho = .48$, $n=44$, $p < .001$). Further analysis revealed that the primary contributing subtest to this total score correlation was the GHQ Anxiety subtest score. The correlation between the GHQ Anxiety score and child anxiety was also statistically significant ($\rho = .395$, $n=44$, $p = .008$). Of all the other subtests in the GHQ, only the Somatic scale was significantly correlated with child anxiety ($\rho = .388$, $n=44$, $p = .009$; $\rho = .344$, $n=43$, $p = .024$). Depression and Social Dysfunction subtest scores were not correlated with child anxiety. See Table 15 for all subtests correlations.

Table 15

Spearman's Rank Order Correlation Coefficients (rho) Between Child Anxiety, Somatisation, and Parental Adjustment for complete sample (n=44.)

<i>Variable</i>	<i>Child Anxiety</i>
<i>1. Somatisation</i>	<i>.59**</i>
<i>2. Protective Parenting</i>	<i>.195</i>
<i>3. Parental Adjustment- GHQ Total</i>	<i>.48**</i>
<i>4. GHQ – Anxiety Scale Score</i>	<i>.395**</i>
<i>5. GHQ – Somatisation Scale Score</i>	<i>.388**</i>
<i>6. GHQ- Depression Scale Score</i>	<i>.290</i>
<i>7. GHQ- Social Dysfunction Scale Score</i>	<i>.118</i>

*** p<.05*

Wilcoxon's Signed Ranks Test was used to determine any difference between parent and teacher perceptions of child anxiety. It was hypothesised that there would be a difference between parent and teacher perceptions of child anxiety with parents being more likely to report higher levels of child anxiety (Hypothesis 9). When the complete sample was analysed ($n=30$ – based on children for whom both a parent and teacher rated BASC was returned), results failed to indicate a significant difference between parent's and teacher's ratings of child anxiety $n=30$, $z = -1.823$, $p>.05$. However, when the amended sample was analysed ($n=29$ – based on removal of the extreme outlier) results suggested there was a significant difference between parents and teachers ratings of child anxiety ($z = -2.236$, $n=29$, $p<.05$). Despite these discrepant findings, the overall trend identified did support the research hypothesis because parent's mean rank ratings of child anxiety were

higher than teacher's. When the control and asthma groups were individually analysed more complex findings emerged. Although the asthma group comprised 26 participants, only 16 had BASC Teacher Rating forms completed and returned. Similarly, the control group comprised 18 participants, but only 14 had BASC-TRS. Results from the control group indicated that the difference in parent and teacher ratings was statistically significant with parents' reports of anxiety resulting in a higher mean rank than teachers. ($z=-2.043$, $n=14$, $p<.05$). However, although the same trend was identified with the asthma group ($z=-6.92$, $n=16$, $p>.05$), the result was not significant.

Although the factor that provided the largest contribution to sample attrition was recruitment based (inability to establish contact), investigation into other possible explanations for non-participation were undertaken. Statistical analyses were used to compare those who did and did not complete the second study to look for differences among them. Independent samples t-tests were run to compare mean scores of the two groups (those who participated in the study at Time 1 only (Group A) and those who participated in the study at both Time 1 and Time 2 (Group B) on key variables (anxiety, somatisation, the GHQ total score, the GHQ subtest scores, and the PPS). Levene's test for equality of variances indicated that the variation of scores for both groups was the same for each analysis.

BASC Anxiety: Results indicated that there was no significant difference in scores between Group A ($M=8.03$, $SD=4.82$), and Group B [$M=7.61$, $SD=5.18$; $t(101)=.424$, $p=.67$].

BASC Somatisation: There was no significant difference on scores between Group A ($M=3.54$, $SD=3.32$), and Group B [$M=3.84$, $SD=3.09$; $t(101)=-.465$, $p=.64$]. GHQ Total

Score: There was no significant difference on scores between Group A (M= 19.98, SD=9.40) Group B [M=18.18, SD= 8.30; $t(101)=1.01$, $p=.31$]. GHQ Somatic Complaints: There was no significant difference on scores between Group A (M= 6.19, SD=3.95) Group B [M=5.07, SD= 3.34; $t(101)=1.51$, $p=.13$]. GHQ Anxiety: There was no significant difference on scores between Group A (M= 5.95, SD=3.795) Group B [M=56.20, SD= 2.99; $t(101)=-.370$, $p=.71$]. GHQ Social Dysfunction: There was no significant difference on scores between Group A (M= 6.69, SD=2.34) Group B [M=6.20, SD= 2.46; $t(101)=-1.03$, $p=.31$]. GHQ Depression: There was no significant difference on scores between Group A (M= 1.15, SD=2.72) Group B [M=.70, SD= 2.35; $t(101)=-.875$, $p=.38$]. PPS: There was no significant difference on scores between Group A (M=30.14, SD=5.78) Group B [M=29.36, SD= 7.60; $t(101)=-.588$, $p=.59$].

Examination of frequencies and descriptive analyses of Group A and Group B on other categorical variables (e.g. parent and physician ratings of asthma severity, and demographic information) did not suggest any differences across the two groups. For example, the dispersion of physician rated asthma across the three severity categories (mild, moderate, severe) was similar across both groups, with both groups having more children rated as having severe asthma than mild or moderate. Asthma status was however identified as a possible differentiator as there were more participants whose children had asthma in Group A (n=39) than Group B (n=26). However there were also more asthma free children in Group A (n=20) than Group B (n=18). Chi-square test for independence was run to explore the relationship between Group A and Group B regarding asthma status, to determine if there were similar proportion of people who had children with asthma that participated in at Time 1 only and those that also participated Time 2. Results indicated that

the proportion of children with asthma did not significantly differ across Group A (66.1%) and Group B (59.1%), $X^2(1, N=103) = .27, p > .05$.

Additional analyses were considered appropriate to explore any relationship between the time of the child's diagnosis with asthma and their scores on the anxiety and somatisation scores, as well as their parent's scores on the parental adjustment and protection questionnaires (GHQ & PPS). These analyses were executed to explore the possibility that the stress of a recent diagnosis may have impacted on the results. Analysis of the difference in the time between receiving the diagnosis of child asthma and participating in the research at time 1 failed to show any evidence of a link. Some participants completed the study questionnaires only a few months after diagnosis and reported low levels of child anxiety, parental anxiety, and adjustment, while others completed the questionnaire several months after diagnosis and reported higher levels of child and parent anxiety. Spearman's Rank Order Correlation analysis showed no significant relationships between time of diagnosis and any of the main variables. Refer to Table 16 below for correlation coefficients.

Table 16

Spearman's Rank Order Correlation Coefficients (rho) Between the Key Research Variables and Time of Asthma Diagnosis.

<i>Variable</i>	<i>Time of Asthma Diagnosis</i>
<i>BASC anxiety</i>	<i>.204</i>
<i>BASC somatisation</i>	<i>-.058</i>
<i>GHQ total score</i>	<i>-.152</i>
<i>GHQ somatic complaints</i>	<i>-.039</i>
<i>GHQ anxiety</i>	<i>-.282</i>
<i>GHQ depression</i>	<i>-.073</i>
<i>GHQ social dysfunction</i>	<i>-.043</i>
<i>PPS</i>	<i>.088</i>

p>.05 for all variables

A correlation coefficient was calculated for asthma status (the independent variable) and parent anxiety (mediator) as part of testing for potential mediation. Results indicated that the independent variable and the mediator were not significantly correlated ($\rho = -.018$, $n = 44$, $p > .05$).

3.2.3 Multivariate Analyses

A one-way between-groups multivariate analysis of variance (MANOVA) was performed to investigate group (Asthma & Control) differences in anxiety and somatisation, to further elucidate findings from the Wilcoxon Signed Ranks Tests used to determine changes over time in anxiety and somatisation for the entire sample (Hypotheses 1 & 2). A MANOVA was considered acceptable to perform on the current sample despite concerns regarding normality as it is robust to such violations (Pallant, 2001). Results failed to show a statistically significant difference between the asthma and control groups on anxiety and somatisation $F(2,41) = .186, p=.831$; Pillais Trace = .009.

3.2.4 Regression Analyses

A standard multiple regression was performed to evaluate the predictive power of the three independent variables (somatisation, parental protection, and parental adjustment) for which significant correlations with child anxiety had been identified (Hypotheses 6, 7, & 8). Given findings from the correlation analyses performed with the various subtests of the GHQ, the multiple regression was performed using the GHQ Anxiety Scale.

Results suggested that the independent variables accounted for a significant proportion of the variance in child anxiety ($R^2 = .428$; Adjusted $R^2 = .386$; $F(3,40) = 9.99, p < .001$). Furthermore, results indicated that child somatisation made the strongest unique, significant contribution to explain child anxiety ($\beta = .485, t = 3.606, p = .001$), and that only parental anxiety significantly added to the predictive power of the model. These

findings are consistent with results from correlation analyses discussed earlier. A summary of findings is presented in Table 17.

Table 17
Summary of Multiple Regression Analysis for Variables Predicting Child Anxiety (N=44)

Independent variable	<i>B</i>	<i>SE B</i>	β	<i>T</i>	Sig. (<i>p</i>)
BASC Somatisation Scale	1.50	.416	.485	3.606	.001
GHQ Anxiety Scale	.855	.300	.347	2.846	.007
Parent Protection Scale	.024	.274	.012	.087	.931

4 DISCUSSION

4.1 Overview of Research Aims and Summary of Findings

The primary aim of this research was to examine changes in anxiety and somatisation over time in a group of children with and without asthma using baseline data from an earlier study (Siddons, 2004). It was hypothesised that:

- 1) Levels of child anxiety in both child samples (children with asthma and controls) at Time 2 would be lower than at Time 1 (Hypothesis 1).
- 2) Levels of somatisation in both child samples (children with asthma and controls) at Time 2 would be lower than at Time 1 (Hypothesis 2).
- 3) The number of children with a current diagnosis of asthma would have decreased over time (Hypothesis 3).

Results from the statistical analysis conducted indicated that children's anxiety scores increased over time from Time 1 (original study) to Time 2 (current study). As such, although there was a significant difference between children's anxiety scores at the two time points, findings were contrary to expectations and therefore failed to support Hypothesis 1. Results for changes in levels of somatisation also indicated a trend that was inconsistent with research expectations. Results failed to support Hypothesis 2 as there was a small non-significant increase in levels of somatisation from Time 1 to Time 2. Changes over time in participant group status (i.e. asthma status) suggested that there was a decline in the number of children with asthma, with some children who had a diagnosis of asthma at Time 1 being asthma free by Time 2. Results indicated that the difference in the group

proportions between both time points was statistically significant, and therefore provided support for Hypothesis 3.

The second aim of the study was to examine the contribution of five variables to child anxiety (asthma status, asthma severity, child somatisation, protective parenting, parent adjustment). It was hypothesised that;

- 4) Children with asthma would have higher levels of anxiety than children without asthma (Hypothesis 4).
- 5) Asthma severity would be positively associated with child anxiety (Hypothesis 5).
- 6) Child somatisation would be associated with child anxiety (Hypothesis 6).
- 7) Protective parenting would be associated with child anxiety (Hypothesis 7).
- 8) Parental adjustment would be associated with child anxiety (Hypothesis 8).

Expectations that children with asthma would have higher levels of anxiety than children without asthma were statistically supported. Asthma severity was expected to be positively associated with child anxiety however results failed to indicate a significant correlation therefore failing to support Hypothesis 5. Child somatisation was also expected to be associated with child anxiety. Results supported this expectation thus providing support for Hypothesis 6. Protective parenting was another variable that was expected to be associated with child anxiety. Analysis yielded a non-significant result thus failing to support Hypothesis 7. Parental adjustment was also expected to be associated with child anxiety. Results showed that there was a significant correlation between the two variables, thus supporting Hypothesis 8.

As well as providing a longitudinal aspect through a follow-up data collection this study also extended the research questions from the original study. An additional informant (child's teacher) was used to report on the children's anxiety and thus allowed for a comparison with parental reports of child anxiety. The third aim of the current research was to investigate if there were any differences between parent and teacher reports of child anxiety. Specifically, it was hypothesised that:

9) There would be a difference between parent and teacher perceptions of child anxiety, with parents being more likely to report higher levels of child anxiety (Hypothesis 9).

Results again varied depending on inclusion or exclusion of outliers in the analysis. When the complete sample was analysed results failed to indicate a significant difference between parent and teacher ratings of child anxiety. However, upon removal of the extreme outlier the difference in ratings was significant. Interestingly, the overall trend was consistent with research expectations as parent mean rankings of children's anxiety were higher than teachers. As such, findings showed support for research hypothesis 9.

4.2 Prevalence and Changes in Levels of Anxiety and Somatisation

Anxiety is a universal emotion and human reaction. Although it can manifest as an unwelcome, negative experience (Reber, 1995), it is often successfully managed by people and used as protective or survival tool (House & Stark, 2002). Thus, differentiating between normal or even useful anxiety and pathological anxiety is crucial in psychological assessment and treatment. Although research indicates that anxiety decreases over time and with age, it also suggests that once anxiety is experienced by an individual, they are likely to experience it again to some degree.

Direct comparisons on the prevalence of anxiety and somatisation between this study and the original research (Siddons, 2004), is somewhat limited due to minor differences. Given that the sample of children used were in two different age categories according to the BASC questionnaires, items compared were not identical. Despite this inconsistency, the essence of the scales remained a measure of anxiety (with 9 out of 11 items on the anxiety scale, and 6 out of 8 items on the somatisation scale being identical) and so it was considered reasonable and valid to compare the two.

It was hypothesised that anxiety levels would have decreased in the current study (Time 2) since the original study (Time 1). However, it is not altogether surprising that the opposite was evidenced. Given that the children in the sample were in the first half of primary school it is plausible to expect that the school experience itself presented increased situations of anxiety provoking material and increased potential for separation anxiety. Research has evidenced this tendency with school age children having been found to be

concerned about their competence at school (Bernstein et al., 1996). Furthermore, research has also indicated that school age children's fears are mostly related to school, peers, and health related issues (Bell-Dolan, 1990). As such, the inclusion of children with asthma may have further impacted on this study. In general it is acknowledged that chronically ill children have more to deal with (e.g. medication, increased amount of doctor's appointments, concern for health). Also, chronic illness has been linked with decreased school attendance (Sawyer & Fardy, 2003). These variables (primary school age group and living with asthma) are likely to have influenced findings in the current study regarding the progression of anxiety.

Somatisation or physical expression of negative emotions like anxiety is common in young children (Masi et al., 2000). Presentations of physical symptoms like sweating, vomiting or pain, can be signs of anxiety in children (Winnicott, 1987). As discussed at greater length earlier, this expression of anxiety may be due various reasons, including children's limited capacity for verbal expression or difficulty identifying and describing their emotions (Masi et al., 2000; Masi et al., 1999). As noted earlier, anxiety is generally understood to decrease with time and age. Based on the well established association between anxiety and somatisation it was expected that somatisation, along with anxiety in the sample of children would decrease from Time 1 to Time 2. As with findings relating to anxiety, this was not the case. Levels of somatisation increased across the board (i.e. total sample, asthma group & control group). This outcome may add further weight to the association between these two variables (anxiety & somatisation) in young children as it seems to illustrate that the progression of somatisation is in-line with that of anxiety.

Investigation regarding a change in the trend of participant's at-risk-levels for anxiety and somatisation was also limited due to sample attrition. In the original study, Siddons (2004) identified 34% of their sample as being at-risk for anxiety while only 11.7% of the current sample met this criterion. Similarly, a larger proportion of the original sample was identified as at-risk for somatisation (29%) than for the current study (17.6%). Comparison of these levels appears to suggest that anxiety and somatisation are established in an individual's psychosocial make-up early in life and symptoms lie dormant or decrease with age. However, given that the contribution of the scores from children included at Time 1 but not Time 2 is unknown, this suggestion is purely speculative and would require further investigation.

4.2.1 Association between Somatisation and Child Anxiety

One of the difficulties when anxiety in children is considered is that identification is often complicated because children's presentation of anxiety can be different to adult anxiety; for example: nightmares, fear of the dark, somatic complaints (Bell-Dolan et al, 1990; Mindell & Barrett, 2002; Reynolds & Kamphaus, 1992). Somatic expressions of anxiety may occur in children because of their limited language skills or their own uncertainty about their emotions (Masi et al., 2000). Despite the reasons for somatisation not being clearly established prevalence is clear. Research has consistently reported widespread somatic complaints among children (Beidel et al., 1991; Hodges et al., 1985; Last, 1991; Livingston et al., 1988; Walker & Greene, 1989; Wasserman et al., 1988). Some research has suggested that experiencing somatic complaints can result in levels of psychological distress that are akin to those experienced by children with physical health

problems (Walker & Greene, 1989). Furthermore, support for a correlation between childhood anxiety and somatisation has been demonstrated empirically (Reynolds & Kamphus, 1992; Siddons, 2004). Siddons (2004) demonstrated that a significant proportion of the children with clinical levels of anxiety also had clinical levels of somatisation. Results from the current study supported past research suggesting an association between child anxiety and somatisation in that a positive, medium correlation between child somatisation and child anxiety was found. Results of the regression analysis contributed further support for an association between these two variables, with child somatisation making the strongest unique contribution to the variance in child anxiety. Such consistency in empirical findings suggests that these two variables are intimately tied in childhood. As such, identification and assessment of somatic symptomology should be considered as a part of any assessment of anxiety in children. A correlation between anxiety and somatisation was tested for and found to be moderate ($\rho = .59$). Multicollinearity was not present according to the criterion of $r = .9$ and above, as identified by Pallant (2001).

4.3 Asthma and Anxiety in Young Children

4.3.1 Diagnosis of Asthma

Asthma prevalence rates on a worldwide scale are at high levels. Australia has one of the highest prevalence rates with more than 2.2 million Australians, or over 10% of the population, living with the illness (ACAM, 2005; Asthma Victoria, 2007). Many of the Australians affected by asthma are children, making it the most common childhood chronic illness. In addition to the physical / organic vulnerability these children possess due to their illness, some research suggests that they may also have an increased vulnerability to psychological problems (Bennett, 1994; MacLean et al., 1992; McQuaid et al., 2001; Sawyer, et al., 2001). In particular, research has indicated that this potential vulnerability relates to children with asthma having more internalising behavioural problems such as anxiety (Bennett, 1994; MacLean et al, 1992).

The impact of a chronic illness such as asthma on children's quality of life has also shown to be substantial with research finding associations with sleep disturbance, decreased school attendance, and reduced involvement in sports and other activities (Lenny et al., 1994; Sawyer & Fardy, 2003). Asthma has also been identified as the leading cause for childhood hospitalisations (NAC, 2008). Health status has also been implicated as having a role in the way children express anxiety. Research has suggested that children living with a chronic illness such as asthma have an increased tendency to express their emotions as physical symptoms (Adams et al., 2002; Last, 1991; Reynold & Kamphus, 1998; Tonge, 1994).

Findings from the current research showed that children with asthma had higher levels of anxiety than children without asthma. The results supported research expectations and were consistent with some past research that has shown that children with asthma do have higher levels of anxiety (MacLean et al., 1992; McQuaid et al., 2001; Siddons, 2004). Furthermore, the current research found that children with asthma had higher levels of somatisation. Some explanations for this finding seem obvious. Children living with asthma have a number of associated pressures and responsibilities relating to their illness. For example, they have medication that they and / or their families need to manage, more medical appointments and investigations, and increased levels of hospitalisations compared to children without asthma. Children with asthma also have an additional burden to bear at school which is directly related to their illness. For some children this relates to medication, while for all children Victorian / Australian standards require an Asthma Action Plan to be in place.

The mechanism of any association between asthma and anxiety, or other psychological problems, is unknown. Further investigations of the role of psychosocial, medical, genetic, environmental and familial variables may provide insight into this aspect of the subject. It is possible that the association between asthma and anxiety is influenced by genetic factors. In particular, it may be influenced by a predisposition to allergic disorders as parental history of atopy or allergy has been identified as a risk factor for the development of childhood asthma (NAC, 2006). The previously evidenced strong link between asthma and allergy (NAC, 2006), may be suggestive of genetic influence on the development of asthma and also highlights the possibility of a genetic role in the development of anxiety in people with asthma.

The role that genetic factors may play in the development of anxiety should be considered. Research has suggested that an individual's genetic make-up can be a significant contributor to the development of anxiety disorders (Eley, 2001; Eley & Gregory, 2004). Given the associations evidenced between asthma and anxiety or mental illness (e.g. Goodwin, Jacobi, & Thefeld, 2003), it is possible that there is a genetic link to both. Goodwin & Buka (2008) state that much of the research findings to date "cumulatively support the hypothesis that there may be a shared vulnerability to respiratory abnormalities associated with both anxiety and respiratory disease" (Goodwin & Buka, 2008, p. 774). Their study found that childhood respiratory disease was associated with an elevated risk of anxiety disorders in adulthood.

A recent study examined the association between Post Traumatic Stress Disorder (PTSD) and asthma in adults with an attempt to determine if the association is due to genetic and / or environmental influences (Goodwin, Fisher, & Goldberg, 2007). Their results did confirm the association between PTSD and asthma in their sample, however this association remained even after adjusting for genetic and other potential confounding factors. This study demonstrated that this association was not primarily explained by genetic variables. As such, further research on the potential role of genetics and environmental influences on this association would be beneficial

The impact of asthma on children's academic experience presents another area for concern. In Australia child asthma related emergency department visits increase by more than 50% in the weeks after the beginning of each school term (ACAM, 2005). Although this trend has been explained in terms of increased exposure to respiratory infections, as

discussed in the introduction, it is also possible that school related anxiety plays a role in the reported increased visits to emergency departments.

In addition to the above, and as discussed in more detail in the introduction, children with a chronic illness such as asthma are often characterised as vulnerable children by their parents. As discussed earlier, this can also result in increased parental anxiety which in turn is picked up by the child, contributing to their own anxiety. This potential mediator model (i.e. That parental anxiety acts as a mediating variable in the relationship between child asthma and child anxiety) was statistically evaluated. The first condition for mediation as stipulated by Baron and Kenny (1986) is that the independent variable and the potential mediating variable are correlated. As asthma status (the independent variable) and parent anxiety (potential mediating variable) were not significantly correlated this first condition was not met and therefore mediation could not be present. As such, no further testing was conducted.

4.3.2 Asthma Severity

Given that asthma severity is usually defined in terms of mild, moderate or severe ratings of asthma symptoms, this type of classification was used in this study. However, given past controversy regarding the definition of asthma and these severity classification (Creer, 1982), some measures were taken to address potential issues regarding accuracy of ratings. Firstly, three measure of asthma severity were used: parent rating, physician rating, and the Rosier Scale. The same physician was used to ensure consistency in rating with the

original study. Results indicated that asthma severity was not associated with child anxiety. This finding is consistent with those reported by Siddons (2004) in that, no significant correlations were identified between parent rated asthma severity and child anxiety, physician rated asthma severity and child anxiety, or the Rosier Scale asthma severity and child anxiety. One possible reason for this finding in the current study was the very small samples within each group (Parent Rating: $n=26$; Physician Rating: $n=11$; Rosier Scale: $n=26$). Also, the sample of children with asthma was not truly representative of the child asthma population, as it was very small and did not include the entire range of asthma severity (i.e. no cases of severe asthma were identified by either parent or physician raters).

These findings regarding severity of asthma are consistent with results from the original study and other research on asthma severity which has failed to find any relationship between the two variables (Bender et al., 2000; Kashani et al., 1988; MacLean et al., 1992). However, results in this area have been inconsistent as some past research has reported a relationship between asthma severity and level of child anxiety (Klinnet et al., 2000; Sawyer et al, 2001; Wamboldt et al., 1996 & 1998). A possible explanation of the results obtained by this research is that it may simply be that it is the mere presence or absence of the illness that impacts on levels of anxiety. For example, it may not matter how often medication is required nor the type of medication required, but simply the fact that it is required. Another example, may be that rather than the frequency of episodes (it may not matter if someone has episodes of asthma one or two times a year or several times a year), what is important is that there is always the potential for the illness to manifest.

Despite inconsistencies in evidence for a relationship between asthma severity and anxiety / psychological adjustment, the possibility of this association should not be completely dismissed. The implications of such a relationship add further support for careful psychological screening of chronically ill children including children with asthma.

4.4 Parenting and Child Anxiety

The parent-child, and in particularly the mother-child, relationship has been implicated in the development of child anxiety (Bowlby, 1969; Hudson & Rapee, 2001; Rapee, 1997, 2001). Parental psychological adjustment and overprotective parenting have been identified as having particular influence (Abidin et al., 1992; Thomasgard, 1998, Shainir-Essakow et al., 2005). These variables were considered in the current research to investigate the stability of findings by Siddons (2004) and the implications for future research.

4.4.1 The Role of Protective Parenting

Protective parenting styles have been associated with child behavioural problems, particularly child anxiety (Patterson, 1982; Rapee, 1997, 2001; Stark et al., 1990). As discussed in the introduction, various theoretical explanations have been considered and researched, however the concept of the vulnerable child syndrome (Green & Solnit, 1964; Thomasgard & Metz, 1995) seems particularly relevant to the current study given the focus on the role of asthma in child anxiety. Although empirical studies have produced mixed findings on the role of child chronic illness in parental over-protection (Parker & Libscome, 1981; Thomasgard, Metz et al., 1995; Thomasgard & Metz; 1997; Thomasgard, Shonkoff et al., 1995), results from the study by Siddons (2004) suggested the value of a longitudinal investigation. In her study Siddons (2004) found that children with asthma had higher levels of anxiety than children without asthma. Furthermore, a trend for an association between child anxiety and protective parenting was also evidenced. However, results obtained in the current analyses regarding protective parenting failed to identify a

significant correlation between protective parenting and child anxiety. In considering these findings, it should also be acknowledged that one of the disadvantages of non-parametric statistics is that they tend to be less sensitive than parametric tests and as such may not always detect differences between groups that actually do exist (Pallant, 2001). However, results from the multiple regression analysis were consistent with this finding and did not identify protective parenting as a significant contributor to the variance in child anxiety. Interestingly, comparisons of mean scores suggest that protective parenting increased over time since the original study and the means for the asthma groups at both time points were higher than for the control groups.

It is also possible that this measure was particularly susceptible to socially desirable responding given the context of the study. Given that research aims were transparent and some previous participants declined to participate again because they felt they were “going to be blamed for their children’s problems”, it is likely that some participants minimised their behaviours that they believed could be associated with anxious parenting. This alone would have a significant impact on the results.

4.4.2 The Role of Parental Adjustment

Research has shown substantial support for an association between parental anxiety (in particularly maternal anxiety) and child anxiety (Beidel & Turner, 1997; Bernstein et al., 2005; Manassis & Hood, 1998; McClure et al., 2001; Shainir-Essakow et al., 2005). However, Siddons (2004) failed to find an association between parental adjustment and child anxiety.

Parent adjustment was measured using the GHQ in both the current study and the original study. The original study used the total GHQ score while the total score as well as individual scores for each subtest were used in the current research. Results suggested that parental adjustment was significantly correlated with child anxiety. This relationship was first analysed using the total GHQ score, however it was determined that the GHQ anxiety scale was the strongest contributor of the four GHQ subscales to the GHQ total score. This research provided support for anxiety as a major contributing factor to parental adjustment. Furthermore, the relationship between the GHQ Anxiety (i.e. parent anxiety) and the BASC-Anxiety score (i.e. child anxiety) was highly significant.

Again the inclusion of a chronically ill sample of children may have influenced results as parents of chronically children have been identified as being at higher risk for increased stress than parents of relatively healthy children (Kazak, 1989). However, as highlighted earlier, children with asthma in the study were categorised as having only mild or moderate asthma, and the parents involved were not a clinical sample.

4.5 Informant Differences

4.5.1 Differences between Parent and Teacher Ratings of Child Anxiety

Given that in both clinical and research settings information regarding children is likely to be sourced from parents, teachers or other adults involved in their care, the issue of accuracy in reporting is a relevant concern. Previous research has suggested that informant differences in reports regarding children are high (Achenbach, et al., 1987; DiBartolo & Grills, 2006; Smith & Prior, 1995; Walton et al., 1999; Zbikowski & Cohen, 1988). In their study examining child resilience, Smith and Prior (1995) compared parent and teacher reports and found teachers rated child behaviour more positively than mothers. In their interpretation of this finding the authors acknowledged that this may have been a reflection of the children actually functioning better in the school environment. In other research using parent and teacher reports as well as child self-reports, Brook (1996) found low congruence among all informants. Interestingly, reports regarding anxiety estimates showed higher parent – child congruence than teacher – child congruence. This finding may indicate that parents have a better overall understanding of their child’s emotional life; however it could also suggest that parent concerns and perceptions are more easily identified with by the child.

Most previous research on informant differences seems to implicate parents, and particularly mothers, as reporting more problems with their children than teachers and clinicians (Klennert et al., 2000; Smith & Prior, 1995; Zbikowski & Cohen, 1988). Results from the current study are consistent with this trend of a difference between parents and teachers in reports of child anxiety. Based on previous research (Klennert et al., 2000;

Smith & Prior, 1995; Zbikowski & Cohen, 1988) it was hypothesised that parents would provide higher ratings of child anxiety than teachers. This trend was also evidenced in the current study. However, the difference was only significant when the amended sample without outliers was analysed.

Comparisons between parent and teacher ratings of anxiety for the asthma group showed that the mean rankings of child anxiety from parents were higher than from teachers; however this difference was not significant. This result may suggest that reports from both informants were perhaps quite accurate. Comparisons for the control group showed the same trend with parent's ratings being higher than teacher's, but for the control group this difference was statistically significant. This difference in finding between the asthma and control group may be due to teacher's being more focused on chronically ill children and as such allowing greater identification of internalising behaviours. It is also possible that the difference between parent and teacher reports of child anxiety were not significantly different in the asthma group because chronically ill children may display more consistent behaviours, including their expression of anxiety. As discussed in the introduction this consistency may be as a result of their being more attuned to their physical sensations than their relatively healthy peers.

Another possible explanation for these findings is that parent's perceptions of vulnerability and anxiety are heightened, especially in the case of the asthma sample. It is also possible that teachers could compare the children to their peers and identify potential concerns and a baseline or normal anxiety in the age group. However, it may be that the children simply displayed different behaviours in the school setting. Another plausible

explanation is that with student numbers increasing in most schools in today's academic environment, teachers are more pressured in the classroom and less attuned to individual students and so missing signs of anxiety and somatisation. Interestingly, Murdock, Robinson, Adams, Berz, and Rollock (2009) found that family-school connections were related to school-related psychological functioning of children with asthma. The researchers analysed data from 45 parent-child dyads with children diagnosed with asthma living in urban, low-income neighborhoods. Results indicated an association between higher parent confidence in the school and lower child school anxiety. Also, lower levels of parent participation in the school were linked with increased depressed mood in some children. This research highlights the potential importance family-school connections may have in the promoting better school, health and quality of life outcomes in children with asthma.

4.6 Case Studies

Three cases were selected for discussion to provide a more detailed and individual account and highlight some changes over time. The cases were selected based on their scores falling in the at-risk or clinical levels on one or more of the measures. The real names of the children used in these accounts were changed to fictitious names. It is clinically relevant that each of the children in these cases has had a diagnosis of asthma.

4.6.1 Case Study 1: Sarah

Sarah is a 101 month old girl born in Australia who had been diagnosed with asthma and was included in the asthma group of both the current and original studies. Sarah's mother completed the questionnaires relating to both herself and Sarah for this research. Sarah's mother provided consent for her daughter's school teacher to participate in the study by completing the teacher BASC questionnaire, however she did not forward consent for Associate Professor Freezer or a family doctor to complete the Physician Questionnaire because Sarah's asthma was apparently no longer managed by a physician.

Sarah's mother's reports yielded the highest BASC Parent Rated Anxiety score and second highest BASC Parent Rated Somatisation score of the entire sample. Interestingly, ratings provided by Sarah's teacher indicated much lower levels of anxiety and somatisation, even when compared to teacher rated BASC means. Sarah's mother's reports on the GHQ yielded the highest total score, and highest sub tests scores for the somatisation, anxiety, and equal highest score with one other participant on the depression subtest. These results are somewhat consistent with reports from the original study in 2004.

Sarah's scores across the board were much higher than the sample means in both the original and current studies. She received the highest functional asthma severity rating (14) while the sample mean was $M=1.8$ with a standard deviation of $SD= 2.6$. The second highest score was 6, so there was a large difference from the mean and the rest of the group. This result was particularly surprising given her parent rated asthma severity was moderate. Furthermore, her mother reported that Sarah was no longer under medical management and that she reported that her asthma was "managed most of the time".

See Table 18 below for all of Sarah's scores.

Table 18

Comparison of Sarah's scores to the complete sample (N=44)

Measures	Sarah's Raw Scores	Sample Mean Score & Standard Deviation
Current BASC - PRS Anxiety	26*	9.4 (5)
Current BASC - PRS Somatic	11**	4 (3)
Teacher Rated BASC Anxiety	1	4 (4)
Teacher Rated BASC Somatic	1	1.5 (2)
Current PPS score	41	34 (5)
Current GHQ Total	48*	17 (9)
Current GHQ somatic	15*	4.8 (3)
Current GHQ anxiety	16*	5 (4)
Current GHQ social	9	6.5 (2)
Current GHQ depression	8*	.70 (2)
Previous BASC - PRS Anxiety	12	7.6 (5)
Previous BASC - PRS Somatic	14*	4 (3)
Previous PPS score	40	29 (8)
Previous GHQ Total	58	18 (8)
Previous GHQ somatic	17*	5 (3)
Previous GHQ anxiety	13*	6 (3)
Previous GHQ social	13*	6 (2)
Previous GHQ depression	15*	.70 (2)

* indicates highest scores in sample

** indicates second highest score in sample

4.6.2 Case study 2: Michael

Michael is an 89 month old boy who has been diagnosed with asthma and was included in the asthma groups of both studies. Michael's mother completed the questionnaires and reported that he was born in Australia. Michael's mother provided consent for her son's school teacher to participate in the study and complete the BASC-TRS questionnaire, however she did not forward consent for Associate Professor Freezer or a family doctor to complete the Physician Questionnaire because he was no longer under medical care for his asthma.

Michael's scores on the BASC-anxiety scale were the second highest in the sample. This result is consistent with reports from the previous study when his scores were the highest. His scores on the somatisation scale of the BASC however were lower although they were above the current study mean. Interestingly, Michael's teacher's responses to the BASC yielded opposite findings, as his BASC-TRS anxiety score was quite low, while his BASC-TRS somatisation score was the shared highest. This result regarding somatisation is consistent with his somatisation score in the original study but the difference in informant reports gives weight to the concerns regarding informant differences and accuracy of reports. Michael's mother's responses also resulted in the second highest score for protective parenting via the PPS. This result 'stood out' because all his other scores were close to sample means.

See Table 19 below for all of Michael's scores.

Table 19

Comparison of Michael's scores to the complete sample (N=44)

Measures	Michael's Raw Scores	Sample Mean Score & Standard Deviation
Current BASC - PRS Anxiety	22**	9.4 (5)
Current BASC - PRS Somatic	7	4 (3)
Teacher Rated BASC Anxiety	2	4 (4)
Teacher Rated BASC Somatic	6*	1.5 (2)
Current PPS score	43**	34 (5)
Current GHQ Total	20	17 (9)
Current GHQ somatic	6	4.8 (3)
Current GHQ anxiety	8	5 (4)
Current GHQ social	6	6.5 (2)
Current GHQ depression	0	.70 (2)
Previous BASC - PRS Anxiety	26*	7.6 (5)
Previous BASC - PRS Somatic	10**	4 (3)
Previous PPS score	36	29 (8)
Previous GHQ Total	14	18 (8)
Previous GHQ somatic	5	5 (3)
Previous GHQ anxiety	4	6 (3)
Previous GHQ social	5	6 (2)
Previous GHQ depression	0	.70 (2)

* indicates highest scores in sample

**indicates 2nd highest score in sample

4.6.3 Case Study 3: James

James is a 104 month old boy who has been diagnosed with asthma and was included in the asthma group of both studies. James's mother completed the questionnaires and reported that he was born in Australia. James's mother provided consent for James's teacher to participate in the study and complete the BASC-TRS questionnaire, however she did not forward consent for Associate Professor Freezer or a family doctor to complete the Physician Questionnaire because his management of asthma was undertaken by his parents. As such, she completed the Physician Questionnaire herself. James's score on the BASC-PRS anxiety scale was above the mean and was consistent with his score in the original study. However, his score on the somatisation scale of the BASC-PRS was the highest in the sample. Comparatively, his teacher rated BASC-somatisation score was low (0) as was his previous score (1). This difference in rater reports again highlighting informant differences. Most of James's other scores were only slightly above the means, except for the PPS which was comparatively high. Also, his mother's responses on the GHQ yielded the shared highest score for social dysfunction. This score appears to have been as a result of moderate ratings on items relating to decision making, usefulness, satisfaction with tasks, and length of time completing tasks. Despite this relatively high score, her total on this subscale did not indicate cause for concern, nor did her overall GHQ score. In terms of changes over time, James's scores across the board were higher for the current study than in the original. This may be suggestive of the pressures of school, especially in chronically ill children, but also may be indicative of family issues given the increase in some of his mother's GHQ scores. See Table 20 below for all of James' scores.

Table 20

Comparison of James's scores to the complete sample (N=44)

Measures	James's Raw Scores	Sample Mean Score & Standard Deviation
Current BASC - PRS Anxiety	14	9.4 (5)
Current BASC - PRS Somatic	16*	4 (3)
Teacher Rated BASC Anxiety	3	4 (4)
Teacher Rated BASC Somatic	0	1.5 (2)
Current PPS score	41	34 (5)
Current GHQ Total	21	17 (9)
Current GHQ somatic	5	4.8 (3)
Current GHQ anxiety	4	5 (4)
Current GHQ social	11*	6.5 (2)
Current GHQ depression	1	.70 (2)
Previous BASC - PRS Anxiety	12	7.6 (5)
Previous BASC - PRS Somatic	1	4 (3)
Previous PPS score	37	29 (8)
Previous GHQ Total	6	18 (8)
Previous GHQ somatic	1	5 (3)
Previous GHQ anxiety	3	6 (3)
Previous GHQ social	2	6 (2)
Previous GHQ depression	0	.70 (2)

* indicates highest scores in sample

4.7 Implications of the Research Findings

Previous research has suggested that somatisation may be an expression of anxiety for some children (e.g. Masi et al., 1999; Masi et al., 2000, Siddons, 2004). The current study provides further support for this contention, as once again anxiety was significantly correlated with somatisation. Given that previous studies have established a link between somatisation and chronic illness in children (Adams et al., 2002; Last, 1991; Reynolds & Kamphaus, 1998; Tonge, 1994), the focus on asthma in these two studies may influence this finding to some degree. It may suggest that the association between somatisation and anxiety found in these two studies was confounded by the inclusion of children with asthma. Despite this possibility the consistent finding across both studies is valuable to this area of research. Further research investigating the relationship between anxiety and somatisation in chronically ill children, as well as their comparatively well peers would be a positive addition to the knowledge base.

Results from the current research indicate that parental adjustment, and in particular, parental anxiety is a strong predictor of anxiety in children. Although analyses yielded mixed results regarding protective parenting, its role in child anxiety could not be completely dispelled. These findings highlight the role of parental psychosocial variables in child anxiety.

Findings from this study also highlight the complexity of assessment of childhood anxiety. Information regarding health status, physical complaints/ somatisation, and family / parental psychosocial issues may play a contributing role in child anxiety. Differences in

informant reports regarding children are now well established in research and again evidenced in this study. Despite any trend relating to the inconsistencies per se (i.e. whether parents do or do not report more problems than other informants), the true issue seems to be that agreement about child behaviour is low. Findings from this research support the possibility that child behaviour is situation specific, however more research in this area is required. Also, future studies should take this issue into account in their methodology as discussed further below.

Given the increased levels of anxiety in the children with asthma in both the current and the original study, past recommendations by Siddons (2004) to screen children with asthma for anxiety are reinforced. This recommendation may be applicable to all children living with a chronic illness.

4.8 Methodological Considerations

Certain limitations of the current study require consideration when interpreting the research findings. Primarily limitations related to recruitment and sample size which had a direct impact on the statistical analyses.

4.8.1 Sample Attrition

One of the key methodological concerns of the current research was sample attrition. The original study comprised 103 participants. The final sample number of 51 for the current study fell far short of statistical projections based on previous longitudinal studies. The primary issue faced was establishing contact with previous participants. Many of the numbers and addresses provided from the previous researchers were outdated or incorrect at the time of the current data collection. Various resources were utilized in attempts to locate participants. Internet searches of address and telephone listings in the white pages, electoral role searches, and confirming patients details with Monash Medical Centre's records for participants whose children had asthma, were all attempted. Although these methods were helpful in a few cases, primarily they failed to assist in discovery of the location of many participants. Of the original 103 participants contact details were only resourced for 72 people. On reflection it seems that the initial contact phase of a letter by the previous researchers requesting consent to telephone contact also impacted on recruitment. Of the 103 letters sent (from the previous researchers) 36 were responded to, 31 consenting to further contact, while 5 declined consent to further contact. A large number of letters were not responded to or returned to sender (67). Although, other measures were used to obtain current contact details telephone numbers were only

resourced for 41 of the 67 people. This time consuming effort resulted in the attainment of 72 telephone contact details which allowed for direct explanation of the study and request of current address details and sending of the consent forms and questionnaires. Of the 72 people with whom telephone contact was established 21 declined requests to participate or after receiving the information withdrew from the research, or never returned the questionnaires. The most common reason cited for not participating was limited time availability, however 4 people with whom the study was discussed over the telephone expressed concern regarding the nature of the project and commented that after completing the previous questionnaires they had as if the study was searching for a way to blame parents for their children's emotional problems. Another issue was that most people agreed to participate only via mail but then failed to return the questionnaires. Follow-up phone calls were made to these participants requesting return of the forms and even offering to pick them up in person at a convenient time. Many people still failed to return the questionnaires even after several reminder calls. To illustrate how complicated this procedure became, one person requested continued reminder calls, e.g. "please call me tomorrow to remind me" at each reminder call. Eventually, after several calls and after offering to pick it up this case was abandoned and ultimately no questionnaire was ever received. Some parents refused to consent to teacher or doctor contact expressing concern for their child standing out yet again. One mother said with her child's asthma and allergies he was already conspicuous in the classroom and to his teacher and she did not want to draw further attention to him or his problems.

The issue of attrition is a recognised difficulty of longitudinal research. The attrition rate for longitudinal studies can vary significantly. Pfeifer (1989) found highly variable

attrition rates in follow-up studies, however, of the 30 studies considered, 63% had retention rates over 75%. Other studies have shown even lower attrition rates (Aduato, Alper & Heenehan, 2003; Cotter, Burk, Loeber & Navratil, 2002; Vandeer-Stoep, 1999).

4.8.2 Self Report Measures

Another methodological consideration is the use of self-report measures. Such measures present possible limitations due to respondents answering in a social desirable manner, and/or having difficulty recollecting past information regarding their behaviour, thoughts or emotions. They also present limitations in terms of being influenced by a respondent's psychological state at the time of completion, which may not necessarily be a true reflection of their more consistent thoughts, behaviour, and emotions.

As discussed earlier, a few participants from the original study declined participation in the current research based on their experiences of completing questionnaires. Some reported feeling that the questionnaires were transparent in their attempts to measure parenting psychological issues.

The potential for socially desirable responses, especially given the nature of the relationship investigated (parent / child), must be considered. Future similar studies or follow-ups could include a social desirability scale to measure any such effects and the use of other sources of information (discussed further below) may be beneficial in combating this problem.

Due to the internal and subjective nature of anxiety, parent / teacher reports are a limited resource anyway. As such, the importance of direct assessment of the child is encouraged. As Bernstein et al. (1996) highlight “because of the subjective nature of anxiety symptoms, it is important to include measures that assess through the child or adolescent viewpoint” (Bernstein et al., 1996, p. 1114). This statement highlights the importance of childhood issues being assessed via a variety of methods and instruments, including; self-report measures, parental report measures, and diagnostic interview (Bernstein et al., 1996).

Another potential problem with utilising self report measures in this type of research is that it relies on participant’s ability to recollect information accurately for retrospective items/ measures.

The use of the BASC questionnaires was appropriate in this study as it allowed for a longitudinal investigation regarding parental reports of child anxiety. However, with the introduction of an additional informant, some limitations may have also been introduced. The parent and teacher BASC forms differed on a number of items as they each refer to situation specific behaviours – i.e. teachers are asked to report on behaviour relating to school. As such, informants were not reporting on the same things, which could account for the differences in reports of child anxiety and somatisation. This is a noteworthy limitation, and should be contemplated when considering the implications of the study’s findings. However, it is also important to note that the BASC questionnaires were designed to be used together as a complimentary system of assessing behaviour. As previously noted, each of the BASC forms can be used in the assessment of the generalised areas of interest

(anxiety and somatisation for the current research). Importantly, given that the additional perspectives of child anxiety span different settings, obtaining information from both BASC forms provides enhanced understanding of the child's overall adjustment.

Another limitation of the current study was the use of the same informant, the mother, for the report of their child's anxiety and their own. This method may have affected the outcomes of the study. It is possible that the parent's emotional and psychological state influenced their observations and interpretation of their child's behaviour and emotions. For example, an anxious and / or depressed informant may be more likely to view their child's behavior in a negative way.

4.8.3 Generalisation of Study Results

As in the original study, generalisation of the research findings may be limited because the sample was not totally representative of the general population. In the initial study (Siddons, 2004) children with asthma were recruited from one physician in one clinic and so treatment and medical management were relatively homogenous. However, given that many of children with asthma in the current sample were no longer active patients of Associate Professor Freezer and were instead in the care of a family physician and or monitored by their parents, this issue was not as relevant in the current study.

It should also be noted that the BASC PRS and TRS ask participants to report on the "past 6 months". As such, consideration regarding the time frame of data collection is required. In general, parents and teachers were commenting on roughly the same period. As

described in the Method section, as soon as parental consent to send the BASC-TRS to the teacher was received (sent via mail together with the BASC-PRS), the teacher forms were sent to be completed. As such, there would have been approximately a lag of one to four weeks. However, not all participant forms were collected in a sixth month period. As previously outlined, data collection spanned over approximately a two year period. The implications of this should be considered, as the children and parents were not being compared on the same period of time in their lives. The challenge of administering all questionnaires to all participants in the exact same period was substantial given that this follow-up research was not forecasted, and that recruitment was extremely difficult. Unfortunately, potential limitations from this methodological process could not be avoided. However, the comparisons are still considered to be valid, relevant and insightful as they provide information on the changes in group trends and differences in individual cases.

4.9 Recommendations

Perhaps one way of preventing some of the difficulties with sample attrition faced in this research is with planning in advance for the potential of another future study. That may include requesting participants to sign up from the beginning to potential future follow-up components of study (of course with option to withdraw at any time). Also, particular care in documentation of participant contact details (especially for student research) is necessary. All documents and resources used in recruitment should perhaps be safeguarded by the supervisor in case future contact with any participant is required, even if not for a follow up study.

With regard to the area of research investigated in this thesis, it is recommended that any similar future research aim to improve sample representation. One way to achieve this may be to recruit children with asthma from different treatment sources / centres. This would allow for better representation of children with asthma, and also provide improved application of results.

The use of another informant provided insightful advantage to this research, however did not allow for a complete and thorough exploration of child anxiety. The inclusion of another measure, for example child self-report questionnaire, interview and or observation, would provide valuable information in the identification, assessment, and measurement of child anxiety levels. Finally, it is strongly believed that the inclusion of a social desirability measure in similar future research would be extremely beneficial.

The uncertainty of the direction of any relationship between asthma and child anxiety has been highlighted by this research. As noted previously, it is possible that a child's diagnosis with asthma leads to parental anxiety, and the parental anxiety in turn leads to child anxiety. Although the proposed mediation model was not statistically upheld when applied to the current data and sample, it is recommended that future research investigate this further.

4.10 Summary and Conclusions

The current research sought to investigate changes over time in anxiety and somatisation in young children with and without asthma. In doing so, it contributed to research on the topics of childhood asthma, childhood chronic illness, childhood anxiety, and parental factors associated with each. The use of the same sample that participated in the previous study has contributed a longitudinal aspect to the existing knowledge in this area. Comparison of consistencies and inconsistencies in findings over time has enhanced understanding of the dynamics involved in families dealing with childhood asthma. This information is useful in providing a more complete picture of the child's life and the effects of asthma on child adjustment (particularly regarding anxiety and somatisation).

The use of a teacher as an informant was also valuable because it highlighted differences in perceptions of the child's behaviour. Such differences may have been due to environmental factors or issues more closely related to parental bias, fear, or embarrassment or situation specific behaviour. Continuing research in this area with larger samples would help elucidate some of the inconsistencies in the current research on these issues.

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Appendices

Appendix A Behavioural Assessment System for Children - Parent Rating Scale-child version (BASC – PRS-C)

Appendix B Behavioural Assessment System for Children - Teacher Rating Scale-child version (BASC - TRS-C)

Appendix C Parent Protection Scale (PPS)

Appendix D The General Health Questionnaire – 28 (GHQ-28)

Appendix E Demographics Questionnaire (DQ)

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Appendix A

BASC – PRS-C

Appendix B

BASC - TRS-C

Appendix C

Parent Protection Scale (PPS)

Appendix D

The General Health Questionnaire – 28 (GHQ-28)

Appendix E

Demographics Questionnaire (DQ)

Appendix F

Physician Questionnaire (PQ)

Physician Questionnaire

Child: _____

Consultant: _____

1. Does the child still fulfill the criteria for a diagnosis of asthma?
 Yes- Please answer questions 2-8.
 No – No need to proceed.
2. Severity of the child's asthma:
 Mild
 Moderate
 Severe
3. Age (months) when first diagnosed: _____
4. Please indicate reported symptoms when not medicated:
 Persistent cough
 Shortness of breath
 Wheezing
 Waking at night with cough or wheeze
 Other (please specify) _____
5. Reasons for current consultation: _____
6. Please indicate (i) Number of consultations to date: _____
(ii) Frequency of consultations: _____
7. Prescribed medication (dosage and type): _____
8. Please indicate how well the child's asthma is currently managed:
 Poorly managed
 Managed less often than not
 Managed about half the time
 Managed most of the time
 Completely managed

Appendix G

Introductory letter to participants of the original study

Appendix H

Consent to Contact Teacher Form

Victoria University

PO Box 14428
MELBOURNE VIC 8001
Australia

Telephone:
(03) 9919 2397

Facsimile:
(03) 9919 2218

Email:
Sandra.Lancaster@vu.edu.au

School of Psychology
Professor Sandra Lancaster

Convenor, Doctor of Psychology (Clinical)

Director, Psychology Clinic

St Albans Campus

McKechnie Street
St Albans

Consent to contact Teacher

Dear **Mr/Ms** **(teacher)**

As the parent/guardian of**(participant**
child's name) I give my consent for you to complete the enclosed form (BASC)
regarding my child.

Name of School / Kindergarten:

School Address:

Parent's Name (printed)

Signature

Date

Researcher's Name (printed)

Signature

Date

Appendix I

Letter to Teacher

Victoria University
PO Box 14428
MELBOURNE VIC 8001
Australia

St Albans Campus
McKechnie Street
St Albans



School of Psychology
Professor Sandra Lancaster
Convenor, Doctor of Psychology
Director, Psychology Clinic (Clinical)
Telephone: (03) 9919 2397

Facsimile:
(03) 9919 2218
Email:
Sandra.Lancaster@vu.edu.au

(Date).....

Dear(teacher's name)

The family of one of your pupils,(child's name) is participating in a project being conducted by Michelle Popovski and Professor Sandra Lancaster through Victoria University. This project, which is part of a Doctor of Clinical Psychology degree, is looking at child behavioural adjustment.

The parent/guardian of(child's name) has given permission for you to complete the enclosed questionnaire regarding their child. I have also enclosed their signed consent form. Could you please return the completed form in the reply paid envelope.

Thanking you for your time,

Michelle Popovski, Doctor of Clinical Psychology student

Professor Sandra Lancaster, Clinical Psychologist

Appendix J

Physician Consent Form

Victoria University

PO Box 14428
MELBOURNE VIC 8001

St Albans Campus

McKechnie Street
St Albans



Physician consent form

Dear **Dr**

As the parent/guardian of(**participant child's name**) I give my consent for you to complete the enclosed form (Physician Questionnaire) regarding my child.

Parent's Name (printed)

Signature

Date

Researcher's Name (printed)

Signature

Date

Note: All parties signing the Consent Form must date their own signature.

Appendix K

Participant Information and Consent Form

Southern Health

Participant Information and Consent Form

Version 1.4 Dated 07-09-2005

Site 1.0 Monash Medical Centre

Full Project Title: **Changes in anxiety and somatisation in young children with and without asthma.**

Principal Researcher: Professor Sandra Lancaster

Associate Researcher(s): Ms Michelle Popovski

Associate Researcher: Associate Professor Nick Freezer

This Participant Information and Consent Form is 6 pages long. Please make sure you have all the pages.

1. Your Consent

You are invited to take part in this research project which is a follow-up of the study conducted by Dr Heather Siddons and Professor Sandra Lancaster in 2002. This Participant Information and Consent form contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.

You will be given a copy of the Participant Information and Consent Form to keep as a record.

2. Purpose and Background

The purpose of this project is to follow up and extend the previous research which looked at factors associated with anxiety in young children with and without a diagnosis of asthma. Previous research has indicated that anxiety is often higher in children with a chronic illness. This follow-up study has been developed by Ms Michelle Popovski who is undertaking her Doctor of Psychology degree at Victoria University under the supervision of Professor Sandra Lancaster.

We would like to invite you to participate in this research project because we would like to build on the information provided by you and other parents (102) in the previous study and to see if there are changes as the children become older.

3. Procedures

The researchers of the previous study (Dr Heather Siddons & Professor Sandra Lancaster) have contacted everyone that participated in the previous research by mail, advising them of the follow-up study and requesting their participation. So that we can study changes over time we need to obtain current information from the parents who were involved in the previous study.

Participation in this project will involve completion of 5 questionnaires, signing this consent form, and signing one, (or two if your child has asthma), other forms giving consent for the researcher to contact your child's teacher and doctor (if your child has asthma), requesting they complete a questionnaire. These consent forms will be included with a letter (copies included) to the teacher/ doctor. The teacher will not be advised of your child's asthma status; they will only be informed that your family is participating in a project looking at child behavioural adjustment.

The length of time it takes to complete the questionnaires and consent form will vary between individuals, however based on the experience from the previous study, it is estimated that most participants will require 30-45minutes to complete the questionnaires.

4. Possible Benefits

Possible benefits include;

- Contribution to existing knowledge in this area

Given that the parents in this study were also involved in the original study, the researchers will be able to identify and explore any changes in the children's anxiety over time (and through important events such as commencement of school / pre-school). The information provided from teachers will assist in the understanding of the children's school experience.

- A better understanding of anxiety in young children

More recent parental reports will increase understanding about anxiety in children and how the way they express it may change over time. The teacher's perspective is also important as some children may behave differently in the school setting.

- A better understanding of families dealing with childhood asthma

The use of information provided by the teachers, and the analysis of changes in parental reports since the original study will help to highlight consistencies and inconsistencies in findings and will enhance understanding of the dynamics involved in families living with childhood asthma.

As with most research the expected benefits from this research project are more likely to benefit children and families in the future than those who are taking part in this project. We cannot guarantee or promise that you will receive any benefits from this

project. Benefits of the study are indirect and will come by increasing professional knowledge and therefore will benefit future patients.

5. Possible Risks

There are no known risks associated with this study. As we wish to look at change over time the questionnaires are ones that you have already completed in the previous study. However, if for any reason you felt upset by any of the questions and/or wished to talk to a health professional we would provide you with some referral options.

6. Privacy, Confidentiality and Disclosure of Information

Your name (and that of your child) will be removed from the questionnaires and replaced by a code. The information provided will then be entered into a computer and the questionnaires filed in a locked filing cabinet in Professor Sandra Lancaster's office. As specified in university regulations this data will be kept for a period of 7 years. Only Professor Sandra Lancaster and Michelle Popovski will have access to this data. Information will be disposed of after 7 years – questionnaires will be shredded and computer files deleted. Any information we collect about you or your child will remain confidential except as required by law, including situations where your child's safety may be at risk.

Participants will be asked if they would like to receive information on the results of the study during the telephone conversation with the researcher. Participants who would like this information will be added to a mailing list and sent a summary of findings and results on completion of the project. A submission for publication of the research findings and results of this study to a peer reviewed journal will be made.

In any publication, and in the summary of findings made available to participants, information will be provided in such a way that you and your child cannot be identified. Results will be reported to indicate group trends and no names or other identifying information will be used.

7. Further Information or Any Problems

If you require further information or if you have any problems concerning this project you can contact one of the researchers. The researchers responsible for this project are:

Name: Professor Sandra Lancaster

Business Hours: 99192397

Email: Sandra.Lancaster@vu.edu.au

Fax: 9919 2218

Name: Michelle Popovski

Phone: 0418 518 828

Email: michelle.popovski@research.vu.edu.au

8. Other Issues

Complaints

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

Ms Malar Thiagarajan

Executive Officer,

Southern Health Human Research Ethics Committee,

Ph: 9594 3025

Or

Associate Professor Ross Williams

Chair Victorian University Human Research Ethics Committee

Telephone: 9688 4590

9. Participation is Voluntary

Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.

Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your routine treatment, your relationship with those treating you or your relationship with Monash Medical Centre.

Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

If you decide to withdraw from this project, please notify a member of the research team who will ask you to complete the Revocation of Consent Form before you withdraw.

10. Ethical Guidelines

This project will be carried out according to the *National Statement on Ethical Conduct in Research Involving Humans* (June 1999) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethical aspects of this research project have been approved by the Human Research Ethics Committee of Southern Health.

Victoria University Human Research Ethics Committee has also approved all ethical aspects of this research.

Victoria University

PO Box 14428
MELBOURNE VIC 8001
Australia

St Albans Campus

McKechnie Street
St Albans

Southern Health



Consent Form

Version 1.4 Dated 07-09-2005

Site 1.0 Monash Medical Centre

Full Project Title: Changes in anxiety and somatisation in young children with and without asthma

I have read and I understand the Participant Information version **1.4** dated **07-09-2005**.

I freely agree to participate in this project according to the conditions in the Participant Information and Consent Form.

I will be given a copy of the Participant Information and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

Participant's Name (printed)

Signature

Date

Name of Witness to Participant's Signature (printed)

Signature

Date

Researcher's Name (printed)

Signature

Date

Note: All parties signing the Consent Form must date their own signature.

Victoria University

PO Box 14428
MELBOURNE VIC 8001
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St Albans Campus

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St Albans

Southern Health



Revocation of Consent Form

Full Project Title: **Changes in anxiety and somatisation in young children with and without asthma.**

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise any treatment or my relationship with Monash Medical Centre or Southern Health.

Participant's Name (printed)

Signature

Date